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TAXONOMIC REVISION OF THE CRETAN FAUNA OF THE GENUS *TEMNOTHORAX* MAYR, 1861 (HYMENOPTERA: FORMICIDAE), WITH NOTES ON THE ENDEMISM OF ANT FAUNA OF CRETE

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Abstract.— We revise the Cretan species of the ant genus *Temnothorax* Mayr, 1861. Sixteen species are recognized, including seven new species which are possiblyendemic to Crete: *T. crassistriatus* **sp. nov.**, *T. daidalosi* **sp. nov.**, *T. ikarosi* **sp. nov.**, *T. incompletus* **sp. nov.**, *T. minotaurosi* **sp. nov.**, *T. proteii* **sp. nov.**, and *T. variabilis* **sp. nov.** A new synonymy is proposed, *Temnothorax exilis* (Emery, 1869) =*Temnothorax specularis* (Emery, 1916) **syn. nov.** An identification key to Cretan *Temnothorax*, based on worker caste is given. We provide a checklist of ant species described from Crete and discuss their status, distribution and endemism.

Key words.— Key, checklist, Myrmicinae, new species, Mediterranean Subregion, new synonymy

INTRODUCTION

Crete is the fifth largest island in the Mediterranean Sea and the biggest island of Greece. It's situated on the southernmost part of the Aegean Sea, with an area of 8400 km^2 (Vogiatzakis *et al.* 2008). The landscape is mountainous, defined by 15 high mountain ranges crossing from west to east, three of them exceeding 2000 m of altitude. The main island is also surrounded by about 36 larger or smaller offshore islets. The mountains create huge regional variations in Crete's Mediterranean climate, with rain-excesses and rain shadows. In general, aridity increases from west to east and from north to south. Annual precipitation ranges from about 240 mm in the south-east to at least 2000 mm in the high White Mountains range (Lefka Ori) (Grove *et al.* 1993). Temperature on mountains seems to fall at a rate of about 6°C per 1000 m (Rackham & Moody 1996). Above 1600 m most of the precipitation falls as snow that covers the ground from late October until May (or locally even July). The high mountains are limestone. Crete shows significant temperature gradients in west-east and north-south directions (Vogiatzakis *et al.* 2008).

Crete, next to Cyprus, is one of two large Mediterranean islands that has not been subject of intense myrmecological studies. Almost all knowledge of myrmecofauna of this island comes from papers published before World War II, including faunistic notes (Lucas 1854, Forel 1886, 1889, 1910, Emery 1894, 1921, 1925, Müller 1923, Santschi 1927a, Stitz 1928) and

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a few descriptions of new, mostly endemic, taxa (Forel 1886, 1889, 1910, Emery 1894, 1906, 1908a, 1908b, Karavaiev 1912, 1927, Santschi 1929). Consequently, they do not take into account many taxa that have been divided into groups of species as a result of modern revisions. In recent years we have observed an increase in myrmecological research worldwide, including Crete as a study target, and they are mainly regional checklists (Legakis 2011, Borowiec & Salata 2012, 2013), and modern revisions (Radchenko 1997, Boer 2013, Borowiec & Salata 2014a, Csősz *et al.* 2015, Salata & Borowiec 2015a, 2017).

Based on literature, 106 ant species were recorded from Crete (Legakis 2011, Borowiec & Salata 2012, 2013, Csősz *et al.* 2015, Salata & Borowiec 2015a, 2017, 2018). There are 20 taxa described from Crete, among which 7 have an endemic status (Appendix 1). Except one *Lasius* species, all valid endemic Cretan species are members of the subfamily Myrmicinae. The highest number of endemics belongs to *Aphaenogaster* (3 species). Other endemic species are members of *Temnothorax* (1), *Monomorium* (1) and *Oxyopomyrmex* (1) respectively. Nevertheless, our study shows that there is at least one more endemic species of Formicinae subfamily as well: *Cataglyphis cretica* (Forel, 1910), which is currently considered as a junior synonym of *C. aenescens* (Borowiec & Salata 2013). The degree of endemism of Cretan myrmecofauna was estimated by Legakis (1983) at 16%. Nevertheless, in the same study, only 45 ant species were considered as present on Crete. Legakis & Kypriotakis (1994) published a review of endemic Cretan flora and fauna showing that 56% of all endemic animals were found in mountainous areas, a fact mainly attributed to the complex geological history of the island. A more recent study (Triantis & Mylonas 2009) indicated that land snails endemism can reach up to 50%. These results have shown that myrmecofauna of Crete is poorly investigated and needs more detailed study.

Material and data collected between 2007 and 2014, contributed to confirm that the species diversity of Cretan ants ant fauna is rich and comprises several undescribed, and probably endemic species. Below we present a review of Cretan species of the genus *Temnothorax*. Distribution and biology of nine known species are discussed and seven species are described as new to science. As Cretan populations of a few wide distributed species differ from these known from other Mediterranean regions, we decided to redescribe also *T. exilis*, *T. recedens* and *T. semiruber*.

Material and methods

Most of the material was sampled between 2007 and 2014 from sites in different parts of Crete. The main method was a direct sampling (hand collecting). Individual specimens and nests were collected on the ground, in leaf litter and rock rubble, under stones and tree trunks. This method was occasionally supplemented by litter sifting and collecting material with an entomological umbrella. All specimens were preserved in 75% EtOH. Study was supported with material deposited in the Natural History Museum of Crete (University of Crete, Heraklion) and the collection of G. Bračko (Ljubljana, Slovenia). All studied type specimens of taxa mentioned in differential diagnoses or characteristics are listed in the Appendix 2. Examined specimens are housed in the following collections:

BMNH – Natural History Museum, London;
CASC – California Academy of Sciences, San Francisco, California, USA;
DBET – Department of Biodiversity and Evolutionary Taxonomy, University of Wrocław, Poland;
DSAB – Dipartimnto di Scienze Agrarie, Universita di Bologna, Bologna, Italy;
GBC – G. Bračko collection, Ljubljana, Slovenia;
HNHM – Hungarian National History Museum, Budapest, Hungary;
MHNG – Museumd'Histoire Naturelle,Geneva, Switzerland;
MNHN – Muséum National d'Histoire Naturelle, Paris, France;
MNHW – Museum of Natural History, University of Wrocław, Wrocław, Poland;
MSNG – Museo Civico di Storia Naturale, Genova, Italy;
MZLS – Museum of Zoology, Lausanne, Switzerland;
NHMB – Naturhistorisches Museum Basel, Switzerland;
NHMC – Natural History Museum of Crete, University of Crete, Heraklion;
UASK – Institute of Zoology, National Academy of Sciences of Ukraine, Kiev;
ZMHB – Museum für Naturkunde, Zentralin-stitut der Humboldt-Universität, Berlin, Germany.

Moreover, to determine a distribution range and a morphological variability of all Cretan populations we compared them with material collected from other Greek regions. Data concerning samples used in the comparison is provided in series of regional checklists (Borowiec & Salata 2012, 2013, 2014b, 2017a, b, 2018a, b, Bračko *et al.* 2016). Therefore, we see no reason to repeat this information.

Specimens were compared using standard methods of comparative morphology. Photos were taken using a Nikon SMZ 1500 stereomicroscope, Nikon D5200 photo camera and Helicon Focus software. All given label data are in original spelling, presented in square brackets; a vertical bar (|) separates data on different rows and double vertical bars (||) separate labels. Images of type specimens are available online on

AntWeb (www.AntWeb.org) and are accessible using the unique specimen identifier, CASENT or FOCOL.

Pilosity inclination degree applies to this used in Hölldobler & Wilson (1990). The adpressed (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.

Measurements

EL – eye length; measured along the maximum vertical diameter of eye;
EW – eye width; measured along the maximum horizontal diameter of eye;
HL – head length; measured in straight line from mid-point of anterior clypeal margin to mid-point of posterior margin in full-face view;
HTL – hind tibia length; maximum length of hind tibia;
HW – head width; measured in full-face view directly above the eyes;
ML – mesosoma length; measured as diagonal length from the anterior end of the neck shield to the posterior margin of the propodeal lobe;
PEH – petiole height; maximum petiole height the chord of ventral petiolarprofile at node level is the reference line perpendicularto which the maximum height of petiole is measured;
PEL – petiole length; measuredfrom anterior corner of subpetiolar process to dor-so-caudal corner of caudal cylinder;
PNW – pronotum width; maximum width of pronotum in dorsal view;
PPH – postpetiole height; maximum height of the postpetiole in lateral viewmeasured perpendicularly to a line defined by thelinear section of the segment border between dorsaland ventral petiolar sclerite;
PPL – postpetiole length; measured in lateral view perpendicular to the straight section of lateral postpetiolar margin;
PPW – postpetiole width; maximum width of postpetiole in dorsal view;
PSL – propodeal spine length; measured from the center of the propodeal spiracle to the top of the propodeal spine in lateral view;
PW – petiole width; maximum width of petiole in dorsal view;
SDL – spiracle to declivity length; minimum distance from the center of the propodeal spiracle to the propodeal declivity;
SL – scape length; maximum straight-line length of scape.

Indices

HI – HW/HL * 100;
SI1 – SL/HL * 100;
SI2 – SL/HW * 100;
MI – HTL/ML * 100;
EI1 – EW/EL * 100;
EI2 – EW/HL * 100;
TI – HW/HTL * 100;
PI – PL/PH * 100;
PPI – PPL/PPH * 100.

Abbreviations

q. – gyne;
w. – worker;
m. – male.
HC – hand collecting;
EU – entomological umbrella;
LS – litter sifting.

We list all other ant species collected from the same localities as species new to science. In our opinion it provides valuable information about ecosystem structure and species diversity characteristic for habitats preferred by these species. Maps were created in DivaGis 7.5 (Hijmans *et al*. 2011).

Results

Family **Formicidae** Latreille, 1809

Subfamily **Myrmicinae** Lepeletier, 1835

Tribe **Crematogastrini** Forel, 1893

Genus ***Temnothorax*** Mayr, 1861

Temnothorax Mayr, 1861 is one of the most numerous ant genera in the Mediterranean Region (Prebus 2015). The most recent catalogue (Bolton 2018) lists 271 Palearctic taxa, among which 186 are known from Mediterranean (Borowiec 2014, Csősz *et al*. 2015, Salata & Borowiec 2015, Radchenko *et al*. 2015, Galkowski & Lebas 2016, Galkowski & Cagniant 2017, Sharaf *et al*. 2017, Catarineu *et al*. 2017, Csősz *et al*. 2018). Almost since its description *Temnothorax* was confused with the genus *Leptothorax* Mayr, 1855 and considered as its subgenus, closely related genus or junior synonym (Bolton 1994). Finally, Bolton (2003) removed the genus from synonymy under *Leptothorax* and discussed its characteristic features. Later, Radchenko (2004), using information presented by Bolton (2003), compared both genera and listed most useful features in their delimitation.

Species of *Temnothorax* are minute ants, with usually monogynous and counting less than 200 workers colonies. Most often nests are located in soil, rock crevices, leaf litter, under stones or in dead hollow twigs (Radchenko 2004, Prebus 2017). Due to the frequently overlapping characters, high morphological

variability, lack of sufficiently reliable diagnostic traits and limited access to material, *Temnothorax* species are generally considered as one of most taxonomically difficult ant taxa. Study on Greek *Temnothorax* is additionally impeded by complicated taxonomical history of taxa recorded from this region. Additionally, most recent studies published by Csősz *et al.* (2015, 2018) highlighted that species considered as widespread represent in fact complexes of cryptic taxa. Therefore, it is strongly recommended to study the genus based on recent material, collected from various localities.

So far few Greek *Temnothorax* species have been included in modern revisions (Csősz *et al.* 2015, 2018, Salata & Borowiec 2015) and knowledge on Greek myrmecofauna is in the preliminary stage. Thus current state of recognition of Greek myrmecofauna requires studies focused on easily distinguished species or species-groups. This would create a background for future research. Below we list all *Temnothorax* species recorded from Crete and discuss their distribution and intraspecific variability. The present work represents a preliminary step toward a knowledge of the diversity of the Greek ants.

Temnothorax ariadnae Csősz, Heinze & Mikó, 2015 (Figs 1–5)

Temnothorax ariadnae Csősz, Heinze & Mikó, 2015: 42, figs. 25A–C (w.).

Diagnosis. *Temnothorax ariadnae* together with *T. helenae*, *T. lucidus* and *T. subtilis* are members of the *T. nylanderi* group recorded from Crete. This group is characterized by presence of metanotal groove, brown to yellow body coloration, completely yellow antennae and well-developed head and mesosoma sculpture. *Temnothorax ariadnae* and *T. helenae* can be distinguished from other Cretan members of this group by dark yellow to yellowish-brown body colouration, head slightly longer than wide and presence of rugoso-reticulate sculpture on the head surface. Both species are extremely similar and difficult to distinguish. *Temnothorax ariadnae* differs from *T. helenae* in head sculpture. In *T. helenae* longitudinal striation occurs on the whole head surface and rugoso-reticulate area is limited to the center of frons. Whereas in *T. ariadnae* head is mostly rugoso-reticulate and longitudinal striation, if occurs, is limited to outer edges of frons. In series of specimens is also visible difference in body coloration – specimens of *T. ariadnae* are generally slightly darker yellow to yellowish-brown coloured than usually pale yellow specimens of *T. helenae*. *Temnothorax lucidus* and *T. subtilis* can be distinguished from other members of the *T. nylanderi* group from Crete by partly reduced head striation (frons at least partly smooth and shiny). According to original description (Csősz *et al.* 2015) *T. lucidus* has longer propodeal spines and frons are smooth and shiny on the almost whole surface while *T. subtilis* has smooth area limited to the center of frons. In order to separate these two species following discriminant function can be also used: D4 = +0.0717*EL +0.0778*NOH +0.0404*SPST -0.0824*SPBA -10.32, *T. subtilis* = -2.056 [-4.256, +0.259], *T. lucidus* = +2.098[-0.146, +6.298] (more detailed description see Csősz *et al.* 2015: 27).

Type material (label data). Paratype (w.) (CAS ENT0914694): *Temnothorax*| *ariadnae* sp. n. | det. Csosz, 2014 || GREECE, GR (4) 0024 | Crete | 5 km N Ano Vianos Vic. Katofigi | 35.0922 N,25.4165 E, 60 mH | 17. IV. 2011, leg. A. Schulz || ANTWEB | CASENT | 0914694 (CASC) [examined].

Type locality. Greece, Crete, Ano Vianos.

Material examined. GREECE: 2w., Rethymno Prov., Ag. Joannis loc. 1, 35.23333N/24.4E, 448 m, oak forest, HC, EU, LS, 06 V 2013, leg. L. Borowiec & S.

Figures 1–4. *Temnothorax ariadnae* Csősz, Heinze & Mikó, worker (scale: 0.5 mm). 1. Dorsal view. 2. Lateral view. 3. Head, sculpture. 4. Head with antennae.

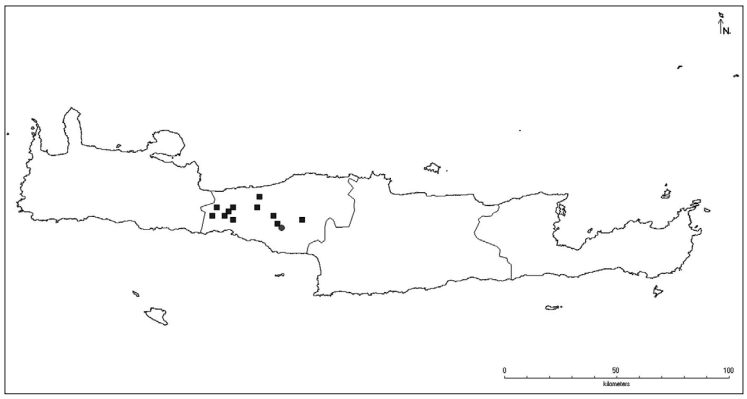


Figure 5. Distribution of *Temnothorax ariadnae* Csősz, Heinze & Mikó on Crete.

Salata (DBET); 1q., 9w., Rethymno Prov., Antonios Spilia Gorge, 35.25N/24.56666E, 342 m, deciduous forest in gorge, HC, EU, LS, 11 V 2013, L. Borowiec & S. Salata (DBET); 7w., Rethymno Prov., Chromonastiri, 35.326944N/24.510278E, 262 m, deciduous forest in gorge, HC, EU, 10 V 2013, L. Borowiec & S. Salata (DBET); 6w., Rethymno Prov., Gerakari, 35.21666N/24.58333E, 751 m, oak forest, HC, EU, LS, 09 V 2013, leg. L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., Kato Malaki, 35.28333N/24.4E, 235 m, deciduous forest, HC, EU, LS, 15 V 2013, leg. L. Borowiec & S. Salata (DBET); 6w., Rethymno Prov., n. Argiroupolis, 35.28333N/24.33333E, 197 m, deciduous forest on wetland, HC, EU, 13 V 2013, leg. L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., n. Velonado, 35.25N/24.36667E, 373 m, deciduous forest on hill slope, HC, EU, LS, 13 V 2013, leg. L. Borowiec & S. Salata (DBET); 6w., Rethymno Prov., n. Vilandredo, 35.25N/24.31667E, 354 m, deciduous forest in small gorge, HC, EU, LS, 13 V 2013, leg. L. Borowiec & S. Salata (DBET); 2w., Rethymno Prov., Selli-Oros, 35.28333N/24.5E, 473 m, single oak trees near road, HC, 11 V 2013, leg. L. Borowiec & S. Salata (DBET); 3w., Rethymno Prov., Setoures, 35.26667N/24.38333E, 305 m, macchia in gorge, HC, EU, 15 V 2013, leg. L. Borowiec & S. Salata (DBET); 4w., Rethymno Prov., Vistagi, 35.23333N/24.68333E, 563 m, macchia in gorge, HC, EU, 16 V 2013, leg. L. Borowiec & S. Salata (DBET).

Description. See Csősz *et al.* 2015: 42.

General distribution. Greece: Crete.

Distribution on Crete, literature data. Rethymno Prov.: Csősz *et al.* 2015: Table 1. – vic. of Gerakari, 35 km SE Rethymno, 700 m a.s.l., 35.2142N/24.605E, 24.04.2011.

Biology. Diurnal species. Common in deciduous forests, especially in these dominated by oaks. Nesting under stones or in the litter, usually in shady localities, close to streams or in humid soil. Colonies monogynous.

Temnothorax crassistriatus sp. nov.
(Figs 6–10)

Differential diagnosis. *Temnothorax crassistriatus* differs from other Cretan species in combination of the following features: absence of metanotal groove, thick and sparse striation covering head surface and lack of reticulation on it, low and round petiole node, and presence of thick and dense longitudinal striation on petiole and postpetiole. On Crete it can be confused only with *T. minotaurosi* from which it differs in lack of smooth and shiny area on frons, thicker longitudinal striation on mesosoma and bicolor body colouration. From species known outside the Crete it is most similar to: *T. alpinus* (Ruzsky, 1902) from which it differs in brighter body coloration, longer propodeal spines and lack of reticulation on head; *Temnothorax anodontoides* (Dlussky & Zabelin, 1985) from which it differs in presence of propodeal spines and lack of reticulation on head and bicolored body; *T. arnoldii* Radchenko & Fedoseeva, 2015 from which it differs in lack of reticulation on head and mesosoma and lower petiole node.

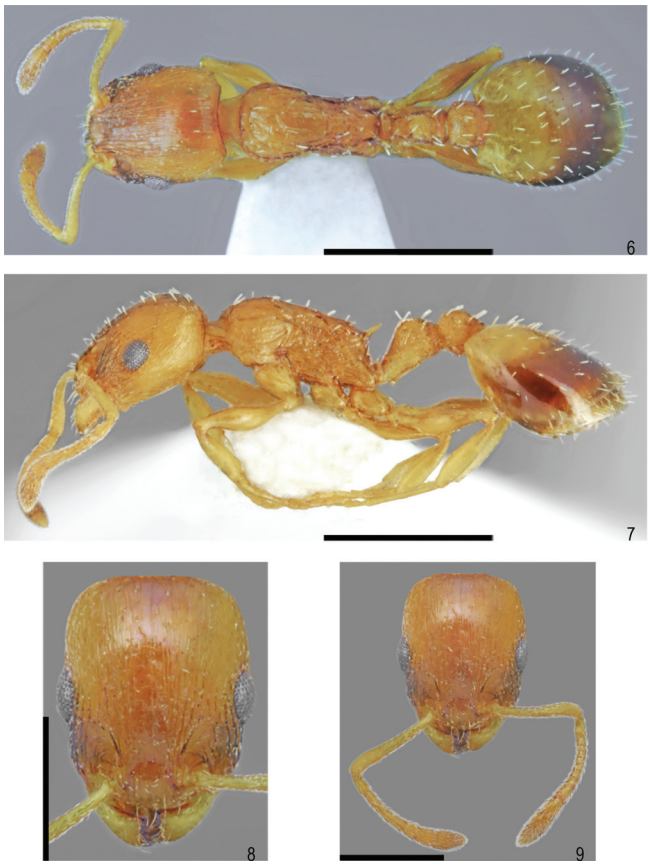
Etymology. The new species name "*crassistriatus*" refers to the thick striation covering workers mesosoma (lat. crassi – thick, striatae – striation).

Type material (label data). Holotype (w.) (CAS ENT0845902): *Temnothorax* | *crassistriatus* sp. nov. | Holotype || GREECE Crete Lasithi | Prov. Limnakarou Plateau | 1130 m 35°08'N 25°28'E | 26.04.14. S. Salata (MNHW); paratype (w.) (CASENT 0845903): the same data as holotype (DBET).

Type locality. Greece, Crete, Limnakarou Plateau.

Material examined. GREECE: 1w., Lasithi Prov., Chochlades, 35.13333N/26.23333E, 76 m, phrygana and single olive trees in narrow gorge, HC, EU, 08 IV 2014, leg. S. Salata (DBET); 2w., Lasithi Prov., Kato Symi loc. 3, 35.05N/25.48333E, 818 m, pine forest, HC, EU, LS, 13 IV 2014, leg. S. Salata (DBET).

Description. Workers (n=5): HL: 0.716 ± 0.03 (0.681-0.771); HW: 0.594 ± 0.03 (0.569-0.637); SL: 0.511 ± 0.03 (0.48-0.559); EL: 0.163 ± 0.006 (0.156-0.168); EW: 0.121 ± 0.006 (0.112-0.128); ML: 0.856 ± 0.08 (0.793-1.006); PSL: 0.192 ± 0.01 (0.179-0.212); SDL: 0.13 ± 0.009 (0.123-0.145); PL: 0.344 ± 0.02 (0.325-0.38); PPL: 0.198 ± 0.01 (0.178-0.218); PH: 0.237 ± 0.01 (0.223-0.257); PPH: 0.239 ± 0.02 (0.223-0.268); HTL: 0.486 ± 0.03 (0.436-0.514); PNW: 0.422 ± 0.01 (0.402-0.446); PW: 0.184 ± 0.01 (0.167-0.201); PPW: 0.255 ± 0.008 (0.245-0.268); HI: 83.0 ± 1.2 (80.8-84.0); SI1: 71.3 ± 0.9 (70.5-72.5); SI2: 85.9 ± 1.5 (84.1-87.8); MI: 54.9 ± 3.2 (51.1-60.5); EI1: 73.9 ± 1.5 (71.8-76.2); EI2: 16.8 ± 0.4 (16.4-17.3); TI: 127.1 ± 5.3 (118.5-133.8); PI: 145.0 ± 5.3 (136.2-150.2); PPI: 82.6 ± 2.4 (79.8-85.5).



Figures 6–9. *Temnothorax crassistriatus* sp. nov., worker (scale: 0.5 mm). 6. Dorsal view. 7. Lateral view. 8. Head, sculpture. 9. Head with antennae.

Head and mesosoma brick-red to orange. Sometimes frons and occipital part of the head darker, brown to black. Gaster orange to dark orange, tergites with thin, black, transverse band apically. Legs orange, sometimes tibia with black apical margin. Antennae orange, flagellum with darker club (Figs 6–9).

Head quadrate, 1.2 times as long as wide, lateral surfaces below and above eyes straight, gently convex on the posterior edges, occipital margin of head straight or slightly concave (Figs 8–9). Anterior margin of the clypeus slightly convex. Eyes small, oval, 1.3 times as long as wide. Antennal scape short, in lateral view slightly curved, 0.7 times as long as length of the head, in apex gradually widened, its base with small, triangular tooth, funiculus long, club 3 segmented (Figs 8–9). Surface of scape with very fine microreticulation, shiny, covered with thin, dense, adpressed setae. Mandibles rounded with thick sparse, longitudinal striae, shiny. Clypeus shiny with thick, longitudinal striae, area between striae smooth and shiny. Frontal carinae short, not extending beyond frontal lobes. Antennal fossa deep, with sparse, thick roundly curved striae, area between striae smooth and shiny. Frontal lobes narrow, smooth with thick longitudinal striae (Figs 8–9). Head covered on the whole surface with thick, longitudinal striation, area between striae smooth and shiny. Upper sides of genae and posterior part of head with weaker, but still visible, sculpture, never smooth (Figs 8–9). Entire head bearing suberect to erect, pale and thick setae (Figs 8–9).

Mesosoma elongate, 2.0 times as long as wide, slightly arched in profile. Pronotum convex on sides. Propodeal spines from short to long, narrow, with wide base, directed upward, with acute tips (Figs 6–7). Mesosoma on the whole surface with sparse, thick and visible longitudinal striation, area between striae smooth or with diffuse microreticulation, always shiny. Dorsal surface of mesosoma bearing short, sparse erect setae (Figs 6–7).

Petiole, in lateral view, with short peduncle, node low, with anterior and posterior faces bended, its dorsal surface arched. Postpetiole, in lateral view, regularly convex, apical half with gently convex sides (Figs 6–7). Peduncle with thick striation, area between striae smooth or with punctuation, shiny. Petiolar node and postpetiole dorsum shiny, with thick, dense striation, area between striae smooth or with slight microreticulation. Petiole and postpetiole on dorsal surfaces bearing sparse, short, semierect to erect setae (Figs 6–7).

Gaster smooth and shiny, bearing erect, thin, pale setae (Figs 6–7). Legs short, shiny, with fine microreticulation. Tibiae 0.7 times as long as head length, bearing adpressed setae on the whole surface. Inner margins of tibia and femora without erect setae (Figs 6–7).

General distribution. Greece, Crete.

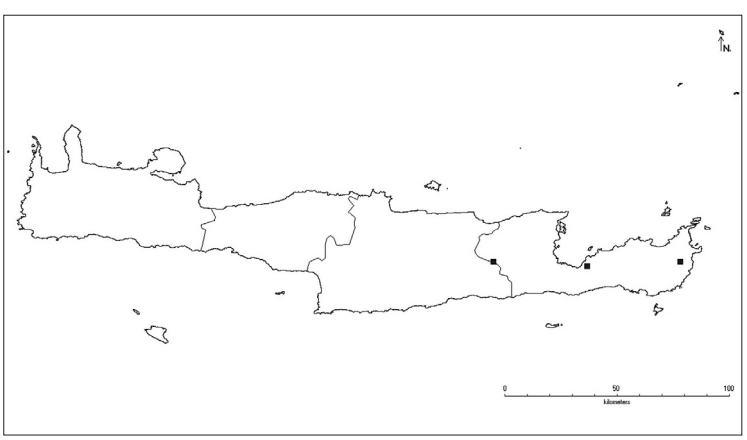


Figure 10. Distribution of *Temnothorax crassistriatus* sp. nov. on Crete.

Biology. Diurnal species. Species inhabiting deciduous bushes, forests edges or phrygana. Workers were collected in litter or on rocks. The following ant species were recorded in the same areas:Lasithi Prov., Chochlades: *Aphaenogaster cecconii* Emery, *A. subterraneoides* Emery, *Camponotus baldaccii* Emery, *C. gestroi creticus* Forel, *Crematogaster sordidula* (Nylander), *Lepisiota nigra* (Dalla Torre), *Messor mcarthuri* Steiner *et al*., *M. wasmanni* Krausse, *Pheidole* cf. *pallidula*, *Plagiolepis pygmaea* (Latreille), *Tapinoma erraticum* (Latreille), *T. exilis* (Emery), *Temnothorax proteii* sp. nov., *Tetramorium kephalosi* Salata & Borowiec, *Trichomyrmex perplexus* (Radchenko);

Lasithi Prov., Kato Symi loc. 3: *Aphaenogaster rugosoferruginea* Forel, *A. simonellii* Emery, *Camponotus aethiops* (Latreille), *C. baldaccii* Emery, *C. candiotes* Emery, *C. gestroi creticus* Forel, *C. kiesenwetteri* (Roger), *Crematogaster sordidula* (Nylander), *Lasius bombycina* Seifert & Galkowski, *Messor mcarthuri* Steiner *et al*., *M. wasmanni* Krausse, *Monomorium creticum* Emery, *Pheidole* cf. *pallidula*, *Plagiolepis pygmaea* (Latreille);

Lasithi Prov., Limnakarou: *Aphaenogaster simonellii* Emery, *Camponotus aethiops* (Latreille), *C. piceus* (Leach), *Formica cunicularia* Latreille, *Lasius illyricus* Zimmermann, *L. lasioides* Emery, *Messor hellenius* Agosti & Collingwood, *M. wasmanni* Krausse, *Monomorium creticum* Emery, *Plagiolepis taurica* Santschi, *Tapinoma erraticum* (Latreille), *Temnothorax exilis* (Emery), *T. ikarosi* sp. nov., *Tetramorium kephalosi* Salata & Borowiec.

Temnothorax daidalosi sp. nov.
(Figs 11–15, 61)

Differential diagnosis. *Temnothorax daidalosi* is a member of species characterized by lack of metanotal groove, uniform dark body colouration and presence of dense, fine reticulation on the head. From dark workers of *T. exilis* it differs in lack of smooth and shiny surfaces on head and dorsal surface of mesosoma; from *T. dessyi* (Menozzi, 1936) it differs in lack of longitudinal striation on whole head surface; from *T. saxatilis* Schulz, Heinze & Pusch, 2007 it differs in lack of smooth areas on dorsal surface of mesosoma and in long, thin propodeal spines; from *T. platycephalus* (Espadaler, 1997) it differs in more square head shape and presence of longitudinal wrinkles and reticulation on mesosoma surface.

Etymology. Name refers to a craftsman and artist Daedalus (Δαίδαλος/Daidalos/), who, according to Greek mythology, built on Crete a labyrinth for Minotaur.

Type material (label data). Holotype (w.) (CASENT0845904): *Temnothorax* | *daidalosi* sp. nov. | Holotype || Greece, Crete, Rethymno Pr. | Palelimnos | 35°18.706N/24°25.103 E | 15 V 2013, 262 m | L. Borowiec (MNHW); Paratypes (7w.) (CASENT0845905-CASENT0845911): the same data as holotype (DBET); Paratypes (4w.) (CASENT 0845945-CASENT0845948): Collection L. Borowiec | Formicidae | DBET-GR00561 || GREECE W Crete 10-15 m | Kato Daratso n. Chania | 35°30'N/23°58'E litoral | 6 V 2011. L. Borowiec (NHMC); Paratypes (4w.) (CASENT0845949-CASENT 0845952): Collection L. Borowiec | Formicidae | DBET-GR00980 || GREECE Crete, Rethymno Pr. | Antonios Spilia Gorge | 35°15.245 N/24°34.220 E 342 m | 11 V 2013. L. Borowiec (DBET); paratype (w.) (CASENT 0845953): Collection L. Borowiec | Formicidae | DBET-GR00997 || GREECE Crete, Rethymno Pr. | n. Vilandredo | 35°15.714 N/24°19.922 E 354 m | 13 V 2013. L. Borowiec (DBET); paratype (w.) (CASENT0845954): Collection L. Borowiec | Formicidae | DBET-GR00996 || GREECE Crete, Rethymno Pr. | n. Argiroupolis | 35°17.583 N/24°20.588 E | 13 V 2013, 197 m | L. Borowiec (DBET).

Type locality. Greece, Crete, Palelimnos.

Material examined. GREECE: 3w., Chania Prov., Agia Irini, 35.31667N/23.83333E, 587 m, humid and dark gorge partly overgrown by deciduous forest (*Quercus-Platanus*), HC, LS, 01 V 2014, leg. S. Salata (DBET); 1w., Chania Prov., Agia, 6 km SW, 35.46666N/23.91666E, 22 m, deciduous forest (*Quercus* sp.) and dry meadows surrounding artificial water reservoir, HC, EU, 03 V 2011, leg. L. Borowiec (DBET); 1w., Chania Prov., Therisso, 35.43333N/23.98333E, 320 m, calcareous gorge overgrown by single deciduous trees and phrygana, HC, 01 V 2011, leg. L. Borowiec (DBET); 3w., Irakleio Prov., Houdetsi, 35.16667N/25.15E, 426 m, hill slope overgrown by macchia, HC, 22 IV 2014, leg. S. Salata (DBET); 3w., Lasithi Prov., Gorge of Richtis, 35.16667N/25.98333E, 245 m, humid gorge overgrown by deciduous forest and macchia, HC, EU, LS, 06 IV 2014, leg. S. Salata (DBET); 5q., 11w., Rethymno Prov., Fourfouras, 35.21666N/24.71666E, 578 m, mountain meadow, HC, EU, 14 V 2013, leg. L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., Rodakino-Sellia, 35.2N/24.33333E, 301 m, phrygana, HC, 08 V 2013, leg. L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., Setoures, 35.26667N/24.38333E, 305 m, macchia in gorge, HC, EU, 15 V 2013, leg. L. Borowiec & S. Salata (DBET); 6w., Rethymno Prov., Spili-Gerakari loc. 1, 35.2N/24.55E, 763 m, mountain pasture, HC, EU, 09 V 2013, leg. L. Borowiec & S. Salata (DBET).

Description. Workers (n=15): HL: 0.689 ± 0.05 (0.592-0.771); HW: 0.602 ± 0.04 (0.508-0.681); SL: 0.453 ± 0.03 (0.38-0.503); EL: 0.161 ± 0.01 (0.123-0.19); EW: 0.112 ± 0.009 (0.087-0.123); ML: 0.807 ± 0.07 (0.659-0.939); PSL: 0.19 ± 0.02 (0.156-0.232); SDL: 0.124 ± 0.01 (0.109-0.156); PL: 0.292 ± 0.03 (0.246-0.335); PPL: 0.195 ± 0.02 (0.156-0.223); PH: 0.219 ± 0.02

Figures 11–14. *Temnothorax daidalosi* sp. nov., worker (scale: 0.5 mm). 11. Dorsal view. 12. Lateral view. 13. Head, sculpture. 14. Head with antennae.

(0.19-0.251); PPH: 0.22 ± 0.02 (0.179-0.257); HTL: 0.458 ± 0.02 (0.413-0.508); PNW: 0.412 ± 0.03 (0.344-0.469); PW: 0.16 ± 0.02 (0.134-0.19); PPW: 0.224 ± 0.02 (0.19-0.267); HI: 87.4 ± 1.2 (85.8-89.5); SI1: 65.8 ± 1.5 (62.8-68.5); SI2: 75.3 ± 1.7 (72.7-79.4); MI: 56.1 ± 3.1 (51.4-63.2); EI1: 69.6 ± 4.5 (61.6-78.8); EI2: 16.2 ± 0.8 (14.7-17.6); TI: 133.6 ± 5.9 (121.0-141.8); PI: 133.2 ± 5.6 (124.3-142.5); PPI: 88.5 ± 4.1 (82.8-94.9).

Whole body uniformly dark brown. Only legs and antennae brown to bright brown, clubs always darkened. Ventral side of petiole and postpetiole sometimes paler coloured than dorsal side, yellowish-brown. Femora mostly dark in central part (Figs 11–14, 61).

Head quadrate, 1.1 times as long as wide, lateral surfaces below eyes straight, above eyes gently convex, posterior edges convex, occipital margin of head straight or slightly concave (Figs 13–14). Anterior margin of the clypeus slightly convex, sometimes with slight medial notch. Eyes small, oval, 1.4 times as long as wide. Antennal scape short, in lateral view slightly curved, 0.7 times as long as length of the head, in apex gradually widened, its base with small, triangular tooth, funiculus long, club 3 segmented (Figs 13–14). Surface of scape with very fine microreticulation, shiny, covered with thin, dense, adpressed setae. Mandibles rounded with thick sparse, longitudinal striae, shiny. Clypeus shiny with thick, longitudinal striae, area between striae smooth and shiny. Frontal carinae short, not extending beyond frontal lobes. Antennal fossa deep, with sparse, thick roundly curved striae, area between striae smooth and shiny. Frontal lobes narrow, smooth with slight, dense longitudinal reticulation (Figs 13–14). Head covered on the whole surface with thick, dense reticulation, shiny. Sometimes anterior part of both head and genae also with a few longitudinal striae (Figs 11–14, 61). Entire head bearing suberect to erect, pale, short and thick setae (Figs 13–14).

Mesosoma elongate, 2.0 times as long as wide, slightly arched in profile. Pronotum convex on sides. Propodeal spines long, narrow, with narrow base, directed upward, with acute tips (Figs 11–12, 61). Mesosoma shiny, on the whole surface with sparse, thick and visible longitudinal, sometimes interrupted, striation, area between striae with thick reticulation. Sometimes dorsal surface of propodeum with dispersed striation, its posterodorsal surface always with thick and dense reticulation (Figs 11–12, 61). Entire mesosoma bearing suberect to erect, pale, short and thick setae (Figs 11–12, 61).

Petiole, in lateral view, with short peduncle, node high, with anterior and posterior faces straight, laterally inclined, its dorsal flat or slightly arched. Postpetiole, in lateral view, regularly convex, apical half with gently convex sides (Figs 11–12, 61). Peduncle and petiolar node and postpetiole dorsum shiny, with thick, dense reticulation, area between rugae smooth. Petiole

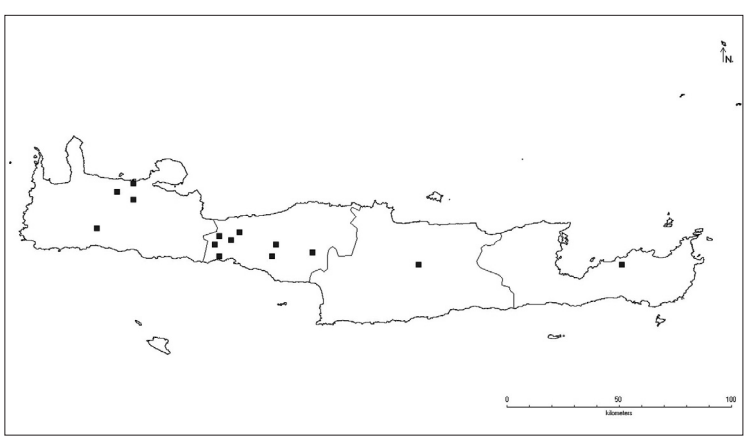


Figure 15. Distribution of *Temnothorax daidalosi* sp. nov. on Crete.

and postpetiole on dorsal surfaces bearing sparse, short, semierect to erect setae (Figs 11–12, 61).

Gaster smooth and shiny, bearing erect, thin, pale setae (Figs 11–12, 61). Legs short, shiny, with fine microreticulation. Tibiae 0.7 times as long as head length, bearing adpressed setae on the whole surface. Inner margins of tibia and femora without erect setae (Figs 11–12, 61).

General distribution. Greece, Crete.

Biology. On lowlands species related with forests and humid phrygana. On mountain zone prefers open and humid habitats. Most numerous samples were recorded on flat rocks partly overgrown by phrygana. The following ant species were recorded in the same areas as *T. daidalosi*:

Chania Prov., Agia Irini: *Aphaenogaster simonellii* Emery, *Camponotus baldaccii* Emery, *C. candiotes* Emery, *C. gestroi creticus* Forel, *Crematogaster ionia* Forel, *C. sordidula* (Nylander), *Messor mcarthuri* Steiner *et al*., *Monomorium creticum* Emery, *Pheidole* cf. *pallidula*, *Tapinoma erraticum* (Latreille), *Temnothorax minotaurosi* sp. nov., *Tetramorium diomedeum* Emery;

Chania Prov., Agia: *Aphaenogaster simonellii* Emery, *Camponotus aethiops* (Latreille), *C. baldaccii* Emery, *C. candiotes* Emery, *C. gestroi creticus* Forel, *C. kiesenwetteri* (Roger), *C. lateralis* (Olivier), *C. rebeccae* Forel, *Crematogaster ionia* Forel, *Lasius lasioides* Emery, *Monomorium creticum* Emery, *M. monomorium* Bolton, *Pheidole* cf. *pallidula*, *Temnothorax proteii* sp. nov., *T. variabilis* sp. nov.;

Chania Prov., Kato Daratso n. Chania: *Camponotus candiotes* Emery, *C. gestroi creticus* Forel, *C. lateralis* (Olivier), *Crematogaster ionia* Forel, *Lepisiota nigra* (Dalla Torre), *Messor wasmanni* Krausse, *Monomorium creticum* Emery, *Plagiolepis pallescens* sensu Radchenko, *P. pygmaea* (Latreille), *Temnothorax exilis* (Emery), *T. proteii* sp. nov., *Tetramorium* cf. *caespitum*;

Chania Prov., Therisso: *Aphaenogaster cecconii* Emery, *A. rugosoferruginea* Forel, *A. simonellii* Emery, *Camponotus aethiops* (Latreille), *C. baldaccii* Emery, *C. kiesenwetteri* (Roger), *C. lateralis* (Olivier), *Colobopsis truncata* (Spinola), *Crematogaster* cf. *ionia*, *C. sordidula* (Nylander), *Lasius lasioides* Emery, *Lepisiota frauenfeldi* (Mayr), *L. melas* (Emery), *Messor ibericus* Santschi, *M. wasmanni* Krausse, *Monomorium creticum* Emery, *Pheidole* cf. *pallidula*, *Plagiolepis pygmaea* (Latreille), *Solenopsis crivellarii* Menozzi, *S. orbula* Emery, *Tapinoma erraticum* (Latreille), *Temnothorax proteii* sp. nov., *T. recedens* (Nylander), *T. variabilis* sp. nov., *Tetramorium* cf. *caespitum*, *T. diomedeum* Emery, *T. kephalosi* Salata & Borowiec;

Irakleio Prov., Houdetsi: *Aphaenogaster simonellii* Emery, *Camponotus baldaccii* Emery, *C. candiotes* Emery, *C. gestroi creticus* Forel, *Lepisiota nigra* (Dalla Torre), *Messor mcarthuri* Steiner *et al*., *Pheidole* cf. *pallidula*, *Plagiolepis taurica* Santschi, *Tapinoma erraticum* (Latreille), *Temnothorax exilis* (Emery);

Rethymno Prov., Antonios Spilia Gorge: *Aphaenogaster cecconii* Emery, *A. rugosoferruginea* Forel, *A. simonellii* Emery, *Camponotus candiotes* Emery, *C. lateralis* (Olivier), *Crematogaster ionia* Forel, *Lasius tapinomoides*, *Messor wasmanni* Krausse, *Pheidole* cf. *pallidula*, *Stigmatomma denticulatum* Roger, *Temnothorax ariadnae* Csősz, Heinze & Mikó, *T. proteii* sp. nov., *T. variabilis* sp. nov., *Tetramorium* cf. *caespitum*, *T. diomedeum* Emery;

Rethymno Prov., Fourfouras: *Aphaenogaster cecconii* Emery, *A. rugosoferruginea* Forel, *A. simonellii* Emery, *A. subterraneoides* Emery, *Camponotus aethiops* (Latreille), *C. baldaccii* Emery, *C. gestroi creticus* Forel, *C. jaliensis* (Dalla Torre), *C. kiesenwetteri* (Roger), *Crematogaster sordidula* (Nylander), *Lasius bombycina* Seifert & Galkowski, *Lepisiota nigra* (Dalla Torre), *M. ibericus* Santschi, *M. wasmanni* Krausse, *Oxyopomyrmex krueperi* Forel, *Pheidole* cf. *pallidula*, *Plagiolepis pallescens* sensu Radchenko, *Strongylognathus silvestrii* Menozzi, *Temnothorax proteii* sp. nov., *T. recedens* (Nylander), *T. variabilis* sp. nov., *Tetramorium* cf. *caespitum*, *T. diomedeum* Emery, *Tetramorium punctatum* Santschi;

Rethymno Prov., n. Argiroupolis: *Aphaenogaster cecconii* Emery, *A. rugosoferruginea* Forel, *A. simonellii* Emery, *Camponotus candiotes* Emery, *C. lateralis* (Olivier), *Crematogaster* cf. *ionia* Forel, *Lasius tapinomoides*, *Lepisiota nigra* (Dalla Torre), *Messor mcarthuri* Steiner *et al*., *M. wasmanni* Krausse, *Pheidole* cf. *pallidula*, *Plagiolepis pallescens* sensu Radchenko, *Temnothorax variabilis* sp. nov., *T. ariadnae* Csősz, Heinze & Mikó, *T. proteii* sp. nov., *Tetramorium* cf. *caespitum*;

Rethymno Prov., n. Vilandredo: *Aphaenogaster rugosoferruginea* Forel, *Camponotus baldaccii* Emery, *C. candiotes* Emery, *C. gestroi creticus* Forel, *C. kiesenwetteri* (Roger), *Crematogaster ionia* Forel, *Lasius lasioides* Emery, *L. bombycina* Seifert & Galkowski, *Messor mcarthuri* Steiner *et al*., *Monomorium creticum* Emery, *Pheidole* cf. *pallidula*, *Tapinoma erraticum* (Latreille), *Temnothorax ariadnae* Csősz, Heinze & Mikó, *T. variabilis* sp. nov., *Tetramorium* cf. *caespitum*, *Tetramorium diomedeum* Emery, *Tetramorium punctatum* Santschi;

Rethymno Prov., Palelimnos: *Aphaenogaster cecconii* Emery, *A.* cf. *subterranea*, *A. simonellii*

Emery, *Camponotus baldaccii* Emery, *C. candiotes* Emery, *C. jaliensis* (Dalla Torre), *C. kiesenwetteri* (Roger), *C. rebeccae* Forel, *Crematogaster sordidula* (Nylander), *Lasius tapinomoides*, *L. lasioides* Emery, *Lepisiota nigra* (Dalla Torre), *Messor mcarthuri* Steiner *et al*., *M. wasmanni* Krausse, *Tetramorium* cf. *caespitum*, *Tetramorium kephalosi* Salata & Borowiec;

Rethymno Prov., Rodakino-Sellia: *Camponotus candiotes* Emery, *C. piceus* (Leach), *Lepisiota melas* (Emery), *Messor ibericus* Santschi, *M. wasmanni* Krausse, *Pheidole* cf. *pallidula*, *Plagiolepis pallescens* sensu Radchenko, *Tapinoma festae* Emery, *Temnothorax proteii* sp. nov.;

Rethymno Prov., Setoures: *Aphaenogaster simonellii* Emery, *Camponotus candiotes* Emery, *C. gestroi creticus* Forel, *C. kiesenwetteri* (Roger), *C. lateralis* (Olivier), *Crematogaster* cf. *ionia*, *C. sordidula* (Nylander), *Hypoponera eduardi* (Forel), *Lasius turcicus* Santschi, *Lepisiota nigra* (Dalla Torre), *Messor ibericus* Santschi, *M. wasmanni* Krausse, *Monomorium creticum* Emery, *Temnothorax ariadnae* Csősz, Heinze & Mikó, *T. proteii* sp. nov., *T. recedens* (Nylander), *Tetramorium* cf. *caespitum*, *T. kephalosi* Salata & Borowiec, *T. punctatum* Santschi;

Rethymno Prov., Spili-Gerakari loc. 1: *Lepisiota nigra* (Dalla Torre), *Messor mcarthuri* Steiner *et al*., *Tetramorium kephalosi* Salata & Borowiec.

Temnothorax exilis (Emery, 1869)
(Figs 16–20)

Leptothorax exilis Emery, 1869: 15, pl. 1, fig. 9 (w.).
Leptothorax exilis subsp. *creticus* Forel, 1910: 23 (w.q.).
Leptothorax exilis var. *darii* Forel, 1911: 334 (w.).
Leptothorax tuberum ruficornis Emery, 1914: 157 (w.).
Leptothorax exilis var. *specularis* Emery, 1916: 174 (w.) (= *Leptothorax tuberum* ssp. *exilis* var. *specularis* Emery, 1898 (w.) unavailable name), **syn. nov.**
Leptothorax exilis var. *boccaris* Santschi, 1923c: 331 (w.).
=*Leptothorax exilis* var. *nitidulus* Santschi, 1923c: 331(w.q.) (= *Leptothorax tuberum obscurior nitidulus* Forel, 1894: 39 (w.); unavailable name).
Leptothorax exilis – Baroni Urbani 1987: 1040, figs. 2–5 (w.) redescription, figs. 6–13 (q.m.).
Temnothorax exilis – Bolton 2003: 271.

Diagnosis. *Temnothorax exilis* is readily separated from other Cretan species by combination of following characters: lack of metanotal groove, reduced head and mesosoma striation and high petiole node with flat dorsal surface. Cretan populations of this species have usually completely dark, occasionally bicolor, body colouration. Nevertheless, bright brown to yellow colored specimens of this species are known from continental Greece as well.

Type material (label data). *T. exilis*, syntype (w.) (CASENT0904756): *Leptothorax*| *exilis* Em. | Napoli || VII 77 | Casamicciola || Museo Civico | di Genoa || ANTWEB | CASENT | 0904756 (MSNG); *T. specularis*, syntype (w.) (CASENT0904757): *Leptothorax*| *exilis* | v. *specularis* || Pizza | Cavarma || Museo Civico di Genova || ANTWEB | CASENT | 0904757 (MSNG) [images examined].

Type locality. Italy, Campania, Cavarma.

Material examined. GREECE: 7w., Chania Prov., 3 km S Askifou, 35.26666N/24.16666E, 750 m, phrygana overgrown by single olive trees, HC, EU, 01 V 2007, leg. L. Borowiec & M.L. Borowiec (DBET); 6w., Chania Prov., Kallikratiano, 35.2N/24.21667E, 441 m, calcareous gorge partly overgrown by deciduous forest and phrygana, HC, EU, 08 V 2013, leg. L. Borowiec (DBET); 7w., Chania Prov., Kato Daratso n. Chania, 35.5N/23.98333E, 10-15 m, sandy, anthropogenic seaside overgrown by single pine trees and phrygana, HC, 06 V 2011, leg. L. Borowiec (DBET); 3w., Chania Prov., Kato Daratso n. Chania, 35.5N/23.96666E, 18 m, sandy, anthropogenic seaside overgrown by single pine trees and phrygana, HC, 06 V 2011, leg. L. Borowiec (DBET); 1w., Chania Prov., Kato Daratso n. Chania, 35.5N/23.96666E, 23 m, urban green area, HC, 07 V 2011, leg. L. Borowiec (DBET); 1w., Chania Prov., Khora Sfakion, 35.2N/24.13333E, 6 m, rocky seaside, HC, 01 V 2007, leg. L. Borowiec & M.L. Borowiec (DBET); 1w., Chania Prov., Omalos-Prases, 35.33333N/23.85E, 945 m, mountain plateau – macchia, HC, 03 V 2011, leg. L. Borowiec (DBET); 1w., Chania Prov., Tzitzifes n. Vrises, 35.35N/24.15E, 264 m, olive groves and limestone rocks, HC, 05 V 2011, leg. L. Borowiec (DBET); 2w., Irakleio Prov., Agia Eirini, 35.26667N/25.15E, 130 m, fields and macchia close to a stream, HC, EU, 16 IV 2014, leg. S. Salata (DBET); 1q.,5w., Irakleio Prov., Ethia, 34.98333N/25.2E, 683 m, small mountain plateau transformed into fields, HC, EU, 23 IV 2014, leg. S. Salata (DBET); 1q., 3w., Irakleio Prov., Houdetsi, 35.16667N/25.15E, 426 m, hill slope overgrown by macchia, HC, 22 IV 2014, leg. S. Salata (DBET); 3w., Irakleio Prov., Komos, 35.014166N/24.76667E, 28 m, dry and sandy area overgrown by single olive trees and clumps of grass, HC, EU, 24 IV 2014, leg. S. Salata (DBET); 1w., Irakleio Prov., Skalani-Prasas, 35.3N/25.18333E, 43 m, phrygana and olive groves, HC, EU, 01 IV 2014, leg. S. Salata (DBET); 5w., Lasithi Prov., Agia Fotia, 35.18333N/26.16667E, 21 m, olive groves and macchia in gorge, HC, EU, 07 IV 2014, leg. S. Salata (DBET); 1q.,10w., Lasithi Prov., Agia Fotia-Palekastro, 35.2N/26.16667E, 2 m, rocky seaside with phrygana, HC, 07 IV 2014, leg. S. Salata (DBET); 3w., Lasithi Prov., Agia Triada-Goudouras, 35.01667N/26.13333E, 230 m, phrygana on a hill slope, HC, EU, 22 IV 2014, leg. S. Salata (DBET); 3w., Lasithi Prov., Chochlades, 35.13333N/26.23333E, 76 m, phrygana and single olive trees in narrow gorge, HC, EU, 08 IV 2014, leg. S.

Figures 16–19. *Temnothorax exilis* (Emery), worker (scale: 0.5 mm). 16. Dorsal view. 17. Lateral view. 18. Head, sculpture. 19. Head with antennae.

Salata (DBET); 4w., Lasithi Prov., Erimoupolis, 35.25N/26.25E, 0 m, phrygana, HC, EU, 08 IV 2014, leg. S. Salata (DBET); 1w., Lasithi Prov., Kalio Horio-Prina, 35.1N/25.7E, 145 m, pine forest, HC, EU, LS, 04 IV 2014, leg. S. Salata (DBET); 3w., Lasithi Prov., Limnakarou, 35.13333N/25.46667E, 1130 m, small mountain plateau with single cheery trees and phrygana, HC, EU, 26 IV 2014, leg. S. Salata (DBET); 5w., Lasithi Prov., Mohlos, 35.16667N/25.9E, 9 m, macchia in a gorge, HC, EU, 06 IV 2014, leg. S. Salata (DBET); 1w., Lasithi Prov., Moni Toplou Gorge, 35.21667N/26.2E, 151 m, olive groves and surrounding phrygana, HC, EU, 08 IV 2014, leg. S. Salata (DBET); 2w., Lasithi Prov., Sfaka-Tourloti, 35.15N/25.93333E, 337 m, macchia in gorge, HC, EU, 07 IV 2014, leg. S. Salata (DBET); 1q.,17w., Lasithi Prov., Vlihadia Gorge, 35.33333N/25.68333E, 3 m, sandy gorge with halophyte vegetation, HC, EU, 03 IV 2014, leg. S. Salata (DBET); 1q., 12w., Rethymno Prov., Episkopi, 35.35N/24.35E, 0 m, sandy beach, HC, 01 IV 2014, leg. S. Salata (DBET).

Redescription (based on Cretan specimens). Workers (n=15): HL: 0.634 ± 0.03 (0.581-0.671); HW: 0.507 ± 0.03 (0.47-0.564); SL: 0.479 ± 0.03 (0.43-0.536); EL: 0.154 ± 0.009 (0.145-0.168); EW: 0.104 ± 0.008 (0.087-0.112); ML: 0.713 ± 0.06 (0.625-0.816); PSL: 0.156 ± 0.02 (0.126-0.184); SDL: 0.121 ± 0.01 (0.106-0.134); PL: 0.283 ± 0.05 (0.235-0.391); PPL: 0.161 ± 0.01 (0.145-0.179); PH: 0.193 ± 0.02 (0.168-0.212); PPH: 0.187 ± 0.01 (0.168-0.201); HTL: 0.417 ± 0.03 (0.369-0.458); PNW: 0.358 ± 0.02 (0.33-0.391); PW: 0.143 ± 0.01 (0.117-0.156); PPW: 0.184 ± 0.02 (0.156-0.201); HI: 80.4 ± 1.6 (77.8-84.2); SI1: 75.5 ± 1.9 (73.3-80.0); SI2: 93.9 ± 2.4 (90.8-97.9); MI: 59.3 ± 2.6 (54.7-62.7); EI1: 67.8 ± 5.7 (55.8-77.2); EI2: 16.5 ± 1.1 (13.9-17.7); TI: 121.1 ± 4.1 (116.2-127.4); PI: 146.0 ± 16.4 (131.4-184.4); PPI: 86.2 ± 2.0 (83.6-89.1).

Most often whole body uniformly brown to dark brown. Only antennae, mandibles and tibiae brown to bright brown, clubs always darkened. In some specimens mesosoma is brighter than head and gaster, but always brown. Femora with dark spots in central part (Figs 16–19). Specimens with mesosoma yellow or reddish yellow or specimens completely pale coloured, which are often observed in populations west of Greece, have never been observed in Cretan populations.

Head quadrate to subrectangular, 1.3 times as long as wide, lateral surfaces below eyes straight, above eyes gently convex, posterior edges convex, occipital margin of head straight or slightly concave (Figs 18–19). Anterior margin of the clypeus slightly convex, with medial notch. Eyes small, oval, 1.5 times as long as wide. Antennal scape short, in lateral view slightly curved, 0.75 times as long as length of the head, in apex gradually widened, its base with small, triangular tooth, funiculus long, club 3 segmented (Figs 18–19).

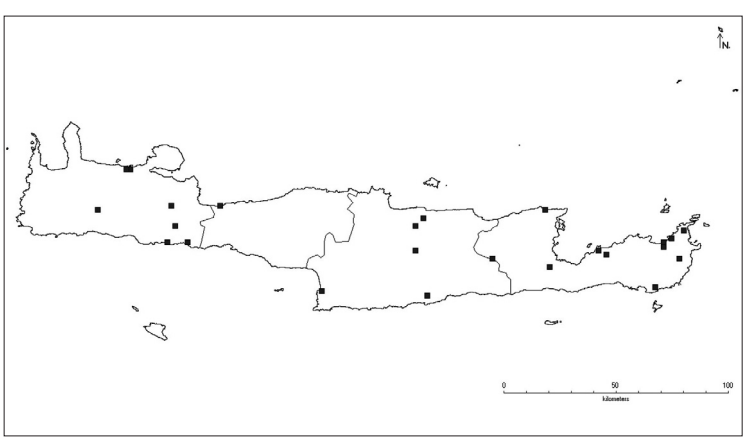


Figure 20. Distribution of *Temnothorax exilis* (Emery) on Crete.

Surface of scape with very fine microreticulation, shiny, covered with thin, sparse, adjusted to subdecumbent setae. Mandibles rounded with thick sparse, longitudinal striae, shiny. Clypeus shiny with thin, sparse, longitudinal striae, area between striae smooth. Frontal carinae short, not extending beyond frontal lobes. Antennal fossa deep, with sparse, thin roundly curved striae, area between striae smooth and shiny. Frontal lobes narrow, smooth with thin, sparse longitudinal striation (Figs 18–19). Head on the almost whole surface smooth and shiny. Sculpture, if occurs, limited to sparse, thin, longitudinal striation on the posterior part of frons and area between eyes and mandibles (Figs 18–19). Entire head bearing from subdecumbent to suberect, pale, short and thick setae (Figs 18–19).

Mesosoma elongate, 2.0 times as long as wide, slightly arched in profile. Pronotum convex on sides. Propodeal spines medium, with wide base, directed upward, with acute tips (Figs 16–17). Mesosoma shiny, its dorsal surface on the almost whole surface smooth and shiny, only its outer edges wits sparse, thin longitudinal striation, area between striation smooth. Lateral surfaces of pronotum with thin, sparse longitudinal striation, area between striation with microreticulation, shiny. Lateral surfaces of mesonotum and propodeum with thick, dense, longitudinal striation, area between striae smooth (Figs 16–17). Entire mesosoma bearing suberect to erect, pale, short and thick setae (Figs 16–17).

Petiole, in lateral view, with short peduncle, node high, with anterior and posteriol faces concave, its dorsal surface arched. Postpetiole, in lateral view, regularly convex, apical half with gently convex sides (Figs 16–17). Peduncle and petiolar node and postpetiole dorsum shiny, with thin, dense reticulation, area between rugae smooth, sometimes centre of dorsal surfaces of petiolar node and postpetiole dorsum with reduced striation or smooth. Petiole and postpetiole on dorsal surfaces bearing sparse, short, semierect to erect setae (Figs 16–17).

Gaster smooth and shiny, bearing erect, thin, pale setae (Figs 16–17). Legs short, shiny, with fine microreticulation. Tibiae 0.7 times as long as head length, bearing adpressed setae on the whole surface. Inner margins of tibia and femora without erect setae (Figs 16–17).

General distribution. Croatia; France: Corsica, mainland; Georgia; Greece: Aegean Is., Crete, Dodecanese, Ionian Is., mainland; Italy: mainland, Sardinia, Sicily; Macedonia; Malta; Montenegro; Serbia; Slovenia; Spain: mainland; Tunisia; Turkey.

Distribution on Crete, literature data. Crete: Forel 1910: 23 (as *Leptothorax exilis* subsp. *creticus*); Emery 1924a: 254 (as *Leptothorax exilis* subsp. *cretica*); Legakis 2011: 17; Legakis 2011: 17 (as *Temnothorax creticus*); Borowiec 2014: 177.

Biology. Species related with open, dry habitats. Usually overgrown by phrygana. Nests in soil, most often under medium size rocks of in rock cleavages, always in sunny localities. Colonies monogynus or polygynous.

Comments. Baroni Urbani (1971), in his catalogue of Italian ants, described an intraspecific variability of body sculpture within *T. exilis*. He concluded that most of species of the *exilis* group, among them *T. specularis*, don't manifest any valuable differences and considered them to be junior synonyms of *T. exilis*. However, Collingwood (1978), without justifications, raised *T. specularis* again to species level. In a subsequent paper (Agosti & Collingwood 1987) *T. specularis* was differentiated from *T. exilis* based on head sculpture (*T. specularis* was supposed to have head smooth and shiny while *T. exilis* was characterized with strongly sculptured head). This proves that the authors of this paper wrongly interpreted *T. exilis* and probably didn't examine the type materials. Our investigation of type specimens of both species along with material collected from the entire Mediterranean Region do not reflect clear differences between these taxa. Therefore, *T. specularis* is considered as a junior synonym of *T. exilis*. Cretan populations of *T. exilis* are more homogenous than populations from continental Greece and the western part of Mediterranean basin. However, we treat *T. exilis* ssp. *creticus* Forel as a straightforward synonym because this problem should be investigated based on morphologic and molecular analysis of all available populations from Greece. This taxon is extremely variable on island parts of Greece and it is difficult to assess whether we are dealing with a group of subcryptic species or local ecocline or populations formed by genetic drift.

Temnothorax helenae Csősz, Heinze & Mikó, 2015 (Figs 21–25)

Temnothorax helenae Csősz, Heinze & Mikó, 2015: 45, figs. 26A–C (w.).

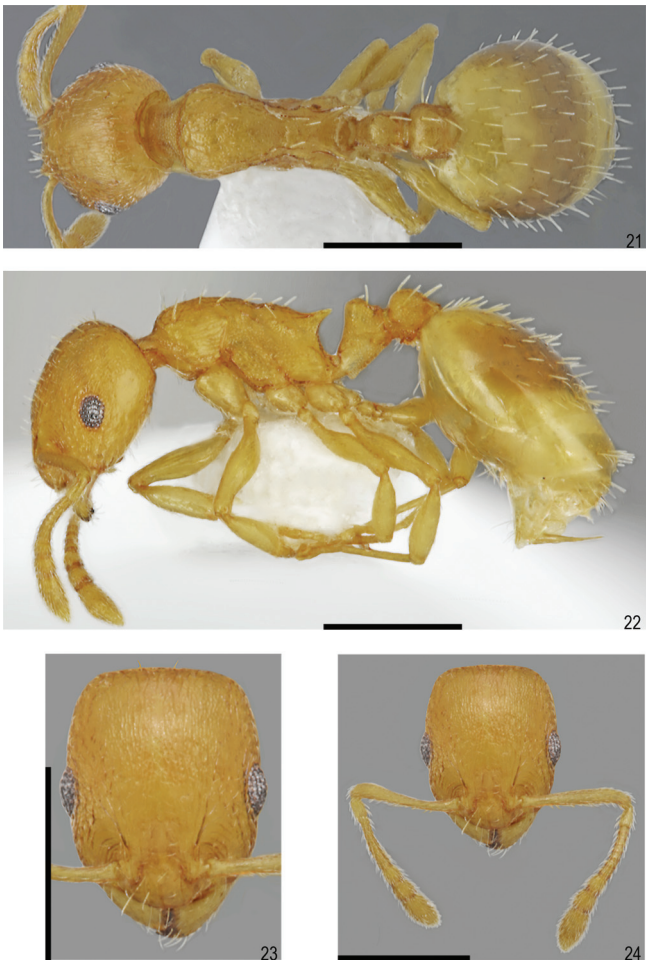
Diagnosis. See *T. ariadnae*.

Type material (label data). Holotype (w.) (CAS ENT0914697): *Temnothorax*| *helenae* sp. n. || HOLO- | TYPE || GREECE, GR (32) 0344 | Peloponnesus |Taygetos Oros, Street to Profitis Ilias | 36.968 N, 22.404 E, 800Mh | 01.V.2011, leg. A. Schulz || ANTWEB | CASENT | 0914697 (HNHM) [examined].

Type locality. Greece, Peloponnese, Taygetos Mountains.

Material examined. GREECE: 1w., Chania Prov., Sfinari vicinity, 35.41667N/23.5667E, 120 m, anthropogenic hill slope overgrown by deciduous trees, 03 V 2015, leg. G. Bra ko (GBC).

Description. See Csősz *et al.* 2015: 45.



Figures 21–24. *Temnothorax helenae* Csősz, Heinze & Mikó, worker (scale: 0.5 mm). 21. Dorsal view. 22. Lateral view. 23. Head, sculpture. 24. Head with antennae.

General distribution. Bulgaria, Greece (Crete, mainland), Turkey.

Distribution on Crete, literature data. Chania Prov.: Csősz *et al.* 2015: Table 1. – Anisarkis, vic. of Kandanos, 35 km SW Chania, 500 m a.s.l., 35.3279N/ 23.7420E, 1992 r. Rethymno Prov.: Csősz *et al.* 2015: Table 1. – vicinity of Katofigi, 5 km N Ano Vianos, 600 m a.s.l., 35.0922N/25.4165E, 17.04.2011.

Biology. Species inhabiting oak forests. Nests in litter or galls. Workers were collected in litter or on rocks. Colonies monogynous.

Temnothorax ikarosi sp. nov.
(Figs 26–30)

Differential diagnosis. *Temnothorax ikarosi* differs from most of Cretan species in uniform, dark body colouration and presence of thick, longitudinal striation on the whole head surface. On island it can be confused with *T. daidalosi* from which it differs in short, triangular propodeal spines and striation on head. From species known outside the Crete it is most similar to: *T. anodontoides* (Dlussky & Zabelin, 1985) from which it differs in presence of propodeal spines and thicker head striation; *T. dessyi* Menozzi, 1936 from which it differs in low and convex petiole node, short propodeal spines and presence of dense, longitudinal striation on genae and lateral surfaces of mesosoma; *T. rottenbergii* (Emery, 1870), *T. angustulus* (Nylander, 1856), *T. mirabilis* (Espadaler & Cagniant, 1996) and *T. niger* (Forel, 1894) from whom it differs in thicker striation on head, lack of smooth surface between striation and short, triangular propodeal spines; from *T. sardous* (Santschi, 1909) it differs in short, triangular propodeal spines and lack of dense/ heavy reticulation on petiole and postpetiole.

Etymology. Name refers to Greek hero Icarus (Ἴκαρος, /Íkaros/), who died during his escape from Crete.

Type material (label data). Holotype (w.) (CAS ENT0845912): *Temnothorax* | *ikarosi* sp. nov. | HOLOTYPE || GREECE, Crete, Lasithi | Prov. Limnakarou Plateau | 1750 m 35°06'N 25°28'E | 5.8.2000. M. Chatzaki (MNHW).

Type locality. Greece, Crete, Limnakarou Plateau.

Description. Workers (n=1): HL: 0.892; HW: 0.719; SL: 0.633; EL: 0.173; EW: 0.129; ML: 1.014; PSL: 0.162; SDL: 0.14; PL: 0.403; PPL: 0.23; PH: 0.273; PPH: 0.276; HTL: 0.59; PNW: 0.518; PW: 0.209; PPW: 0.281; HI: 80.6; SI1: 71.0; SI2: 88.0; MI: 58.2; EI1: 75.0; EI2: 14.5; TI: 122.0; PI: 147.4; PPI: 83.3.

Head, mesosoma, and gaster uniformly dark brown. Femora dark orange with dark brown central area. Tibiae and tarsus dark orange. Scape dark brown with dark orange apex. Antennae dark orange with darker, brown clubs (Figs 26–29).

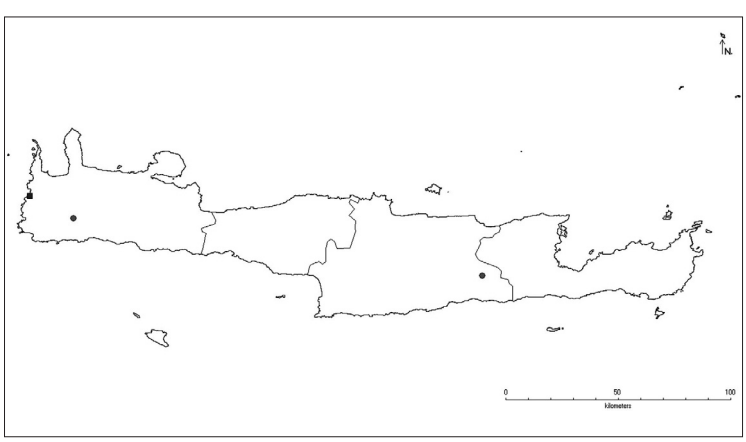


Figure 25. Distribution of *Temnothorax helenae* Csősz, Heinze & Mikó on Crete.

Figures 26–29 *Temnothorax ikarosi* sp. nov., worker (scale: 0.5 mm). 26. Dorsal view. 27. Lateral view. 28. Head, sculpture. 29. Head with antennae.

Head quadrate, 1.2 times as long as wide, lateral surfaces below and above eyes straight, posterior edges gently convex, occipital margin of head straight or slightly arched (Figs 28–29). Anterior margin of the clypeus slightly convex. Eyes small, oval, 1.4 times as long as wide. Antennal scape short, in lateral view slightly curved, 0.7 times as long as length of the head, in apex gradually widened, its base with small, triangular tooth, funiculus long, club 3 segmented (Figs 28–29). Surface of scape with very fine microreticulation, shiny, covered with thin, dense, adpressed setae. Mandibles rounded with thick sparse, longitudin-al striae, shiny. Clypeus shiny with thick, longitudinal striae, area between striae smooth and shiny. Frontal carinae short, not extending beyond frontal lobes. Antennal fossa deep, with dense, thick roundly curved striae, area between striae with dense rugosity, shiny. Frontal lobes narrow, smooth with slight, dense longitudinal reticulation (Figs 28–29). Head covered on the whole surface with thick, dense longitudinal striation, area between striation with dense rugosity, matt. Sometimes genae with striation partly replaced by rugae, also with a few longitudinal striae (Figs 28–29). Entire head bearing suberect to erect, pale, short and thick setae (Figs 28–29).

Mesosoma elongate, 2.0 times as long as wide, slightly arched in profile. Pronotum convex on sides. Propodeal spines short, triangular, with wide base, directed upward, with acute tips (Figs 26–27). Dorsal surfaces of mesonotum and pronotum shiny, with thick, dense longitudinal rugae and striation, area between sculpture smooth and shiny. Dorsal surface of propodeum shiny, with dense reticulation and, sometimes, a few longitudinal wrinkles. Lateral surfaces of pronotum shiny, with sparse, thick longitudinal striation, area between striation rugae. Lateral surfaces of mesonotum and propodeum shiny, with thick and dense rugosity (Figs 26–27). Entire mesosoma bearing suberect to erect, pale, short and thick setae (Figs 26–27).

Petiole, in lateral view, with short peduncle, node high, with anterior and posterior faces straight, its dorsal surface flat, inclined downward. Postpetiole, in lateral view, regularly convex, apical half with gently convex sides (Figs 26–27). Peduncle and petiolar node and postpetiole dorsum shiny, with thick, dense reticulation, area between rugae smooth. Petiole and postpetiole on dorsal surfaces bearing sparse, short, semierect to erect setae (Figs 26–27).

Gaster smooth and shiny, bearing erect, thin, pale setae (Figs 26–27). Legs short, shiny, with fine microreticulation. Tibiae 0.7 times as long as head length, bearing adpressed setae on the whole surface. Inner margins of tibia with a row of erect setae (Figs 26–27).

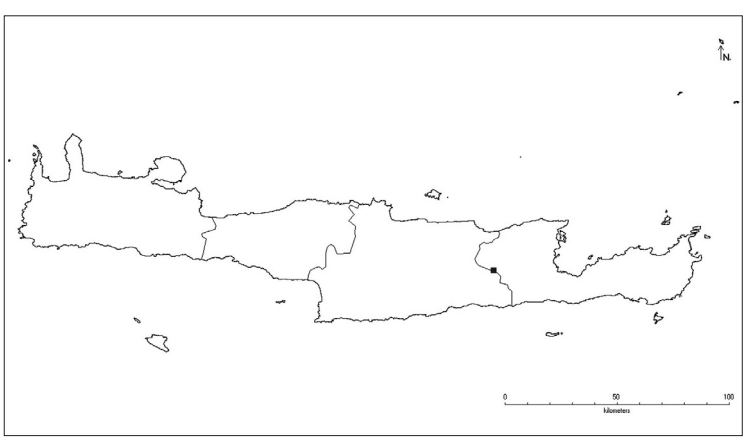


Figure 30. Distribution of *Temnothorax ikarosi* sp. nov. on Crete.

General distribution. Greece, Crete.

Biology. Biology poorly known. A single worker was collected on a wall of shelter. The wall was overgrown by a blackberry bush. The shelter was placed at the orchard edges on mountain plateau (1750 m a.s.l.). The ant species recorded in the same areas as *T. ikarosi* are listed in biology description of *T. crassistriatus* (Lasithi Prov., Limnakarou).

Comment. Schulz *et al.* (2007) mentioned *T. anodontoides* from Peloponnesus. After examination of type specimens of *T. anodontoides* and photographs of species collected on Greek mainland we conclude that they represent two distinct species. There is a possibility that specimens noted by Schulz *et al.* (2007) represent undescribed species closely related to *T. ikarosi*. We decided to describe *T. ikarosi* from single specimen only because this taxon is very distinct from all species of the genus *Temnothorax* described from the eastern part of the Mediterranean Basin. In our materials from Greece we have 1563 samples of *Temnothorax* with at least 70 morphospecies, including several undescribed taxa, and none of them appear similar to *T. ikarosi*. Also, in our materials from other mediterranean European and North African countries, Transcaucasia, Cyprus and Turkey representing 200 samples we did not find any species similar to *T. ikarosi*.

Temnothorax incompletus sp. nov.
(Figs 31–36)

Differential diagnosis. *Temnothorax incompletus* differs from all other Cretan species in bright yellow body colouration and presence of dark, interrupted transverse band on the first tergite of gaster. The only known species which can possess such feature are members of the *T. interruptus* group. *Temnothorax incompletus* differs from them in lack of frontal lobes wider than frons.

Etymology. Name refers to incomplete band on the dorsal surface on the first tergite of gaster (lat. *incomplete*).

Type material (label data). Holotype (w.) (CAS ENT0845913): *Temnothorax*| *incompletus* sp. nov. | HOLOTYPEE | GREECE, Crete, Rethymno Pr. | Vistagi | 35°14.699 N/24°41.516 E | 16 V 2013, 563 m | S. Salata (MNHW); Paratype (w.) (CASENT0845914): GREECE, Crete, Lasithi | dis. Prina, 350 m, 35°05N | /25°42E, 31.01.00, | Nikolakakis (NHMC).

Type locality. Greece, Crete, Vistagi.

Description.Workers (n=2): HL: 0.581-0.615; HW: 0.446-0.503; SL: 0.413-0.441; EL: 0.112-0.123; EW: 0.078-0.078; ML: 0.603-0.682; PSL: 0.123-0.123; SDL: 0.089-0.101; PL: 0.235-0.274; PPL: 0.156-0.156; PH: 0.165-0.179; PPH: 0.156-0.207; HTL: 0.359-0.391; PNW: 0.302-0.352; PW: 0.14-0.134; PPW: 0.184-0.19; HI: 76.8-0.81.8; SI1: 71.1-71.7; SI2: 92.6-87.7; MI: 59.5-57.3; EI1: 69.6-63.4; EI2: 13.4-12.7; TI: 124.2-128.6; PI: 142.4-153.1; PPI: 100.0-75.4.

Whole body uniformly bright yellow. Only first tergite of gaster with dark brown apical band, widest laterally and gradually narrowing to the centre, interrupted in the central part by pale brown colour (Figs 31–36).

Head quadrate, 1.2 times as long as wide, lateral surfaces below and above eyes straight, posterior edges gently convex, occipital margin of head slightly concaved (Figs 33–34). Anterior margin of the clypeus slightly convex. Eyes small, oval, 1.5 times as long as wide. Antennal scape short, in lateral view slightly curved, 0.7 times as long as length of the head, in apex gradually widened, its base with small, triangular tooth, funiculus long, club 3 segmented (Figs 33–34). Surface of scape with very fine microreticulation, shiny, covered with thin, dense, adpressed setae. Mandibles rounded with thick sparse, longitudinal striae, shiny. Clypeus shiny, with thin, sparse, longitudinal striae, area between striae smooth and shiny. Frontal carinae short, not extending beyond frontal lobes. Antennal fossa deep, with a few roundly curved striae, area between striae smooth and shiny. Frontal lobes narrow, smooth and shiny (Figs 33–34). Head shiny, covered on the whole surface with very sparse, shallow and thick reticulation, area between reticulation smooth. Frons, in the central part with reduced sculpture. Occipital part of head with smooth areas (Figs 33–34). Suberect to erect, pale, short and thick setae only on frons and occipal part of head (Figs 33–34).

Mesosoma elongate, 2.0 times as long as wide, slightly arched in profile. Pronotum convex on sides. Propodeal spines short, triangular, with wide base, directed upward, with convex tips (Figs 31–32). Dorsal surface of mesosoma shiny, with very thin, sparse and shallow reticulation, sculpture reduced on the center of pronotum, area between reticulation smooth. Lateral surfaces of mesosoma shiny, with thin, sparse reticulation, on mesonotum reticulation occurs together with a few longitudinal striae, area between sculpture smooth (Figs 31–32). Entire mesosoma bearing suberect to erect, pale, short and thick setae (Figs 31–32).

Petiole, in lateral view, with long peduncle, node high, with anterior and posterior faces straight, its dorsal surface arched. Postpetiole, in lateral view, regularly convex, apical half with gently convex sides (Figs 31–32). Peduncle and petiolar node and postpetiole dorsum shiny, with thin, sparse reticulation, area between rugae smooth. Petiole and postpetiole on dorsal surfaces bearing sparse, short, semierect to erect setae (Figs 31–32).

Gaster smooth and shiny, bearing erect, thin, pale setae (Figs 31–32). Legs short, shiny, with fine

Figures 31–35. *Temnothorax incompletus* sp. nov., worker (scale: 0.5 mm). 31. Dorsal view. 32. Lateral view. 33. Head, sculpture. 34. Head with antennae. 35. Gaster, dorsal view.

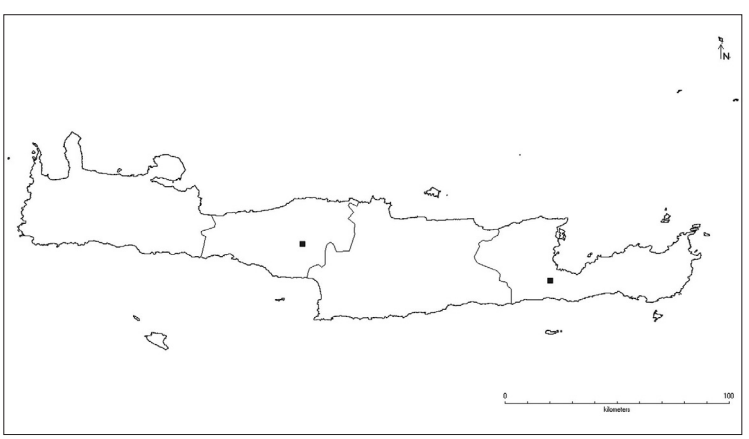


Figure 36. Distribution of *Temnothorax incompletus* sp. nov. on Crete.

microreticulation. Tibiae 0.6 times as long as head length, bearing adpressed setae on the whole surface. Inner margins of tibia without a row of erect setae (Figs 31–32).

General distribution. Greece, Crete.

Biology. The single worker was collected on litter in area overgrown by macchia. The ant species were recorded in the same areas as *T. incompletus*:

Lasithi Prov., Prina: *Aphaenogaster simonellii* Emery, *Camponotus jaliensis* (Dalla Torre), *Crematogaster sordidula* (Nylander), *Plagiolepis pygmaea* (Latreille);

Rethymno Prov., Vistagi: *Aphaenogaster rugosoferruginea* Forel, *A. simonellii* Emery, *Camponotus baldaccii* Emery, *C. gestroi creticus* Forel, *C. kiesenwetteri* (Roger), *Crematogaster* cf. *ionia*, *Lasius lasioides* Emery, *L. turcicus* Santschi, *Lepisiota frauenfeldi* (Mayr), *L. nigra* (Dalla Torre), *Messor mcarthuri* Steiner *et al.*, *Messor wasmanni* Krausse, *Pheidole* cf. *pallidula*, *Plagiolepis taurica* Santschi, *Tapinoma festae* Emery, *Temnothorax ariadnae* Csősz, Heinze & Mikó, *T. recedens* (Nylander), *Tetramorium diomedeum* Emery, *T. kephalosi* Salata & Borowiec, *Trichomyrmex perplexus* (Radchenko).

Temnothorax kraussei (Emery, 1915) (Figs 37–41)

Epimyrma kraussei Emery, 1915: 262, pl. 4, figs. 14–16 (w.q.).
Epimyrma foreli Menozzi, 1921: 29, fig. 2 (w.q.).
Epimyrma vandeli Santschi, 1927b: 126 (q.m.).
Epimyrma kraussei – Buschinger *et al.* 1987: 253.
Temnothorax kraussei – Ward *et. al.* 2015: 15.

Diagnosis. *Temnothorax kraussei* is a social parasite of *Temnothorax* species. Its characteristic features are: 11 segmented antennae, presence of lobe-like appendages on ventral surfaces of petiole and postpetiole, dull body surface and reduced teeth. It's the only member of this group present on Crete.

Type material (label data). Syntype (w.) (CASENT0904776): *Epimyrma* | *kraussei* Emery || TYPUS || Sardagna | Sorgono | 14.III.913 || Museo Civico | di Genova || Collezione | EMERY || ANTWEB | CASENT | 0904776 (MSNG) [image examined].

Type locality. Italy, Sardinia, Sorgono.

General distribution. Algeria; Croatia; France: Corsica, mainland; Greece: Crete, mainland; Germany; Gibraltar; Italy: main-

Figures 37–40. *Temnothorax kraussei* (Emery), worker (scale: 0.5 mm). 37. Dorsal view. 38. Lateral view. 39. Head, sculpture. 40. Head with antennae.

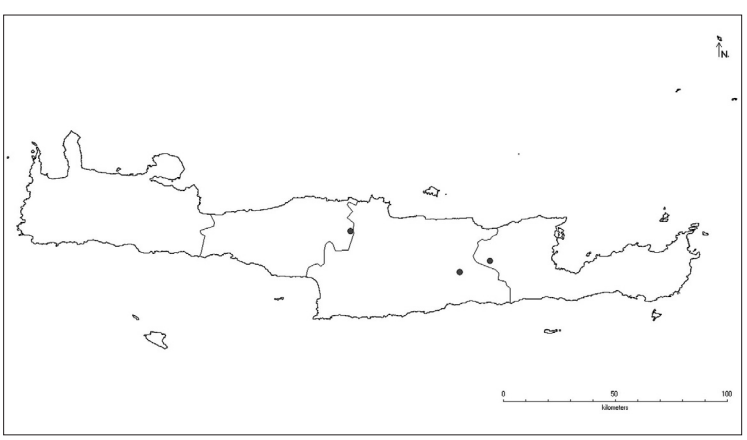


Figure 41. Distribution of *Temnothorax kraussei* (Emery) on Crete.

land, Sardinia; Morocco; Slovenia; Spain: mainland; Turkey.

Distribution on Crete, literature data. Crete: Legakis 2011: 17 (as *Epimyrma kraussei*); Borowiec 2014: 137 (as *Myrmoxenus kraussei*). Iraklion Prov.: Buschinger 1989: 71 – Panagia, SE Heraklion, 350 m a.s.l., 1 IV 1988; Panagia, SE Heraklion, 350 m a.s.l., 6 IV 1988 (as *Epimyrma kraussei*). Lasithi Prov.: Buschinger 1989: 71 – Lasithi Plateau, Kronos cave, 1000 m a.s.l., 15 IV 1988 (as *Epimyrma kraussei*). Rethymno Prov.: Buschinger 1989: 71 – Anogia – Ideon Andron cave, 1100 m a.s.l. 9 IV 1988 (as *Epimyrma kraussei*).

Biology. Social parasite of *Temnothorax* species. On Crete collected in nests of *T. recedens*.

Temnothorax lucidus Csősz, Heinze & Mikó, 2015 (Figs 42–45)

Temnothorax lucidus Csősz, Heinze & Mikó, 2015: 20, figs. 10A–C (w.).

Diagnosis. See *T. ariadnae*.

Type material (label data). Holotype (w.) (CASENT0914692): *Temnothorax*| *lucidus* sp. n. | det. Csősz, 2014 || HOLO- | TYPE || TURKEY, TUR (11)492 | Taurus Mt. | 3 km W. Arslanköy | 37.0024 N, 34.2151 E, 1900mH | 06.11.2011, leg. A. Schulz || ANTWEB | CASENT | 0914692 (HNHM). [examined].

Type locality. Turkey, Taurus Mountains.

Description. See Csősz *et al.* 2015: 20.

General distribution. Greece (Crete), Turkey.

Distribution on Crete, literature data. Rethymno Prov.: Csősz *et al.* 2015: Table 1. –Nida plateau, vicinity of Skinakas, 15 km S Anogia, 35.2093N/24.8946E, 1500–1700 m a.s.l., 20.04.2011; Nida Plateau, 4-7 km N Anogia, 35.2499N/24.8946E, 1200-1400 m a.s.l., 23.04. 2011. Lasithi Prov.: Csősz *et al.* 2015: Table 1. – Lasithi Plateau, 16 km S Malia, 35.1625N/ 25.4560E, 1000 m a.s.l., 18.04. 2011.

Biology. High-mountain species. Biology unknown.

Temnothorax minotaurosi sp. nov. (Figs 46–50)

Differential diagnosis. *Temnothorax minotaurosi* is a member of species characterized by absence of metanotal groove, uniform, dark body colouration and presence of smooth area on the centre of frons. As the only member of this group its mesosoma is covered only with sparse, thick longitudinal striation. At first glance it can be confused with *T. nigritus* (Emery, 1878), from

Figures 42–44. *Temnothorax lucidus* Csősz, Heinze & Mikó, worker (scale: 0.5 mm). 42. Dorsal view. 43. Lateral view. 44. Head, sculpture. Source: www.AntWeb.org, Michele Esposito.

which it differs in more convex petiole node and lack of reticulation on the mesosoma.

Etymology. Name refers to Minotaur /Μινώταυρος/. A mythological creature, part man and part bull, who lived on Crete trapped in a labyrinth built by Daedalus.

Type material (label data). Holotype (w.) (CAS ENT0845915): *Temnothorax minotaurosi* sp. nov. | HOLOTYPEE || GREECE, Crete, Chania Prov. | Imbros Gorge | 35°12.684 N 24°10.104 E | 8 V 2013, 234 m | L. Borowiec (MNHW); Paratypes (8w.) (CAS ENT0845916-CASENT0845923): the same data as holotype (DBET, NHMC).

Type locality. Greece, Crete, Imbros Gorge.

Material examined. GREECE: 3w., Chania Prov., Agia Irini, 35.31667N/23.83333E, 587 m, humid and dark gorge partly overgrown by deciduous forest (*Quercus-Platanus*), HC LS, 01 V 2014, leg. S. Salata (DBET).

Description. Workers (n=10): HL: 0.712 ± 0.02 (0.682-0.737); HW: 0.59 ± 0.02 (0.547-0.625); SL: 0.51 ± 0.01 (0.486-0.525); EL: 0.162 ± 0.01 (0.145-0.179); EW: 0.115 ± 0.008 (0.101-0.123); ML: 0.839 ± 0.03 (0.788-0.894); PSL: 0.209 ± 0.01 (0.196-0.235); SDL: 0.143 ± 0.01 (0.131-0.156); PL: 0.325 ± 0.01 (0.313-0.346); PPL: 0.185 ± 0.01 (0.168-0.201); PH: 0.227 ± 0.01 (0.212-0.254); PPH: 0.222 ± 0.01 (0.201-0.24); HTL: 0.489 ± 0.01 (0.47-0.508); PNW: 0.414 ± 0.01 (0.391-0.436); PW: 0.177 ± 0.01 (0.156-0.201); PPW: 0.234 ± 0.02 (0.212-0.257); HI: 82.9 ± 1.6 (80.1-85.4); SI1: 71.6 ± 1.2 (70.6-74.8); SI2: 86.4 ± 1.4 (84.0-88.8); MI: 57.6 ± 1.2 (56.2-59.7); EI1: 70.9 ± 4.5 (64.7-78.8); EI2: 16.1 ± 0.9 (14.8-17.5); TI: 122.4 ± 1.3 (119.4-123.8); PI: 143.5 ± 5.2 (136.2-150.2); PPI: 83.6 ± 5.8 (73.6-90.1).

Whole body uniformly dark brown. Only flagellum, legs and base of the first tergite of gaster brown to bright brown. Femora with darker central part (Figs 46–49).

Head quadrate, 1.2 times as long as wide, lateral surfaces below and above eyes straight, posterior edges gently convex, occipital margin of head straight (Figs 48–49). Anterior margin of the clypeus slightly convex, with median notch. Eyes small, oval, 1.4 times as long as wide. Antennal scape short, in lateral view slightly curved, 0.7 times as long as length of the head, in apex gradually widened, its base with small, triangular tooth, funiculus long, club 3 segmented (Figs 48–49). Surface of scape with very fine microreticulation, shiny, covered with thin, dense, adpressed setae. Mandibles convex with thick sparse, longitudinal striae, shiny. Clypeus shiny, with thin, sparse, longitudinal striae, area between striae smooth and shiny. Frontal carinae short, not extending beyond frontal lobes. Antennal fossa deep, with a few roundly curved striae, area between striae shiny, with sparse and slight reticulation. Frontal lobes narrow, smooth and shiny (Figs 48–49). Head shiny, thick to thin,

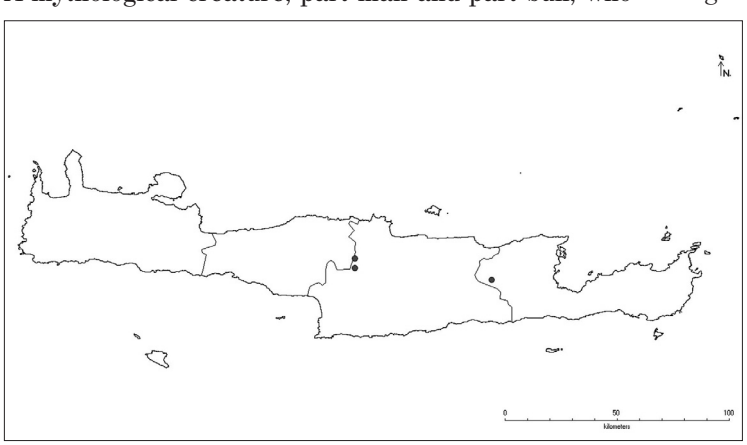


Figure 45. Distribution of *Temnothorax lucidus* Csősz, Heinze & Mikó on Crete.

Figures 46–49. *Temnothorax minotaurosi* sp. nov., worker (scale: 0.5 mm). 46. Dorsal view. 47. Lateral view. 48. Head, sculpture. 49. Head with antennae.

sparse, longitudinal, but sometimes interrupted, striation covers almost whole its surface, center of frons smooth, sometimes area between frons and eyes with sparse and thick reticulation, area between sculpture smooth. Occipital part of head and genae with reduced sculpture (Figs 48–49). Whole head surface bearing suberect to erect, pale, short and thick setae (Figs 48–49).

Mesosoma elongate, 2.0 times as long as wide, slightly arched in profile. Pronotum convex on sides. Propodeal spines long, triangular, with wide base, directed upward, with acute tips (Figs 46–47). Whole meso-soma surface shiny, with thick, sparse longitudinal striation, lateral surfaces sometimes with striation interrupted (Figs 46–47). Entire mesosoma bearing suberect to erect, pale, short and thick setae (Figs 46–47).

Petiole, in lateral view, with long peduncle, node high, with anterior face inclined, posterior face straight, its dorsal surface arched. Postpetiole, in lateral view, regularly convex, apical half with gently convex sides (Figs 46–47). Peduncle and petiolar node and postpetiole dorsum shiny, with thin, dense reticulation, area between rugae smooth, sometimes dorsal surface of petiole with a few wrinkles (Figs 46–47).

Gaster smooth and shiny, bearing erect, thin, pale setae (Figs 46–47). Legs short, shiny, with fine microreticulation. Tibiae 0.6 times as long as head length, bearing adpressed setae on the whole surface. Inner margins of tibia without a row of erect setae (Figs 46–47).

General distribution. Greece, Crete.

Biology. Species inhabiting humid areas overgrown by bushes, usually close to water source. Workers collected on rocks partly covered by vegetation. The ant species were recorded in the same areas as *T. minotaurosi*:

Chania Prov., Agia Irini: see biology description in *T. daidalosi*;

Chania Prov., Imbros: *Aphaenogaster cecconii* Emery, *A. simonellii* Emery, *Camponotus candiotes* Emery, *C. jaliensis* (Dalla Torre), *C. kiesenwetteri* (Roger), *Crematogaster* cf. *ionia*, *C. sordidula* (Nylander), *Lepisiota nigra* (Dalla Torre), *Messor* cf. *semirufus*, *M. mcarthuri* Steiner *et al.*, *M. ibericus* Santschi, *M. wasmanni* Krausse, *Pheidole* cf. *pallidula*, *Tapinoma festae* Emery, *Temnothorax recedens* (Nylander), *Tetramorium punctatum* Santschi.

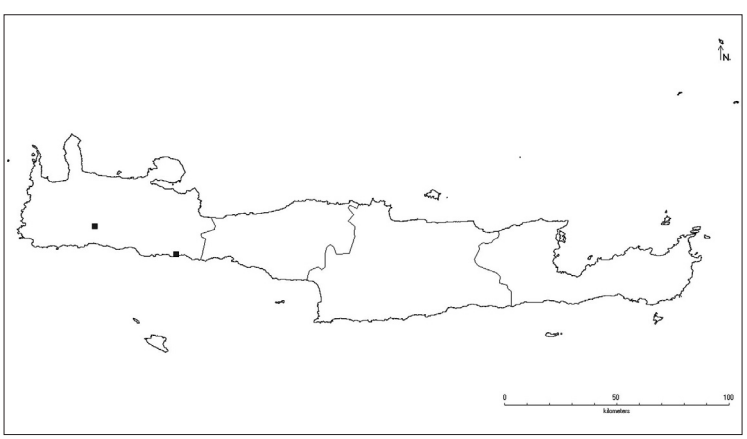


Figure 50. Distribution of *Temnothorax minotaurosi* sp. nov. on Crete.

Temnothorax muellerianus (Finzi, 1922) (Figs 51–55)

Leptothorax (*Temnothorax*) *muellerianus* Finzi, 1922: 118, fig. 1 (w.).
Chalepoxenus gribodoi Menozzi, 1923: 257 (w.q.).
Chalepoxenus insubricus Kutter, 1950: 337, figs. 1–3 (m.).
Chalepoxenus siciliensis Kutter, 1973: 278, figs. 1, 3, 4, 6 (w.q.).
Chalepoxenus muellerianus – Finzi 1924: 123. – Buschinger *et al.* 1988: 939 (biology).
Temnothorax muellerianus – Ward *et al.* 2015: 15.

Diagnosis. Social parasite of *Temnothorax* species. It is characterized by presence of tooth-like projections on the ventral surfaces of petiole and postpetiole, deep metanotal groove and reduced body striation. It is the only known member of this group recorded on Crete.

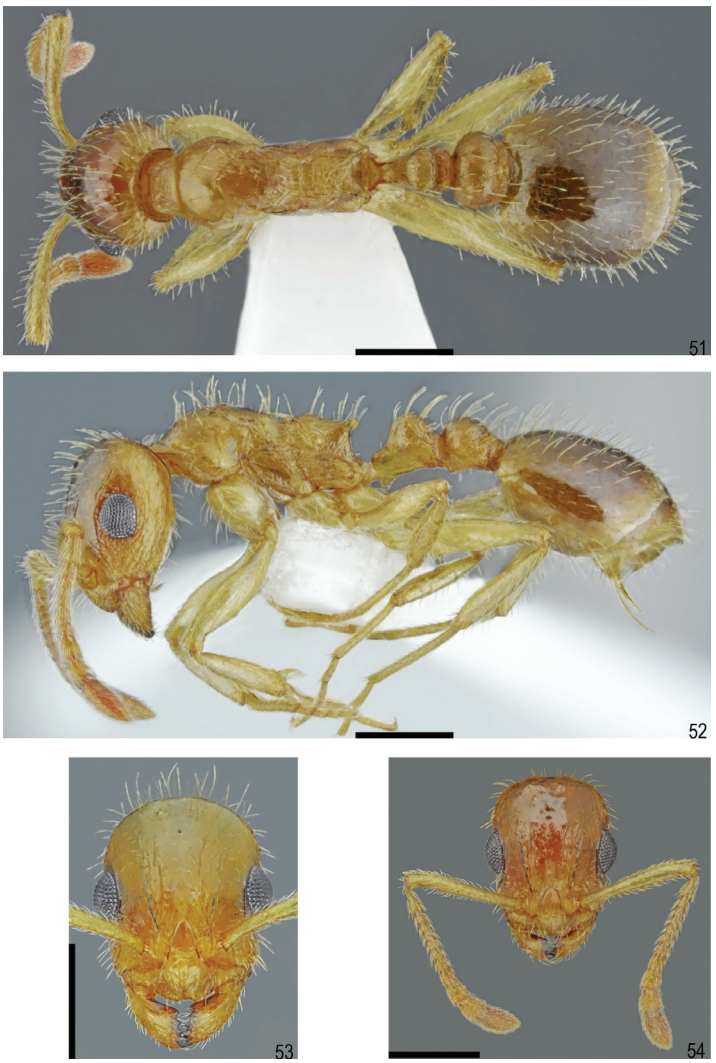
Type locality. Italy.

Material examined. GREECE: 1q.,4w., Lasithi Prov., Erimoupolis, 35.25N/26.25E, 0 m, phrygana, HC, EU, 08 IV 2014, leg. S. Salata (DBET); 5w., Lasithi Prov., Mohlos, 35.16667N/25.9E, 9 m, macchia in a gorge, HC, EU, 06 IV 2014, leg. S. Salata (DBET).

General distribution. Bulgaria; Croatia; Cyprus; France: mainland; Germany; Greece: Crete, Ionian Is., mainland; Italy: mainland; Sicily; Portugal; Serbia; Slovenia; Spain: mainland; Switzerland; Turkey; Ukraine.

Distribution on Crete, literature data. Crete: Legakis 2011: 16 (as *Chalepoxenus muellerianus*); Borowiec 2014: 63 (as *Chalepoxenus muellerianus*); Salata & Borowiec 2015c: 144.

Biology. Social parasite of *Temnothorax* species. On Crete collected from nests of *T. exilis*. When uncovered both gyne and workers were hiding in soil. Whereas host species workers were trying to hide pulpas and eggs. Infected nests were located in very dry and sunny localities.



Figures 51–54. *Temnothorax muellerianus* (Finzi), worker (scale: 0.5 mm). 51. Dorsal view. 52. Lateral view. 53. Head, sculpture. 54. Head with antennae.

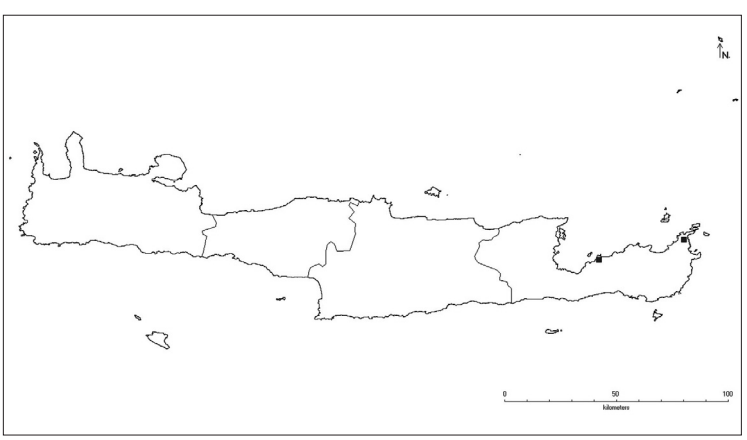


Figure 55. Distribution of *Temnothorax muellerianus* (Finzi) on Crete.

Temnothorax proteii sp. nov. (Figs 56–60, 62)

Differential diagnosis. Member of species characterized by lack of metanotal groove, uneven reddish brown to orange body colouration, presence of propodeal spines and longitudinal striation on head. On Crete it can be confused only with *T. crassistriatus* from which it differs in presence of reticulation between striae on head and mesosoma, higher petiole node

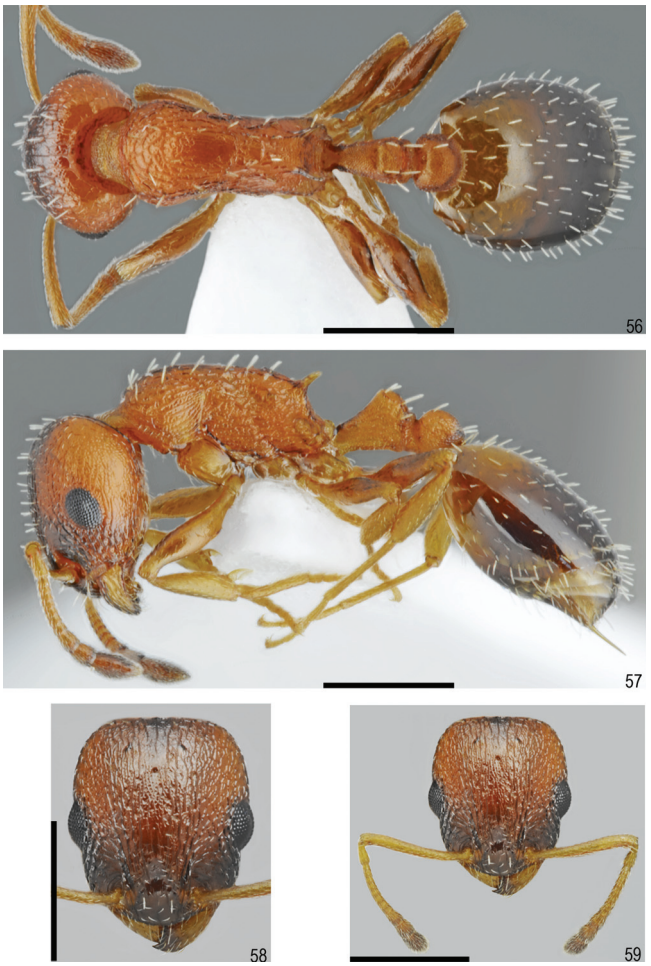
which has flat dorsal surface and absence of striae on petiole and postpetiole. There are other species known from outside the Crete, which has characters similar to *T. proteii*. Most similar is *T. affinis* (Mayr, 1885) from which it differs in lack of longitudinal reticulation on frons, thicker body striation and lack of microstriation between rugosities; from *T. graecus* (Forel, 1911) it differs in flat dorsal surface of propodeum and longer propodeal spines; from *T. clypeatus* (Mayr, 1853) it differs in lack of medial notch on the clypeus anterior margin; from *T. corticalis* (Schenck, 1852) it differs in well-developed petiole peduncle and flat dorsal surface of petiole.

Etymology. Named after Greek sea-god Proteus /Πρωτεύς/ who was known for his ability to change his shape. Specimens of *Temnothorax proteii* vary in head sculpture and propodeal spines length and shape what makes it the most morphologically differentiated species known from Crete.

Type material (label data). Holotype (w.) (CASENT0845924): *Temnothorax* | *proteii* sp. nov. | HOLOTYPEE || Collection L. Borowiec | Formicidae | DBET-GR00565 || GREECE W Crete 10-15 m | Kato Daratso n. Chania | 35°30 ’N/23°59’E litoral | 6 V 2011. L. Borowiec (MNHW); Paratypes (11w.) (CASENT 0845925-CASENT0845935): the same data as holotype (DBET, NHMC).

Type locality. Greece, Crete, Kato Daratso.

Material examined. GREECE: 5w., Chania Prov., Agia, 6 km SW, 35.46666N/23.91666E, 22 m, deciduous forest (*Quercus* sp.) and dry meadows surrounding artificial water reservoir, HC, EU, 03 V 2011, leg. L. Borowiec (DBET); 3w., Chania Prov., Fres n. Vrises, 35.38333N/24.15E, 173 m, pine grove, HC EU, 05 V 2011, leg. L. Borowiec (DBET); 1w., Chania Prov., Koutsomatados-Mili, 35.38333N/23.66666E, 308 m, hill slope overgrown by deciduous forest, HC, 02 V 2011, leg. L. Borowiec (DBET); 1w., Chania Prov., S from Georgioupoli, 35.35N/24.25E, 17 m, fields, HC, 04 V 2007, leg. L. Borowiec & M.L. Borowiec (DBET); 2w., Chania Prov., Therisso, 35.43333N/23.98333E, 320 m, calcareous gorge overgrown by single deciduous trees and phrygana, HC, 01 V 2011, leg. L. Borowiec (DBET); 2w., Chania Prov., Vrisses-Agii Pantes, 35.38333N/24.16667E, 106 m, stream vicinity overgrown by mixed forest, HC, EU, 30 IV 2014, leg. S. Salata (DBET); 6w., Chania Prov., W of Georgioupoli, 35.36666N/24.25E, 17 m, wetlands near road, HC, 02 V 2007, leg. L. Borowiec & M.L. Borowiec (DBET); 3w., Irakleio Prov., Agia Eirini, 35.26667N/25.15E, 130 m, fields and macchia close to a stream, HC, EU, 16 IV 2014, leg. S. Salata (DBET); 1q.,7w., Irakleio Prov., Alagni-Patsideros, 35.16667N/25.21667E, 463 m, olive groves and phrygana, HC, EU, 22 IV 2014, leg. S. Salata (DBET); 5w., Irakleio Prov., Sfendili, 35.25N/25.38333E, 151 m, deciduous forest in small gorge, HC,



Figures 56–59. *Temnothorax proteii* sp. nov., worker (scale: 0.5 mm). 56. Dorsal view. 57. Lateral view. 58. Head, sculpture. 59. Head with antennae.

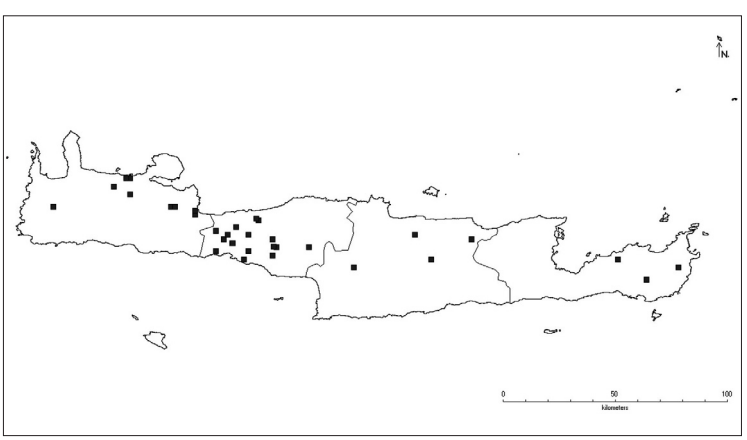


Figure 60. Distribution of *Temnothorax proteii* sp. nov. on Crete.

EU, 01 IV 2014, leg. S. Salata (DBET); 1w., Irakleio Prov., Zaros, 35.13333N/24.9E, 409 m, artificial deciduous forest and macchia surrounding lake, HC, EU, LS, 06 V 2014, leg. S. Salata (DBET); 3w., Lasithi Prov., Chochlades, 35.13333N/26.23333E, 76 m, phrygana and single olive trees in narrow gorge, HC, EU, 08 IV 2014, leg. S. Salata (DBET); 2w., Lasithi Prov., Gorge of Richtis, 35.16667N/25.98333E, 245 m, humid gorge overgrown by deciduous forest and macchia, HC, EU, LS, 06 IV 2014, leg. S. Salata (DBET); 3w., Lasithi Prov., Voila, 35.08333N/26.1E, 578 m, rocks overgrown by macchia, HC, EU, 09 IV 2014, leg. S. Salata (DBET); 11w., Rethymno Prov., Ag. Joannis loc. 1, 35.23333N/24.4E, 448 m, oak forest, HC, EU, LS, 06 V 2013, leg. L. Borowiec & S. Salata (DBET); 2w., Rethymno Prov., Ag. Joannis loc. 4, 35.23333N/24.4E, 480 m, deciduous forest in the vicinity of stream, HC, EU, LS, 06 V 2013, leg. L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., Ambelaki, 35.26666N/24.46666E, 455 m, deciduous forest, HC, EU, 10 V 2013, leg. L. Borowiec & S. Salata (DBET); 4w., Rethymno Prov., Ampelakiou, 35.355556N/24.67944E, 464 m, macchia in small gorge, HC, EU, 10 V 2013, leg. L. Borowiec & S. Salata (DBET); 2w., Rethymno Prov., Antonios Spilia Gorge, 35.25N/24.56666E, 342 m, deciduous forest in gorge, HC, EU, LS, 11 V 2013, L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., Chromonastiri, 35.326944N/24.510278E, 262 m, deciduous forest in gorge, HC, EU, 10 V 2013, L. Borowiec & S. Salata (DBET); 2w., Rethymno Prov., Fourfouras, 35.21666N/24.71666E, 578 m, mountain meadow, HC, EU, 14 V 2013, leg. L. Borowiec & S. Salata (DBET); 4w., Rethymno Prov., Frati, 35.2N/24.46666E, 297 m, oak forest, HC, EU, LS, 07 V 2013, leg. L. Borowiec & S. Salata (DBET); 2w., Rethymno Prov., Gerakari, 35.21666N/24.58333E, 751 m, oak forest, HC, EU, LS, 09 V 2013, leg. L. Borowiec & S. Salata (DBET); 3w., Rethymno Prov., Kissos, 35.18333N/24.56667E, 623 m, deciduous forest, HC, EU, 09 V 2013, leg. L. Borowiec & S. Salata (DBET); 12w., Rethymno Prov., n. Argiroupolis, 35.28333N/24.33333E, 197 m, deciduous forest on wetland, HC, EU, 13 V 2013, leg. L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., n. Velonado, 35.25N/24.36667E, 373 m, deciduous forest on hill slope, HC, EU, LS, 13 V 2013, leg. L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., Oros, 35.33333N/24.5E, 591 m, mixed forest in gorge, HC, EU, LS, 10 V 2013, leg. L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., Palelimnos, 35.3N/24,41666E, 262 m, oak forest, HC, EU, 15 V 2013, leg. L. Borowiec & S. Salata (DBET); 5w., Rethymno Prov., rd. to Preveli Beach loc. 1, 35.16666N/24.45E, 58 m, river bank overgrown by deciduous forest, HC, EU, LS, 07 V 2013, leg. L. Borowiec & S. Salata (DBET); 2w., Rethymno Prov., Rodakino-Sellia, 35.2N/24.33333E, 301 m, phrygana, HC, 08 V 2013, leg. L. Borowiec & S. Salata (DBET); 3w., Rethymno Prov., Setoures, 35.26667N/24.38333E, 305 m, macchia in gorge, HC, EU, 15 V 2013, leg. L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., Spili-Gerakari loc. 2, 35.21987N/24.57144E, 804 m, mountain pasture, HC, 09 V 2013, leg. L. Borowiec & S. Salata (DBET).

Description. Workers (n=15): HL: 0.703 ± 0.02 (0.653-0.748); HW: 0.586 ± 0.02 (0.559-0.614); SL: 0.5 ± 0.02 (0.463-0.542); EL: 0.159 ± 0.006 (0.148-0.168); EW: 0.122 ± 0.006 (0.112-0.134); ML: 0.801 ± 0.03 (0.754-0.872); PSL: 0.194 ± 0.01 (0.17-0.218); SDL: 0.13 ± 0.009 (0.114-0.145); PL: 0.325 ± 0.02 (0.296-0.363); PPL: 0.202 ± 0.01 (0.184-0.223); PH: 0.22 ± 0.009 (0.207-0.24); PPH: 0.217 ± 0.01 (0.201-0.251); HTL: 0.479 ± 0.04 (0.38-0.525); PNW: 0.406 ± 0.02 (0.38-0.447); PW: 0.181 ± 0.01 (0.168-0.201); PPW: 0.239 ± 0.01 (0.218-0.265); HI: 83.2 ± 1.9 (80.6-86.6); SI1: 71.2 ± 1.5 (68.0-74.3); SI2: 85.7 ± 2.0 (81.8-90.0); MI: 59.7 ± 3.8 (47.9-63.4); EI1: 76.5 ± 3.2 (71.4-81.1); EI2: 17.2 ± 1.1 (15.3-18.9); TI: 122.7 ± 9.8 (116.3-151.5); PI: 147.8 ± 5.6 (138.5-159.5); PPI: 91.8 ± 4.8 (82.5-97.4).

Head and mesosoma rusty brown. Vertex centre, posterior parts of frons and malar area brown to black. Flagellum, legs and base of the first tergite of gaster brown to bright brown. Tibiae with darker central part (Figs 56–59).

Head oval, 1.2 times as long as wide, lateral surfaces below and above eyes slightly convex, posterior edges convex, occipital margin of head straight (Figs 58–59). Anterior margin of the clypeus slightly convex, without median notch. Eyes small, oval, 1.3 times as long as wide. Antennal scape short, in lateral view slightly curved, 0.7 times as long as length of the head, in apex gradually widened, its base with small, triangular tooth, funiculus long, club 3 segmented (Figs 58–59). Surface of scape with very fine microreticulation, shiny, covered with thin, dense, adpressed to subdecumbent setae. Mandibles rounded with thick sparse, longitudinal striae, shiny. Clypeus shiny, with a few, thick, longitudinal striae, area between striae smooth and shiny. Frontal carinae short, not extending beyond frontal lobes. Antennal fossa deep, with a few roundly curved striae, area between striae shiny, with sparse and slight reticulation. Frontal lobes narrow, smooth and shiny (Figs 58–59). Frons shiny, with thick, dense longitudinal striation, area between striae, on center and anterior part, with rugosity, posterior part with smooth area. Gena, area between eyes and frontal carina and occipital part of head shiny, with thick reticulation and a few longitudinal, thin striae, area between sculpture microreticulate (Figs 58–59). Whole head surface bearing suberect to erect, pale, short and thick setae (Figs 58–59).

Mesosoma elongate, 2.0 times as long as wide, slightly arched in profile. Pronotum rounded on sides. Propodeal spines medium length, narrow, with wide

base, posterior part directed upward, tips slightly curved downward, sharp (Figs 56–57). Dorsal surface of mesosoma shiny, with dense, thick, longitudinal reticulation, area between sculpture with sparse microreticulation. Lateral surfaces of mesosoma with thick, sparse longitudinal striation, area between striae with dense reticulation (Figs 56–57). Entire mesosoma bearing suberect to erect, pale, short and thick setae (Figs 56–57).

Petiole, in lateral view, with medium-length peduncle, node high, with anterior face straight, posterior face convex, its dorsal surface flat, inclined posteroventral. Postpetiole, in lateral view, regularly convex, apical half with gently convex sides (Figs 56–57). Peduncle, petiolar node and postpetiole dorsum shiny, with thick, dense reticulation, area between rugae smooth (Figs 56–57).

Gaster smooth and shiny, bearing erect, thin, pale setae (Figs 56–57). Legs short, shiny, with fine microreticulation. Tibiae 0.7 times as long as head length, bearing adpressed to documbent setae on the whole surface. Inner margins of tibia without a row of erect setae (Figs 56–57).

Range of the morphological variability. *Temnothorax proteii* is the most morphologically differentiated Cretan species. In the species description we described the holotype, which represents the most common morphology. Nevertheless, specimens of this species can differ in the following features:

Body colouration: except specimens which had body colouration identical with this described above, we could also observe specimens with brighter, reaching up to bright orange or yellow body colouration (Fig. 62). There is also wide variability in the size and colouration of dark stain covering head. It may cover only posterior parts of malar area and frons and be brown or can be black and cover whole malar area, frons and vertex.

Frons sculpture: longitudinal striation can be sometimes interrupted, especially on the anterior part of frons. Rugosity, which covers the area between striation, can sometimes weaken or disappear on the whole frons centre.

Genae sculpture: longitudinal striation can be absent.

Mesosoma sculpture: its dorsal surface can be sometimes covered by thick, sparse to moderately dense longitudinal striae, which may be interrupted, the area between striae is always rugulose. Longitudinal striation can co-occur or be replaced by longitudinal reticulation or irregular reticulation. Lateral surfaces can have longitudinal striation limited to the pronotum.

Petiole sculpture: some specimens have, except rugosity, few wrinkles on its surface.

Propodeal spines: some specimens have propodeal spines short and triangular, in other the tips can be straight.

General distribution. Greece, Crete.

Biology. Workers were reported in material collected on the entomological umbrella. Species inhabiting blackberry bushes growing along the roads, deciduous forests, macchia and bushes overgrowing banks of streams or rivers. Nests have never been found. Probably nesting in dry branches or galls. The following ant species were recorded in the same area as *T. proteii*:

Chania Prov., Agia; Chania Prov., Kato Daratso n. Chania; Chania Prov., Therisso; Rethymno Prov., Antonios Spilia Gorge; Rethymno Prov., Fourfouras; Rethymno Prov., n. Argiroupolis; Rethymno Prov., Rodakino-Sellia; Rethymno Prov., Setoures: see biology description in *T. daidalosi*;

Lasithi Prov., Chochlades: see biology description in *T. crassistriatus*;

Chania Prov., Fres n. Vrises: *Aphaenogaster simonellii* Emery, *Camponotus baldaccii* Emery, *C. gestroi creticus* Forel, *C. kiesenwetteri* (Roger), *Crematogaster* cf. *ionia*, *C. sordidula* (Nylander), *Lepisiota nigra* (Dalla Torre), *Plagiolepis pallescens* sensu Radchenko, *Solenopsis crivellarii* Menozzi, *S. orbula* Emery, *Tetramorium kephalosi* Salata & Borowiec;

Chania Prov., Koutsomatados-Mili: *Aphaenogaster rugosoferruginea* Forel, *A. simonellii* Emery, *Camponotus baldaccii* Emery, *C. kiesenwetteri* (Roger), *Crematogaster ionia* Forel, *Hypoponera eduardi* (Forel), *Lasius lasioides* Emery, *L. turcicus* Santschi, *Lepisiota melas* (Emery), *Messor mcarthuri* Steiner *et al.*, *Monomorium creticum* Emery, *Plagiolepis pygmaea* (Latreille), *Tapinoma erraticum* (Latreille), *Tetramorium kephalosi* Salata & Borowiec;

Chania Prov., S from Georgioupoli: *Aphaenogaster simonellii* Emery, *Camponotus candiotes* Emery, *C. kiesenwetteri* (Roger), *C. ionia* Forel, *Lepisiota melas* (Emery);

Chania Prov., Vrisses-Agii Pantes: *Aphaenogaster simonellii* Emery, *A. subterraneoides* Emery, *Camponotus candiotes* Emery, *C. gestroi creticus* Forel, *C. lateralis* (Olivier), *Crematogaster ionia* Forel, *Monomorium creticum* Emery, *Tapinoma erraticum* (Latreille);

Chania Prov., W of Georgioupoli: *Lasius bombycina* Seifert & Galkowski;

Irakleio Prov., Agios Eirini: *Aphaenogaster rugosoferruginea* Forel, *A. simonellii* Emery, *Camponotus candiotes* Emery, *C. gestroi creticus* Forel, *C. lateralis* (Olivier), *Crematogaster ionia* Forel, *C. sordidula* (Nylander), *Lasius turcicus* Santschi, *Lepisiota nigra* (Dalla Torre), *Messor ibericus* Santschi, *Temnothorax exilis* (Emery);

Irakleio Prov., Alagni-Patsideros: *Aphaenogaster simonellii* Emery, *Camponotus baldaccii* Emery,

C. gestroi creticus Forel, *Crematogaster ionia* Forel, *C. sordidula* (Nylander), *Messor ibericus* Santschi, *M. wasmanni* Krausse, *Pheidole* cf. *pallidula*, *Plagiolepis pygmaea* (Latreille);

Irakleio Prov., Sfendili: *Aphaenogaster simonellii* Emery, *Camponotus candiotes* Emery, *C. jaliensis* (Dalla Torre), *C. kiesenwetteri* (Roger), *C. lateralis* (Olivier), *Crematogaster sordidula* (Nylander), *Lasius turcicus* Santschi, *Messor wasmanni* Krausse;

Irakleio Prov., Zaros: *Aphaenogaster simonellii* Emery, *Camponotus baldaccii* Emery, *C. candiotes* Emery, *Camponotus gestroi creticus* Forel, *Crematogaster* cf. *ionia*, *C. sordidula* (Nylander), *Lasius bombycina* Seifert & Galkowski, *Lepisiota nigra* (Dalla Torre), *Messor mcarthuri* Steiner *et al*., *Monomorium creticum* Emery, *Pheidole* cf. *pallidula*, *Tapinoma festae* Emery, *Temnothorax recedens* (Nylander), *Tetramorium* cf. *caespitum*;

Lasithi Prov., Gorge of Richtis: *Aphaenogaster rugosoferruginea* Forel, *Camponotus candiotes* Emery, *C. gestroi creticus* Forel, *Crematogaster sordidula* (Nylander), *Lasius tapinomoides*, *L. lasioides* Emery, *Messor wasmanni* Krausse, *Tetramorium* cf. *caespitum*;

Lasithi Prov., Voila: *Aphaenogaster simonellii* Emery, *A. subterraneoides* Emery, *Camponotus baldaccii* Emery, *Camponotus candiotes* Emery, *Camponotus gestroi creticus* Forel, *Crematogaster sordidula* (Nylander), *Lasius lasioides* Emery, *Lepisiota nigra* (Dalla Torre), *Temnothorax variabilis* sp. nov., *Tetramorium* cf. *caespitum*, *T. punctatum* Santschi;

Rethymno Prov., Ag. Joannis loc. 1: *Camponotus gestroi creticus* Forel, *C. lateralis* (Olivier), *Cataglyphis aenescens* (Nylander), *Crematogaster ionia* Forel, *Lasius bombycina* Seifert & Galkowski, *Monomorium creticum* Emery, *Solenopsis crivellarii* Menozzi, *Temnothorax ariadnae* Csősz, Heinze & Mikó;

Rethymno Prov., Ag. Joannis loc. 4: *Aphaenogaster rugosoferruginea* Forel, *Camponotus baldaccii* Emery, *C. candiotes* Emery, *C. kiesenwetteri* (Roger), *Crematogaster sordidula* (Nylander), *Lasius lasioides* Emery, *Lepisiota melas* (Emery), *Monomorium creticum* Emery, *Plagiolepis pallescens* sensu Radchenko, *Solenopsis crivellarii* Menozzi, *Temnothorax flavicornis*, *T. recedens* (Nylander), *T. variabilis* sp. nov., *Tetramorium* cf. *caespitum*, *T. diomedeum* Emery;

Rethymno Prov., Ambelaki: *Crematogaster ionia* Forel, *Tapinoma erraticum* (Latreille), *T. festae* Emery, *Tetramorium* cf. *caespitum*;

Rethymno Prov., Ampelakiou: *Aphaenogaster simonellii* Emery, *Camponotus baldaccii* Emery, *C. candiotes* Emery, *C. gestroi creticus* Forel, *C. kiesenwetteri* (Roger), *Crematogaster sordidula* (Nylander), *Lasius bombycina* Seifert & Galkowski, *Lepisiota nigra* (Dalla Torre), *Messor mcarthuri* Steiner *et al*., *M. wasmanni* Krausse, *Pheidole* cf. *pallidula*, *Plagiolepis pallescens* sensu Radchenko, *Tapinoma erraticum* (Latreille), *Tetramorium* cf. *caespitum*, *Tetramorium punctatum* Santschi;

Rethymno Prov., Chromonastiri: *Aphaenogaster cecconii* Emery, *A. rugosoferruginea* Forel, *A. simonellii* Emery, *Camponotus candiotes* Emery, *C. gestroi creticus* Forel, *C. kiesenwetteri* (Roger), *Crematogaster ionia* Forel, *C. sordidula* (Nylander), *Lasius lasioides* Emery, *Lasius turcicus* Santschi, *Lepisiota nigra* (Dalla Torre), *Messor wasmanni* Krausse, *Pheidole* cf. *pallidula*, *Temnothorax ariadnae* Cs sz, Heinze & Mikó, *T. variabilis* sp. nov.;

Rethymno Prov., Frati: *Aphaenogaster rugosoferruginea* Forel, *A. simonellii* Emery, *Camponotus baldaccii* Emery, *C. lateralis* (Olivier), *Crematogaster ionia* Forel, *C. sordidula* (Nylander), *Lasius turcicus* Santschi, *Messor muticus* (Nylander), *Messor wasmanni* Krausse, *Monomorium creticum* Emery, *Pheidole* cf. *pallidula*, *Tetramorium kephalosi* Salata & Borowiec;

Rethymno Prov., Gerakari: *Aphaenogaster rugosoferruginea* Forel, *A. subterraneoides* Emery, *Camponotus aethiops* (Latreille), *Lasius psammophilus* Seifert, *Monomorium creticum* Emery, *Temnothorax variabilis* sp. nov., *T. ariadnae* Csősz, Heinze & Mikó;

Rethymno Prov., Kissos: *Aphaenogaster rugosoferruginea* Forel, *A. simonellii* Emery, *Camponotus aethiops* (Latreille), *C. baldaccii* Emery, *C. gestroi creticus* Forel, *C. jaliensis* (Dalla Torre), *C. kiesenwetteri* (Roger), *C. lateralis* (Olivier), *Cataglyphis aenescens* (Nylander), *Crematogaster* cf. *ionia*, *Crematogaster sordidula* (Nylander), *Lasius lasioides* Emery, *L. turcicus* Santschi, *Lepisiota melas* (Emery), *L. nigra* (Dalla Torre), *Messor ibericus* Santschi, *M. wasmanni* Krausse, *Monomorium creticum* Emery, *Pheidole* cf. *pallidula*, *Plagiolepis pallescens* sensu Radchenko, *Solenopsis crivellarii* Menozzi, *Tapinoma erraticum* (Latreille), *Tetramorium* cf. *caespitum*, *T. diomedeum* Emery, *Tetramorium punctatum* Santschi;

Rethymno Prov., n. Velonado: *Aphaenogaster simonellii* Emery, *Camponotus aethiops* (Latreille), *C. candiotes* Emery, *C. kiesenwetteri* (Roger), *Crematogaster ionia* Forel, *Lasius lasioides* Emery, *L. bombycina* Seifert & Galkowski, *Lepisiota nigra* (Dalla Torre), *Messor ibericus* Santschi, *Messor wasmanni* Krausse, *Monomorium creticum* Emery, *Pheidole* cf. *pallidula*, *Plagiolepis pallescens* sensu Radchenko, *Solenopsis crivellarii* Menozzi, *Solenopsis orbula* Emery, *Tapinoma erraticum* (Latreille), *Temnothorax ariadnae* Csősz, Heinze

Figures 61–62. 61. *Temnothorax daidalosi* sp. nov., specimen with long propodeal spines (scale: 0.5 mm). 62. *Temnothorax proteii* sp. nov., specimen with bright body colouration (scale: 0.5 mm).

& Mikó, *T. recedens* (Nylander), *Tetramorium diomedeum* Emery, *Tetramorium punctatum* Santschi;

Rethymno Prov., Oros: *Aphaenogaster simonellii* Emery, *Camponotus gestroi creticus* Forel, *C. kiesenwetteri* (Roger), *Crematogaster sordidula* (Nylander), *Lepisiota nigra* (Dalla Torre), *Messor mcarthuri* Steiner *et al*., *Messor wasmanni* Krausse, *Monomorium creticum* Emery, *Pheidole* cf. *pallidula*, *Tetramorium punctatum* Santschi;

Rethymno Prov., Palelimnos: *Aphaenogaster rugosoferruginea* Forel, *A. simonellii* Emery, *Camponotus baldaccii* Emery, C. *candiotes* Emery, *C. jaliensis* (Dalla Torre), *C. kiesenwetteri* (Roger), *Crematogaster* cf. *ionia*, C. *sordidula* (Nylander), *Lasius turcicus* Santschi, *Lepisiota nigra* (Dalla Torre), *Messor wasmanni* Krausse, *Pheidole* cf. *pallidula*, *Plagiolepis pallescens* sensu Radchenko, *Solenopsis crivellarii* Menozzi, *Temnothorax recedens* (Nylander), *Tetramorium* cf. *caespitum*, *T. diomedeum* Emery, *T. kephalosi* Salata & Borowiec;

Rethymno Prov., rd. to Preveli Beach loc. 1: *Aphaenogaster rugosoferruginea* Forel, *A. simonellii* Emery, *Camponotus baldaccii* Emery, *C. candiotes* Emery, *C. gestroi creticus* Forel, *C. kiesenwetteri* (Roger), *Cardiocondyla mauritanica* Forel, *Crematogaster* cf. *ionia* Forel, *Cryptopone ochracea* (Mayr), *Lasius tapinomoides*, *L. lasioides* Emery, *L. bombycina* Seifert & Galkowski, *L. psammophilus* Seifert, *Lepisiota frauenfeldi* (Mayr), *L. nigra* (Dalla Torre), *Messor ibericus* Santschi, *M. wasmanni* Krausse, *Pheidole* cf. *pallidula*, *Plagiolepis pallescens* sensu Radchenko, *Temnothorax recedens* (Nylander), *Tetramorium* cf. *caespitum*, *Tetramorium punctatum* Santschi;

Rethymno Prov., Spili-Gerakari loc. 2: *Camponotus aethiops* (Latreille), *C. candiotes* Emery, *Lasius bombycina* Seifert & Galkowski, *Solenopsis crivellarii* Menozzi.

Comment. This species is the most abundant *Temnothorax* species on Crete. Workers are characterized by wide differentiation in body length, head and mesosoma sculpture and shape and length of propodeal spines. Small workers have denser and gentler body sculpture and their propodeal spines are shorter. That makes them similar to species from the *T. graecus* group. Bigger workers have sparse, thick body sculpture and well developed propodeal spines, like species from the *T. affinis* group. Both forms were collected almost always from the same plant or bush. We collected also specimens bearing intermediate features. That proves that they represent a single species. Such wide variation of characters we observed in other Greek species of *Temnothorax* which establish nests inside stems of plants. Because we failed to collect the nest sample of such a common species, we suspect that *T. proteii* also has nests inside plant stems.

Temnothorax recedens (Nylander, 1856)
(Figs 63–67, 73)

Myrmica recedens Nylander, 1856: 94, pl. 3, fig. 41 (w.).
Leptothorax (*Temnothorax*) *mordax* Santschi, 1919: 242 (q.).
Leptothorax (*Temnothorax*) *pictus* Emery, 1924b: 166 (w.).
Leptothorax (*Temnothorax*) *recedens* (Nylander) var. *barbarus* Santschi, 1939: 76 (w.q.).
Leptothorax (*Temnothorax*) *ergatogyna* Bernard, 1950: 17, fig. 3 (w.q.).
Temnothorax recedens – Mayr 1861: 68.
Leptothorax (*Temnothorax*) *recedens* – Forel 1890: lxxii.
Temnothorax recedens – Bolton 2003: 271.

Diagnosis. It is the only known species on Crete characterized by deep metanotal groove, big eyes, and reduced body sculpture (mesosoma and head on almost whole surface smooth and shiny).

Type locality. France.

Material examined. GREECE: 2w., Chania Prov., Greleska-Agioi Theodoroi, 135.31667N/23.85E, 171 m, 19 VII 2013, leg. S. Simaiakis (NHMC); 1w., Irakleio

Prov., Achentrias, 34.98333N/25.21667E, 750 m, pitfall trap, 28 IX 1999, leg. M. Papadimitrakis (NHMC); 1w., Lasithi Prov., Kroustas, 35.1N/25.66667E, 400 m, pitfall trap, 31 VI 2000, leg. E. Nikolakakis (NHMC); 2w., Lasithi Prov., Milatos, 35.3N/25.58333E, 310 m, pitfall trap, 12 VII 2000, leg. M. Chatzaki (NHMC); 1w., Rethymno Prov., Garazo, 35.33333N/24.78333E, 100 m, pitfall trap, 21 VIII 1999, leg. E. Nikolakakis (NHMC); 2w., Rethymno Prov., Moni Preveli, 35.15N/24.46667E, 15 m, pitfall trap, 26 VIII 1996, leg. M. Maroukli (NHMC); 2w., Chania Prov., Diktamos Gorge n. Stilos, 35.43333N/24.1E, 160 m, calcareous gorge overgrown by singe *Platanus* sp. trees, HC, 04 V 2011, leg. L. Borowiec (DBET); 1w., Chania Prov., Imbros, 35.2N/24.16666E, 234 m, calcareous gorge partly overgrown by deciduous forest and phrygana, HC, EU, 08 V 2013, leg. L. Borowiec (DBET); 2w., Chania Prov., Kato Daratso, 35.5N/23.98333E, 35-40 m, sandy, anthropogenic seaside overgrown by single pine trees and phrygana, HC and EU, 30 IV 2011, leg. L. Borowiec (DBET); 3w., Chania Prov., Therisso, 35.43333N/23.98333E, 320 m, calcareous gorge overgrown by single deciduous trees and phrygana, HC, 01 V 2011, leg. L. Borowiec (DBET); 2w., Chania Prov., Tzitzifes n. Vrises, 35.35N/24.15E, 264 m, olive groves and limestone rocks, HC, 05 V 2011, leg. L. Borowiec (DBET); 2w., Irakleio Prov., Gortys, 35.05N/24.93333E, 151 m, ruins of medieval basilica surrounded by olive groves, situated close to a dry riverbank, HC, EU, 03 V 2014, leg. S. Salata (DBET); 2w., Irakleio Prov., Avgeniki, 35.18333N/25.01667E, 227 m, humid and dark gorge with singe pine trees, HC, EU, LS, 03 V 2014, leg. S. Salata (DBET); 1q.,10w., Irakleio Prov., Katofigi, 35.08333N/25.4E, 560 m, deciduous forest on hill slope, HC, LS, 12 IV 2014, leg. S. Salata (DBET); 1w., Irakleio Prov., Miamou, 34.96667N/24.93333E, 494 m, gorge overgrown by macchia and phrygana, HC, EU, 24 IV 2014, leg. S. Salata (DBET); 1q.,10w., Irakleio Prov., Rouvas loc. 2, 35.15N/24.83333E, 1089 m, rocky mountain hills overgrown by oak forest, HC, EU, LS, 03 V 2014, leg. S. Salata (DBET); 4w., Irakleio Prov., Rouvas Gorge, 35.14444N/24.9061E, 455 m, wet area in gorge overgrown by deciduous trees and surrounded by phrygana, HC, EU, LS, 24 IV 2014, leg. S. Salata (DBET); 5w., Irakleio Prov., Zaros, 35.13333N/24.9E, 409 m, artificial deciduous forest and macchia surrounding lake, HC, EU, LS, 06 V 2014, leg. S. Salata (DBET); 1w., Lasithi Prov., Kalami-Psari Forada, 35.016667N/25.48333E, 419 m, mixed forest in gorge, HC, EU, LS, 12 IV 2014, leg. S. Salata (DBET); 2w., Lasithi Prov., Lastros, 35.13333N/25.88333E, 336 m, phrygana, HC, 10 IV 2014, leg. S. Salata (DBET); 1w., Lasithi Prov., Moni Toplou Gorge, 35.21667N/26.2E, 151 m, olive groves and surrounding phrygana, HC, EU, 08 IV 2014, leg. S. Salata (DBET); 2w., Lasithi Prov., Praisos, 35.11667N/26.06667E, 320 m, olive grove and macchia in gorge, HC, EU, 09 IV 2014, leg. S. Salata (DBET); 3w., Lasithi Prov., Schinokapsala-Agios Ioannis, 35.05N/25.85E, 400 m, deciduous forest in hill slope, HC, EU, 10 IV 2014, leg. S. Salata (DBET); 2w., Rethymno Prov., Ag. Joannis loc. 4, 35.23333N/24.4E, 480 m, deciduous forest in the vicinity of stream, HC, EU, LS, 06 V 2013, leg. L. Borowiec & S. Salata (DBET); 3w., Rethymno Prov., Fourfouras, 35.21666N/24.71666E, 578 m, mountain meadow, HC, EU, 14 V 2013, leg. L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., Kato Malaki, 35.28333N/24.4E, 235 m, deciduous forest, HC, EU, LS, 15 V 2013, leg. L. Borowiec & S. Salata (DBET); 4w., Rethymno Prov., Kotsifou Gorge, 35.2N/24.38333E, 57 m, macchia in gorge, HC, EU, 05 V 2013, leg. L. Borowiec & S. Salata (DBET); 8w., Rethymno Prov., Kissou Kampos, 35.16666N/24.55E, 514 m, macchia and deciduous forest on hill slope, HC, EU, LS, 14 V 2013, leg. L. Borowiec & S. Salata (DBET); 2w., Rethymno Prov., Kourtaliotiko Gorge, 35.18333N/24.45E, 158 m, limestone gorge partly overgrown by macchia, HC, EU, 06 V 2013, leg. L. Borowiec & S. Salata (DBET); 3w., Rethymno Prov., n. Velonado, 35.25N/24.36667E, 373 m, deciduous forest on hill slope, HC, EU, LS, 13 V 2013, leg. L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., Palelimnos, 35.3N/24,41666E, 262 m, oak forest, HC, EU, 15 V 2013, leg. L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., rd. to Preveli Beach loc. 1, 35.16666N/24.45E, 58 m, river bank overgrown by deciduous forest, HC, EU, LS, 07 V 2013, leg. L. Borowiec & S. Salata (DBET); 3w., Rethymno Prov., Selli-Oros, 35.28333N/24.5E, 473 m, single oak trees near road, HC, 11 V 2013, leg. L. Borowiec & S. Salata (DBET); 1q.,1w., Rethymno Prov., Setoures, 35.26667N/24.38333E, 305 m, macchia in gorge, HC, EU, 15 V 2013, leg. L. Borowiec & S. Salata (DBET); 5w., Rethymno Prov., Vistagi, 35.23333N/24.68333E, 563 m, macchia in gorge, HC, EU, 16 V 2013, leg. L. Borowiec & S. Salata (DBET).

Redescription (based on Cretan specimens). Workers (n=15): HL: 0.637 ± 0.07 (0.503-0.745); HW: 0.518 ± 0.06 (0.408-0.603); SL: 0.623 ± 0.07 (0.491-0.735); EL: 0.138 ± 0.01 (0.106-0.156); EW: 0.095 ± 0.01 (0.067-0.112); ML: 0.787 ± 0.116 (0.609-0.978); PSL: 0.129 ± 0.03 (0.089-0.179); SDL: 0.141 ± 0.03 (0.084-0.19); PL: 0.293 ± 0.04 (0.212-0.358); PPL: 0.216 ± 0.03 (0.156-0.257); PH: 0.199 ± 0.03 (0.156-0.246); PPH: 0.193 ± 0.03 (0.154-0.243); HTL: 0.518 ± 0.08 (0.358-0.603); PNW: 0.364 ± 0.05 (0.279-0.441); PW: 0.142 ± 0.02 (0.109-0.168); PPW: 0.213 ± 0.03 (0.156-0.257); HI: 81.2 ± 2.3 (77.7-85.9); SI1: 97.7 ± 3.9 (92.3-108.1); SI2: 120.3 ± 2.7 (115.6-125.8); MI: 65.0 ± 8.1 (49.3-75.0); EI1: 69.9 ± 8.7 (53.8-78.9); EI2: 15.0 ± 1.7 (12.8-17.9); TI: 102.4 ± 13.0 (87.1-132.0); PI: 147.6 ± 10.4 (128.1-167.1); PPI: 112.0 ± 10.7 (94.2-131.3).

Head and gaster brown to dark brown. Mesosoma mostly in the same colouration as head, but with orange pronotum. Sometimes orange area covering

Figures 63–66. *Temnothorax recedens* (Nylander), worker (scale: 0.5 mm). 63. Dorsal view. 64. Lateral view. 65. Head, sculpture. 66. Head with antennae.

some parts of mesonotum and propodeum, in extreme examples the whole mesosoma orange. Base of the first tergite of gaster with bright brown to orange spot. Antennae and legs with the same colouration as mesonotum. Femora with dark spots in central part (Figs 63–66, 73).

Head oval, 1.2 times as long as wide, lateral surfaces below eyes straight, above eyes gently convex, posterior edges convex, occipital margin of head convex (Figs 65–66). Anterior margin of the clypeus slightly rounded, medial notch absent. Eyes big, oval, 1.5 times as long as wide. Antennal scape long, in lateral view slightly curved, 0.9 times as long as length of the head, in apex gradually narrowed, its base with small, triangular tooth, funiculus long, club 3 segmented (Figs 65–66). Surface of scape with very fine microreticulation, shiny, covered with dense, suberect to erect setae. Mandibles rounded with thick sparse, longitudinal striae, shiny. Clypeus shiny and smooth. Frontal carinae short, not extending beyond frontal lobes. Antennal fossa deep, smooth and shiny. Frontal lobes narrow, smooth and shiny (Figs 65–66). Head on the almost whole surface smooth and shiny. Sculpture, if occurs, limited to sparse, thin, longitudinal striation on the area between eyes and mandibles (Figs 65–66). Entire head bearing from suberect to erect, pale, long and thick setae (Figs 65–66).

Mesosoma elongate, 2.2 times as long as wide, slightly arched in profile. Metanotal groove deep. Pronotum convex on sides. Propodeal spines short, with wide base, directed upward, with acute tips (Figs 63–64, 73). Dorsal surface of promesonotum smooth and shiny, sometimes with few longitudinal wrinkles. Dorsal surface of propodeum shiny, smooth or with slight reticulation. Lateral surfaces of pronotum smooth and shiny. Lateral surfaces of mesonotum and propodeum shiny, with slight, longitudinal striation or reticulation (Figs 63–64, 73). Entire mesosoma bearing suberect to erect, pale, long and thick setae (Figs 63–64, 73).

Petiole, in lateral view, with short peduncle, node high, with anterior and posteriol faces straight or convex, its dorsal surface arched. Postpetiole, in lateral view, regularly convex, apical half with gently convex sides (Figs 63–64, 73). Peduncle and petiolar node and postpetiole dorsum shiny, with thin, microreticulation, area between rugae smooth, central parts of dorsal surfaces of petiolar node and postpetiole dorsum smooth. Petiole and postpetiole on dorsal surfaces bearing sparse, long, semierect to erect setae (Figs 63–64, 73).

Gaster smooth and shiny, bearing erect, thin, pale setae (Figs 63–64, 73). Legs short, shiny, with fine microreticulation. Tibiae 0.7 times as long as head length, bearing adpressed setae on the whole surface. Inner margins of tibia and femora with erect setae (Figs 63–64, 73).

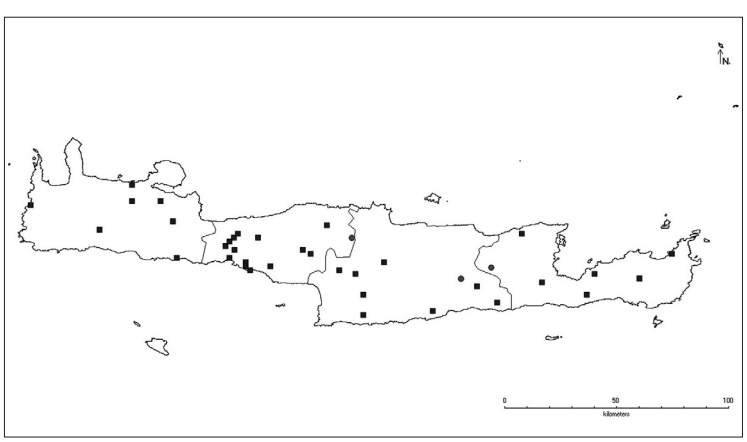


Figure 67. Distribution of *Temnothorax recedens* (Nylander) on Crete.

General distribution. Armenia; Bulgaria; Croatia; Cyprus; France: Corsica, mainland; Georgia; Gibraltar; Greece: Aegean Is., Crete, Dodecanese, mainland; Israel; Italy: mainland, Sardinia, Sicily; Macedonia; Malta; Morocco; Portugal; Serbia; Spain: Baleares, mainland; Switzerland; Tunisia; Turkey.

Distribution on Crete, literature data. Crete: Legakis 2011: 19; Borowiec 2014: 187. Iraklion Prov.: Buschinger 1989: 71 – Panagia, SE Heraklion, 350 m a.s.l., 1 IV 1988; Panagia, SE Heraklion, 350 m a.s.l., 6 IV 1988 (as *Leptothorax* (*Temnothorax*) *recedens* (Nylander)). Lasithi Prov.: Buschinger 1989: 71 – Lasithi Plateau, Kronos cave, 1000 m a.s.l., 15 IV 1988 (as *Leptothorax* (*Temnothorax*) *recedens* (Nylander)). Rethymno Prov.: Buschinger 1989: 71 – Angina – Ideon Andron cave, 1100 m a.s.l., 9 IV 1988 (as *Leptothorax* (*Temnothorax*) *recedens* (Nylander));

Biology. Species with very wide habitat preferences. Collected in deciduous forests, bushes growing along water sources, phrygana and in mountains. Nests most often in soil, sometimes under stones or in rocks crevices. Workers collected in litter or on rocks. Colonies polygynous.

Comment. Cretan populations of *Temnothorax recedens* are distinctly bicoloured, with head, lateral parts of mesosoma, and large part of gaster always darker than the rest of body. It differ them from populations from eastern part of Greece, which have less contrasting colouration. Cretan specimens have propodeal spines short, shorter than in most populations from southern and central Greece. Such combination of characters makes Cretan populations more similar to the populations from western part of its distribution areal. Perhaps, *Temnothorax recedens* is a complex of cryptic species and this hypothesis should be verified by genetic and morphometric studies.

Temnothorax semiruber (André, 1881)
(Figs 68–72, 74)

Leptothorax rottenbergi var. *semiruber* André, 1881: 72 (w.).
Leptothorax rottenbergi var. *balcanica* Santschi, 1909: 474, fig. 7 (w.).
Leptothorax rottenbergi var. *jesus* Forel, 1913a: 432 (w.).
Leptothorax rottenbergi st. *semiruber* var. *galatica* Santschi, 1921: 111, unavailable name.
Temnothorax semiruber – Bolton 2003: 271.

Diagnosis. *Temnothorax semiruber* is the only species known from Crete characterized by following features: sparse and thick body sculpture, long petiole peduncle and propodeal spines, low and rounded petiole node and shiny body surface. It is the largest and the most strongly sculptured species among Cretan *Temnothorax* species.

Type material (label data). Lectotype (w.) (CAS ENT0915396): Lectotypus | *Leptothorax rettenbergii* var. | *semiruber*, André 1881 | det. A. SCHULZ 1998 || TYPE || *Leptothorax* | *semiruber* | André || Tiberiade | abeille || MUSEUM PARIS | COLLECTION | ERNEST ANDRÉ | 1914 || Muséum Paris | EY9198 || ANTWEB | CASENT | 0915396 (MNHN) [examined].

Type locality. Israel, Tiberiade.

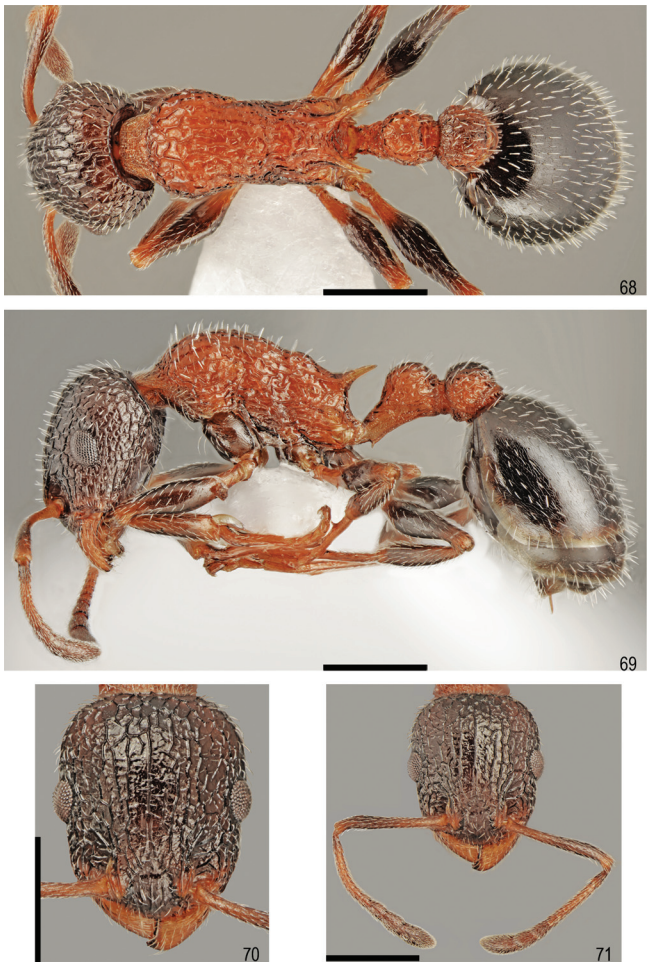
Material examined. GREECE: 1w., Irakleio Prov., Omalos Viannou, 35.06667N/25.43333E, 1100 m, pitfall trap, 28 IX 1999, leg. M. Papadimitrakis (NHMC); 2w., Irakleio Prov., Dikti, 35.11667N/25.46667E, 1450 m, pitfall trap, 10 V 2001, leg. E. Nikolakakis (NHMC); 3w., Chania Prov., Omalos, 35.31667N/23.9E, 1122 m, mountain plateau – macchia, HC, 03 V 2014, leg. S. Salata (DBET); 4w., Chania Prov., Omalos, 35.33333N/23.88333E, 1034 m, mountain plateau, soil ramp separating fields, HC, 03 V 2011, leg. L. Borowiec (DBET); 1w., Lasithi Prov., Kaminaki loc. 2, 35.13333N/25.45E, 1169 m, mixed forest, HC, EU, LS, 16 IV 2014, leg. S. Salata (DBET); 4w., Rethymno Prov., Nida plateau, 35.2N/24.83333E, 1370 m, pasture on mountain plateau, HC, EU, 29 IV 2014, leg. S. Salata (DBET); 9w., Rethymno Prov., rd. to Nida plateau, 35.25N/24.88333E, 1166 m, mountain meadow with single deciduous trees, HC, EU, 26 IV 2014, leg. S. Salata (DBET).

Original description and redescription. See André 1881: 72.

Redescription (based on Cretan specimens). Workers (n=4): HL: 0.802 ± 0.03 (0.771-0.832); HW: 0.632 ± 0.02 (0.609-0.654); SL: 0.585 ± 0.01 (0.57-0.603); EL: 0.171 ± 0.005 (0.168-0.179); EW: 0.137 ± 0.008 (0.131-0.151); ML: 0.969 ± 0.04 (0.921-1.011); PSL: 0.291 ± 0.02 (0.268-0.313); SDL: 0.152 ± 0.01 (0.134-0.162); PL: 0.42 ± 0.02 (0.408-0.447); PPL: 0.249 ± 0.01 (0.24-0.263); PH: 0.268 ± 0.0 (0.268-0.268); PPH: 0.294± 0.008 (0.282-0.302); HTL: 0.543 ± 0.015 (0.531-0.57); PNW: 0.494 ± 0.015 (0.474-0.514); PW: 0.252 ± 0.007 (0.246-0.263); PPW: 0.294 ± 0.006(0.285-0.302); HI: 78.8 ± 0.4 (78.3-79.4); SI1: 73.0 ± 0.8 (71.9-73.9); SI2: 92.6 ± 1.4 (90.6-94.2); MI: 56.1 ± 1.4 (53.9-57.7); EI1: 80.0 ± 2.6 (78.0-84.4); EI2: 17.1 ± 0.8 (16.1-18.1); TI: 116.4 ± 2.6 (114.7-120.9); PI: 156.8 ± 5.8 (152.2-166.8); PPI: 84.4 ± 1.8 (82.5-87.1).

Head and gaster reddish brown to black. Legs reddish brown to black with anterior and posterior edges from dark brown to brick-red. Scape black with dark brown to brick-red apex, funiculus black with few first segments from dark brown to brick-red. Mesosoma, petiole and postpetiole from reddish brown to brick-red, only dorsal surface of postpetiole with black spot. Some specimens with uniform colouration on the whole body, from dark brown to almost completely black (Figs 68–71, 74).

Head rectangular, 1.2 times as long as wide, lateral surfaces below eyes straight, above eyes gently convex, posterior edges convex, occipital margin of head straight or slightly convex (Figs 70–71). Anterior



Figures 68–71. *Temnothorax semiruber* (André), worker (scale: 0.5 mm). 68. Dorsal view. 69. Lateral view. 70. Head, sculpture. 71. Head with antennae.

margin of the clypeus slightly convex, without medial notch. Eyes small, oval, 1.4 times as long as wide. Antennal scape short, in lateral view slightly curved, 0.75 times as long as length of the head, in apex gradually widened, its base with small, triangular tooth, funiculus long, club 3 segmented (Figs 70–71). Surface of scape with fine microreticulation, shiny, covered with thin, dense, adjusted to subdecumbent setae. Mandibles rounded with thick sparse, longitudinal striae, shiny. Clypeus shiny with thick, longitudinal striae, area between striae smooth. Frontal carinae short, not extending beyond frontal lobes. Antennal fossa deep, with sparse, thick reticulation, area between striae smooth and shiny. Frontal lobes narrow, smooth with thick, reticulation (Figs 70–71). Head on the whole surface covered by thick, irregular reticulation, sometimes, on frons, reticulation longitudinal, area between reticulation with slight microreticulation (Figs 70–71). Entire head bearing from suberect to erect, pale, long and thick setae (Figs 70–71).

Mesosoma elongate, 2.0 times as long as wide, slightly arched in profile. Pronotum convex on sides. Propodeal spines long, narrow, with wide base, angled, with acute tips (Figs 68–69, 74). Mesosoma shiny, its whole surface covered by thick, irregular reticulation, area between reticulation with microsculpture (Figs 68–69, 74). Entire mesosoma bearing suberect to erect, pale, short and thick setae (Figs 68–69, 74).

Petiole, in lateral view, with long peduncle, node low, arched. Postpetiole, in lateral view, regularly convex, apical half with gently convex sides (Figs 68–69, 74). Peduncle and petiolar node and postpetiole dorsum shiny, with thick, dense reticulation, area between reticulation with microsculpture. Petiole and postpetiole on dorsal surfaces bearing sparse, short, semierect to erect setae (Figs 68–69, 74).

Gaster smooth and shiny, bearing erect, thin, pale setae and a layer of short adpressed microsetae (Figs 68–69, 74). Legs short, shiny, with fine microreticulation. Tibiae 0.7 times as long as head length, bearing adpressed setae on the whole surface. Inner margins of tibia and femora without erect setae (Figs 68–69, 74).

General distribution. Albania; Bulgaria; Greece: Aegean Is., Crete, Cyclades, Dodecanese, mainland; Israel; Lebanon; Macedonia; Serbia; Turkey.

Distribution on Crete, literature data. Crete: Legakis 2011: 19; Borowiec 2014: 189.

Biology. Alpine species. The nests were found in rock crevices, under rocky vegetation and in rock dirt, always in sunlit positions. Workers were caught within a maximum of 50 cm from the nest.

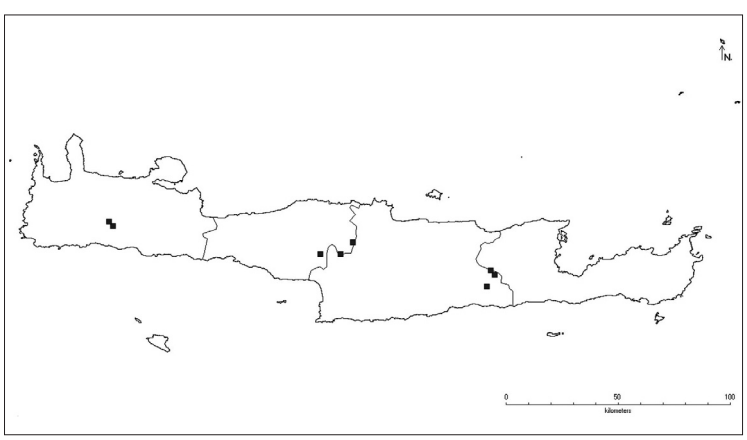
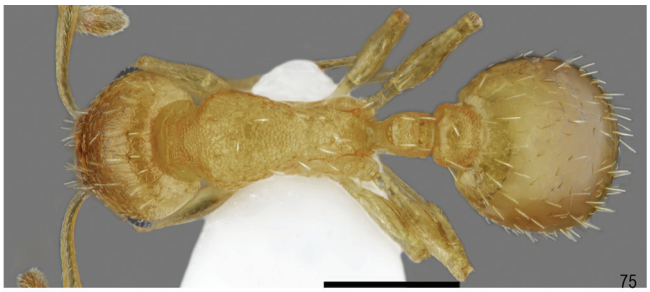


Figure 72. Distribution of *Temnothorax semiruber* (André) on Crete.

Figures 73–74. Specimens with dark body colouration (scale: 0.5 mm). 73. *Temnothorax recedens* (Nylander). 74. *Temnothorax semiruber* (André).



Figures 75–78. *Temnothorax subtilis* Csősz, Heinze & Mikó, worker (scale: 0.5 mm). 75. Dorsal view. 76. Lateral view. 77. Head, sculpture. 78. Head with antennae.

Temnothorax subtilis Csősz, Heinze & Mikó, 2015 (Figs 75–79)

Temnothorax subtilis Csősz, Heinze & Mikó, 2015: 24, figs. 12A–C (w.).

Diagnosis. See diagnosis in *T. ariadnae*.

Type material (label data). Holotype (w.) (CASENT0914635): *Temnothorax* | *subtilis* sp. nov. | det. Csősz 2014 | HOLO- | TYPE || TURKEY, TUR(03):431 | Taurus Mt., |5 km SW. Akseki | 37,0257 N, 31,7518 E, 950 mH | 02.XI.2011, leg. A. Schulz (HNHM) [examined].

Type locality. Turkey, Taurus Mountains.

Description. See Cs sz *et al.* 2015: 26.

General distribution. Greece (Crete, Thessaly), Turkey.

Distribution on Crete, literature data. Chania Prov.: Csősz *et al.* 2015: Table 1. – Pilion, 39.3967N, 23.0619E, 1000–1400 m a.s.l., 39.3967N/23.0619E, 14.05. 1996. Rethymno Prov.: Cs sz *et al.* 2015: Table 1. – 1 km E Kardaki, 35.2077N/24.6298E, 600 m a.s.l., 1992 r.; Zaros, 48 km SE Rethymno, 35.1326N/24.9072E, 400 m a.s.l., 1992r.

Biology. Mountain species. Workers collected in shady gorges or on rocks covered with moss.

Temnothorax variabilis sp. nov. (Figs 80–88)

Differential diagnosis. Member of the *T. luteus* group characterized by uniform bright yellow body colouration except dark band on apical margin of the first tergite of gaster, lack of metanotal groove and big eyes. According to Seifert *et al.* (2014) there are two known cryptic species of this group: *T. luteus* (Forel, 1974) and *T. racovitzai* (Bondroit, 1918) distributed in western part of the Mediterranean basin east to Switzerland. *Temnothorax variabilis* differs from them in following morphometric data (data provided in order: *T. variabilis* vs *T. racovitzai* vs *T. luteus*): CL/CW: 1.235 ± 0.02 vs 1.130 ± 0.012 vs 1.135 ± 0.015; ML/CS (CS=CL+CW/2): 0.781 ± 0.008 vs 1.171 ± 0.014 vs 1.241 ± 0.017 and PNW/CS: 0.388 ± 0.007 vs 0.597 ± 0.01 vs 0.616 ± 0.01.

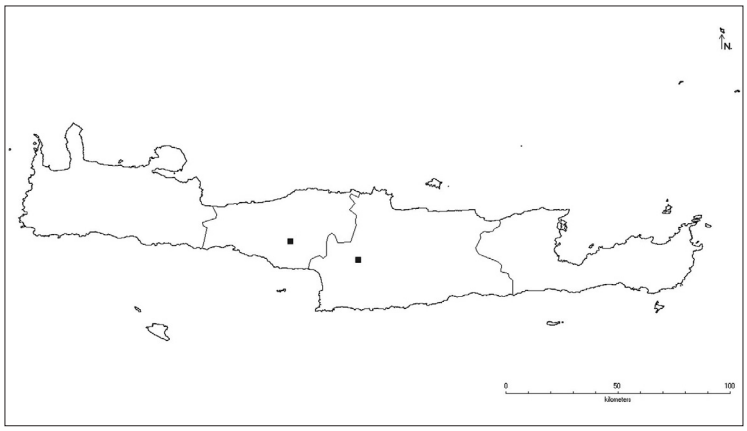


Figure 79. Distribution of *Temnothorax subtilis* Csősz, Heinze & Mikó on Crete.

Etymology. Name refers to high variability in body sculpture (lat. *variabilis* – variable).

Type material (label data). Holotype (w.) (CASENT0845936): *Temnothorax*| *variabilis* sp. nov. | HOLOTYPEE|| Collection L. Borowiec | Formicidae | DBET-GR00995 || GREECE, Crete, Rethymno Prov. | n. Argiroupolis | 35°17.583 N/24°20.588 E | 13 V 2013, 197 m | L. Borowiec (MNHW); Paratypes (8w.) (CASENT0845937-CASENT0845944): the same data as holotype (DBET, NHMC).

Type locality. Greece, Crete, Argiroupolis.

Material examined. GREECE: 1w., Chania Prov., Agia, 6 km SW, 35.46666N/23.91666E, 22 m, deciduous forest (*Quercus* sp.) and dry meadows surrounding artificial water reservoir, HC, EU, 03 V 2011, leg. L. Borowiec (DBET); 1w., Chania Prov., Kato Daratso n. Chania, 35.5N/23.96666E, 18 m, sandy, anthropogenic seaside overgrown by single pine trees and phrygana, HC, 06 V 2011, leg. L. Borowiec (DBET); 1w., Chania Prov., Kourna, 35.31666N/24.28333E, 95 m, calcareous rocks overgrown by phrygana, HC, 03 V 2007, leg. L. Borowiec & M.L. Borowiec (DBET); 2w., Chania Prov., Therisso, 35.43333N/23.98333E, 320 m, calcareous gorge overgrown by single deciduous trees and phrygana, HC, 01 V 2011, leg. L. Borowiec (DBET); 2w., Chania Prov., Tzitzifes n. Vrises, 35.35N/24.15E, 264 m, olive groves and limestone rocks, HC, 05 V 2011, leg. L. Borowiec (DBET); 1w., Irakleio Prov., Irakleio city, 35.31667N/25.1E, 6 m, lawns surrounding promenade, HC, 01 IV 2014, leg. S. Salata (DBET); 3w., Lasithi Prov., Voila, 35.08333N/26.1E, 578 m, rocks overgrown by macchia, HC, EU, 09 IV 2014, leg. S. Salata (DBET); 1w., Rethymno Prov., Ag. Joannis loc. 4, 35.23333N/ 24.4E, 480 m, deciduous forest in the vicinity of stream, HC, EU, LS, 06 V 2013, leg. L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., Antonios Spilia Gorge, 35.25N/24.56666E, 342 m, deciduous forest in gorge, HC, EU, LS, 11 V 2013, L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., Chromonastiri, 35.326944N/ 24.510278E, 262 m, deciduous forest in gorge, HC, EU, 10 V 2013, L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., Fourfouras, 35.21666N/ 24.71666E, 578 m, mountain meadow, HC, EU, 14 V 2013, leg. L. Borowiec & S. Salata (DBET); 1w., Rethymno Prov., Gerakari, 35.21666N/24.58333E, 751 m, oak forest, HC, EU, LS, 09 V 2013, leg. L. Borowiec & S. Salata (DBET); 3w., Rethymno Prov., n. Vilandredo, 35.25N/24.31667E, 354 m, deciduous forest in small gorge, HC, EU, LS, 13 V 2013, leg. L. Borowiec & S. Salata (DBET).

Description. Workers (n=15): HL: 0.598 ± 0.03 (0.556-0.654); HW: 0.485 ± 0.02 (0.447-0.525); SL: 0.426 ± 0.02 (0.391-0.466); EL: 0.128 ± 0.006 (0.123-0.14); EW: 0.097 ± 0.007 (0.089-0.109); ML: 0.657 ± 0.03 (0.609-0.726); PSL: 0.153 ± 0.01 (0.123-0.168); SDL: 0.107 ± 0.007

Figures 80–83. *Temnothotax variabilis* sp. nov., worker with weak sculpture (scale: 0.5 mm). 80. Dorsal view. 81. Lateral view. 82. Head, sculpture. 83. Head with antennae.

Figures 84–87. *Temnothotax variabilis* sp. nov., worker with strong sculpture (scale: 0.5 mm). 84. Dorsal view. 85. Lateral view. 86. Head, sculpture. 87. Head with antennae.

(0.095-0.117); PL: 0.246 ± 0.01 (0.223-0.277); PPL: 0.153 ± 0.01 (0.14-0.17); PH: 0.181 ± 0.009 (0.168-0.201); PPH: 0.177 ± 0.006 (0.168-0.19); HTL: 0.39 ± 0.02 (0.346-0.425); PNW: 0.326 ± 0.02 (0.302-0.357); PW: 0.143 ± 0.01 (0.128-0.159); PPW: 0.192 ± 0.01 (0.176-0.212); HI: 81.0 ± 1.1 (78.8-82.9); SI1: 71.3 ± 1.3 (69.0-73.7); SI2: 88.0 ± 1.6 (84.8-90.9); MI: 59.5 ± 1.8 (54.9-61.7); EI1: 75.7 ± 5.6 (66.9-86.4); EI2: 16.2 ± 1.3 (14.6-18.6); TI: 124.2 ± 3.0 (120.9-132.3); PI: 136.2 ± 3.0 (131.3-143.3); PPI: 86.9 ± 5.6 (76.9-98.3).

Whole body uniformly bright yellow. Only apical margin of the first tergite of gaster with a narrow, black band (Figs 80–87).

Head oval, 1.2 times as long as wide, lateral surfaces below and above eyes slightly convex, posterior edges convex, occipital margin of head slightly concave (Figs 82–83, 86–87). Anterior margin of the clypeus slightly convex, without median notch. Eyes small, oval, 1.3 times as long as wide. Antennal scape short, in lateral view slightly curved, 0.7 times as long as length of the head, in apex gradually widened, its base with small, triangular tooth, funiculus long, club 3 segmented (Figs 82–83, 86–87). Surface of scape with very fine microreticulation, shiny, covered with thin, dense, adpressed to subdecumbent setae. Mandibles rounded with thick sparse, longitudinal striae, shiny. Clypeus shiny, with gentle and sparse striation, area between striae smooth. Frontal carinae short, not extending beyond frontal lobes. Antennal fossa deep, with a few roundly curved striae, area between striae shiny, with sparse and slight reticulation. Frontal lobes narrow, smooth and shiny (Figs 82–83, 86–87). Frons shiny, with thin, sparse longitudinal stria-tion and reticulation, area between striae smooth or microreticulate, sometimes sculpture reduced or absent on the center (Figs 82-83, 86-87). Rest of head shiny, with sparse, thick reticulation, area between striation smooth, sometimes posterior part of head and genae, on whole surface of partly, with reduced sculpture or smooth areas. Whole head surface bearing suberect to erect, pale, short and thick setae (Figs 82–83, 86–87).

Mesosoma elongate, 1.7 times as long as wide, slightly arched in profile. Pronotum convex on sides. Propodeal spines long or medium length, narrow, with wide base, directed upward, tips sharp (Figs 80–81, 84–85). Dorsal surface of mesosoma shiny, with sparse, thin reticulation, sometimes reticulation co-occurs with a few, thin longitudinal striae, area between sculpture smooth. Dorsal surface of pronotum sometimes with reduced sculpture and with smooth area on its center (Figs 80–81, 84–85). Lateral surfaces of propodeum with thin, sparse longitudinal striation, area between striae with scarce reticulation or smooth. Lateral surfaces of mesonotum and propodeum with dense but gentle reticulation, area between reticulation smooth (Figs 80–81, 84–85). Entire mesosoma

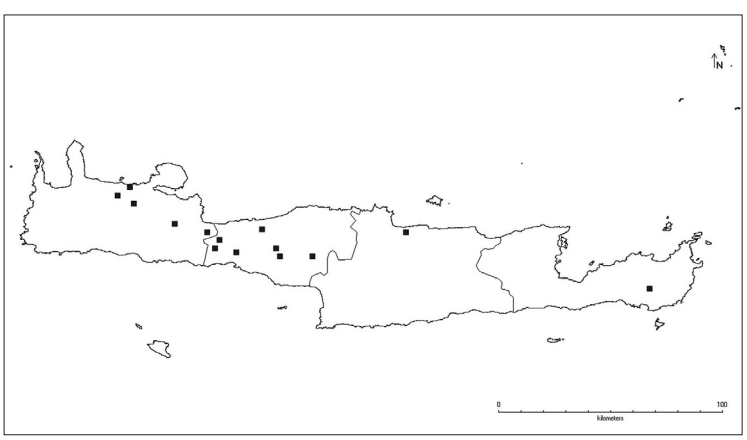


Figure 88. Distribution of *Temnothotax variabilis* sp. nov. on Crete.

bearing suberect to erect, pale, short and thick setae (Figs 80–81, 84–85).

Petiole, in lateral view, with short peduncle, node high, with anterior face straight or concave, posterior face straight, its dorsal surface aculate, sharply arched. Postpetiole, in lateral view, regularly convex, apical half with gently convex sides (Figs 80–81, 84–85). Peduncle and petiolar node and postpetiole dorsum shiny, with thin, dense reticulation, area between reticulation smooth, sometimes petiole with a few wrinkles (Figs 80–81, 84–85).

Gaster smooth and shiny, bearing erect, thin, pale setae (Figs 80–81, 84–85). Legs short, shiny, with fine microreticulation. Tibiae 0.7 times as long as head length, bearing adpressed to documbent setae on the whole surface. Inner margins of tibia without a row of erect setae (Figs 80–81, 84–85).

General distribution. Greece, Crete.

Biology. Species rare. Most often collected from dry, open areas. Specimens observed in material collected on entomological umbrella. A few workers were collected from litter in deciduous forests. The ant species were recorded in the same areas as *T. variabilis*:

Chania Prov., Agia; Chania Prov., Therisso; Rethymno Prov., Antonios Spilia Gorge; Rethymno Prov., Fourfouras; Rethymno Prov., n. Argiroupolis; Rethymno Prov., n. Vilandredo: see biology description in *T. daidalosi*;

Lasithi Prov., Voila; Rethymno Prov., Ag. Joannis loc. 4; Rethymno Prov., Chromonastiri; Rethymno Prov., Gerakari: see biology description in *T. proteii*;

Chania Prov., Kato Daratso n. Chania: *Camponotus gestroi creticus* Forel, *Temnothorax exilis* (Emery);

Chania Prov., Tzitzifes n. Vrises: *Aphaenogaster rugosoferruginea* Forel, *A. simonellii* Emery, *Camponotus baldaccii* Emery, *C. kiesenwetteri* (Roger), *C. lateralis* (Olivier), *Crematogaster* cf. *ionia*, *Lasius lasioides* Emery, *Lepisiota nigra* (Dalla Torre), *Messor wasmanni* Krausse, *Pheidole* cf. *pallidula*, *Plagiolepis pygmaea* (Latreille), *Temnothorax exilis* (Emery), *Temnothorax recedens* (Nylander), *Tetramorium diomedeum* Emery;

Irakleio Prov., Irakleio city: *Nylanderia jaegerskioeldi* (Mayr), *Plagiolepis pygmaea* (Latreille), *Tapinoma festae* Emery.

Comment. There are other undescribed morphospecies from the *T. luteus* group known from Peloponnese and Aegean Islands (our unpublished data). Our current data shows that real *T. luteus* and *T. racovitzai* occur only in the western part of Mediterranean Region. Balkan populations require more detailed investigation.

Key to Cretan *Temnothorax* (based on worker caste)

1. Petiole and postpetiole with lobe- or teeth-shape projections (Figs 38, 57), social parasite of *Temnothorax* species **2**
–. Petiole and postpetiole without lobe- or teeth-shape projections (Figs 3, 32), nonparasitic species **3**
2. Antennae 11-segmented (Fig. 40), petiole and postpetiole with lobe-like projections (Fig. 38), body with well-developed sculpture (Figs 37–40) . . . . . ***T. kraussei*** (Emery)
–. Antennae 12-segmented (Fig. 54), petiole and postpetiole with teeth-like projections (Fig. 57), body sculpture reduced, on head almost absent (Figs 51–54) . . . . . ***T. muellerianus*** (Finzi)
3. Metanotal groove present (Figs 2, 23, 43, 64, 69, 76) **4**
–. Metanotal groove absent (Figs 7, 12, 17, 27, 32, 47, 57, 81, 85) **9**
4. Whole body shining with reduced sculpture, head on almost entire surface smooth (Figs 63–66, 73) . . . . . ***T. recedens*** (Nylander)
–. Entire body surface covered with well-developed sculpture, at most frons with reduced sculpture (Figs 1–4, 21–24, 42–44, 68–71, 75–78) **5**
5. Petiole low, convex, with long peduncle, propodeal spines long (PSL>0.250mm), thin (Fig. 69). Head and mesosoma strongly sculptured (Figs 68–71). Large species, ML above 0.920 . . . . . ***T. semiruber*** (André)
–. Petiole high, with short or moderate peduncle, propodeal spines short or moderate (PSL<0.2 mm), wide (Figs 2, 22, 43, 76). Head and mesosoma finely sculptured (Figs 1–4, 21–24, 42–44, 75–78). Small species, ML below 0.850 . . . . . **6**
6. Frons on the whole surface sculptured (Figs 3, 23) **7**
–. Frons at least in central part smooth and shiny (Figs 44, 77) **8**
7. Head mostly rugoso-reticulate, longitudinal striation, if occurs, limited to outer edges of frons (Fig. 3) . . . . . ***T. ariadnae*** Csősz, Heinze & Mikó
–. Longitudinal striation occurs on the whole head surface, rugoso-reticulate area limited to the center of frons (Fig. 23) . . . . . ***T. helenae*** Csősz, Heinze & Mikó.
8. Propodeal spines longer (PSL>0.140mm) (Fig. 43), frons smooth and shiny on the almost whole surface (Fig. 44) . . . . . ***T. lucidus*** Csősz, Heinze & Mikó
–. Propodeal spines shorter (PSL<0.140mm) (Fig. 76), smooth area limited to the frons center (Fig. 77) . . . . . ***T. subtilis*** Csősz, Heinze & Mikó.
9. Antennae, head and mesosoma uniformly yellow (Figs 32, 81, 85) **10**
–. Antennae, head and mesosoma with another colouration (Figs 7, 12, 17, 27, 47, 57, 62, 69, 73, 74) **11**

10. Transverse band on the first tergite of gaster interrupted (Fig. 35), propodeal spines short and triangular (Fig. 32) ..... ***T. incompletus*** sp. nov.
–. Transverse band on the first tergite of gaster never interrupted (Figs 80, 84), propodeal spines thin and long (Figs 81, 84) ..... ***T. variabilis*** sp. nov.
11. Whole body uniformly dark brown, head on the whole surface with dense and thick reticulation (Figs 11–14) ..... ***T. daidalosi*** sp. nov.
–. Body not uniformly coloured (Figs 6–9, 56–59, 62, 68–71, 74), if uniformly coloured then at least head covered with sculpture different than only reticulation (Figs 16–19, 26–29, 46–49) **12**
12. Head with reduced sculpture, at least frons centre smooth and shiny (Figs 18, 48) **13**
–. Whole head surface covered with dense or sparse but always visible sculpture (Figs 8, 28, 58, 70) **14**
13. Mesosoma shiny, covered with only sparse, longitudinal striation (Figs 46, 47) .... ***T. minotaurosi*** sp. nov.
–. Mesosoma at least at its lateral surfaces with sculpture different that longitudinal striation, its dorsal surface partly smooth (Figs 16, 17) .... ***T. exilis*** (Emery)
14. Head, mesosoma, petiole and postpetiole with strong longitudinal striation, petiole node low and convex (Figs 6–9) ..... ***T. crassistriatus*** sp. nov.
–. Head, mesosoma, petiole and postpetiole with sculpture different than longitudinal striation, petiole node never low and convex **15**
15. Body colouration never uniform, longitudinal striation on head limited to frons, propodeal spines long, on the top slightly curved downward (Figs 56–59, 62) ..... ***T. proteii*** sp. nov.
–. Body uniformly dark brown, longitudinal striation on the whole head surface, propodeal spines short, triangular or long and straight (Figs 26–29) ..... ***T. ikarosi*** sp. nov.

Discussion

The new *Temnothorax* taxa described in the present paper increasesthe number of endemic Formicidae known only from Crete to 14 species. Endemism of ants on Greece's largest island is estimated at approximately 13%, slightly lower from a previous estimation of 16% by Legakis (1983). The discrepancy is difficult to reconcile the moment since Legakis (1983) failed to list the species included in his analysis. However, we predict that additional endemic ant taxa may be discovered in the future.

In comparison to other large Mediterranean islands (>3000 km^2), Crete seems to have a rich endemic fauna. There are five endemic species known from Corsica: *Lasius casevitzi* Seifert & Galkowski, *Temnothorax melas* (Espadaler), *Temnothorax corsicus* (Emery), *Formica corsica* Seifert and *Plagiolepis delaugerrei* Casevitz-Weulersse (Seifert & Galkowski 2016), four from Sardinia: *Leptanilla doderoi* Emery, *Myrmecina melonii* Rigato, *Stenamma sardoum* Emery, *Temnothorax sardous* (Santschi) (Borowiec 2014), two from Cyprus: *Crematogaster cypria* Santschi and *Oxyopomyrmex pygmalioni* Salata & Borowiec (Salata & Borowiec 2015a,b) and one from Mallorca: *Lasius balearicus* Talavera, Espadaler & Vila.

The complex geological history of Crete together with the mountainous relief and the geographical position in the Eastern Mediterranean area seems a reasonable underlying explanation. The fragmentation of Crete into several paleo-islands during the Neogene [from the lower Tortonian (11 Mya) until the late Pliocene (2–3 Mya)] (Dermitzakis 1990; Douris *et al.* 1998; Welter-Schultes & Williams 1999; Fassoulas 2001) and the vicariance events thereafter, may have resulted in allopatric speciation on these different paleo-islands. After the reunion of the paleo-islands in Pliocene, the populations of the ancestral species of the radiations that became previously isolated may have evolved into separate species (Hausdorf & Sauer 2009).

Apart from Crete, the Greek Aegean islands also appear to be one of the largestFormicidae endemism centers of Mediterranean region. Currently, on Karpathos (26th Mediterranean island by area) three endemic species occur: *Aphaenogaster karpathica* Boer, *Bothriomyrmex jannonei* Menozzi and *Aphaenogaster olympica* Borowiec & Salata (Borowiec 2014, Borowiec & Salata 2014a). Two endemic species are known from Rhodes: *Aphaenogaster jolantae* Borowiec & Salata and *Aphaenogaster charesi* Salata & Borowiec (Salata & Borowiec 2016). Given the area differences between Karpathos and Rhodes islands and their paleohistory/isolation, one would expect additional endemic ant species on Rhodes, as is known for other well-documented animal groups (e.g. land-snails: Welter-Schultes & Williams 1999). Some undescribed species from the genus *Temnothorax* collected on Lesbos, Rhodes, Samos, and Naxos at least in part substantiate to be Aegean endemics (Borowiec & Salata, in prep.). Myrmecological research on Rhodes Island shouldto be an urgent future goal.

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Appendix 1. List of taxa described from Crete.

Aphaenogaster balcanicoides Boer, 2013
Aphaenogaster balcanicoides Boer, 2013: 68, Figs 11, 34, 35 (w.).
Status: valid.
Range: Crete.
Aphaenogaster cecconii Emery, 1894
Aphaenogaster (*Ischnomyrmex*) *cecconii* Emery, 1894: 7.
Status: valid.
Range: Crete.
Aphaenogaster rugosoferruginea Forel, 1889
Aphaenogaster splendida r. *rugosoferruginea* Forel, 1889: 260.
Status: valid.
Range: Crete.
Aphaenogaster simonellii Emery, 1894
Aphaenogaster testaceopilosa var. *simonellii* Emery, 1894: 8.
Status: valid.
Range: Crete and Karpathos.
Camponotus baldaccii Emery, 1908
Camponotus maculatus subsp. *baldaccii* Emery, 1908a: 198 (s.w.).
Status: valid.
Range: Crete, Dodecanese, East Aegean Islands, mainland (Sterea Ellas).
Camponotus candiotes Emery, 1894
Camponotus lateralis var. *candiotes* Emery, 1894: 10 (w.).
Status: valid.
Range. Eastern Mediterranean.
Camponotus gestroi creticus Forel, 1886
Camponotus Gestroi st. *Creticus* Forel, 1886: clix, fig. 1 (w.).
Status: junior synonym of *Camponotus gestroi* Emery, 1898.
Crematogaster auberti laestrigon cretica Karavaiev, 1927
Crematogaster (*Acrocoelia*) *auberti* subsp. *laestrigon* var. *cretica* Karavaiev, 1927: 106, fig. 2 (w.).
Status: unavailable name.
Cataglyphis cursor cretica (Forel, 1910)
Myrmecocystus (*Cataglyphis*) *cursor* var. *cretica* Forel, 1910: 23 (w.m.).
Status: junior synonym of *Cataglyphis aenescens* (Nylander, 1849).
Cataglyphis cursor helenica dorica Santschi, 1929
Cataglyphis cursor st. *helenica* var. *dorica* Santschi, 1929: 35 (w.).
Status: unavailable name.
Epixenus creticus (Emery, 1908)
Epixenus creticus Emery, 1908g: 558, fig. 5 (m.).
Status: junior synonym of *Monomorium creticum*.
Epixenus biroi Forel, 1910
Epixenus biroi Forel, 1910: 21.
Status: junior synonym of *Monomorium creticum*.
Lasius tapinomoides Salata & Borowiec, 2018
Lasius tapinomoides Salata & Borowiec, 2018: 142, figs 1–7 (w.q.).
Status: valid.
Range: Crete.
Lepisiota splendens (Karavaiev, 1912)
Acantholepis Frauenfeldi var. *splendens* Karavaiev, 1912b: 586 (w.q.).
Status: valid.
Range: Eastern Mediterranean.
Monomorium creticum Emery, 1895
Monomorium Abeillei var. *creticum* Emery, 1895: 66 (w.).
Status: valid.
Range: Crete.
Oxyopomyrmex laevibus Salata & Borowiec, 2015
Oxyopomyrmex laevibus Salata & Borowiec, 2015a: 22, Figs 19–21, 76 (w.).
Status: valid.
Range: Crete.

Appendix 1. Continued.

Temnothorax ariadnae Csősz, Heinze & Mikó, 2015
Temnothorax ariadnae Csősz, Heinze & Mikó, 2015: 42, Figs 25A–C (w.).
Status: valid.
Range: Crete.
Temnothorax exilis creticus (Forel, 1910)
Leptothorax exilis subsp. *creticus* Forel, 1910: 23 (w.q.).
Status: junior synonym of *Temnothorax exilis* Emery, 1896.
Temnothorax helenae Csősz, Heinze & Miko, 2015
Temnothorax helenae Csősz, Heinze & Mikó, 2015: 45, Figs. 26A–C (w.).
Status: valid.
Range: Bulgaria, Greece (Crete, mainland), Turkey.
Temnothorax lucidus Csősz, Heinze & Mikó, 2015
Temnothorax lucidus Csősz, Heinze & Mikó, 2015: 20, Figs. 10A–C (w.).
Status: valid.
Range: Greece (Crete), Turkey.
Temnothorax subtilis Csősz, Heinze & Mikó, 2015
Temnothorax subtilis Csősz, Heinze & Mikó, 2015: 26, Figs. 12A–C (w.).
Status: valid.
Range: Greece (Crete, mainland), Turkey.

Appendix 2. List of studied type specimens of *Temnothorax* species.

Temnothorax affinis (Mayr, 1885)

Syntype (w.) (CASENT0907571): [Fully | 14.VII-17 || Clypeus mit längskiel | Fuhlerschaft Kü (…) || als bei tuberum || Typus || ANTWEB | CASENT | 0907571 || Catalogué | Base MZL || two other labels – unreadable writing] (MZLS).

T. anodontoides (Dlussky & Zabelin, 1985)

Syntype (w.): [Paratypus *Leptoth.* | *anodontoides* | Dlussky et Zabelin || 81-171 || С. Забеицш | Колег-Даг |Кара-су 6.V.81] (UASK).

T. alpinus (Ruzsky, 1902)

Lectotype (w.) (CASENT09090410): [*L. tuberum* | v. *alpinus* | Ruzsky || Lectotype | *Leptothorax alpinus* | Ruzsky, 1902 | det. A. Schulz & M. Verhaagh 1999 || Cotypus || r. *L. alpinus* | Ruzsky || Coll. Forel. | ANTWEB | CASENT | 0909041 || Kaukasus, | unreadible written] (MHNG).

T. arnoldii Radchenko & Fedoseeva, 2015

Holotype (w.): [С-3 Кавказ | А 6141 | К. Арнолди || С-3 Кавказ | А 6141 | К. Арнолди | PARATYPUS| *Temnothorax arnodii* | Radchenko & Fedoseeva] (SIZK).

T. clypeatus (Mayr, 1853)

Syntype (w.) (CASENT0901782): [*clypeatus*| G. Mayr, Type. || SYN- | TYPE || Brit. Mus. | 1922-501 || Prater | Coll. G. Mayr || ANTWEB | CASENT | 0901782 || BMNH(E) | 1014983] (BMNH).

T. corticalis (Schenck, 1852)

Syntype (w.) (FOCOL2016): [Nassau || *corticalis* | Schenck || *Leptothorax* | *corticalis* | Schenck || GBIF-D/FoCol | 2016 | specimen + label | data documented || 29890 || Type] (ZMHB).

T. dessyi Menozzi, 1936

Syntype (w.): [*Leptothorax* | *Dessyi* | Typus! Menoz. | Menozzi dater. || Dlimbo | Scapranto | 24.IV.1934 | C. Menozzi] (DSAB).

T. graecus (Forel, 1911)

Syntype (w.) (CASENT0909017): [*L. bulgaricus* | For | r. *graecus* | typi Forel | (…)|| Lectotype | *Leptothorax graecus* | Forel, 1911 top specimen | det. A. Schulz & M. Verhaagh 1999 || Typus || r. *L. graecus* || Coll. | A. Forel || ANTWEB | CASENT | 0909017] (MHNG).

T. interruptus (Schenkc, 1852)

Syntype (w.) (FOCOL2008): [Nassau | *Leptothorax interruptus* Schenck || *interruptus* Schenck || Type || GBIF-D/FoCol 2010 | specimen + label | data documented] (ZMHB).

T. luteus (Forel, 1974)

Lektotype (w.) (CASENT0907603): [*Lectotype* (bottom worker) | *Temnothorax luteus* | (Forel, 1874) | des. B. Seifert 2011 || ANTWEB | CASENT | 09077603 | Catalogué | Base MZL] (MZSL).

T. mirabilis (Espadaler & Cagniant, 1996)

Paratype (w.) (CASENT0912965): [Paratypus | *L. mirabilis* Espadaler | & Cagniant det. || Dj. Hebri, Atlas Mitja | (M) 15-V-1987 | X. Espadaler leg. || ANTWEB | VASENT | 0912965] (NHMB).

T. niger (Forel, 1894)

Lektotype (w.) (CASENT0909032): [*L. niger* | Forel | type | Marseille | (…) |pres St. Loup || Typus || Lectotypus | des: Schulz 1994 || Coll. Forel. | ANTWEB | CASENT | 0909032] (MHNG).

T. nigritus (Emery, 1878)

Syntype (w.) (CASENT0904737): [*Leptothorax nigritus* Em | Lambessa (Algiri) || TYPUS || ANTWEB | CASENT | 0904737 || Museo Civico di Genova] (MSNG).

T. platycephalus (Espadaler, 1997)

Pataype (w.) (CASENT0912982): [Paratypus | *L. platycephalus* | X. Espadaler det. || ANTWEB | CASENT | 0912982 || Nava las Correhuelas | Sª Cazorla (J) 1650 m | 26-VII-1983 ||X. Espadaler leg.] (NHMB).

T. racovitzai (Bondroit, 1918)

Syntype (w.) (CASENT0901783): [*Leptothorax* | *racovitzai* | type Bond. | Banyuls || SYN- | TYPE || excoll. | Donishorpe | B. M.1934-4 ||BMNH(E) | 1014984] (BMNH).

T. rottenbergii (Emery, 1870),

Syntype (w.) (CASENT0904731): [*Leptothorax* | *Rottenbergi* | Em | Catania Rottb. || TYPUS || ANTWEB | CASENT | 0904731 || Catania | v. Rottb. || Museo Civico di Genoa || Collezione | EMERY] (MSNG).

T. sardous (Santschi, 1909)

Holotype (w.) (CASENT0912994): [*L. Rottenbergi* | Em. | v. *sordoa* | Sant. || HOLOTYPE | *Leptothorax* | *rottenbergi* | *sardoa* | SANTSCHI | A. F. 1985 || Sardargne | Sardoa || Sammlung | Dr. F. Santschi | Kairouan | ANTWEB | CASENT | 0912994] (NHMB).

T. solerii (Menozzi, 1936)

Syntypes (2w.): [*L.* (*Temnothorax*) | *Solerii* | Typus! Menoz. | Menozzi deter. || Otos | Scarpanto | 23.IV.1934 | C. Menozzi] (DSAB).