

# REVIEW OF THE *APHAENOGASTER SPLENDIDA* SPECIES-GROUP (HYMENOPTERA: FORMICIDAE)

SEBASTIAN SALATA<sup>1,2\*</sup>, CELAL KARAMAN<sup>3</sup>, KADRI KIRAN<sup>4</sup>  
and LECH BOROWIEC<sup>5</sup>

<sup>1</sup>Department of Entomology, California Academy of Sciences, USA

<sup>2</sup>Department of Biodiversity and Evolutionary Taxonomy, University of Wrocław, Poland / e-mail: sebastian.salata@uwr.edu.pl / orcid.org/0000-0003-0811-2309

<sup>3</sup>Trakya University, Faculty of Sciences, Department of Biology, Turkey  
e-mail: celalkaraman78@gmail.com / orcid.org/0000-0001-7983-0194

<sup>4</sup>Trakya University, Faculty of Sciences, Department of Biology, Turkey  
e-mail: kadrikiran@trakya.edu.tr / orcid.org/0000-0002-2158-5592

<sup>5</sup>Department of Biodiversity and Evolutionary Taxonomy, University of Wrocław, Poland / e-mail: lech.borowiec@uwr.edu.pl / orcid.org/0000-0001-5668-6855

\*Corresponding author

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**Abstract.**— Members of the *Aphaenogaster splendida* group are reviewed. We recognize 12 species, of which three are new: *A. hamaensis* **sp. nov.** (Syria), *A. peloponnesiaca* **sp. nov.** (continental Greece), and *A. vohraliki* **sp. nov.** (Turkey). Species status is restored for *Aphaenogaster schmitzi* Forel, 1910 **stat. rev.**, and *Aphaenogaster transcaucasica* Karavaiev, 1926 **stat. nov.** is raised to the species rank. *Aphaenogaster schmitzi* Forel, 1910 is recognized as a senior synonym of *Aphaenogaster schmitzi syria* Forel, 1910 **syn. nov.** and *Aphaenogaster ovaticeps* Emery, 1898 is recognized as a senior synonym of *Aphaenogaster muelleriana* Wolf, 1915 **syn. nov.** Detailed descriptions, measurements, habitat and nesting preferences, and activity of workers of all 12 species are given. Keys to workers and known gynes, and photographs of all species and their known castes are presented.



**Key words.**— ants, key, new species, biogeography, Mediterranean Subregion

## INTRODUCTION

*Aphaenogaster* Mayr, 1853 is a moderately large genus with 205 valid nominal species and 22 valid nominal subspecies distributed worldwide (Bolton 2020). However, the majority of species are known from the Northern Hemisphere, and, in the Palearctic, they

reach their highest diversity in regions with a Mediterranean climate. Many species are common and dominant in both deciduous and coniferous forests (Kiran *et al.* 2008, Salata & Borowiec 2018b, Alicata & Schifani 2019, Galkowski *et al.* 2019). Other, rarer species are known from steppe or semidesert habitats or shady and humid places (Boer 2013, Bračko *et al.* 2019).

There are also species that inhabit caverns, caves or cave-imitating human constructions, such as tunnels or culverts under roads (Borowiec & Salata 2014a). So far, there are 84 species recorded from Europe and the Mediterranean, including the Near East, and the highest diversity is concentrated in two regions: in the northwestern part of North Africa and in the eastern part of the Mediterranean Basin (Bolton 2020). The most speciose countries are Morocco (41), Algeria (27), Greece (22), Italy (21), Turkey (20), Tunisia (19), Spain (18), Transcaucasian countries (9), Croatia (8), Israel (8), France (8), Georgia (8), Macedonia (6), and Bulgaria (6) (Arakelian 1994, Cagniant 1996, Bračko 2006, Bolton *et al.* 2007, Gratiashvili & Barjadze 2008, Casevitz-Weulersse & Galkowski 2009, Vonshak & Ionescu-Hirsch 2009, Lapeva-Gjonova *et al.* 2010, Karaman 2011, Borowiec & Salata 2012, 2013, 2014a, Kiran & Karaman 2012, 2020, Boer 2013, Bračko *et al.* 2014, Salata & Borowiec 2018a, Alicata & Schifani 2019, Borowiec *et al.* 2019, Bračko *et al.* 2019). Other European and Mediterranean countries list three or fewer species (Bračko 2007, Borowiec 2014). That said, these estimates are disputable, as recent revisions have revealed that some taxa previously considered to be widespread consist of groups of morphologically similar but distinct species (Boer 2013, Borowiec & Salata 2014a, Salata & Borowiec 2016, Alicata & Schifani 2019, Bračko *et al.* 2019, Galkowski *et al.* 2019). Thus, historic records need verification and confirmation.

Based on the literature, there are several Palearctic species-groups of *Aphaenogaster* that have been separated on the morphological basis. The very first division of Palearctic *Aphaenogaster* into species-groups was proposed by Schulz (1994). This work was later revised and supplemented with additional species-groups definitions (Boer 2013, Borowiec & Salata 2014a, Salata & Borowiec 2018b, Alicata & Schifani 2019, Bračko *et al.* 2019, Galkowski *et al.* 2019). Monophyly of some of the groups was partially confirmed by phylogenetic analyses (Gómez *et al.* 2018), but it is likely that further research will introduce corrections to this species-group division, as indicated by some authors (Salata & Borowiec 2018b, Alicata & Schifani 2019).

One of the species-groups recognized by Schulz (1994) is the *Aphaenogaster splendida* species-group, which originally included the following nine taxa: *A. muelleriana* Wolf, *A. ovaticeps* Emery, *A. schurri* Forel, *A. splendida* (Roger), *A. syria* Forel, *A. transcaucasica* Karavaiev, *A. rugosoferruginea* Forel, *A. theryi* Santschi, and *A. schmitzi* Forel. This division was confusing as *A. syria* was at this time a junior synonym of *A. syriaca* Emery, which was not included in the species-group division. Additionally, *A. theryi* was listed by Schulz as a member of both the *splendida* and *gibbosa* species-groups, and recently

its affiliation with the latter group was confirmed by Salata & Borowiec (2018b). Thus, the number of valid taxa listed by Schulz was seven. The group was distinguished based on medium to large body size; generally slim body, with long legs; an oval, or at least elongated head; body color reddish yellow to dark brown; distinct body sculpture, dull head due to a fine underground sculpture; scape distinctly protruding beyond the occipital margin of the head; and second funicular segment about 1.5 to 2 times longer than wide. The majority of taxa listed by Schulz (1994) are known from the eastern part of the Mediterranean Basin (*sensu* Vigna Taglianti *et al.* 1999), which covers the area east of the Italian peninsula and the Gulf of Sirte, east to the Black Sea with some extensions east to Iran and the Middle East and south-west to the Sahara. *Aphaenogaster splendida* (Roger) is the only member of the group historically known from other parts of the Mediterranean and North Africa. Additionally, *A. schurri* is known only from India and southern Asia but, based on our study, this species morphologically is closer to *rothneyi* species-group.

Schulz (1994) distinguished the *A. rothneyi* species-group as morphologically most similar to the *splendida* species-group. Members of the *splendida* species-group were separated from the *rothneyi* species-group based on shorter funicular segments, more oval head shape, and less protruded mesonotum. Based on our observations all these features overlap with intraspecific variation observed in some members of the *splendida* species-group. There are currently six members of the *rothneyi* species-group distributed from Iran to Japan (Kiran *et al.* 2013). We assume that the separation of both groups from each other might be artificial and species of the *rothneyi* species-group might consist of taxa of the *splendida* species-group with more eastern distribution. However, verification of this assumption requires further investigation supported with molecular data.

Below, based on newly collected material and specimens deposited in museums, we present an updated definition of the *Aphaenogaster splendida* species-group and revise the species-level taxonomy for its members. In total, we recognize 12 species as belonging to this group, three of which are new to science. Where possible all castes are described and illustrated. Additionally, we provide a key to the workers and gynes of the revised taxa and include notes on their biology. We also discuss three other species with uncertain taxonomic position.

## MATERIALS AND METHODS

Photos were taken using a Nikon SMZ 1500 stereomicroscope, Nikon D5200 photo camera and Helicon

Focus software. All given label data for types are in their original spelling; a vertical bar (|) separates data on different rows and double vertical bar (||) separates labels. Label data are followed by repository in parentheses, and whether examined by the authors. Additional information about the labels or explanatory notes are given in square brackets. Measurements are given as the mean and range in millimeters. Type specimens' photographs and associated data are available online on AntWeb ([www.AntWeb.org](http://www.AntWeb.org)) and are accessible using the unique CASENT identifying specimen code. Distribution maps are based on investigated material only and do not include literature records. The general distribution patterns of each species are discussed in the distribution sections in the species accounts.

Examined specimens are housed in the following collections:

- ASC – Antonio Scupola collection;
- BMNH – Museum of Natural History, London, England;
- CASC – California Academy of Sciences, San Francisco, USA;
- EMTU – Entomological Museum of Trakya University, Edirne, Turkey;
- GBC – Gregor Bračko collection, Ljubljana, Slovenia;
- NHMB – Naturhistorisches Museum Basel, Switzerland;
- MHNG – Muséum d'Historie Naturelle, Genève, Switzerland;
- MNHW-DBET – Museum of Natural History, University of Wrocław, Poland, in temporary deposit by Department of Biodiversity and Evolutionary Taxonomy, University of Wrocław, Poland (coll. L. Borowiec);
- MSNG – Natural History Museum, Genoa, Italy;
- NHMC – Natural History Museum of Crete, University of Crete, Heraklion;
- PWC – Petr Werner collection, Prague, Czechia;
- SIZK – Smalhausen Institute of Zoology, Kiev, Ukraine;
- SSC – Sebastian Salata collection, Wrocław, Poland;
- ZMHB – Museum für Naturkunde, Berlin, Germany.

Measurements:

- EL – eye length; maximum diameter of the compound eye;
- FLW – frontal lobe width; maximum width of frontal lobes measured in full-face view;
- GL – gena length; the smallest distance between the anterior margin of the compound eye and the mandibular insertion to the head;
- HBL – hind basitarsus length; measured from the junction with tibia to the junction with the second tarsal segment;

- HL – head length; measured in a straight line from mid-point of anterior clypeal margin to mid-point of posterior margin in full-face view;
- HTL – hind tibia length; measured from the junction with femur to the junction with first tarsal segment;
- HW – head width; measured in full-face view directly above the eyes;
- MH – mesosoma height; measured from the upper edge of mesonotum to the lowest point of the mesopleuron margin; in profile view (gynes only);
- MW – mesosoma width; maximum width of scutum in gynes, in dorsal view;
- PH – petiole height; the chord of ventral petiolar profile at node level is the reference line perpendicular to which the maximum height of petiole is measured, measured in lateral view;
- PL – petiole length; measured from anterior corner of subpetiolar process to dorsocaudal corner of caudal cylinder, measured in lateral view;
- PNW – pronotum width; maximum width of pronotum in dorsal view;
- PPW – postpetiole width; maximum width of the postpetiolar node in dorsal view;
- PSL – propodeal spines length; measured from centre of propodeal spiracle to the top of propodeal spine;
- PW – petiole width; maximum width of the petiolar node in dorsal view;
- SL – scape length; maximum straight-line length of scape excluding the basal condylar bulb;
- WL – mesosoma length (Weber's length); diagonal length of mesosoma in lateral view from the anterior point of the pronotal slope and excluding the neck, to the posteroventral margin of the propodeum.

Ratios:

- EL/HL – eye length/head length ratio;
- FLW/HW – frontal lobe width/head width ratio;
- HL/HW – head length/width ratio;
- HTL/HW – hind tibia length/head width ratio;
- PL/PH – petiole length/height ratio;
- PSL/HW – propodeal spines length/head width ratio;
- SL/HW – scapus length/head width ratio;
- SL/HL – scapus length/head length ratio;
- WL/MW – mesosoma length/scutum width ratio (gynes only);
- WL/PNW – mesosoma length/pronotum width ratio.

Abbreviations:

- Q – queen, m – male, w – worker.

## RESULTS

### Synopsis of species of the *Aphaenogaster splendida* species-group

- Aphaenogaster aktaci* Kiran & Tezcan, 2008.  
*Aphaenogaster festae* Emery, 1915.  
*Aphaenogaster hamaensis* sp. nov.  
*Aphaenogaster kervillei* Forel, 1910.  
*Aphaenogaster ovaticeps* Emery, 1898.  
 = *Aphaenogaster muelleriana* Wolf, 1915 syn. nov.  
*Aphaenogaster peloponnesiaca* sp. nov.  
*Aphaenogaster rugosoferruginea* Forel, 1889.  
*Aphaenogaster schmitzi* Forel, 1910 stat. rev.  
 = *Aphaenogaster schmitzi syria* Forel, 1910 syn. nov.  
*Aphaenogaster splendida* (Roger, 1859).  
*Aphaenogaster syriaca* Emery, 1908.  
*Aphaenogaster transcaucasica* Emery, 1908 stat. nov.  
*Aphaenogaster vohraliki* sp. nov.

## TAXONOMY

### *Aphaenogaster splendida* species-group

**Diagnosis.** Workers moderate to large (WL 1.5–3.0), with slim and elongated body; head always longer than wide, slim and oval to elongated (HL/HW: 1.1–1.6); antennae and legs elongate; scape distinctly protruding above the head occipital margin; segments of antennal funicle always longer than wide; body usually yellow to yellowish brown, occasionally brown but never black; head sculpture distinct, with microreticulate background and more or less developed longitudinal to reticulate rugae; surface of mesosoma mostly reticulate and with additional sculpture of longitudinal or/and reticulate rugae, shiny areas, if present, restricted to pronotal top and sides; gaster shiny, usually smooth or with diffused microreticulation only on the first gastral tergite. Males with gibbous promesonotum, and narrow elongate propodeum, known in detail for only two species (Figs 37, 38).

**Comments.** The group comprises species associated with coniferous and deciduous warm, dry to moderately humid forests. Most species prefer shady parts of forests or moist areas; such as stream valleys or shaded walls of rocks located along the streams. Nests were always observed under stones, and with monogynous colonies consisting of less than 100 workers. The majority of species are monomorphic, but in *A. festae*, *A. ovaticeps*, *A. splendida* and *A. syriaca*, along with typical workers, we have observed specimens exhibiting a body size approximately two times smaller than average. Additionally, the proportions of the body were different than the average worker in the nest. Usually the small workers had shorter antennae and propodeal spines, a shorter, convex propodeum and less developed sculpture on the head and mesosoma. However, the small workers were

performing typical activities inside and outside the nests, thus despite their distinct morphological differences we assume that they represent the same species.

### Key to workers of species of the *Aphaenogaster splendida* species-group

1. Head elongate, HL/HW usually higher than 1.45, sides behind eyes strongly converging posteriad, head sculpture with only longitudinal rugae and occupying not more than anterior 2/3 of frontal face, posterior part of head only microreticulate (Figs 46–48); coloration of head and mesosoma always pale yellow (Figs 39–42, 81, 82) . . . . . **2**
- . Head less elongate, HL/HW usually lower than 1.45, if higher then sides behind eyes weakly converging posteriad (Figs 11, 28–30, 65, 66) or head regularly oval (Figs 9, 10, 12), rugae on head occupying usually more than anterior 2/3 surface, posterior part of head often strongly reticulated (Figs 9–12, 28–30); coloration of head and mesosoma variable, from pale yellow to rusty yellow or brown (Figs 1, 2, 19, 20, 53, 54, 57, 58, 71–74, 77–80) . . . . . **4**
2. Propodeal spines long, running distinctly upwards (Fig. 82). Species known from Turkey . . . ***A. vohraliki***
- . Propodeal spines very short, forming reduced teeth or small spines (Figs 40, 42). Species known from Israel and Syria . . . . . **3**
3. Head very elongate, HL/HW 1.516–1.548, sides behind eyes strongly converging posteriad (Fig. 47). Background microreticulation of pronotum distinct. Larger species, WL 1.95–2.19 . . . . . ***A. hamaensis***
- . Head moderately elongate, HL/HW 1.433–1.477, sides behind eyes moderately converging posteriad (Fig. 48). Background microreticulation of pronotum diffused, surface appears more or less smooth. Smaller species, WL 1.48–1.94 . . . . . ***A. kervillei***
4. Head regularly oval, similarly converging anterad and posterad, postocular margins form regular arch (Figs 10, 12); eyes relatively small EL/HL 0.129–0.157 . . . . . **5**
- . Head not regularly oval, at least in the middle more or less parallel-sided, postocular margins never form regular arch (Figs 9, 11, 28–30, 65, 66); eyes relatively large EL/HL 0.157–0.192 . . . . . **6**
5. Head and mesosoma yellowish-brown to brown, propodeal dorsum flat and slightly declining toward spines, anterior part of mesonotum lower, propodeal spines shorter and thicker, head stouter HL/HW 1.351 [1.330–1.368] (Figs 49, 50). Italy (Apulia, Friuli-Venezia Giulia, Liguria), Slovenia, Croatia, Bosnia and Hercegovina, Serbia, Montenegro, Albania, and Greece (Epirus, Ionian Islands, western Sterea Ellas, southern Macedonia) . . . . . ***A. ovaticeps***



- . Head and mesosoma yellow to rusty yellow, propodeal dorsum distinctly convex, anterior part of mesonotum higher, propodeal spines longer and thinner, head slimmer HL/HW 1.410 [1.370–1.447] (Figs 53, 54). Greece (Stereia Ellas and Peloponnese) ..... *A. peloponnesiaca*
6. Head and mesosoma yellowish-brown to brown, if mesosoma mostly yellow then head at least in frontal face more or less infuscated (Figs 1, 2, 57, 58) .... 7
- . Head and mesosoma uniformly yellow to rusty yellow (Figs 19, 20, 61, 62, 71–74, 77–80) ..... 8
7. Larger, WL 1.54–2.01. Propodeum on top with longitudinal rugae. Gaster uniformly brown to black (Fig. 1). Greece: North Aegean Islands (Lesbos) and western Turkey (Isparta, İzmir) ..... *A. aktaci*
- . Smaller, WL 1.45–1.65. Propodeum on top with transverse rugae. Gaster with pale basal spot (Fig. 57). Endemic to Crete ..... *A. rugosoferruginea*
8. Slim species, HTL/HW higher than 1.36, scape elongate, SL/HW 1.60–1.76, hind femora only slightly swollen medially and shallowly narrowing to base and apex (Fig. 74); pronotal surface with diffused microreticulation, appears smooth and shiny ..... *A. splendida*
- . Stout species, HTL/HW below 1.32, scape moderately elongate, SL/HW 1.46–1.63, hind femora distinctly swollen medially and distinctly narrowing to base and apex (Figs 20, 62, 78, 80); pronotal surface usually distinctly microreticulate ..... 9
9. Mesonotum placed distinctly higher than posterior part of pronotum (Figs 20, 78). More distinctly sculptured species, pronotum usually with distinct microreticulation ..... 10
- . Mesonotum placed not or only slightly higher than posterior part of pronotum (Figs 62, 80). Less distinctly sculptured species, pronotum with diffused microreticulation or partly smooth ..... 11
10. Head more elongate (Fig. 28), HL/HW: 1.347 (1.313–1.390), scape longer in relation to head width, SL/HW: 1.541 (1.463–1.636). Species with more western and northern distribution: north-western Greece, Bulgaria, Aegean Islands, Turkey east to Niğde and Mersin Provinces ..... *A. festae*
- . Head less elongate (Fig. 30), HL/HW: 1.270 (1.220–1.307), scape shorter in relation to head width, SL/HW: 1.420 (1.340–1.469). Species with more eastern and southern distribution: Cyprus, Lebanon, Israel, Egypt (Sinai Peninsula), and Adana Province in Turkey ..... *A. syriaca*
11. Scape longer in ratio to head width, SL/HW: 1.512. Head less distinctly sculptured with less distinct background microreticulation (Fig. 66). Azerbaijan and probably also Georgia .... *A. transcaucasica*
- . Scape shorter in ratio to head width, SL/HW: 1.39 (1.326–1.467). Head more distinctly sculptured with more distinct background microreticulation (Fig. 65). Israel, Jordan, Syria, and Turkey (Siirt Province) ..... *A. schmitzi*

### Key to known gynes of species of the *Aphaenogaster splendida* species-group

(Gynes of *A. hamaensis*, *A. kervillei*, *A. syriaca*, *A. transcaucasica*, and *A. vohraliki* are unknown)

1. Head and mesosoma rusty-brown to brown, if mesosoma rusty-yellow then head at least in the middle of frons with brown spot of diffused borders (Figs 3, 4, 51, 52, 59, 60) ..... 2
- . Head and mesosoma yellow, reddish-yellow to rusty-yellow (Figs 23, 24, 55, 56, 67, 68, 75, 76) ..... 4
2. Base of first gastral tergite with diffused microreticulation, appears more or less shiny ..... 3
- . Base of first gastral tergite with strong microreticulation and longitudinal striation, appears more or less dull ..... *A. rugosoferruginea*
3. Scutum at most in basal 1/3 length with distinct longitudinal striation, top of propodeum with thick and sparse transverse wrinkles, propodeal spines large with very broad base, PSL 0.56–0.59 .... *A. aktaci*
- . Scutum at least in basal half with distinct longitudinal striation, top of propodeum with thick and dense transverse wrinkles, propodeal spines moderately large with narrow base, PSL 0.41–0.51 ..... *A. ovaticeps*
4. Scutum at most in basal 2/3 length with distinct striation, in anterior part with diffused microreticulation, appears partly shiny ..... 5
- . Scutum on almost whole surface with distinct striation, in anterior part with distinct microreticulation, appears more or less dull .... *A. peloponnesiaca*
5. Head slimmer, HL/HW 1.193–1.254, usually above 1.209 ..... 6
- . Head stouter, HL/HW 1.203 ..... *A. schmitzi*
6. Scutellum on sides with distinct striation. Anterior surface of pronotum in the middle with narrow smooth or microreticulate area. Antennal scape slightly shorter, SL/HW 1.194 (1.168–1.228) ..... *A. festae*
- . Scutellum on sides with partly diffused striation. Anterior surface of pronotum in the middle with broad smooth area. Antennal scape slightly longer, SL/HW 1.308 ..... *A. splendida*

## REVIEW OF SPECIES

### *Aphaenogaster aktaci* Kiran & Tezcan, 2008

*Aphaenogaster aktaci* Kiran & Tezcan in Kiran *et al.* 2008: 690; Kiran & Karaman 2012: 16; Salata & Borowiec 2018a: 3.

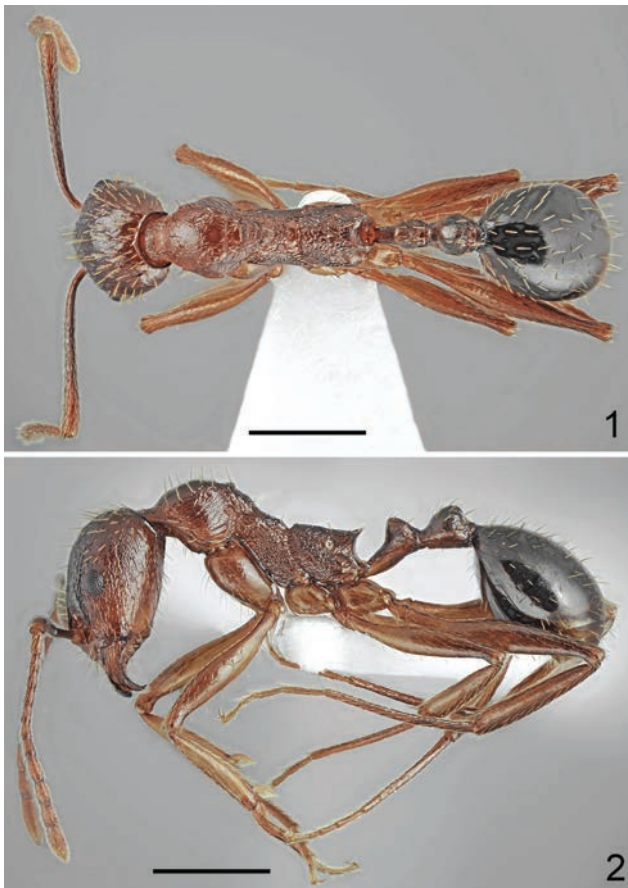
**Type material examined.** Holotype worker: Turkey, İzmir, Bozdağ-Gölcük Village 2 km E, 38°19' N, 28°06' E, 1160 m a.s.l., 09.VI.2001, 01/1295a, leg. S. Tezcan (EMTU), personally examined; paratype worker: TURKEY, İzmir Prov., 1160 m | Ödemiş-Bozdağ-Gölcük Vill. | 06.06.2001, 38°30'29" / 28°04'25" | leg. S. Tezcan || Collection L. Borowiec | Formicidae | LBC-TR00204 (MNH-DBET), personally examined.

**Other material examined.** GREECE: 52w, Aegean Islands, Lesbos, Argennos, 39.35494 / 26.2661, 548 m, 2015-06-12, leg. L. Borowiec (MNH-DBET); 1Q, 51w, Aegean Islands, Lesbos, Ligona Valley, 39.32734 / 26.21009, 229 m, 2015-06-11, leg. L. Borowiec (MNH-DBET); 2Q, 120w, Aegean Islands, Lesbos, Mt. Olympos, 39.06958 / 26.34976, 814 m, 2015-06-10, leg. L. Borowiec (MNH-DBET); TURKEY: 1w, Isparta,

Yukarıgökdere Village, Kasnak oak forest, N 37°42.964 E 30°49.899, 1998-06-25, leg. N. Jansson & M. Avcı (EMTU).

**Comparative notes.** *Aphaenogaster aktaci* is a very distinct species, the darkest and the most strongly sculptured species of the group. Its brown to dark brown coloration groups it with *A. ovaticeps* and dark specimens of *A. rugosoferruginea*. *Aphaenogaster ovaticeps* distinctly differs with regularly oval and less rugose head, and propodeal dorsum with transverse rugosities. *Aphaenogaster rugosoferruginea* differs in smaller size (WL 1.45–1.65 vs. 1.54–2.01), propodeal dorsum with transverse rugosities, smaller and thinner propodeal spines, and presence of pale spot on the base of the first gastral tergite. It is also paler than *A. aktaci* with body in most specimens yellowish-brown; only the darkest specimens have mesosoma as brown colored as in pale specimens of *A. aktaci*. Also, these three dark colored species are well separated geographically: *A. ovaticeps* is distributed in the Ionian Islands, western part of Balkans and northern regions of Italy, *A. rugosoferruginea* is endemic to Crete, and *A. aktaci* is distributed in the northern Aegean Islands (Lesbos) and western Turkey (Isparta and İzmir provinces).

**Description.** Worker: Measurements and ratios (n = 15): HL: 1.348 (1.15–1.47), HW: 1.034 (0.85–1.16), GL: 0.362 (0.32–0.40), FLW: 0.376 (0.32–0.42),



Figures 1, 2. *Aphaenogaster aktaci*, worker (specimen from Greece, Lesbos, Ligona Valley). (1) dorsal; (2) lateral (scale bar = 1 mm).



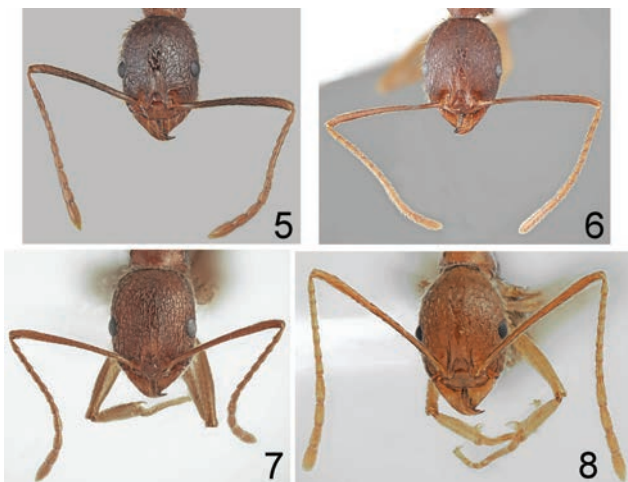
Figures 3, 4. *Aphaenogaster aktaci*, gyne (specimen from Greece, Lesbos, Ligona Valley). (3) dorsal; (4) lateral (scale bar = 1 mm).



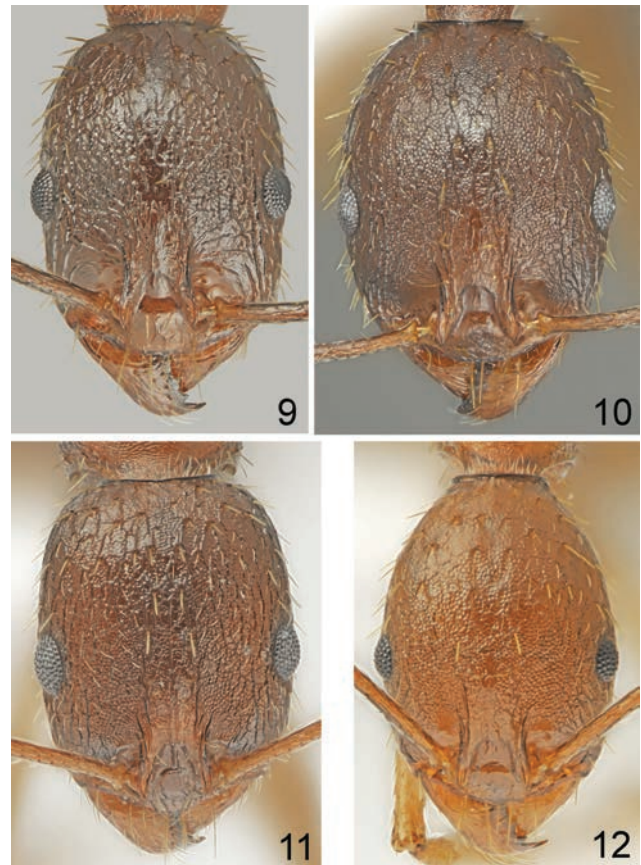
EL: 0.238 (0.20–0.28), SL: 1.524 (1.35–1.64), PNW: 0.734 (0.63–0.79), WL: 1.840 (1.54–2.01), PSL: 0.340 (0.29–0.41), PH: 0.336 (0.31–0.38), PL: 0.512 (0.45–0.58), PW: 0.272 (0.23–0.31), PPW: 0.372 (0.33–0.40), HTL: 1.312 (1.11–1.46), HBL: 1.300 (1.07–1.45), HL/HW: 1.308 (1.261–1.358), HTL/HW: 1.274 (1.181–1.358), SL/HW: 1.483 (1.388–1.588), SL/HL: 1.133 (1.095–1.174), WL/PNW: 2.506 (2.429–2.585), FLW/HW: 0.364 (0.349–0.376), PSL/HW: 0.326 (0.282–0.387), PL/PH: 1.523 (1.452–1.607), EL/HL: 0.176 (0.171–0.190).

**Color.** Head mostly yellowish-brown to dark-brown, clypeus, antennal sockets and frontal lobes paler than rest of head; mesosoma, petiole and post-petiole yellowish-brown to dark-brown, gaster brown to almost black only hind margins of tergites yellowish. Mandibles yellowish-brown, antennae yellowish, scape and first five segments of funicle sometimes yellowish-brown to brown, darker colored than apical segments of funicle; legs yellowish, in the darkest specimens mid and hind femora and tibiae yellowish-brown (Figs 1, 2). **Head.** Approximately 1.3 times as long as wide, not bulging behind eyes, broadly oval, weakly rounded behind eyes, without vertexal corners, hind margin with narrow marginal keel, straight or slightly concave (Figs 5, 9). Anterior margin of clypeus shallowly emarginate. Eyes small, approximately 0.2 times as long as length of lateral margin of head, placed distinctly in front of the middle of head (Fig. 2). Mandibles elongate, with distinct striation and shiny space between striation. Clypeus with feeble microreticulation and few longitudinal rugae, but background shiny. Frontal carinae moderately long, as long as 1/3 length of head, almost parallel-sided, frontal triangle smooth and shiny, antennal sockets inside smooth and shiny outside mar-

gined by circular rugae. Almost whole surface of head with longitudinal, oblique and reticulate sculpture, and with distinct microreticulation between rugosities, only occipital part of head predominantly with distinct microreticulation, surface of head appears rugose. Entire dorsum and ventrum of head with sparse, long, erect setae. Scape microreticulate, without rugae or striation, elongate, approximately 1.5 times as long as width of head, at base 0.55 times as wide as in apex then gradually widened, without preapical constriction. Funicle elongate, approximately 1.5 times as long as scape, first segment elongate, approximately 2.4 times as long as wide on apex, 0.6 times as long as two subsequent segments combined, segments 2–7 elongate, segment 3 approximately 1.2 times as long as segment 2, segment 8 approximately twice as long as wide, last three segments indistinctly wider than preceding segments, not forming a distinct club, 1.3 times as long as segments 5–8 combined (Figs 2, 5). **Mesosoma.** Promesonotum approximately 1.6 times as long as wide, pronotum weakly convex in profile with well-marked anterior setose tubercles, anterior part of mesonotum placed slightly higher than posterior part



Figures 5–8. Head and antennae, worker. (5) *Aphaenogaster aktaci*; (6) *Aphaenogaster ovaticeps*; (7) *Aphaenogaster rugosoferruginea*; (8) *Aphaenogaster peloponnesiaca*.



Figures 9–12. Head sculpture, worker. (9) *Aphaenogaster aktaci*; (10) *Aphaenogaster ovaticeps*; (11) *Aphaenogaster rugosoferruginea*; (12) *Aphaenogaster peloponnesiaca*.

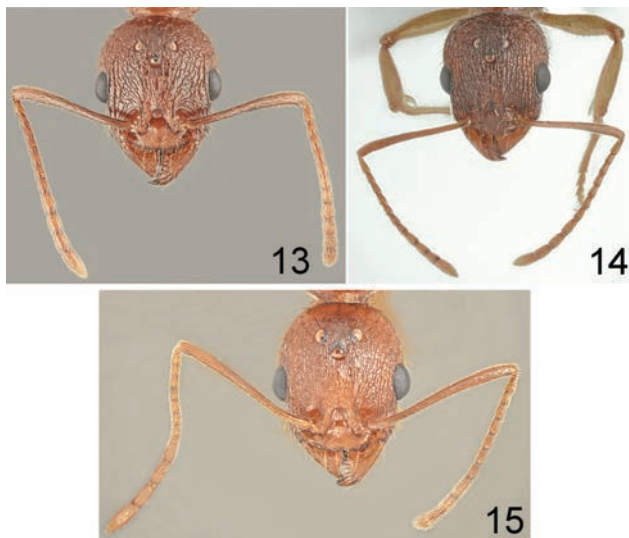
of pronotum thus promesonotal convexity distinctly angulate in profile. Propodeum elongate, propodeal spines long, with broad base then acute, run obliquely upwards (Fig. 2). Top of pronotum microreticulate and microgranulate, in anterior part and laterally with more or less distinct oblique and transverse rugae, on sides with distinct, dense longitudinal rugae and microreticulate to microgranulate interspaces. Elevated part of mesonotum on top with more or less distinct transverse rugae and with microreticulate to microgranulate interspaces, top of posterior part of mesonotum with longitudinal rugae and with microreticulate to microgranulate interspaces, sides of mesosoma mostly microgranulate with few rugae in posterior third, propodeum on sides with distinct longitudinal rugae and more or less microreticulate interspaces, at the top with wrinkled sculpture tending to form longitudinal rugae (Fig. 2). Pronotum with 12–14 long, erect setae, the longest as long as propodeal spines, mesonotum with 6 and propodeum with a pair of long, erect setae. **Petiole and postpetiole.** Petiole elongate with long stem, its anterior face deeply concave, node in profile obtusely angulate. Posterior face flat to shallowly concave. Ventral margin of petiole straight to slightly convex, with more or less distinct longitudinal keel (Fig. 2). In dorsal view, petiole narrowest at base then weakly divergent, almost parallel-sided before petiolar node, then with rounded sides. Petiole on almost entire surface microreticulate and microgranulate, posterior face and sides with short wrinkles. Postpetiole in lateral profile more or less regularly rounded. In dorsal view the postpetiole approximately 1.3 times as long as wide with regularly rounded sides (Fig. 1), on almost entire surface microreticulate and microgranulate,

posterior face with distinct longitudinal wrinkles. **Gaster.** Lucid, only base close to postpetiole with diffused microreticulation and indistinct, short, longitudinal groove. Petiolar node, postpetiole and gaster with long standing setae. **Legs.** Moderately thin and elongate, stouter than in species of *A. vohraliki* complex but slimmer than in species of *A. festae* complex, hind femora moderately swollen in the middle and gradually narrowed to base and to apex.

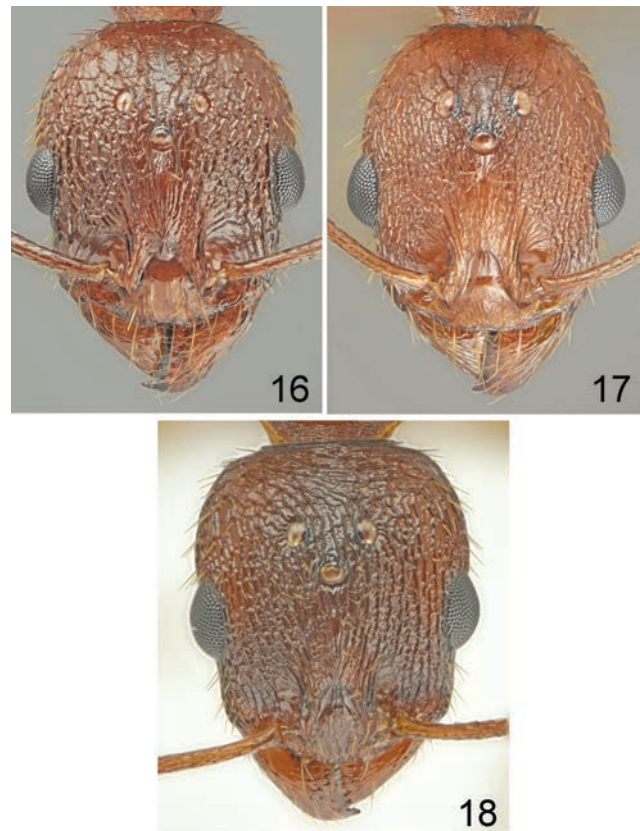
**Variability.** Within populations is small, manifested mostly in body size, paler or darker coloration and length of propodeal spines.

Gyne: Measurements and ratios ( $n = 3$ ): **HL:** 1.557 (1.55–1.57), **HW:** 1.300 (1.29–1.31), **SL:** 1.530 (1.50–1.55), **EL:** 0.427 (0.36–0.50), **WL:** 2.813 (2.76–2.85), **PSL:** 0.577 (0.56–0.59), **PH:** 0.530 (0.52–0.54), **PL:** 0.733 (0.70–0.77), **MW:** 1.363 (1.31–1.42), **PW:** 0.427 (0.41–0.45), **PPW:** 0.620 (0.59–0.64), **HTL:** 1.457 (1.45–1.46), **HL/HW:** 1.198 (1.183–1.208), **SL/HW:** 1.177 (1.145–1.202), **SL/HL:** 0.983 (0.968–1.000), **WL/MW:** 2.065 (2.007–2.107), **PL/PH:** 1.384 (1.296–1.453), **EL/HL:** 0.274 (0.232–0.323).

**Color.** Whole body from pale brown to dark brown, frons partly, and gastral tergites darker than mesosoma (Figs 3–4). **Head.** Oval, lateral surfaces below eyes



Figures 13–15. Head and antennae, gyne. (13) *Aphaenogaster aktaci*; (14) *Aphaenogaster rugosoferruginea*; (15) *Aphaenogaster ovaticeps*.



Figures 16–18. Head sculpture, gyne. (16) *Aphaenogaster aktaci*; (17) *Aphaenogaster ovaticeps*; (18) *Aphaenogaster rugosoferruginea*.



straight, gently rounded on the posterior edges, occipital margin of head convex (Fig. 13). Anterior margin of the clypeus gradually convex. Eyes big, oval, 0.25 times as long as length of the head. Antennal scape short, slightly curved, 0.8 times as long as length of the head, not exceeding beyond occipital margin of head, in apex gradually widened, its base with small teeth. Pedicel more than 2 times longer than wide; average 1.2 times longer than second segment of funicle. Other funicular segments more than  $1\frac{1}{2}$  times longer than wide (Fig. 13). Surface of scape with very fine, short and sparse striae and sparse punctation; covered with thin, moderate dense, adpressed to decumbent setae, shorter than  $1/2$  of scape width. Mandibles triangular with thick, longitudinal striae, shiny. Clypeus shiny with sparse, thick, longitudinal striae, area between striae with gentle microreticulation or smooth, shiny. Frontal carinae short, slightly extending across the fronts of the antennal fossae. Antennal fossa deep, with sparse roundly curved striae, area between striation smooth. Frontal lobes narrow, smooth with thick longitudinal striae. Head on the whole surface with thick, moderately dense, longitudinal reticulation, area between rugae with irregular, fine and thick rugae, shiny. Entire head bearing thick, suberect to erect, pale setae (Figs 13, 16). **Mesosoma.** Short, square, 1.7 times as long as head; in lateral view scutum slightly convex, scutellum located above scutum, and globular; propodeal spines triangular, long, with wide base, inclined at the  $45^\circ$  angle; dorsal surface of propodeum inclined towards its posterior surface (Fig. 4). Pronotum with longitudinal, horizontal, weak but dense striation, area between striae smooth or with microreticulation, shiny. Scutum with extremely fine and sparse microreticulation and shiny, only on its posterior edge with some short, longitudinal wrinkles; scutellum and axilla with longitudinal striation; propodeum shiny, with dense transverse to irregular striation (Fig. 3). Anepisternum and katapisternum shiny with sparse and fine microreticulation; lateral edges with very dense, thick longitudinal striation. Mesosoma dorsum with sparse, thick, erect setae (Fig. 4). **Petiole.** Peduncle moderate, node with convex anterior and posterior faces, its dorsal surface wide and convex. On the whole surface covered by dense microreticulation, and sparser thick, irregular striae, and long, thick erect setae (Fig. 4). **Postpetiole.** In lateral view, regularly rounded, 0.8 times as long as wide, apical half with gently rounded sides. On the whole surface covered by dense microreticulation, and sparser thick, irregular striae, and long, thick erect setae (Fig. 4). **Gaster.** Smooth and shiny, bearing dense, long, suberect to erect, pale setae (Figs 3–4).

**Biology.** In Turkey nests of *Aphaenogaster aktaci* were found most often under stones, occasionally under bark of dead tree trunks and in soil close to trees in old *Pinus nigra*, *P. brutia* and oak forests.

In Greece nests were observed under large stones located close to streams, always in shaded areas of deciduous forests.

**Distribution.** Greece (Lesbos), Turkey (Isparta, İzmir).

### *Aphaenogaster festae* Emery, 1915

*Aphaenogaster splendida* var. *festae* Emery, 1915a: 2.

Subspecies of *Aphaenogaster splendida*: Emery 1921a: 60; Menozzi, 1936: 270; Hamann & Klemm, 1976: 670.

Status as species: Arnoldi 1976: 1024; Agosti & Collingwood 1987: 53; Legakis 2011: 6; Kiran & Karaman 2012: 16; Borowiec & Salata 2012: 464; Bračko *et al.* 2016: 11; Borowiec & Salata 2018b: 3; Borowiec *et al.* 2019: 614.

**Type material examined.** Syntype worker: *Aph. splendida* | *festae* Emery | Rhodos || ANTWEB | CASENT | 0904169 (MSNG); photograph examined [AntWeb, CASENT0904169, photos by Zach Lieberman, available on <https://www.AntWeb.org>].

**Other material examined.** BULGARIA: 5w, Krdžali distr., Krdžali, 1988-04-25, leg. P. Bezděčka (MNHW-DBET); GREECE: 60w, Aegean Islands, Lesbos, n. Antissa, 39.23841 / 25.99782, 74 m, 2015-06-08, leg. L. Borowiec (MNHW-DBET); 42w, Aegean Islands, Lesbos, Ipsilometopo, 39.32012 / 26.24461, 485 m, 2015-06-11, leg. L. Borowiec (MNHW-DBET); 1Q, 23w, Aegean Islands, Lesbos, M. Pythariou, 39.17322 / 25.96195, 99 m, 2015-06-08, leg. L. Borowiec (MNHW-DBET); 1Q, 36w, Aegean Islands, Lesbos, 3.4 km NE of Skalochori, 39.27923 / 26.10926, 292 m, 2015-06-09, leg. L. Borowiec (MNHW-DBET); 8w, Aegean Islands, Lesbos, rd. Sykaminia-Vigla, 39.35468 / 26.30483, 395 m, 2015-06-12, leg. L. Borowiec (MNHW-DBET); 3w, Aegean Islands, Samos, 1.7 km S of Agios Konstantinos, 37.79064 / 26.83246, 285 m, 2017-06-05, leg. L. Borowiec (MNHW-DBET); 8w, Aegean Islands, Samos, 740 m N of Idroussa, 37.78575 / 26.74528, 130 m, 2017-06-07, leg. L. Borowiec (MNHW-DBET); 4w, Aegean Islands, Samos, 1 km S of Idroussa, 37.76997 / 26.74862, 240 m, 2017-06-07, leg. L. Borowiec (MNHW-DBET); 1w, Aegean Islands, Samos, 1.3 km S of Idroussa, 37.76763 / 26.75136, 310 m, 2017-06-07, leg. L. Borowiec (MNHW-DBET); 2w, Aegean Islands, Samos, 1 km NE of Kallithea, 37.74111 / 26.5893, 300 m, 2017-06-04, leg. L. Borowiec (MNHW-DBET); 1Q, 38w, Aegean Islands, Samos, 400 m E of Kastania, 37.75111 / 26.68886, 390 m, 2017-06-06, leg. L. Borowiec (MNHW-DBET); 7w, Aegean Islands, Samos, 1.3 km S of Kastania, 37.754216 / 26.69263, 350 m, 2017-06-06, leg. L. Borowiec (MNHW-DBET); 5w, Aegean Islands, Samos, 300 m W of Konteika, 37.75689 / 26.73443, 355 m, 2017-06-07, leg. L. Borowiec (MNHW-DBET); 1Q, 53w, Aegean Islands, Samos, 550 m N of Kosmadei, 37.76574 / 26.66201, 490 m, 2017-06-06, leg. L. Borowiec (MNHW-DBET); 13w, Aegean Islands, Samos, 760 m N of Mavratzei, 37.72534 / 26.86054, 265 m,

2017-06-03, leg. L. Borowiec (MNHW-DBET); 2Q, 26w, Aegean Islands, Samos, 1 km N of Mavratzei, 37.73222 / 26.86118, 310 m, 2017-06-03, leg. L. Borowiec (MNHW-DBET); 4w, Aegean Islands, Samos, Mili, 37.67975 / 26.86006, 40 m, 2017-06-03, leg. L. Borowiec (MNHW-DBET); 1w, Aegean Islands, Samos, Nachtigallental, 37.78333 / 26.81666, 50-100 m, 2013-05-28, leg. R. Hofer (MNHW-DBET); 19w, Aegean Islands, Samos, Nachtigallental, 37.78333 / 26.81666, 50-100 m, 2013-06-09, leg. H.C. Wagner (MNHW-DBET); 1Q, 18w, Aegean Islands, Samos, Pandroso, 37.73165 / 26.82803, 670 m, 2017-06-08, leg. L. Borowiec (MNHW-DBET); 10w, Aegean Islands, Samos, 1.3 km E of Pythagoreio, 37.69441 / 26.95728, 60 m, 2017-06-02, leg. L. Borowiec (MNHW-DBET); 10w, Aegean Islands, Samos, 1.4 km E of Pythagoreio, 37.69538 / 26.95837, 50 m, 2017-06-02, leg. L. Borowiec (MNHW-DBET); 1Q, 5w, Aegean Islands, Samos, Pythagorion, 1984-05-02, leg. D. Agosti (MHNG); 1Q, 8w, Aegean Islands, Samos, Vigla, 37.7 / 26.63333, 15 m, 2013-06-06, leg. H.C. Wagner (MNHW-DBET); 1w, Cyclades, Naxos, Apollonas, 37.17917 /

25.5525, 7 m, 2015-04-11, leg. Mus. Athens Exp. (MNHW-DBET); 1w, Cyclades, Naxos, 1.6 km N of Mesi, 37.16083 / 25.5478, 146 m, 2015-04-11, leg. Mus. Athens Exp. (MNHW-DBET); 5w, Cyclades, Naxos, 1 km S of Sifones, 37.0872 / 25.511, 585 m, 2015-04-11, leg. Mus. Athens Exp. (MNHW-DBET); 1w, Dodecanese, Agathonisi, Agathonisi, 37.46 / 26.97, 85 m, 1997-05-22-31, leg. A. Legakis (MNHW-DBET); 4w, Dodecanese, Kos, Paleo Pili loc. 2, 36.8357 / 27.19018, 362 m, 2015-07-07, leg. S. Salata (SSCC); 4w, Dodecanese, Kos, Plaka, 36.78917 / 27.0671, 53 m, 2015-07-06, leg. S. Salata (SSCC); 4w, Dodecanese, Kos, Zia-Ag. Dimitrios rd. loc. 2, 36.85047 / 27.21447, 301 m, 2015-07-08, leg. S. Salata (SSC); 1w, Dodecanese, Rhodes, n. Apollona, 36.26184 / 27.97488, 335 m, 2015-05-06, leg. L. Borowiec (MNHW-DBET); 1w, Dodecanese, Rhodes, Attavyros loc. 3, 36.20018 / 27.81451, 593 m, 2015-05-04, leg. L. Borowiec (MNHW-DBET); 85w, Dodecanese, Rhodes, Epta Piges, 36.25459 / 28.11378, 99 m, 2015-05-06, leg. L. Borowiec (MNHW-DBET); 1w, Dodecanese, Rhodes, Loytani River, 36.258 / 28.1197, 60 m, 2013-05-28, leg. M. Chatzaki (MNHW-DBET); 1Q, 44w, Dodecanese, Rhodes, road to Prof. Ilias loc. 2, 36.27618 / 27.97216, 522 m, 2015-05-07, leg. L. Borowiec (MNHW-DBET); 1w, Thrace, Rodopi, n. Strymi, 40.97329 / 25.54116, 165 m, 2015-09-05, leg. L. Borowiec (MNHW-DBET); **TURKEY:** 1w, Antalya, Beldibi, 36.73333 / 30.55, 10-20 m, 2006-07-10, leg. L. Borowiec (MNHW-DBET); 1Q, 7w, 1m Antalya, Çakırlar-Yarbaşçandır rd., 36.78333 / 30.43333, 760 m, 2010-07-02, leg. L. Borowiec (MNHW-DBET); Antalya, Çıralı,



Figures 19, 20. *Aphaenogaster festae*, worker (specimen from Greece, Rhodes, road to Profitis Ilias). (19) dorsal; (20) lateral (scale bar = 1 mm).



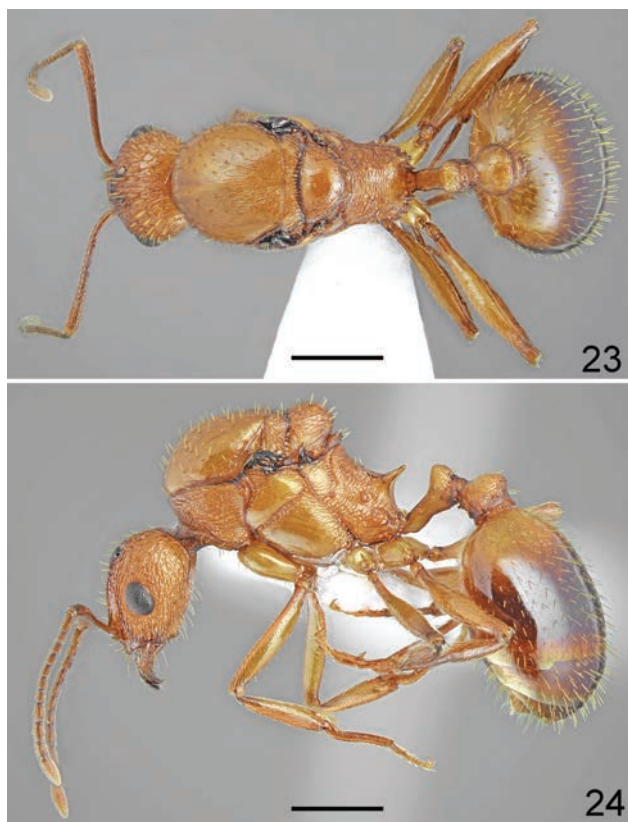
Figures 21, 22. *Aphaenogaster festae*, variation of mesosoma lateral. (21) northern populations; (22) southern populations.



36.41666 / 30.45, 15 m, 2010-06-30, leg. L. Borowiec (MNHW-DBET); 1w, Antalya, Kemer-Çıralı, 0 m, 2013-05-19, leg. A. Lenoir (EMTU); 2Q, 6w, 1m, Antalya, Kemer-Somakseğri rd., 36.58333 / 30.46666, 319 m, 2010-07-01, leg. L. Borowiec (MNHW-DBET); 1w, Antalya, Kumluca-Çavuşköy, 652 m, 2013-05-20, leg. A. Lenoir (EMTU); 1w, Antalya, Manavgat-Side, 2000-05-30, leg. Jansson & Coşkun (EMTU); 2Q, 2w, 1m, Antalya, ancient Phaselis, 36.5262 / 30.5455, 6 m, 2010-06-29, leg. L. Borowiec (MNHW-DBET); 20w, Antalya, ancient Termessos, 36.96666 / 30.45, 1018 m, 2010-07-03, leg. L. Borowiec (MNHW-DBET); 11w, Aydın, Karacasu-Geyre, 37.70658 / 28.75359, 559 m, 2007-07-12, leg. C. Karaman (MNHW-DBET, EMTU); 2m, Balıkesir, Ayvacık-Küçükkuşu, 2003-07-19, leg. K. Kiran (EMTU); 22w, 5m, Çanakkale, Eceabat-Yalova Vill., 40.25832 / 26.41386, 50 m, 2004-07-22, leg. K. Kiran (MNHW-DBET, EMTU); 33w, Çanakkale, Gökçeada Island, 40.20437 / 25.96372, 64 m, 2018-06-05, leg. C. Karaman (MNHW-DBET, EMTU); 44w, Çanakkale, Gökçeada Island, 40.13987 / 25.73101, 76 m, 2018-07-25, leg. C. Karaman (MNHW-DBET, EMTU); 2Q, 29w, 5m, Çanakkale, Gökçeada Island, 40.20701 / 25.82346, 188 m, 2018-07-26, leg. C. Karaman (MNHW-DBET, EMTU);

14w, Çanakkale, Gökçeada-Eskibademli Vill., 40.22102 / 25.90608, 139 m, 2017-05-14, leg. C. Karaman (MNHW-DBET, EMTU); 10w, Denizli, Babadağ-Demirli Vill., 37.79648 / 28.82975, 1040 m, 2007-07-11, leg. C. Karaman (MNHW-DBET, EMTU); 1m, Kütahya, Gediz-Yağmurlar, 1040 m, 2008-07-16, leg. C. Karaman (EMTU); 50w, Manisa, Gördes-Kabakoz, 988 m, 2007-07-03, leg. C. Karaman (EMTU); 3w, Mersin, Erdemli-Devrent, 2005-08-11, leg. Jansson & Avcı (EMTU); 1w, Mersin, Gülnar-Köseçobanlı Vill., 2006-07-26, leg. Jansson & Avcı (EMTU); 1w, Mersin, Mut-Sertavul, 1394 m, 2011-06-18, leg. Kiran & Aksoy (EMTU); 2w, Muğla, Marmaris, 1975-05-01, leg. Besuchet & Löbl (MHNG); 4w, Muğla, 15 km N of Marmaris, 1975-05-01, leg. Besuchet & Löbl (MHNG); 1w, Niğde, Altunhisar, 38.04 / 34.38, 1635 m, 2011-06-22, leg. Kiran & Aksoy (EMTU); 3Q, 50w, 7m, Uşak, Eşme-Ağabey Vill., 38.24305 / 28.86405, 1200 m, 2007-07-06, leg. C. Karaman (MNHW-DBET, EMTU).

**Comparative notes.** *Aphaenogaster festae*, together with *A. syriaca*, *A. schmitzi* and *A. transcaucasica*, form a complex of species characterized by yellow to rusty-yellow coloration; moderately elongate legs with hind femora distinctly swollen in the middle and distinctly narrowing toward base and apex; moderately thin and elongate tibiae, distinctly widened from base to apex; and distinct body sculpture with head with relatively distinct reticulation. *Aphaenogaster schmitzi* and *A. transcaucasica* well differ in the anterior part of mesonotum not elevated or placed only slightly higher than pronotum, thus the promesonotal convexity forms a more or less regular arch. They differ also in shorter propodeal spines and less developed body sculpture, especially pronotal surface, because of its diffused microsculpture and lack of rugosities, appears more or less shiny. While *A. festae* has the whole pronotal surface usually distinctly microreticulate with lateral sides more or less rugose (pale colored northern population has rugosities indistinct or completely absent). *Aphaenogaster syriaca*, which appears to be the most similar to *A. festae*, differs in less elongated head, HL/HW: 1.270 (1.220–1.307) vs. HL/HW: 1.347 (1.313–1.390), slightly shorter antennal scape in relation to head width, SL/HW: 1.419 (1.340–1.469) vs. 1.541 (1.463–1.636), and propodeal spines placed less upwards than in *A. festae*. Additionally, both species are separated geographically. *Aphaenogaster festae* has a more western and northern distribution, from north-western Greece, Bulgaria, Aegean Islands to the Niğde and Mersin Provinces in Turkey. *Aphaenogaster syriaca* has a more eastern and southern distribution ranging from Cyprus, Lebanon, and Israel to Adana Province in Turkey. It is possible that they are sympatric in southeastern Turkey, but limited material from this region prevents that assessment.



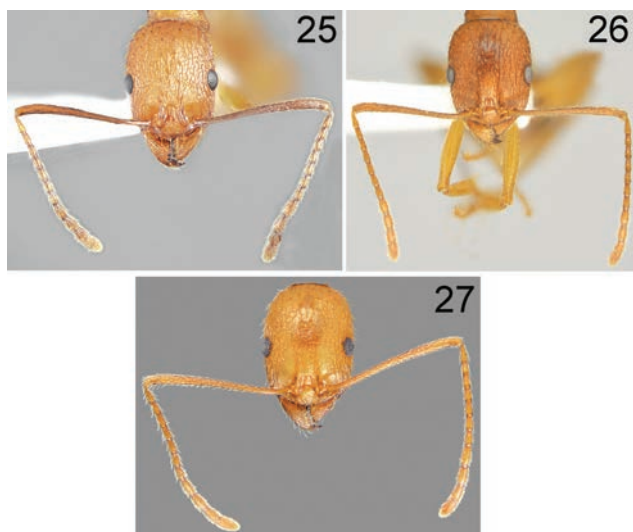
Figures 23, 24. *Aphaenogaster festae*, gyne (specimen from Greece, Rhodes, road to Profitis Ilias). (23) dorsal; (24) lateral (scale bar = 1 mm).



**Description.** Worker: Measurements and ratios ( $n = 15$ ): HL: 1.214 (1.07–1.28), HW: 0.903 (0.77–0.96), GL: 0.323 (0.28–0.37), FLW: 0.317 (0.29–0.34), EL: 0.219 (0.18–0.24), SL: 1.389 (1.26–1.45), PNW: 0.651 (0.56–0.69), WL: 1.660 (1.44–1.79), PSL: 0.210 (0.15–0.24), PH: 0.303 (0.26–0.33), PL: 0.477 (0.41–0.50), PW: 0.219 (0.19–0.24), PPW: 0.313 (0.26–0.34), HTL: 1.150 (0.97–1.23), HBL: 1.116 (0.96–1.19), HL/HW: 1.347 (1.313–1.390), HTL/HW: 1.272 (1.247–1.310), SL/HW: 1.541 (1.463–1.636), SL/HL: 1.144 (1.109–1.190), WL/PNW: 2.549 (2.493–2.576), FLW/HW: 0.348 (0.303–0.379), PSL/HW: 0.232 (0.195–0.242), PL/PH: 1.578 (1.485–1.724), EL/HL: 0.178 (0.168–0.190).

**Color.** Almost whole body from pale yellow to rusty yellow, legs and antennae yellow, only first gastral tergite yellowish brown to brown with yellow basal spot (Figs 19–20). **Head.** Slightly elongate, approximately 1.3 times as long as wide, not bulging behind eyes, in the middle almost parallel-sided, behind eyes regularly rounded, without vertexal corners, hind margin with narrow carina, straight or with small triangular emargination in the middle (Figs 25, 28). Anterior margin of clypeus with more or less distinct median emargination. Eyes moderately large, approximately 0.2 times as long as length of lateral margin of head, placed slightly in front of the middle of head (Fig. 28). Mandibles elongate, with distinct striation, shiny. Clypeus on whole surface distinctly microreticulate and with rugae, sometimes interantennal area only microreticulate, without distinct rugae, interspaces appear from slightly shiny to slightly dull. Antennal sockets only in the deepest part smooth and shiny, mostly distinctly microreticulate usually not bordered externally by circular rugae but in the northern

populations the rugae tend to form incomplete circular sculpture. Frontal carinae short, as long as 1/4 length of head but usually they pass without a clear border in a longitudinal rugae on frontal surface of head, subparallel, frontal triangle with more or less distinct background microreticulation and with more than one median keel. Almost whole surface of head with longitudinal and oblique sculpture and with distinct microreticulation between rugosities, also occipital part of head with more or less rugose sculpture, rugae in area behind eyes tend to form reticulate sculpture. Scape microreticulate, usually without striation but in southern populations often with feeble longitudinal striae, moderately elongate, 1.47–1.63 times as long as width of head, at base 0.5 times as wide as in apex then gradually widened, without preapical constriction. Funicle elongate, approximately 1.4 times as long as scape, first segment elongate, approximately twice as long as wide on apex, 0.7 times as long as two subsequent segments combined, segments 2–7 elongate, segment 3 approximately as long as segment 2, segment 8



Figures 25–27. Head and antennae, worker. (25) *Aphaenogaster festae*; (26) *Aphaenogaster syriaca*; (27) *Aphaenogaster splendida*.

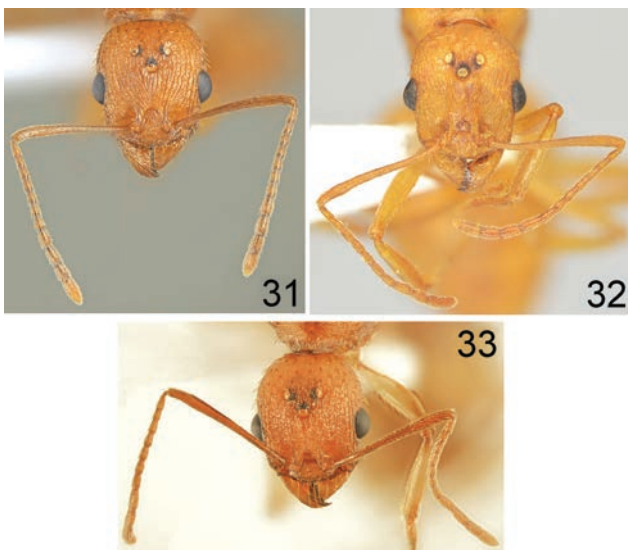


Figures 28–30. Head sculpture, worker. (28) *Aphaenogaster festae*; (29) *Aphaenogaster splendida*; (30) *Aphaenogaster syriaca*.

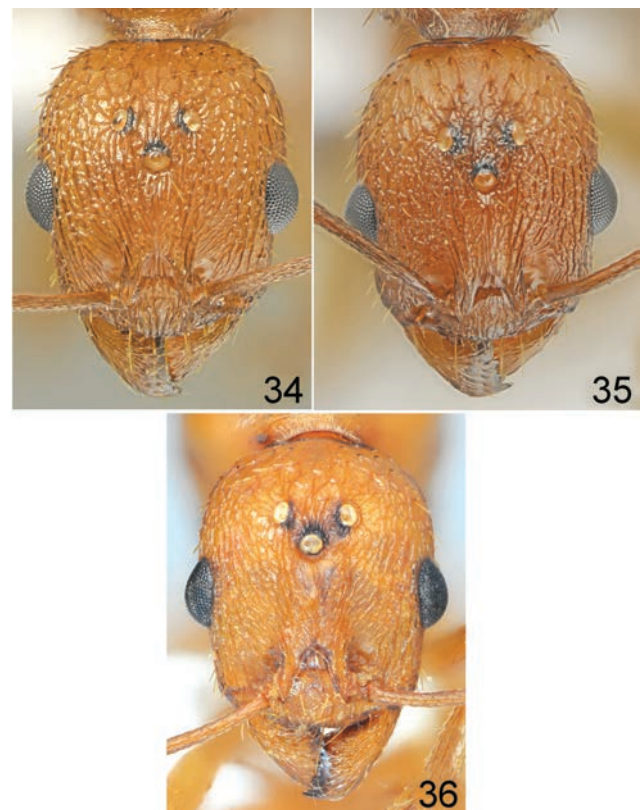
approximately 2.2 times as long as wide, last three segments slightly wider than preceding segments, but not forming a distinct club, 1.2 times as long as segments 5–8 combined (Fig. 25). **Mesosoma.** Moderately elongate, promesonotum approximately 1.5 times as long as wide, pronotum weakly convex in profile, anterior part of mesonotum usually distinctly higher than posterior part of pronotum thus promesonotal convexity more or less angulate but in northern populations anterior part of mesonotum usually less high than in southern populations but promesonotum never forms regular convexity in profile. Propodeum moderately elongate, propodeal spines usually long, spiniform, running distinctly upwards (Figs 20–22). Pronotal surface always with more or less distinct microreticulation, also in anterior part, usually on sides with more or less visible rugosities, but in small, pale colored northern population and in specimens from Mersin province in Turkey these rugosities indistinct or completely obsolete. Mesonotum on top microreticulate and microgranulate without longitudinal rugae or only basally with rudiments of rugae, on sides usually only with distinct microreticulation and granulation, without rugae, only in southern populations with few short rugae in posterolateral corners, propodeum at the top anteriorly with transversely wrinkled sculpture and microreticulation between rugae, area in front of propodeal spines only with microreticulation, on sides propodeum mostly with microreticulate and granulate sculpture, only posterior corners with few longitudinal rugae (Figs 21, 22). Pronotum and mesonotum with 8–10 erect setae, propodeum with single pair of setae, the longest slightly longer than propodeal spines. **Petiole and postpetiole.** Petiole elongate with long stem, its anterior face

deeply concave, node rounded. Posterior face shallowly concave. Ventral margin of petiole straight, without spine or distinct angulation (Fig. 20). In dorsal view, petiole only more or less widened behind base, then almost parallel-sided, petiolar node subangulate to subrounded in profile. Petiole anteriorly and on top usually with distinct microreticulation, only in pale northern populations partly microreticulation on top of petiole more or less diffused and surface partly smooth and shiny. Postpetiole in lateral profile regularly rounded. In dorsal view the postpetiole almost as long as wide with regularly rounded sides (Fig. 20), on almost entire surface more or less microreticulate but without wrinkles. **Gaster.** Lucid, only base close to postpetiole with distinct, short, longitudinal grooves and with distinct microreticulation. Petiolar node, postpetiole and gaster with long standing setae. **Legs.** Moderately thin and elongate, hind femora distinctly swollen in the middle then distinctly narrowed to base and to apex, tibiae moderately thin and elongate, distinctly widened from base to apex.

**Variability.** We observed variability within and between populations, manifested in body sculpture and coloration, and the length of propodeal spines. Northern populations are usually paler and have shorter propodeal spines directed more upward than southern



Figures 31–33. Head and antennae, gyne. (31) *Aphaenogaster festae*; (32) *Aphaenogaster splendida*; (33) *Aphaenogaster peloponnesiaca*.



Figures 34–36. Head sculpture, gyne. (34) *Aphaenogaster festae*; (35) *Aphaenogaster peloponnesiaca*; (36) *Aphaenogaster splendida*.



populations. But this variability is also observed within some populations from the same region thus cannot be considered as a cline (Figs 21, 22). Northern and eastern populations usually have weaker sculpture on the pronotum and petiolar nodes, and this character is correlated with generally paler body coloration. Morphometric characters do not provide data allowing the separation of the brightly colored, northern populations from the remaining ones. Thus, their possible distinctness requires more detailed research supported by genetic data. *Aphaenogaster festae* is one of the most widely distributed and ecologically least specialized species. It occurs in dry and moist forests, both deciduous and coniferous, which could indicate its genetic diversity.

**Gyne:** Measurements and ratios ( $n = 4$ ): **HL:** 1.390 (1.33–1.42), **HW:** 1.150 (1.11–1.19), **SL:** 1.373 (1.30–1.40), **EL:** 0.383 (0.36–0.40), **WL:** 2.540 (2.41–2.74), **PSL:** 0.428 (0.40–0.47), **PH:** 0.463 (0.42–0.52), **PL:** 0.723 (0.69–0.75), **MW:** 1.263 (1.17–1.38), **PW:** 0.350 (0.32–0.38), **PPW:** 0.545 (0.53–0.59), **HTL:** 1.258 (1.16–1.34), **HL/HW:** 1.209 (1.193–1.224), **SL/HW:** 1.194 (1.168–1.228), **SL/HL:** 0.987 (0.977–1.007), **WL/MW:** 2.014 (1.975–2.119), **PL/PH:** 1.571 (1.442–1.667), **EL/HL:** 0.275 (0.271–0.282).

**Color.** Head and mesosoma yellow; petiolar nodes yellow, usually with brown posterior margin, gaster bicolor, first tergite brown, anterior 1/4–1/3 length with yellow spot of diffused borders, subsequent tergites yellow basally and brown apically, sternites yellow (Fig. 23, 24). Mandibles, antennae and legs yellow. **Head.** Stout, HL/HW 1.193–1.224, broadly oval, not bulging behind eyes, without vertexal corners, weakly rounded behind eyes and anterad, hind margin straight. Anterior margin of clypeus with shallow

emargination. Eyes large, approximately 0.34 times as long as length of lateral margin of head, slightly oval, placed slightly in front of the middle of head (Fig. 34). Ocelli large, first ocellus placed on the line connecting posterior margin of the eyes. Scape moderately elongate, approximately 1.2 times as long as width of head, at base 0.5 times as wide as in apex then gradually widened, without preapical constriction. Funicle elongate, approximately 1.5 times as long as scape, first segment elongate, approximately 2.4 times as long as wide on apex, 0.7 times as long as two subsequent segments combined, segments 2–7 elongate, segments 3 approximately as long as segment 2, segment 8 approximately 2.2 times as long as wide, last three segments indistinctly wider than preceding segments, do not form a distinct club, 1.1 times as long as segments 5–8 combined (Fig. 31). Mandibles distinctly striate, shiny. Frontal carinae short, extending to 1/6 length of head, weakly divergent. Clypeus with diffused background microreticulation and distinct longitudinal rugae but appears more or less shiny, frontal triangle shiny with 1–3 median keels. Surface of head in anterior part up to ocelli mostly with distinct longitudinal rugae, behind eyes and ocelli with reticulate rugosities, on whole surface with distinct background microreticulation, appears more or less dull (Fig. 34). Scape microreticulate, without striation. **Mesosoma.** Mesosomal plate (scutum) 1.10–1.15 times as long as wide, relatively high and robust, in profile regularly convex anteriorly and depressed posteriorly, without pronotal corners. Scutellum 1.5 times as wide as long, posterior margin regularly semicircular, in lateral view scutellum strongly convex, placed higher than top of mesonotal plate. Propodeum located considerably lower than mesosomal plate, propodeal spines moderately elongate, finger-shaped, with obtuse tips and narrow base, oriented obliquely upwards (Fig. 24). In dorsal view the spines distinctly divergent. Pronotum with transverse rugae, often interrupted in the middle of frontal face, and distinct background microreticulation, scutum with variable sculpture, usually in basal 1/4–1/3 length with distinct longitudinal striation and distinct background microreticulation, in anterior part without striation, only with diffused microreticulation, appears more or less smooth and shiny, but in extreme cases the striation strongly reduced and visible only close to basal margin of scutum, or strongly expanded extending to basal half-length of scutum. Scutellum laterally with longitudinal striation and in top with only more less diffused microreticulation but the striae can expand to the whole surface of scutellum or can be reduced to only sides of scutellum then top appears partly smooth and shiny. Anepisternum with variable sculpture, from whole surface with only diffused microreticulation then without striation, appearing mostly shiny to with posterior 1/3 length with distinct



Figures 37, 38. Male lateral. (37) *Aphaenogaster festae* (specimen from western Turkey, road Çakırlar-Yarbaşçandır); (38) *Aphaenogaster splendida* (specimen from Sicily, Lampedusa) (scale bar = 1 mm).



microreticulation and fine longitudinal striae, katapisternum also variable, in anterior 1/2–2/3 width with diffused microreticulation, appearing smooth and shiny, in posterior 1/2–1/3 length with distinct microreticulation and more or less distinct longitudinal striation gradually higher and sharper to metanotal suture (Fig. 24). Propodeum on sides and top with sharp transverse and oblique striation, also in area between propodeal spines. **Petiole and postpetiole.** Petiole elongate with long stem, distinctly concave anterior face, subangulate top of node and depressed posterior face, frontal face at base microreticulate, close to top microreticulation more or less diffused, often surface partly smooth and shiny, sides distinctly microreticulate and microgranulate, posterior face microgranulate and with more or less distinct rugae. Postpetiole slightly wider than long, in lateral view with rounded top, anterior face at base with distinct, close to top with diffused microreticulation, appears partly smooth and shiny, posterior face with distinct microreticulation and transverse rugae not interrupted in the middle (Fig. 23). **Gaster.** Smooth and shiny, only base close to postpetiole with more or less diffused microreticulation and striation, in populations from southern Aegean Islands the striation is very short, in populations from northern Aegean islands and western Turkey usually long. All dorsum covered with short erect setae (Figs 23, 24).

**Biology.** Most records come from open to shaded pine forests, but the species was also collected in stream valleys inside deciduous forests, suburban areas with maquis, ruderal areas around villages, and pastures with shrubs. Workers were active at dusk, spending the day hidden under stones, dry branches, or trunks of fallen trees. On cloudy days, foraging workers were found on the litter. Nests are always located under stones. This is a monogynous species. The highest number of workers observed in a nest did not exceed 80 individuals. *Aphaenogaster festae* reaches a high density of nests and is a dominant medium-sized ant in pine forests of the Aegean Islands and western Turkey.

**Distribution.** Greece (Northern Aegean Islands, Dodecanese, Cyclades, Thrace), South Bulgaria, Turkey (Antalya, Aydın, Çanakkale, Denizli, Uşak).

#### *Aphaenogaster hamaensis* sp. nov.

**Etymology.** Named after Syrian province Hama, terra typica for this species.

**Material examined.** Holotype worker: Syria, distr. Hama | Ash'Meiseh | 1.7.1998 | V. Vohralík lgt. | Sample Nr. | V 1139 (CASENT0887500, MNHW-DBET); five paratype workers: the same data as holotype (CASENT0887501–CASENT0887505, MNHW-DBET, PWC).

**Comparative notes.** A very distinct species with the most elongated and narrowed head within the *Aphaenogaster splendida* species-group. Its elongated head with distinctly converging posterior sides makes this species similar to *A. vohraliki* known from Turkey. *Aphaenogaster hamaensis* distinctly differs in extremely short propodeal spines resembling in shape reduced teeth, while *A. vohraliki* has elongated propodeal spines. *Aphaenogaster hamaensis* also has more distinct microreticulation on pronotum and longitudinal rugae extending only to the half-length of head, while in *A. vohraliki* rugae extend to 2/3 of the head and pronotum is less distinctly microreticulate. Due to elongated head, slim legs and very short propodeal spines also *A. kervillei* resembles *A. hamaensis* but differs in slightly smaller body (WL 1.48–1.94 vs. 1.95–2.19), posterior sides of head weakly converging posterad (Fig. 48), and surface of pronotum with strongly diffused microreticulation, mostly smooth. Among the remaining species of the *A. splendida* species-group the most similar to the Syrian species are *A. peloponnesiaca* and *A. splendida* (due to yellow head and mesosoma, and slim and elongated head and antennae). *Aphaenogaster peloponnesiaca* distinctly differs in regularly oval head (Fig. 12), *A. splendida* differs in less converging posterad head with distinct and partly reticulate sculpture also in its posterior half (Fig. 29), and less elongated antennae (SL/HW 1.596–1.759 vs. 2.000–2.032 in *A. hamaensis*).

**Description.** Worker: Measurements and ratios (n = 6): HL: 1.453 (1.41–1.51), HW: 0.946 (0.93–0.99),



Figures 39, 40. *Aphaenogaster hamaensis*, worker (paratype specimen from Syria, Ash'Meiseh). (39) dorsal; (40) lateral (scale bar = 1 mm).

**GL:** 0.458 (0.44–0.48), **FLW:** 0.337 (0.31–0.37), **EL:** 0.250 (0.24–0.26), **SL:** 1.913 (1.86–2.00), **PNW:** 0.713 (0.68–0.74), **WL:** 2.062 (1.95–2.19), **PSL:** 0.200 (0.19–0.21), **PH:** 0.312 (0.29–0.33), **PL:** 0.557 (0.54–0.61), **PW:** 0.273 (0.26–0.29), **PPW:** 0.342 (0.32–0.37), **HTL:** 1.675 (1.59–1.79), **HBL:** 1.587 (1.53–1.65), **HL/HW:** 1.535 (1.516–1.548), **HTL/HW:** 1.769 (1.710–1.835), **SL/HW:** 2.021 (2.000–2.032), **SL/HL:** 1.317 (1.306–1.333), **WL/ PNW:** 2.889 (2.806–2.959), **FLW/HW:** 0.356 (0.333–0.376), **PSL/HW:** 0.211 (0.202–0.226), **PL/PH:** 1.820 (1.727–1.931), **EL/HL:** 0.172 (0.166–0.176).

**Color.** Head, mesosoma legs and antennae pale yellow; gaster yellow, except posterior 2/3 of first gastral tergite dark brown (Figs 39, 40). **Head.** Elongate, approximately 1.5 times as long as wide, not bulging behind eyes, distinctly converging posteriad, without vertexal corners, at base approximately two times narrower than behind eyes, straight or with small emargination in the middle (Figs 44, 47). Anterior margin of clypeus shallowly emarginate. Eyes moderately large, approximately 0.18 times as long as length of lateral margin of head, placed distinctly in front of the middle of head (Fig. 47). Mandibles elongate, with distinct striation and shiny background. Central plate of clypeus shiny, with diffused microreticulation, sides of clypeus microreticulate with few short, oblique rugae. Frontal carinae short, as long as 1/4 length of head, subparallel, frontal triangle shiny, without rugosities. Inside of antennal sockets smooth and shiny, outside microreticulate and shiny, bordered externally by distinct circular rugae. Anterior half of head with longitudinal rugae and microreticulate interspaces, rugae sometimes slightly irregular but never form reticulate sculpture, posterior half of head and postocular area only with microreticulation, whole background of head appears slightly shiny, especially behind eyes and on vertex. Scape, with microreticulate background, without striation, elongate, approximately twice as long as head width, at base 0.6 times as wide as apex then gradually widening, without preapical constriction. Funicle elongate, approximately 1.45 times as long as scape, first segment elongate, approximately three times as long as wide at apex, 0.6 times as long as two subsequent segments combined, segments 2–7 elongate, segment 3 only slightly longer than segment 2, segment 8 approximately 2.6 times as long as wide, last three segments indistinctly wider than preceding segments, not forming a distinct club, approximately 0.9 times as long as segments 5–8 combined (Fig. 44). **Mesosoma.** Thin and elongate, approximately three times longer than wide. Promesonotum approximately twice as long as wide, pronotum weakly convex in profile, anterior part of mesonotum placed higher than posterior part of pronotum, thus promesonotal convexity slightly angulate in profile. Propodeum elongate, propodeal

spines extremely short forming broad, reduced teeth (Fig. 40). Entire pronotum with distinct microreticulation, without rugosities, but appears more or less shiny. Mesonotum on dorsal side microreticulate but shiny, on sides distinctly microreticulate to microgranulate with only rudiments of longitudinal rugae at posterolateral margin, propodeum dorsally in anterior 2/3 length with diffused, transverse fine striation and microreticulate background, in area front of propodeal spines distinctly microreticulate and with transverse striation, on sides with distinct microreticulate and granulate sculpture, in posterior half with short longitudinal rugae (Figs 39, 40). Pronotum with 10, mesonotum 6–10 and propodeum 2–4 long, erect setae, all longer than propodeal spines. **Petiole and postpetiole.** Petiole elongate, approximately 2.4 times as long as wide, with long stem, its anterior face deeply concave, node subangulate in profile. Posterior face convex. Ventral margin of petiole straight, without spine or distinct angulation (Fig. 40). In dorsal view, petiole almost parallel-sided in basal part then weakly divergent. Petiole dorsally and laterally with diffused microreticulation. Postpetiolar node globular. In dorsal view the postpetiole approximately 1.3 times as long as wide with regularly rounded sides (Fig. 39), dorsally and laterally with diffused microreticulation but shiny. **Gaster.** Lucid, only base close to postpetiole with indistinct, very short, longitudinal grooves and diffused microreticulation. Petiolar node, postpetiole and gaster with long standing setae. **Legs.** Thin and elongate, hind femora not swollen in the middle only gradually widened from base to the mid length then gradually narrowed to apex.

**Variability.** Within the population small, manifested mostly by more or less diffused background microreticulation.

Gyne unknown.

**Biology.** Unknown.

**Distribution.** Syria (Hama).

### *Aphaenogaster kervillei* Forel, 1910

*Aphaenogaster kervillei* Forel, 1910: 12; Vonshak & Ionescu-Hirsch 2009: 41; Kiran & Karaman 2012: 16.

**Type material examined.** Lectotype (designated here): *A. kervillei* | Type Forel | Berzé Antiliban | ss pierr. Syrie | (Kerville) || Sp. *A. Kervillei* | Forel || coll. Forel || Typus || ANTWEB | CASENT0907687 (MHNG), personally investigated; 9 paralectotypes: *A. kervillei* | Type For | Berzé Antiliban | Gadeau de Kerville || *kervillei* || Forel || coll. | *A. Forel* || *Coty-*pus (MHNG), personally investigated.

**Other material examined.** 6 workers: Syria, distr. Damascus, Barquash, 25.6.1998, V. Vohralík lgt., Sample Nr. V 1081 (MNHWD-BET, PWC).

**Comparative notes.** A very distinct species. Its elongated head with longitudinal sculpture limited to anterior half of the head groups this species with *A. hamaensis* and *A. vohraliki*. Both relatives differ in more distinctly converging posterad head with almost straight sides behind eyes, while in *A. kervillei* head sides behind eyes are weakly rounded posterad. *Aphaenogaster vohraliki* differs also by almost twice longer propodeal spines (Fig. 82), and *A. hamaensis* differs in extremely short, resembling reduced teeth, propodeal spines (Fig. 40). Also, due to elongated head and slim legs, *A. splendida* appears similar to *A. kervillei* but it differs in oval and more distinctly sculptured head, with longitudinal and reticulate sculpture present also on its posterior half (Fig. 29). Other yellow colored species of the *A. splendida* species-group differ in stouter body, hind femora distinctly swollen medially, and more distinctly sculptured head strongly narrowing toward base and apex, with longitudinal and reticulate sculpture also in its posterior half. Slim and elongated body of *A. peloponnesiaca* reminds body proportions characteristic to *A. kervillei*, but *A. peloponnesiaca* differs in regularly oval head evenly converging anterad and posterad (Fig. 12).

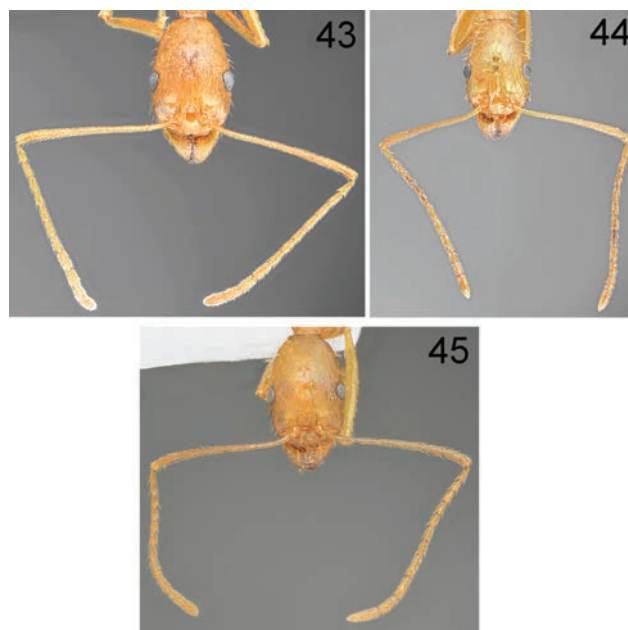
**Description.** Worker: Measurements and ratios ( $n = 5$ ): HL: 1.266 (1.07–1.39), HW: 0.870 (0.73–0.97),

GL: 0.424 (0.36–0.47), FLW: 0.286 (0.25–0.30), EL: 0.186 (0.16–0.21), SL: 1.712 (1.49–1.85), PNW: 0.598 (0.50–0.69), WL: 1.758 (1.48–1.94), PSL: 0.180 (0.14–0.22), PH: 0.280 (0.24–0.31), PL: 0.472 (0.42–0.53), PW: 0.212 (0.17–0.24), PPW: 0.272 (0.23–0.31), HTL: 1.460 (1.21–1.60), HBL: 1.340 (1.10–1.47), HL/HW: 1.456 (1.433–1.477), HTL/HW: 1.678 (1.649–1.730), SL/HW: 1.971 (1.907–2.041), SL/HL: 1.354 (1.331–1.393), WL/PNW: 2.945 (2.812–3.017), FLW/HW: 0.329 (0.309–0.342), PSL/HW: 0.206 (0.178–0.227), PL/PH: 1.688 (1.621–1.750), EL/HL: 0.147 (0.142–0.151).

**Color.** Head, mesosoma legs and antennae pale yellow; gaster yellow, only first gastral tergite in 2/3 posterior half dark brown (Figs 41, 42). **Head.** Elongate, approximately 1.45 times as long as wide, not bulging behind eyes, weakly converging posterad, without vertexal corners, at base approximately twice narrower than behind eyes, hind margin sharply carinate, with small triangular emargination (Figs 45, 48). Anterior margin of clypeus distinctly emarginate. Eyes moderately large, approximately 0.2 times as long as length of lateral margin of head, placed distinctly in front of the middle of head (Fig. 48). Mandibles elongate, with distinct striation and shiny background. Clypeus in anterior half smooth with two short longitudinal rugae, in posterior part smooth or with diffused microreticulation, whole surface of clypeus appears shiny. Frontal carinae short, as long as 1/4 length of head, subparallel, frontal triangle with single longitudinal keel, smooth and shiny. Antennal sockets smooth and shiny, not margined laterally by circular rugae.



Figures 41, 42. *Aphaenogaster kervillei*, worker (specimen from Syria, Barquash). (41) dorsal; (42) lateral (scale bar = 1 mm).



Figures 43–45. Head and antennae, worker. (43) *Aphaenogaster vohraliki*; (44) *Aphaenogaster hamaensis*; (45) *Aphaenogaster kervillei*.



Anterior part of head with longitudinal rugae only on sides never form reticulate sculpture, central part of frons and posterior half of head only microreticulate, whole background of head appears shiny, especially behind eyes and on vertex. Scape with microreticulate background, without striation, elongate, approximately twice longer than width of head, at base 0.6 times as wide as in apex then gradually widened, without preapical constriction. Funicle elongate, approximately 1.45 times as long as scape, first segment elongate, approximately thrice as long as wide on apex, 0.6 times as long as two subsequent segments combined, segments 2–7 elongate, segment 3 approximately 1.2 times as long as segment 2, segment 8 approximately 3.5 times as long as wide, last three segments indistinctly wider than preceding segments, not forming a distinct club, approximately 1.2 times as long as segments 5–8 combined (Fig. 45). **Mesosoma.** Thin and elongate, approximately thrice longer than wide. Promesonotum

approximately twice as long as wide, pronotum weakly convex in profile, anterior part of mesonotum placed slightly to moderately higher than posterior part of pronotum thus promesonotal convexity more or less regularly convex in profile. Propodeum elongate, propodeal spines short, in form of very small denticles or spines, running distinctly upwards (Fig. 42). Entire pronotum with strongly diffused microreticulation, without rugosities, partly completely smooth, shiny. Mesonotum on dorsal side with diffused microreticulation and shiny, on sides distinctly microreticulate to microgranulate without rugae, propodeum dorsally in anterior 2/3 length with transverse fine striation and shiny background, in area front of propodeal spines distinctly microreticulate, on sides with distinct microreticulate and granulate sculpture, without longitudinal rugae (Figs 41, 42). Pronotum with 6–7, mesonotum 4–6 and propodeum 2–3 erect setae, the longest slightly to distinctly longer than propodeal spines. **Petiole and postpetiole.** Petiole elongate, approximately 2.4 times as long as wide, with long stem, its anterior face deeply concave, node subangulate in profile. Posterior face convex. Ventral margin of petiole straight, without spine or distinct angulation (Fig. 42). In dorsal view, petiole slightly widened in anterior  $\frac{1}{4}$  length then weakly divergent. Petiole dorsally with diffused microreticulation, shiny, on sides and ventrally microreticulate but without wrinkles, appearing more or less shiny. Postpetiolar node globular. In dorsal view the postpetiole approximately 1.4 times as long as wide with regularly rounded sides (Fig. 41), dorsally smooth and shiny, laterally with diffused and ventrally with distinct microreticulation but shiny. **Gaster.** Lucid, only base close to postpetiole with indistinct, very short, longitudinal grooves. Petiolar node, postpetiole and gaster with long standing setae.

**Variability.** Within the population small, manifested mostly in the density of the background microreticulation on the head.

Gyne unknown.

**Biology.** Unknown.

**Distribution.** Israel and Syria. Its presence in Lebanon and Turkey is possible but requires confirmation. See also comments to *Aphaenogaster dluskyi* Radchenko & Arakelian, 1991.

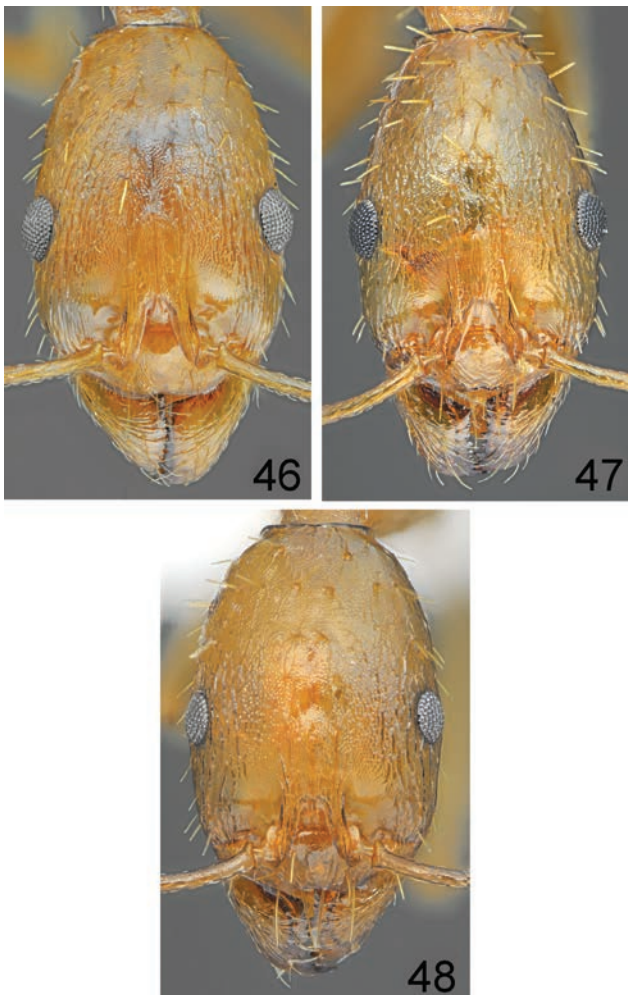
### *Aphaenogaster ovaticeps* (Emery, 1898)

*Stenammina* (*Aph.*) *ovaticeps* Emery, 1898: 136.

*Aphaenogaster ovaticeps* ssp. *mülleriana* Wolf, 1915: 44 **syn. nov.**

*Aphaenogaster ovaticeps muelleriana*: Emery 1916: 130; Emery 1921a: 58; Finzi 1922: 119; Finzi 1923: 3; Müller 1923: 55; Soudek 1925: 14; Finzi 1927: 8; Zimmermann 1935: 13; Baroni Urbani 1962: 130; Baroni Urbani 1971: 51.

*Aphaenogaster ovaticeps*: Emery 1908: 324; Forel 1913: 428; Emery 1916: 130; Bondroit 1918: 159; Emery 1921a: 58; Finzi 1923: 3; Müller 1923: 55; Finzi 1930: 312; Zimmermann 1935: 14;



Figures 46–48. Head sculpture, worker. (46) *Aphaenogaster vohraliki*; (47) *Aphaenogaster hamaensis*; (48) *Aphaenogaster kervillei*.

Baroni Urbani 1962: 130; Baroni Urbani 1971: 50; Agosti & Collingwood 1987: 54; Collingwood 1993: 194; Poldi *et al.* 1995: 3; Legakis 2011: 7; Borowiec & Salata 2012: 466; Borowiec 2014: 15; Lebas *et al.* 2016: 262.

*Aphaenogaster muelleriana*: Agosti & Collingwood, 1987: 54; Schulz 1994: 423; Poldi *et al.* 1995: 3; Bračko 2003: 20; Bračko 2006: 135; Petrov 2006: 90; Bračko 2007: 17; Karaman 2011: 18; Legakis 2011: 7; Borowiec & Salata 2012: 465; Borowiec 2014: 15; Borowiec & Salata 2014b: 510; Lebas *et al.* 2016: 262; Scupola 2017: 3; Borowiec & Salata 2018a: 4; Borowiec & Salata 2018c: 4.

**Type material examined.** *Aphaenogaster ovaticeps*: Syntype worker: “Genova M | 16.V 1803 || CM || Aphaenogaster | ovaticeps | Emery || Typus || ANTWEB | CASENT | 0904170 (MSNG); AntWeb, CASEN0904170, photos by Zach Lieberman, available on <https://www.AntWeb.org>]. *Aphaenogaster muelleriana*: Holotype worker: Aph. Ovaticeps | Em. | v. mulleriana | Wolf | Trieste | Finzi leg || Coll. | A. Forel || Cotypus || ANTWEB | CASENT0907689 (MHNG), personally investigated.

**Note.** The investigated specimen has “Cotypus” label but according to the original description this taxon was described from a single specimen, thus it should be considered as a holotype. Specimens from Trieste collected by Finzi and photographed on AntWeb as FOCOL1227 and FOCOL1228 noted as “Type” are not true syntypes.

**Other material examined.** **CROATIA:** 3w, Dalmatia, Šibenik, Krka National Park, 43.8 / 15.96666, 60 m, 2013-06-26, leg. S. Salata (MNHW-DBET); 2w, Ragusa, U. Sahlb. (MHNG); **GREECE:** 45w, Epirus, Arta, Chrisopigi, 39.11252 / 21.20878, 580 m, 2016-09-04, leg. L. Borowiec (MNHW-DBET); 3w, Epirus, Arta, Chrisopigi, 39.11252 / 21.20878, 580 m, 2016-09-04, leg. L. Borowiec (MNHW-DBET); 14w, Epirus, Preveza, 3 km NE of Kamarina, Zalongo Monument, 39.147 / 20.683, 500 m, 1996-05-20, leg. A. Schulz & K. Vock (MHNG, PWC); 1w, Ionian Islands, Cephalonia, Ag. Panentes ruins, 38.24856 / 20.65411, 230 m, 2019-06-10, leg. L. Borowiec (MNHW-DBET); 11w, Ionian Islands, Cephalonia, Avithos Lake, 38.17293 / 20.71233, 278 m, 2014-06-25, leg. L. Borowiec (MNHW-DBET); 1w, Ionian Islands, Cephalonia, Avithos Lake, 38.17203 / 20.71107, 288 m, 2019-06-10, leg. L. Borowiec (MNHW-DBET); 1w, Ionian Islands, Cephalonia, 1.6 km SW of Digaletto, 38.16558 / 20.67099, 564 m, 2019-06-11, leg. L. Borowiec (MNHW-DBET); 11w, Ionian Islands, Cephalonia, Drongarati Cave, 38.22711 / 20.62839, 56 m, 2014-06-28, leg. L. Borowiec (MNHW-DBET); 2w, Ionian Islands, Cephalonia, Kapandriti vic., 38.113617 / 20.73201, 160 m, 2019-06-09, leg. L. Borowiec (MNHW-DBET); 2w, Ionian Islands, Cephalonia, n. Peratata, 38.14058 / 20.55038, 211 m, 2014-06-24, leg. L. Borowiec (MNHW-DBET); 2w, Ionian Islands, Cephalonia, Poros, 38.14936 / 20.77029, 62 m, 2014-06-27, leg. L. Borowiec (MNHW-DBET); 5w, Ionian Islands, Cephalonia, Poros-Skala rd., 38.12813 / 20.79509, 13 m, 2014-06-27, leg. L.

Borowiec (MNHW-DBET); 4w, Ionian Islands, Cephalonia, Poros-Skala rd., 38.12872 / 20.79576, 5 m, 2019-06-12, leg. L. Borowiec (MNHW-DBET); 1Q, 6w, Ionian Islands, Cephalonia, Psilithrias, 38.4586 / 20.56237, 106 m, 2014-06-26, leg. L. Borowiec (MNHW-DBET); 2w, Ionian Islands, Cephalonia, n. Razata, 38.17166 / 20.52268, 159 m, 2014-06-24, leg. L. Borowiec (MNHW-DBET); 2w, Ionian Islands, Cephalonia, Vendourata, 38.43202 / 20.57021, 202 m, 2014-06-26, leg. L. Borowiec (MNHW-DBET); 11w, Ionian Islands, Korfu, n. Doukades, 39.70075 / 19.75055, 174 m, 2013-06-08, leg. L. Borowiec (MNHW-DBET); 7w, Ionian Islands, Korfu, Klimatia, 39.74123 / 19.78953, 311 m, 2013-06-06, leg. L. Borowiec (MNHW-DBET); 25w, Ionian Islands, Korfu, E of Nymfes, 39.75047 / 19.8057, 179 m, 2013-06-09, leg. L. Borowiec (MNHW-DBET); 6w, Ionian Islands, Korfu, road to Nymfes, 39.7524 / 19.78245, 194 m, 2013-06-09, leg. L. Borowiec (MNHW-DBET); 59w, Ionian Islands, Korfu, Old Perithia, 39.76159 / 19.87412, 467 m, 2013-06-10, leg. L. Borowiec (MNHW-DBET); 1w, Ionian Islands, Korfu, Paleokastritsa, 39.67167 / 19.70167, 20 m, 2002-08-02, leg. G. Bračko (GBC); 1w, Ionian Islands, Korfu, Pandokrator, 39.7438 / 19.8714, 785 m, 2011-07-19, leg. Trichas & Kardaki (NHMC); 2w, Ionian Islands, Lefkada, Asprogerakata, 38.46828 / 20.39191, 430 m, 2016-09-02, leg. L. Borowiec (MNHW-DBET); 4w, Ionian Islands, Zakynthos, 600 m E of Ag. Leon, 37.77045 / 20.72959, 600 m, 2018-05-09, leg. L. Borowiec (MNHW-DBET); 2w, Ionian Islands, Zakynthos, 1.4 km E of Ano Volimes, 37.87594 / 20.68525, 430 m, 2018-05-06, leg. L. Borowiec (MNHW-DBET); 2w, Ionian Islands, Zakynthos, W of Kampi, 37.78161 / 20.68078, 165 m, 2018-05-09, leg. L. Borowiec (MNHW-DBET); 5w, Macedonia, Pieria, Paleo Poroi, 39.96797 / 22.58846, 510 m, 2019-05-17, leg. L. Borowiec (MNHW-DBET); 7w, Macedonia, Pieria, Platamonas Castle hill, 40.00868 / 22.59654 and 40.0073 / 22.59696, 12-60 m, 2019-05-11 and 2019-05-14, leg. L. Borowiec (MNHW-DBET); 1w, Sterea Ellas, Aetolia-Acarmania, NW of Vatos, 38.768 / 20.956, 1000 m, 2007-06-03, leg. Giachino & Vailati (MNHW-DBET). **MONTENEGRO:** 4w, Herceg Novi, 42.4572 / 18.5314, 145 m, 2016-07-14, leg. S. Salata (MNHW-DBET); 1Q, Ulcinj, 41.92 / 19.22, 60 m, 2010-07-05, leg. W. Żyła (MNHW-DBET).

**Comparative notes.** A very distinct species. Together with *Aphaenogaster peloponnesiaca* they create a complex of species with regularly oval head similarly converging anterad and posterad. *Aphaenogaster ovaticeps* differs in brown to dark brown color of head and mesosoma, and flat propodeal dorsum while in *A. peloponnesiaca* body is yellow to rusty-yellow and propodeal dorsum is distinctly convex. From other species of the *A. splendida* species-group the most similar is *A. splendida*, due to slim body and elongated and slim antennae and legs, but differs in pale yellow head and mesosoma, less regularly oval

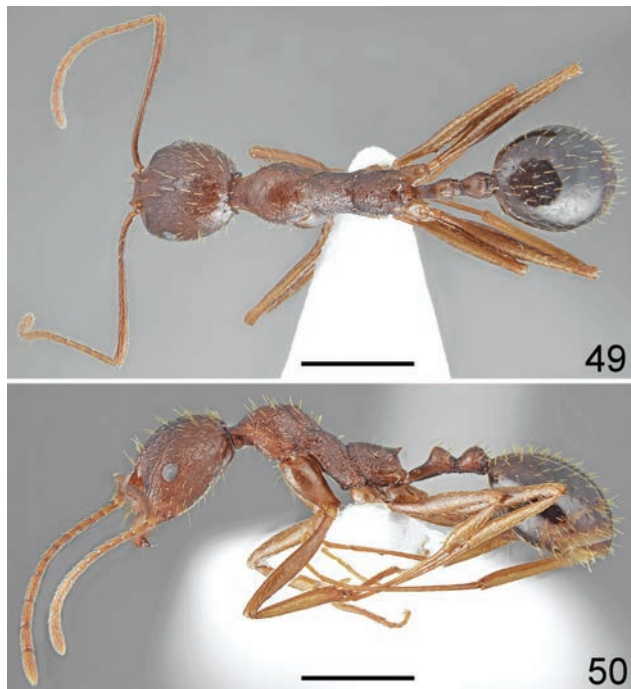


head almost parallel-sided in the middle, and stronger head sculpture. *Aphaenogaster aktaci* and *A. rugosoferruginea* are the only members of the *A. splendida* species-group with dark body coloration, but differ in not regularly oval head with stronger sculpture. *Aphaenogaster aktaci* differs also in longitudinal not transverse rugosities on the top of propodeum and stronger propodeal spines with elongated anterior carina. *Aphaenogaster rugosoferruginea* differs also in stouter body and legs, and hind femora distinctly swollen in the middle.

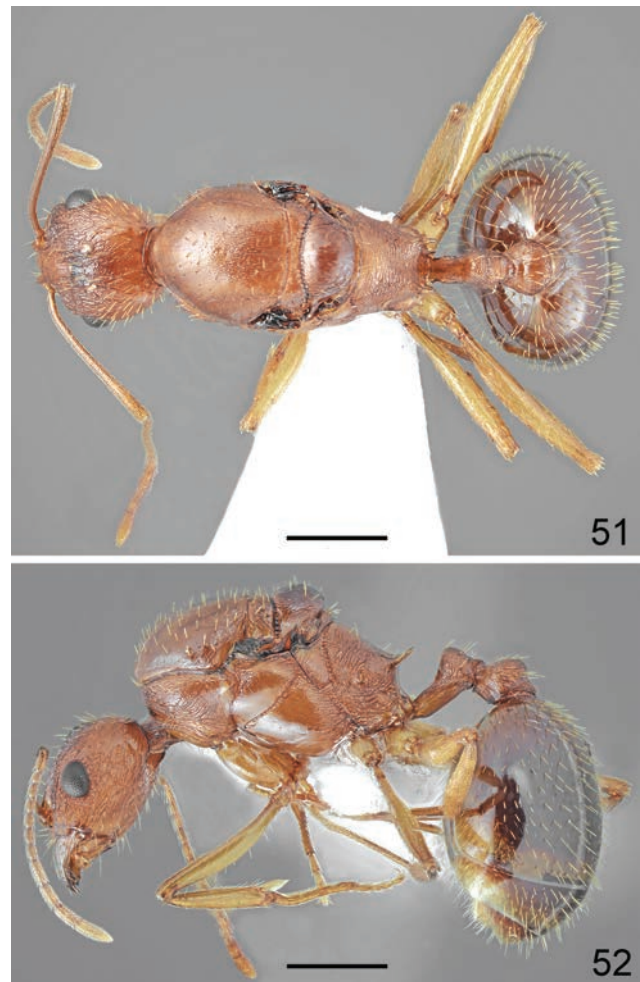
**Description.** Worker: Measurements and ratios ( $n = 15$ ): HL: 1.278 (1.19–1.39), HW: 0.946 (0.87–1.03), GL: 0.334 (0.30–0.37), FLW: 0.342 (0.32–0.37), EL: 0.186 (0.17–0.20), SL: 1.598 (1.47–1.70), PNW: 0.628 (0.57–0.68), WL: 1.736 (1.59–1.87), PSL: 0.226 (0.18–0.27), PH: 0.280 (0.26–0.31), PL: 0.506 (0.45–0.58), PW: 0.218 (0.20–0.25), PPW: 0.280 (0.25–0.32), HTL: 1.318 (1.19–1.46), HBL: 1.306 (1.16–1.45), HL/HW: 1.351 (1.330–1.368), HTL/HW: 1.393 (1.368–1.417), SL/HW: 1.690 (1.650–1.716), SL/HL: 1.251 (1.223–1.289), WL/PNW: 2.767 (2.652–2.864), FLW/HW: 0.368 (0.359–0.379), PSL/HW: 0.238 (0.198–0.274), PL/PH: 1.805 (1.667–1.893), EL/HL: 0.146 (0.129–0.157).

**Color.** Almost whole body from yellow-brown to brown, head and pronotum often partly paler brown colored than mesonotum and propodeum or head in frontal part with darker brown spot of diffused borders, first gastral tergite pale to dark brown to brown

with pale basal spot, legs and antennae yellow (Figs 49, 50). **Head.** Stout, approximately 1.3 times as long as wide, regularly oval, the widest behind eyes then regularly rounded to base and to mandibles, hind margin with narrow carina, straight or in the middle with small triangular emargination (Figs 6, 10). Anterior margin of clypeus with shallow median emargination, sometimes appears completely straight, without emargination but with only subtle dent. Eyes small, approximately 0.16 times as long as length of lateral margin of head, placed distinctly in front of the middle of head (Fig. 10). Mandibles elongate, with distinct striation, shiny. Clypeus on sides and in the middle with surface distinctly microreticulate and with fine rugae, interantennal area only microreticulate and shiny, without distinct rugae, interspaces of clypeus appear from slightly shiny to slightly dull. Antennal sockets only in the deepest part smooth and shiny, mostly distinctly microreticulate usually not bordered externally by



Figures 49, 50. *Aphaenogaster ovaticeps*, worker (specimen from Greece, Cephalonia, Avithos Lake). (49) dorsal; (50) lateral (scale bar = 1 mm).



Figures 51, 52. *Aphaenogaster ovaticeps*, gyne (specimen from Greece, Cephalonia, Psilithrias). (51) dorsal; (52) lateral (scale bar = 1 mm).



circular rugae but in some specimens the rugae tend to form incomplete circular sculpture. Frontal carinae very short, shorter 1/4 length of head, frontal triangle with more or less distinct background microreticulation and usually with more than one median keel. Almost whole surface of head with strong background microreticulation, and in anterior half with thin longitudinal and oblique rugae, especially gena with distinct longitudinal sculpture, posterior part of head usually only with strong microreticulation, without or with rudiments of rugae, occipital part of head with more or less diffused microreticulation. Anterior and central part of head appears more or less dull, occipital part of head appears more or less shiny. Scape microreticulate, without striation, thin and elongate, approximately 1.7 times as long as width of head, at base 0.7 times as wide as in apex then gradually widened, without preapical constriction. Funicle elongate, approximately 1.4 times as long as scape, first segment elongate, approximately 2.4 times as long as wide on apex, 0.7 times as long as two subsequent segments combined, segments 2–7 elongate, segment 3 slightly longer than segment 2, segment 8 approximately 2.8–2.9 times as long as wide, last three segments slightly wider than preceding segments, but not forming a distinct club, 1.1–1.2 times as long as segments 5–8 combined (Fig. 6). **Mesosoma.** Elongate, promesonotum approximately 1.8 times as long as wide, pronotum weakly convex in profile, anterior part of mesonotum usually not or only slightly higher than posterior part of pronotum thus promesonotal convexity more or less regular in profile. Propodeum elongate, dorsal surface usually more or less convex in profile, propodeal spines usually short, triangular, running obliquely upwards, sometimes longer, spiniform, or extremely short in form of small triangular teeth (Fig. 50). Pronotal surface always with more or less distinct microreticulation, top of disc always with microreticulation more or less diffused, appears shiny, sides with distinct microreticulation and microgranulation, usually without longitudinal rugosities but in large specimens with more or less visible longitudinal striation. Elevated anterior part of mesonotum on top microreticulate and microgranulate, on sides with short irregular wrinkles, basal part of top of mesonotum microreticulate and microgranulate, sides of mesonotum with distinct microreticulation and granulation, without rugae, but in posterior half microgranules tend to form more or less visible longitudinal striation, propodeum at the top anteriorly with transversely and irregularly wrinkled sculpture and microreticulation between rugae, area in front of propodeal spines only with microreticulation, on sides propodeum mostly with microreticulate and granulate sculpture, only posterior corners with few longitudinal rugae (Figs 49, 50). Pronotum and mesonotum with 10–12 erect setae, propodeum with two pairs of setae,

the longest slightly longer than propodeal spines. **Petiole and postpetiole.** Petiole elongate with long stem, its anterior face deeply concave, node subrounded to rounded. Posterior face shallowly concave to almost straight. Ventral margin of petiole straight, without spine or distinct angulation (Fig. 50). In dorsal view, petiole only more or less widened behind base, then almost parallel-sided, petiolar node subangulate to subrounded in profile. Petiole anteriorly and on sides with distinct microreticulation, anterior face of petiolar node with diffused microreticulation, shiny, top of petiole and posterior face distinctly microreticulate and with more or less distinct irregular wrinkles. Postpetiole in lateral profile regularly rounded. In dorsal view the postpetiole slightly longer than wide with regularly rounded sides (Fig. 50), on almost entire surface more or less microreticulate and on posterior face usually with short longitudinal or oblique wrinkles. **Gaster.** Lucid, only base close to postpetiole with indistinct, short, longitudinal grooves and diffused microreticulation. Petiolar node, postpetiole and gaster with long standing setae. **Legs.** Thin and elongate, hind femora only slightly swollen in the middle then gradually narrowed to the base and to the apex.

**Variability.** The species is polymorphic, as in some colonies we observed two kinds of workers: the regular ones and microworkers which were almost twice smaller than regular ones. Microworkers differ also in convex dorsal face of propodeum and propodeal spines reduced to small, triangular teeth.

Gyne: Measurements and ratios ( $n = 2$ ): **HL:** 1.535 (1.47–1.60), **HW:** 1.190 (1.16–1.22), **SL:** 1.545 (1.53–1.56), **EL:** 0.365 (0.35–0.38), **WL:** 2.750 (2.70–2.80), **PSL:** 0.460 (0.41–0.51), **PH:** 0.470, **PL:** 0.720, **MW:** 1.380 (1.36–1.40), **PW:** 0.385 (0.38–0.39), **PPW:** 0.550 (0.54–0.56), **HTL:** 1.440 (1.43–1.45), **HL/HW:** 1.240 (1.213–1.267), **SL/HW:** 1.299 (1.279–1.319), **SL/HL:** 1.048 (1.041–1.054), **WL/MW:** 1.993 (1.985–2.000), **PL/PH:** 1.532, **EL/HL:** 0.248 (0.236–0.259).

**Color.** Head and mesosoma yellowish-brown with scutellum and central part of frons slightly darker than rest of surface, or whole head and mesosoma brown; petiolar nodes yellowish-brown to brown, gaster completely brown, or distal sternites partly yellowish brown and first gastral tergite at base slightly paler brown than distally (Figs 51, 52). Mandibles, antennae and legs from yellow to reddish-yellow (Figs 15, 17, 52). **Head.** Stout, HL/HW approximately 1.2, broadly oval, not bulging behind eyes, without vertexal corners, weakly rounded behind eyes and anterad, hind margin straight. Anterior margin of clypeus with very shallow emargination. Eyes large, approximately 0.3 times as long as length of lateral margin of head, placed slightly in front of the middle of head (Figs 15, 17). Ocelli large, first ocellus placed on the line connecting posterior margin of the eyes.

Scape moderately elongate, approximately 1.3 times as long as width of head, at base 0.5 times as wide as in apex then gradually widened, without preapical constriction. Funicle elongate, approximately 1.5 times as long as scape, first segment elongate, approximately twice as long as wide on apex, 0.7 times as long as two subsequent segments combined, segments 2–7 elongate, segments 3 approximately 1.5 times as long as segment 2, segment 8 approximately 2.2 times as long as wide, last three segments indistinctly wider than preceding segments, do not form a distinct club, as long as segments 5–8 combined (Fig. 15). Mandibles distinctly striate, shiny. Frontal carinae short, extending to 1/6 length of head, weakly divergent. Clypeus with diffused background microreticulation and more or less distinct longitudinal rugae but appears more or less shiny, frontal triangle shiny with single median keel. Surface of head in anterior part up to ocelli mostly with distinct longitudinal rugae, behind eye and ocelli tend to form irregular reticulation, on whole surface with distinct background microreticulation, appears more or less dull (Fig. 17). Scape microreticulate, without striation. **Mesosoma.** Mesosomal plate (scutum) 1.1 times as long as wide, relatively high and robust, in profile regularly convex anteriorly and depressed posteriorly, without pronotal corners. Scutellum 1.5 times as wide as long, posterior margin regularly semicircular, in lateral view scutellum strongly convex, placed higher than top of mesonotal plate. Propodeum located considerably lower than mesosomal plate, propodeal spines moderately elongate, narrow, with pointed tips, oriented obliquely upwards (Fig. 52). In dorsal view the spines almost parallel. Pronotum on anterior face with diffused microreticulation, appears shiny, on sides with transverse rugae and distinct background microreticulation, sometimes area along posterior margin without rugae only microreticulate, scutum in paler specimens only in basal half striate, anteriorly with only microreticulate, in darker specimens almost whole surface with longitudinal striation except anterior 1/5 surface; scutellum on whole surface with longitudinal striation, on sides and posteriorly also with distinct microreticulation and microgranulation, in pale specimens central part close to anterior margin only microreticulate. Anepisternum in anterior 1/3–1/2 length with diffused microreticulation then without striation, appears mostly shiny, in posterior part with distinct microreticulation and with distinct longitudinal striation; katapisternum in anterior 2/3 length with diffused microreticulation then without striation, appears mostly shiny, in posterior 1/3 length with distinct microreticulation and with distinct longitudinal striation (Fig. 52). Propodeum on sides and top with sharp transverse and oblique striation, also in area between propodeal spines. **Petiole and postpetiole.** Petiole elongate with long stem, distinctly concave

anterior face, subangulate top of node and depressed posterior face, frontal face mostly smooth and shiny, sides and posterior face microreticulate with distinct rugae. Postpetiole distinctly wider than long, in lateral view with rounded top, anterior face anteriorly with only microreticulation, posteriorly microreticulate and with rugae, appears rugose, posterior face with distinct microreticulation and transverse rugae interrupted in the middle (Fig. 51). **Gaster.** Smooth and shiny, only base close to postpetiole with microreticulation, without or with only rudiments of striae. All dorsum covered with short erect setae (Fig. 52).

**Biology.** The species has the highest predisposition to inhabit very humid and shady locations. Workers were observed active during the day, but only in dark places, such as stream valleys inside plane forests or other deciduous forests, rocky walls, damp rock walls, boulders, stones or damp litter. They were also regularly collected on the walls of watering holes built in mountain villages as a place of rest. Occasionally workers were collected in xerothermic oak forests, mixed or coniferous forests but always in their most humid and dark parts. Also, they were often observed on the rocky walls of the gorges, especially on limestone rocks. In mountains above the upper forest limit specimens were collected in rock crevices or on shady walls of chapels, churches or shelters. One colony was observed inside the ruins of an ancient church. On islands some specimens were observed also at the entrance parts of dump caves. *Aphaenogaster ovaticeps* has monogynous colonies, nests under stone, and the highest number of workers observed in a nest did not exceed 50 individuals.

**Distribution.** Italy (Apulia, Friuli-Venezia Giulia, Liguria), Slovenia, Croatia, Bosnia and Hercegovina, Serbia, Montenegro, Albania, and Greece (Epirus, Ionian Islands, western Sterea Ellas, southern Macedonia).

**Comments.** Emery (1898) described *Aphaenogaster ovaticeps* based on two workers and one male from Genoa, Italy and 6 gynes, one male and one worker from Albania, Pindos and Preveza (now Greece, Epirus Province). He also designated Italian specimens as types of this species and additionally noted differences between male from Genoa and male from Pindos. *Aphaenogaster ovaticeps* is only known from two close sites which are urban sites in Italy's Liguria. Both, types and additional specimens from this population have been defined multiple times as morphologically indistinguishable from *A. muelleriana* (Scupola 2017), and our investigation supported this conclusion. Study of the photographs of the syntype of *A. ovaticeps*, available on AntWeb, and its measurements show no differences between this specimen and majority of our material of Greek populations of *A. muelleriana*. Thus, we decided to recognize *A. muelleriana* as a junior synonym of *A. ovaticeps*.

*Aphaenogaster peloponnesiaca* sp. nov.

*Aphaenogaster splendida*: Borowiec & Salata 2013: 351 and Figs 2, 4, 6, 8, 10, 12, 14, 16 (misinterpretation).

*Aphaenogaster* cf. *muelleriana*: Borowiec & Salata 2017a: 202; Borowiec & Salata 2017b: 2.

**Etymology.** Named after the Greek province Peloponnese, where most material of this species was collected.

**Type material examined.** Holotype worker: GREECE, Peloponnese | Arkadia, n. Kapsas | 37°37.634 N / 22°19.735 E | 3 IX 2013, 766 m | L. Borowiec | | Collection L. Borowiec | Formicidae | LBC-GR01309 (CASENT0887506, MNHW-DBET); 1 gyne, 27 worker paratypes: the same data as holotype (CASENT 0887507–CASENT0887534, MNHW-DBET, MHNG, CASC); 5 worker paratypes: GREECE, Pel. Messinia | Karveli, 600 m | 37.07591 N / 22.20633 E | 17 VI 2016, L. Borowiec | | Collection L. Borowiec | Formicidae | LBC-GR02108 (CASENT0887535–CASENT 0887539, MNHW-DBET).

**Other material examined.** GREECE: 20w, Peloponnese, Arkadia, n. Kapsas, 37.62766 / 22.32885, 766 m, 2013-09-03, leg. L. Borowiec (MNHW-DBET); 1w, Peloponnese, Lakonia, Sparti vic., 37.07671 / 22.42788, 205 m, 2018-05-22, leg. C. Lebas (MNHW-DBET); 2w, Peloponnese, Messinia, Egaleo Mts., 1.4 km S of Flesia-da, 37.08964 / 21.76581, 700 m, 2016-06-16, leg. L. Borowiec (MNHW-DBET); 1w, Peloponnese, Messinia, Egaleo Mts., 0.8 km SSE of Metaxada, 37.0898 / 21.74191, 440 m, 2016-06-16, leg. L. Borowiec (MNHW-DBET); 1w, Peloponnese, Messinia, Kalamata, suburban area, 37.02334 / 22.13753, 4 m, 2016-06-10, leg. L. Borowiec (MNHW-DBET); 1w, Peloponnese, Messinia, 2 km E of Kalamata, 37.01863 / 22.15626, 65 m, 2016-06-12, leg. L. Borowiec (MNHW-DBET); 6w, Peloponnese, Messinia, Kondovounia Mts., Koromilea, 37.15314 / 21.85055, 490 m, 2016-06-16, leg. L. Borowiec (MNHW-DBET); 1w, Peloponnese, Messinia, Kondovounia Mts., 0.8 km N of Koromilea, 37.16272 / 21.84809, 485 m, 2016-06-16, leg. L. Borowiec (MNHW-DBET); 2w, Peloponnese, Messinia, Krioneri vic., 37.47083 / 21.80106, 870 m, 2007-06-06, Giachino & Vailati (ASC); 7w, Peloponnese, Messinia, Taygetos Mts., 2 km W of Arachova, 37.0357 / 22.1978, 680 m, 2016-06-13, leg. L. Borowiec (MNHW-DBET); 5w, Peloponnese, Messinia, Taygetos Mts., 0.6 km W of Artemisia, 37.09877 / 22.22287, 660 m, 2016-06-15, leg. L. Borowiec (MNHW-DBET); 4w, Peloponnese, Messinia, Taygetos Mts., Chora Getson, 36.94779 / 22.25466, 615 m, 2016-06-14, leg. L. Borowiec (MNHW-DBET); 10w, Peloponnese, Messinia, Taygetos Mts., Karveli, 37.07591 / 22.20633, 600 m, 2016-06-17, leg. L. Borowiec (MNHW-DBET); 2w, Peloponnese, Messinia, Taygetos Mts., 2 km NW of Karveli, 37.08415 / 22.19448, 410 m, 2016-06-17, leg. L. Borowiec (MNHW-DBET); 7w, Peloponnese, Messinia, Taygetos Mts., Rintomo

Canyon E of Vorio, 36.96363 / 22.25729, 600 m, 2016-06-14, leg. L. Borowiec (MNHW-DBET); 2w, Peloponnese, Messinia, Taygetos Mts., 0.4 km S of Vorio, 36.95289 / 22.24142, 600 m, 2016-06-14, leg. L. Borowiec (MNHW-DBET); 1w, Peloponnese, Messinia, Tetrazi Mts., 1 km SE of Dassochori, 37.33491 / 21.98344, 670 m, 2016-06-19, leg. L. Borowiec (MNHW-DBET); 1w, Peloponnese, Messinia, Tetrazi Mts., Karnasi, 37.31904 / 21.99158, 460 m, 2016-06-19, leg. L. Borowiec (MNHW-DBET); 1w, Peloponnese, Messinia, Tetrazi Mts., 1.6 km N of Karnasi, 37.33188 / 21.99614, 570 m, 2016-06-19, leg. L. Borowiec (MNHW-DBET); 1w, Peloponnese, Argolida, n. Karia loc. 1, 37.63885 / 22.55093, 697 m, 2013-09-02, leg. L. Borowiec (MNHW-DBET); 4w, Sterea Ellas, Aetolia-Acarnania, Kentriki-Anavriti rd., 38.546 / 21.902, 900 m, 2007-06-09, leg. Giachino & Vailati (ASC, MNHW-DBET); 3w, Sterea Ellas, Aetolia-Acarnania, Psila Alonia, 38.96255 / 21.19527, 62 m, 2016-09-04, leg. L. Borowiec (MNHW-DBET); 1w, Sterea Ellas, Beotia, Moni Kimseos Jerusalem, 38.52 / 22.693, 800 m, 2009-07-08, leg. Giachino & Vailati (MNHW-DBET).

**Comparative notes.** *Aphaenogaster peloponnesiaca*, together with *Aphaenogaster ovaticeps*, are the only species with regularly oval head similarly converging anterad and posterad. Both species are very similar and differ mostly in body coloration. *Aphaenogaster ovaticeps* has head and mesosoma yellowish-brown, brown to dark brown while in *A. peloponnesiaca* has body yellow to rusty-yellow. In other morphological characters both species are very similar. However, *A. peloponnesiaca* has slightly higher elevated anterior part of mesonotum, head behind eyes more distinctly converging posterad, distinctly convex propodeal dorsum, and longer and thinner propodeal spines. Longitudinal and oblique sculpture of head in *A. peloponnesiaca* is slightly further expanded than in *A. ovaticeps*, and often covers anterior 2/3 of the head while in *A. ovaticeps* the sculpture covers usually only anterior half of the head. Both species differ in distribution patterns, *A. ovaticeps* is known from Italy (Apulia, Friuli-Venezia Giulia, Liguria), Slovenia, Croatia, Bosnia and Hercegovina, Serbia, Montenegro, Albania, and northern Greece south to the western Sterea Ellas (Epirus, Ionian Islands, western Sterea Ellas, southern Macedonia) while *A. peloponnesiaca* is known from southern and western Sterea Ellas and Peloponnese of southern Greece. We have no confirmed records of sympatry in Sterea Ellas or Peloponnese, where the species could co-occur. Both species were collected around Ambracian Gulf, but they differ in habitat preferences, with *A. peloponnesiaca* preferring less humid areas than *A. ovaticeps*. Additionally, there is no cline in the morphological differences between the species. The species pair is probably an example of vicariant taxa.



Among other species of the *A. splendida* group the most similar to *A. peloponnesiaca* is *A. splendida*, due to slim body and elongate and slim antennae and legs, but it differs from pale-yellow head and mesosoma, anterior part of mesonotum situated distinctly higher over the surface of pronotum, and less regularly oval more distinctly sculptured head. Yellow species of the *A. festae* complex differ in stouter body, legs with distinctly swollen hind femora, and strongly developed head sculpture covering almost entirely its frontal part, except occipital area. Slim and yellow species of the *A. kervillei* complex distinctly differ in more elongate head, sides of head behind eyes more or less strongly converging posterad and longitudinal sculpture of head covering only anterior one-third to half of head.

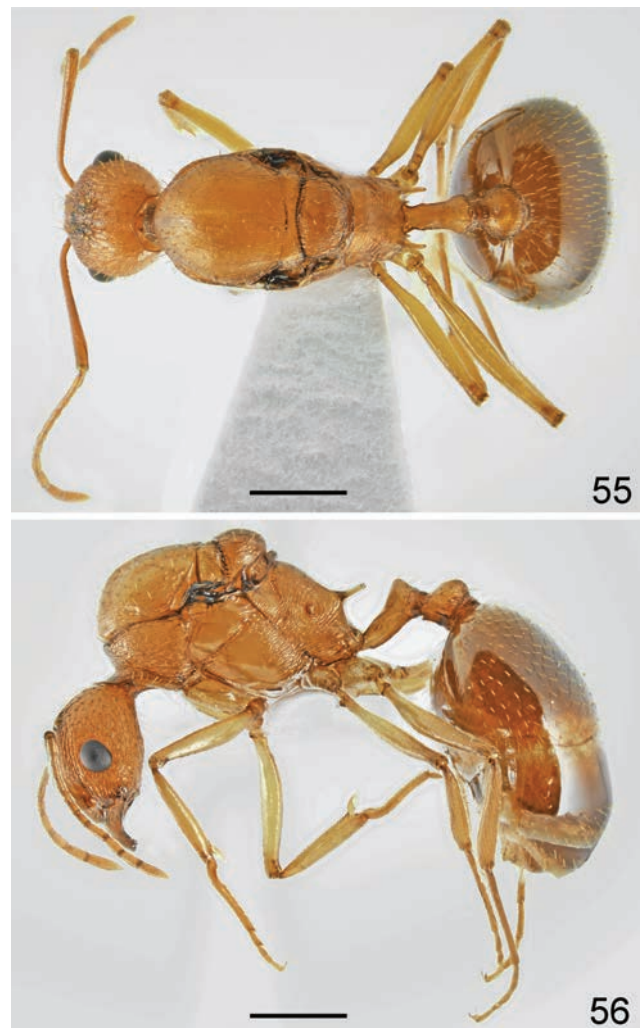
**Description.** Worker: Measurements and ratios ( $n = 15$ ): HL: 1.262 (1.11–1.36), HW: 0.896 (0.78–0.97), GL: 0.332 (0.29–0.38), FLW: 0.336 (0.29–0.36), EL: 0.182 (0.16–0.21), SL: 1.572 (1.45–1.69), PNW: 0.588 (0.50–0.65), WL: 1.700 (1.52–1.82), PSL: 0.250 (0.19–0.30), PH: 0.266 (0.23–0.28), PL: 0.502 (0.44–0.55), PW: 0.196 (0.17–0.22), PPW: 0.256 (0.22–0.28), HTL: 1.278 (1.11–1.37), HBL: 1.248 (1.08–1.34), HL/HW: 1.410

(1.370–1.447), HTL/HW: 1.427 (1.391–1.482), SL/HW: 1.760 (1.656–1.859), SL/HL: 1.248 (1.177–1.306), WL/PNW: 2.901 (2.769–3.04), FLW/HW: 0.375 (0.371–0.380), PSL/HW: 0.277 (0.244–0.313), PL/PH: 1.889 (1.750–1.964), EL/HL: 0.144 (0.130–0.156).

**Color.** Almost whole body from yellow to rusty-yellow, head in frontal part often with darker yellowish-brown spot of diffused borders, first gastral tergite pale brown to brown with yellow basal spot, legs and antennae pale yellow (Figs 53, 54). **Head.** Stout, approximately 1.3–1.4 times as long as wide, regularly oval, the widest behind eyes then regularly rounded to base and to mandibles, hind margin with narrow carina, straight or in the middle with small triangular emargination (Fig. 12). Anterior margin of clypeus with shallow median emargination. Eyes small, approximately 0.16–0.17 times as long as length of lateral margin of



Figures 53, 54. *Aphaenogaster peloponnesiaca*, worker (paratype specimen from Greece, Peloponnese, Kapsas). (53) dorsal; (54) lateral (scale bar = 1 mm).



Figures 55, 56. *Aphaenogaster peloponnesiaca*, gyne (paratype specimen from Greece, Peloponnese, Kapsas). (55) dorsal; (56) lateral (scale bar = 1 mm).

head, placed distinctly in front of the middle of head (Fig. 8). Mandibles elongate, with distinct striation, shiny. Clypeus on sides and in the middle with surface distinctly microreticulate and with fine rugae, interantennal area only microreticulate and shiny, without distinct rugae, interspaces of clypeus appear from slightly shiny to slightly dull. Antennal sockets only in the deepest part smooth and shiny, mostly distinctly microreticulate usually bordered externally by more or less complete circular rugae but sometimes circular rugae completely absent. Frontal carinae very short, shorter 1/4 length of head, frontal triangle with more or less distinct background microreticulation and usually with more than one median keel. Almost whole surface of head with strong background microreticulation, and in anterior half to 2/3 length with thin longitudinal and oblique rugae, especially gena with distinct longitudinal sculpture, posterior part of head usually only with strong microreticulation, without or with rudiments of rugae, occipital part of head with more or less diffused microreticulation, shiny. Anterior and central part of head appears more or less dull, occipital part of head appears more or less shiny. Scape microreticulate, without striation, thin and elongate, approximately 1.7 times as long as width of head, at base 0.7 times as wide as in apex then gradually widened, without preapical constriction. Funicle elongate, approximately 1.4 times as long as scape, first segment elongate, approximately 2.4 times as long as wide on apex, 0.7 times as long as two subsequent segments combined, segments 2–7 elongate, segment 3 slightly longer than segment 2, segment 8 approximately 2.8–2.9 times as long as wide, last three segments slightly wider than preceding segments, but not forming a distinct club, 1.1–1.2 times as long as segments 5–8 combined (Fig. 8). **Mesosoma.** Elongate, promesonotum approximately 1.9 times as long as wide, pronotum weakly convex in profile, anterior part of mesonotum usually slightly higher than posterior part of pronotum thus promesonotal convexity slightly angulate in profile. Propodeum elongate, dorsal surface usually more or less convex in profile, propodeal spines usually elongate with narrow base, running obliquely upwards, occasionally short, but always spiniform, never form small triangular teeth (Fig. 54). Pronotal surface always with more or less distinct microreticulation, top of disc always with microreticulation more or less diffused, appears shiny, sides with distinct microreticulation and microgranulation, usually without longitudinal rugosities but in large specimens with more or less visible longitudinal striation. Elevated anterior part of mesonotum on top microreticulate and microgranulate, on sides with short irregular wrinkles, basal part of top of mesonotum microreticulate and microgranulate, sides of mesonotum with distinct microreticulation and granulation, without rugae, but in posterior half micro-

granules tend to form more or less visible longitudinal striation, propodeum at the top anteriorly with transversely and irregularly wrinkled sculpture and microreticulation between rugae, area in front of propodeal spines only with microreticulation, on sides propodeum mostly with microreticulate and granulate sculpture, only posterior corners with few longitudinal rugae, (Figs 53, 54). Pronotum and mesonotum with 8–12 erect setae, propodeum with two pairs of setae, the longest slightly longer than propodeal spines. **Petiole and postpetiole.** Petiole elongate with long stem, its anterior face deeply concave, node subrounded to subangulate. Posterior face shallowly concave. Ventral margin of petiole straight to shallowly concave, without spine or distinct angulation (Fig. 54). In dorsal view, petiole only more or less widened behind base, then almost parallel-sided, petiolar node subangulate to subrounded in profile. Petiole anteriorly and on sides with distinct microreticulation, anterior face of petiolar node with diffused microreticulation, shiny, top of petiole and posterior face distinctly microreticulate and with more or less distinct irregular wrinkles. Postpetiole in lateral profile regularly rounded. In dorsal view the postpetiole slightly longer than wide with regularly rounded sides (Fig. 53), on almost entire surface more or less microreticulate and on posterior face usually with short longitudinal or oblique wrinkles. **Gaster.** Lucid, only base close to postpetiole with indistinct, short, longitudinal grooves and more or less distinct microreticulation. Petiolar node, postpetiole and gaster with long standing setae. **Legs.** Thin and elongate, hind femora only slightly swollen in the middle then gradually narrowed to the base and to the apex.

**Variability.** The species is polymorphic with additional caste of microworkers, almost twice smaller than typical workers, and propodeal spines reduced to very small thorns.

Gyne: Measurements and ratios ( $n = 1$ ): **HL:** 1.60, **HW:** 1.29, **SL:** 1.65, **EL:** 0.38, **WL:** 2.96, **PSL:** 0.64, **PH:** 0.49, **PL:** 0.76, **MW:** 1.43, **PW:** 0.43, **PPW:** 0.62, **HTL:** 1.59, **HL/HW:** 1.240, **SL/HW:** 1.279, **SL/HL:** 1.031, **WL/MW:** 2.070, **PL/PH:** 1.551, **EL/HL:** 0.238.

**Color.** Mesosoma yellow, head slightly darker, rusty-yellow; petiolar nodes yellow with brown posterior margin, gaster mostly brown, first tergite at base with rusty-yellow spot and with yellowish posterior margin, subsequent tergites almost completely brown, first sternite rusty-yellow, subsequent sternites yellow (Figs 55, 56). Mandibles, antennae and legs yellow (Figs 33, 35, 56). **Head.** Stout, HL/HW 1.2, broadly oval, not bulging behind eyes, without vertexal corners, almost parallel-sided in the middle the weakly rounded behind eyes and anterad, hind margin with shallow median emargination. Anterior margin of clypeus with shallow emargination. Eyes large, approximately 0.29 times as long as length of lateral margin of head,

broadly oval, placed slightly in front of the middle of head (Fig. 35). Ocelli large, first ocellus placed on the line connecting posterior margin of the eyes. Scape elongate, approximately 1.45 times as long as width of head, at base 0.5 times as wide as in apex then gradually widened, without preapical constriction. Funicle elongate, approximately 1.4 times as long as scape, first segment elongate, approximately 2.5 times as long as wide on apex, 0.8 times as long as two subsequent segments combined, segments 2–7 elongate, segments 3 approximately 1.4 times as long as segment 2, segment 8 approximately 2.8 times as long as wide, last three segments indistinctly wider than preceding segments, do not form a distinct club, as long as segments 5–8 combined (Fig. 33). Mandibles distinctly striate, shiny. Frontal carinae short, extending to 1/6 length of head, weakly divergent. Clypeus with diffused background microreticulation and distinct longitudinal rugae but appears more or less shiny, frontal triangle shiny with two median keels. Surface of head in anterior part up to ocelli mostly with distinct longitudinal rugae, behind eyes and ocelli rugae slightly irregular but not form a distinct reticulation, on whole surface with distinct background microreticulation, occipital area mostly with only microreticulation, appears partly shiny (Fig. 35). Scape microreticulate, without striation. **Mesosoma.** Mesosomal plate (scutum) 1.1 times as long as wide, relatively high and robust, in profile regularly convex anteriorly and depressed posteriorly, without pronotal corners. Scutellum 1.45 times as wide as long, posterior margin regularly semicircular, in lateral view scutellum strongly convex, placed higher than top of mesonotal plate. Propodeum located considerably lower than mesosomal plate, propodeal spines moderately elongate, finger-shaped, with rounded tips and narrow base, oriented slightly obliquely upwards (Fig. 56). In dorsal view the spines almost parallel. Pronotum at anterior face with distinct microreticulation tends to form transverse striation, on sides with transverse rugae and distinct background microreticulation, scutum on almost whole surface covered with distinct longitudinal striation and distinct background microreticulation, only narrow part close to the middle of anterior margin with only microreticulation, without striation. Scutellum on almost whole surface with longitudinal striation and background microreticulation and close to posterior margin with distinct microgranulation. Anepisternum on almost whole surface with diffused microreticulation, appears mostly shiny, only close to posterior margin with short, longitudinal rugae, katapisternum in anterior corner with distinct microreticulation and short rugae, centrally with diffused microreticulation and shiny, in posterior 1/5 length with distinct background microreticulation and distinct longitudinal striation (Fig. 56). Propodeum on sides and top with sharp transverse and

oblique striation, also in area between propodeal spines. **Petiole and postpetiole.** Petiole elongate with long stem, distinctly concave anterior face, angulate top of node and depressed posterior face, frontal face more or less microreticulate, sides of peduncle distinctly microreticulate, sides and posterior face of petiolar node microgranulate with distinct transverse rugae. Postpetiole distinctly wider than long, in lateral view with rounded top, anterior face in the middle with diffused microreticulation, appears smooth and shiny, sides of anterior and lateral face with distinct rugae, and posterior face with distinct microgranulate and transverse rugae interrupted in the middle (Fig. 56). **Gaster.** Smooth and shiny, only base close to postpetiole with more or less diffused microreticulation and very short striation. All dorsum covered with short erect setae (Figs 55, 56).

**Biology.** The species prefers slightly drier habitats than *A. ovaticeps* and tends to avoid sunny places. It is a diurnal species; foraging workers were observed mostly in stream valleys inside plane and oak forests, on stones and rocks inside deciduous forests, recreation areas close to streams, occasionally inside buildings or in maquis with oak shrubs. There are only two observations from rocky parts of coniferous, cypress copse. The one observed nest was monogynous, under a stone in a dry, artificially planted pine forest near a chapel, with fewer than 50 workers.

**Distribution.** Endemic to southern Greece (Sterea Ellas and Peloponnese).

#### *Aphaenogaster rugosoferruginea* Forel, 1889

*Aphaenogaster* r. *rugosoferruginea* Forel, 1889: 260.  
Subspecies of *Aphaenogaster splendida*: Emery 1921a: 60; Emery 1908: 326; Emery 1921a: 60; Finzi, 1939: 153; Legakis 2011: 7.  
Status as species: Dalla Torre, 1893: 104; Borowiec & Salata 2012: 466; Borowiec & Salata 2013: 338; Lebas *et al.* 2016: 263.

**Type material examined.** Syntype worker: Kreta | Lasithi geb. | v. Oertzen || *Aphaenogaster* | *splendida* Rog. | v. *rugoso* | *ferruginea* For. || Type (ZMHB) [AntWeb, FOCOL1226, photos by Christiana Kingenberg, available on <https://www.AntWeb.org>].

**Other material examined.** GREECE: 2w, Crete, Chania, Anopoli, 35.23333 / 24.08333, 720 m, 2006-07-22, leg. M. Chatzaki (NHMC); 1w, Crete, Chania, Asi Gonia, 35.25 / 24.26667, 716 m, 2001-05-29, leg. S. Simiakakis (NHMC); 2w, Crete, Chania, Kallikratis, 35.25 / 24.25, 950 m, 2001-10-07, leg. I. Stathi (NHMC); 2w, Crete, Chania, Kournas lake, 35.31667 / 24.26667, 30 m, 1997-07-10, leg. P. Lymberakis (NHMC); 7w, Crete, Chania, Koutsomatados-Mili rd., 35.38333 / 23.66666, 308 m, 2011-05-02, leg. L. Borowiec (MNH-DBET); 1w, Crete, Chania, Paleochora, 35.22 / 23.67, 27 m, 2015-10-15, leg. C. Lebas (MNH-DBET); 2w, Crete, Plemeniana



n. Kandanos, 35.31666 / 23.71666, 339 m, 2011-05-02, leg. L. Borowiec (MNH-DBET); 4w, Crete, Plemeniana, 35.31666 / 23.71667, 293 m, 2014-05-08, leg. S. Salata (SSC); 1w, Crete, Chania, Samaria Gorge, 35.28113 / 23.96238, 276 m, 2019-08-19, leg. L. Colindre (MNH-DBET); 2w, Crete, Chania, Therisso Gorge, 35.43333 / 23.98333, 360 m, 2011-05-01, leg. L. Borowiec (MNH-DBET); 1w, Crete, Chania, Therisso to Kaloros mt., 35.35 / 23.95, 1130 m, 2013-10-04, leg. S. Simaiakis (NHMC); 10w, Crete, Chania, Tzitzifes n. Vrises, 35.35 / 24.15, 264 m, 2011-05-05, leg. L. Borowiec (MNH-DBET); 2w, Crete, Heraklion, Agios Eirini, 35.26667 / 25.15, 130 m, 2014-04-05, leg. S. Salata (SSC); 1w, Crete, Heraklion, Keratokampos, 34.98333 / 25.36667, 30 m, 1999-07-28, M. Papadimitrakis (NHMC); 2w, Crete, Heraklion, Koudoumas, 34.95 / 25.1, 800 m, 1996-10-21, leg. E. Hadjicharalambous (NHMC); 1w, Crete, Heraklion, Magarikari, 35.11667 / 24.81667, 421 m, 2014-04-30, leg. S. Salata (SSCC); 31w, Crete, Heraklion, Mathia, 35.16667 / 25.36667, 589 m, 2014-04-23, leg. S. Salata (SSCC); 1w, Crete, Heraklion, Miamou, 34.96667 / 24.93333, 494 m, 2014-04-24, leg. S. Salata (SSCC); 1w, Crete, Heraklion, Platia Peramata, 34.93333 / 24.81667, 450 m, 2000-02-03, leg. E. Nikolakakis (NHMC); 1w, Crete, Lasithi, Agios Ioannis, 35.01667 / 25.83333, 200 m, 2000-02-01, leg. E. Nikolaka-

kis (NHMC); 1w, Crete, Lasithi, Istro, 35.13333 / 25.7, 80 m, 1997-08-07, leg. I. Stathi (NHMC); 1w, Crete, Lasithi, Kato Symi loc. 3, 35.05 / 25.48333, 818 m, 2014-04-13, leg. S. Salata (SSCC); 1w, Crete, Lasithi, Lastros, 35.13333 / 25.88333, 336 m, 2014-04-06, leg. S. Salata (SSCC); 1w, Crete, Lasithi, Males - Hristos road, 35.08333 / 25.56667, 464 m, 2014-04-12, leg. S. Salata (SSCC); 1w, Crete, Lasithi, Merisini, 35.16667 / 25.9333, 309 m, 2014-04-06, leg. S. Salata (SSC); 3w, Crete, Lasithi, Myrtilos, 35.03333 / 25.56667, 100 m, 2000-01-31, leg. E. Nikolakakis (NHMC); 1w, Crete, Lasithi, Neapoli-Amygdali rd., 35.2 / 25.58333, 561 m, 1997-08-06, leg. I. Stathi (NHMC); 1w, Crete, Lasithi, Richtis Gorge loc. 2, 35.16667 / 25.98333, 245 m, 2014-04-10, leg. S. Salata (SSCC); 1w, Crete, Lasithi, Roza's Gorge loc. 2, 35.21667 / 25.45, 664 m, 2014-04-02, leg. S. Salata (SSCC); 1w, Crete, Lasithi, Schinokapsala - Agios Ioannis rd., 35.05 / 25.85, 452 m, 2014-04-11, leg. S. Salata (SSCC); 2Q, 1w, Crete, Rethymno, Ag. Joannis Forest loc. 2, 35.23333 / 24.4, 439-480 m, 2013-05-06 and 2013-05-17, leg. L. Borowiec & S. Salata (MNH-DBET, SSC); 1w, Crete, Rethymno, Anapodaris, 35.0 / 25.33333, 250 m, 1999-09-28, leg. M. Papadimitrakis (NHMC); 1Q, Crete, Rethymno, Antonios Spilia Gorge, 35.25 / 24.56666, 342 m, 2013-05-11, leg. L. Borowiec (MNH-DBET); 2w, Crete, Rethymno, n. Argiroupolis, 35.28333 / 24.33333, 197 m, 2013-05-13, leg. S. Salata



57



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Figures 57, 58. *Aphaenogaster rugosoferruginea*, worker (specimen from Greece, Crete, Ag. Joannis Forest). (57) dorsal; (58) lateral (scale bar = 1 mm).



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Figures 59, 60. *Aphaenogaster rugosoferruginea*, gyne (specimen from Greece, Crete, Ag. Joannis Forest). (59) dorsal; (60) lateral (scale bar = 1 mm).

(SSCC); 2w, Crete, Rethymno, Exantis, 35.4 / 24.73333, 170 m, 2001-01-13 and 2001-05-08, leg. E. Nikolakakis (NHMC); 1w, Crete, Rethymno, Fourfouras, 35.21666 / 24.71666, 578 m, 2013-05-14, leg. S. Salata (SSCC); 1w, Crete, Rethymno, Frati, 35.2 / 24.46666, 297 m, 2013-05-07, leg. L. Borowiec (MNHW-DBET); 1Q, 1w, Crete, Rethymno, Gerakari, 35.21666 / 24.58333, 751 m, 2013-05-09, leg. L. Borowiec (MNHW-DBET); 2w, Crete, Rethymno, Kardaki, 35.2 / 24.61667, 650 m, 1999-07-21 and 2000-01-26, leg. E. Nikolakakis (NHMC); 3w, Crete, Rethymno, Katsifou Gorge, 35.2 / 24.38333, 57 m, 2013-05-05, leg. S. Salata (SSCC); 8w, Crete, Rethymno, Kissou Kambros, 35.16666 / 24.55, 514 m, 2013-05-14, leg. S. Salata (SSCC); 1w, Crete, Rethymno, Korakas bay west, 35.18333 / 24.3, 35 m, 2001-05-29, leg. I. Stathi (NHMC); 2w, Crete, Rethymno, Moni Preveli, 35.15 / 24.46667, 15 m, 1996-08-26, leg. M. Maroukli (NHMC); 1Q, 1w, Crete, Rethymno, Palelimnos, 35.3 / 24.41666, 262 m, 2013-05-15, leg. L. Borowiec (MNHW-DBET); 2Q, Crete, Rethymno, road to Preveli Beach loc. 1, 35.16666 / 24.45, 58 m, 2013-05-07, leg. L. Borowiec (MNHW-DBET); 3w, Crete, Rethymno, n. Vilandredo, 35.25 / 24.31667, 354 m, 2013-05-13, leg. S. Salata (SSCC); 2w, Crete, Rethymno, n. Vistagi, 35.23333 / 24.68333, 563 m, 2013-05-16, leg. S. Salata (SSC).

**Comparative notes.** *Aphaenogaster rugosoferruginea* morphologically resembles *A. festae* but its dark, yellowish-brown to brown color of body reminds also *A. aktaci* and *A. ovaticeps*. *Aphaenogaster rugosoferruginea* is a slightly paler than *A. aktaci* and *A. ovaticeps*, with most specimens rather yellowish-brown colored, while in two other taxa predominate darker brown colored specimens. *Aphaenogaster aktaci* differs additionally in larger body size (WL 1.54–2.01 vs. 1.45–1.65), longitudinal not transverse rugosities on propodeal dorsum, larger and thicker propodeal spines and first gastral tergite lacking pale basal spot. *Aphaenogaster ovaticeps* distinctly differs with regularly oval and less rugose head, and very long and thin antennae and legs. *Aphaenogaster festae* and its relatives (*A. syriaca*, *A. schmitzi* and *A. transcaucasica*) look very similar to *A. rugosoferruginea* but differ in distinctly paler body, yellow to rusty-yellow and less distinctly microreticulate base of first gastral tergite. *Aphaenogaster rugosoferruginea* is also separated geographically from remaining members of the *A. festae* complex and is endemic to Crete.

**Description.** Worker: Measurements and ratios ( $n = 15$ ): HL: 1.146 (1.05–1.22), HW: 0.850 (0.77–0.91), GL: 0.284 (0.27–0.31), FLW: 0.296 (0.27–0.32), EL: 0.212 (0.20–0.23), SL: 1.340 (1.25–1.40), PNW: 0.620 (0.56–0.67), WL: 1.572 (1.45–1.65), PSL: 0.224 (0.19–0.27), PH: 0.274 (0.25–0.30), PL: 0.476 (0.45–0.52), PW: 0.210 (0.19–0.23), PPW: 0.274 (0.25–0.30), HTL: 1.094 (1.01–1.16), HBL: 1.034 (0.97–1.09), HL/HW: 1.349

(1.322–1.383), HTL/HW: 1.288 (1.264–1.312), SL/HW: 1.578 (1.538–1.623), SL/HL: 1.170 (1.148–1.190), WL/PNW: 2.540 (2.448–2.607), FLW/HW: 0.348 (0.337–0.358), PSL/HW: 0.263 (0.235–0.296), PL/PH: 1.740 (1.621–1.840), EL/HL: 0.185 (0.168–0.191).

**Color.** Head and mesosoma rusty-yellow to rusty-brown, head on frontal face sometimes with darker spot of diffused borders, margins of pronotal and mesonotal segments often infusate. Abdomen brown with paler yellowish-brown base and posterior margin of each sternite. Mandibles, antennae and legs yellow (Figs 57, 58). **Head.** Approximately 1.3 times as long as wide, not bulging behind eyes, weakly converging posterad, without vertexal corners, hind margin straight (Fig. 11). Anterior margin of clypeus weakly convex. Eyes moderately large, approximately 0.2 times as long as length of lateral margin of head, placed slightly in front of the middle of head (Fig. 7). Mandibles elongate, without distinct striation but with some elongate punctures, shiny. Clypeus with few longitudinal and oblique rugae. Frontal carinae short, as long as 1/4 length of head, subparallel, frontal triangle with few longitudinal rugae but shiny between rugosities. Whole surface of head with longitudinal, oblique and reticulate sculpture, and with distinct microreticulation between rugosities, also vertex and tempora rugose thus head appears dull. Scape mostly smooth and shiny, elongate, approximately 1.6 times as long as width of head, at base 0.6 times as wide as in apex then gradually widened, with gentle preapical constriction. Funicle elongate, approximately 1.2 times as long as scape, first segment elongated, approximately twice as long as wide on apex, 0.7 times as long as two subsequent segments combined, segments 2–7 elongate, segment 3 approximately 1.2 times as long as segment 2, segment 8 approximately twice as long as wide, last three segments indistinctly wider than preceding segments, not forming a distinct club, as long as segments 5–8 combined (Fig. 7). **Mesosoma.** Promesonotum approximately twice as long as wide, pronotum strongly convex in profile, anterior part of mesonotum placed distinctly higher than posterior part of pronotum thus promesonotal convexity slightly angulate in posterior third. Propodeum elongate, propodeal spines short, spiniform, running obliquely upwards (Fig. 58). Entire pronotum microreticulate, also in anterior part, in posterior part with more or less visible irregular rugosities, on sides with few longitudinal rugae. Mesonotum on top and sides microgranulate with few rugae, propodeum on sides with distinct granulate sculpture, and some longitudinal rugae, at the top with wrinkled sculpture (Figs 57, 58). Entire dorsum of mesosoma with sparse, long, erect setae, the longest slightly longer than propodeal spines. **Petiole and postpetiole.** Petiole elongate with long stem, its anterior face deeply concave, node rounded. Posterior face shallowly

concave. Ventral margin of petiole straight, without spine or distinct angulation (Fig. 58). In dorsal view, petiole constricted at base then weakly divergent, almost parallel-sided before petiolar node, then globular. Petiole on almost entire surface microreticulate but without wrinkles, appearing more or less shiny. Postpetiole in lateral profile regularly rounded. In dorsal view the postpetiole approximately 1.5 times as long as wide with regularly rounded sides (Fig. 57), on almost entire surface microreticulate but without wrinkles, appearing more or less shiny. **Gaster.** Lucid, in posterior half with diffused microreticulation, base close to postpetiole with indistinct, short, longitudinal grooves and more or less distinct microreticulation. Petiolar node, postpetiole and gaster with long standing setae. **Legs.** Stout and moderately elongate, hind femora swollen in the middle then distinctly widened from base to the mid length then gradually narrowed to apex.

**Variability.** Within the population small, manifested mostly by the body size and coloration.

Gyne: Measurements and ratios ( $n = 4$ ): **HL:** 1.445 (1.41–1.48), **HW:** 1.213 (1.19–1.23), **SL:** 1.415 (1.39–1.47), **EL:** 0.383 (0.37–0.41), **WL:** 2.695 (2.66–2.75), **PSL:** 0.463 (0.44–0.48), **PH:** 0.475 (0.45–0.49), **PL:** 0.780 (0.76–0.81), **MW:** 1.383 (1.34–1.43), **PW:** 0.410 (0.40–0.42), **PPW:** 0.580 (0.57–0.60), **HTL:** 1.270 (1.26–1.29), **HL/HW:** 1.192 (1.171–1.213), **SL/HW:** 1.167 (1.138–1.205), **SL/HL:** 0.979 (966–0.993), **WL/MW:** 1.950 (1.923–1.993), **PL/PH:** 1.643 (1.571–1.689), **EL/HL:** 0.265 (0.255–0.285).

**Color.** Head and mesosoma rusty-yellow to rusty-brown, head on frontal face usually with darker spot of diffused borders, pronotum often with infuscate anterior face and basal angles, mesosomal plate usually with two infuscate stripes along middle slightly converging posterad, scutellum more or less infuscate across posterior margin, sides of propodeum often with more or less visible infuscate spots. Abdomen brown with paler yellowish-brown base and posterior margin of each sternite. Mandibles, antennae and legs yellow (Figs 59, 60). **Head.** Approximately 1.3 times as long as wide, oval, slightly bulging behind eyes, without vertexal corners, hind margin straight. Anterior margin of clypeus weakly convex. Eyes large, approximately 0.25 times as long as length of lateral margin of head, placed slightly in front of the middle of head (Fig. 18). Ocelli large, first ocellus placed on the line connecting posterior margin of the eyes. Scape elongate, approximately 1.5 times as long as width of head, at base 0.6 times as wide as in apex then gradually widened, with gentle preapical constriction. Funicle elongate, approximately 1.4 times as long as scape, first segment elongate, approximately 1.8 times as long as wide on apex, 0.7 times as long as two subsequent segments combined, segments 2–7 elongate, segments 3 approximately 1.3

times as long as segment 2, segment 8 approximately 2.2 times as long as wide, last three segments indistinctly wider than preceding segments, do not form a distinct club, as long as segments 5–8 combined (Fig. 14). Mandibles indistinctly striate, shiny. Frontal carinae short, extending to 1/4 length of head, weakly divergent. Clypeus with longitudinal rugae but appears more or less shiny. Whole surface of head with distinct longitudinal and irregular rugae, on vertex partly transverse and reticulate rugosities, no in sculptured areas but surface between rugae smooth, appears more or less shiny (Fig. 18). Scape with very small punctation but appears smooth and shiny. **Mesosoma.** Mesosomal plate 1.15 times as long as wide, relatively high and robust, in profile regularly convex with rounded pronotal corners. Scutellum 1.6 times as wide as long, posterior margin regularly semicircular, in lateral view scutellum strongly convex, placed higher than top of mesonotal plate. Propodeum located considerably lower than mesosomal plate, propodeal spines moderately elongate, spiniform, with pointed tips, oriented obliquely upwards (Fig. 60). In dorsal view the spines slightly diverging outside. Pronotum with transverse rugae, mesonotal plate almost completely covered with longitudinal striation except along middle in anterior third with narrow smooth and shiny area. Scutellum mostly with longitudinal striation, on top with more or less developed impunctate, smooth area. Anepisternum mostly with fine longitudinal striae but partly diffused in anterior third, katepisternum in anterior third smooth, in posterior 2/3 length with more or less distinct striation gradually higher and sharper to metanotal suture (Fig. 59). Propodeum on sides and top with sharp striation, only area between propodeal spines smooth and shiny. **Petiole and postpetiole.** Petiole elongate with long stem, weakly concave anterior face, rounded top of node and distinctly concave posterior face, inner margin straight with soft angulation anteriorly. Postpetiole slightly wider than long, in lateral view with rounded top, in dorsal view subcircular. Petiole and postpetiole in middle of anterior face smooth, on sides granulate to rugose, on top with transverse rugae (Figs 59, 60). **Gaster.** In basal third with strong microreticulation and longitudinal striation, appears more or less dull. All dorsum covered with short erect setae (Fig. 60).

**Biology.** *Aphaenogaster rugosoferruginea* is a diurnal species, most often found in shaded places inside deciduous forests or limestone gorges. Foraging workers were observed mostly on stones and rocks inside forests or walls of rocks in gorges, during hot days single workers were often observed under stones. It is a monogynous species, nesting under large stones. The number of workers observed in the nest did not exceed 40 individuals.



**Distribution.** Endemic to Crete; old records from other parts of Greece are most likely based on misidentifications of other species of the *A. splendida* group.

***Aphaenogaster schmitzi* Forel, 1910**  
species status restored

*Aphaenogaster schmitzi* Forel, 1910: 10.

Subspecies of *Aphaenogaster syriaca*: Emery 1921a: 60; Menozzi 1933: 51; Vonshak & Ionescu-Hirsch 2009: 41.

*Aphaenogaster schmitzi* var. *syria* Forel, 1910: 12 **syn. nov.**

Junior synonym of *Aphaenogaster syriaca*: Emery 1921a: 60.

**Type material examined.** 15 syntype workers: *A. Schmitzi* | type Forel | Jerusalem | (Schmitz) | in house || Cotypus || schmitzi (MHNG), personally investigated; syntype worker: *A. schmitzi* | type Forel | Jerusalem | (Schmitz) | [Illegible data] || Syntype || ex coll. | Donisthorpe | B.M. 1934.4. || BMNH(E) | 1013870 || ANTWEB | CASENT | 0900458 (BMNH), personally investigated.

**Other material examined.** ISRAEL: 2w, Galilée, Mt. Meron, 900 m, 1982-04-21, leg. Besuchet & Löbl (MHNG); 2w, Galilée, Montfort, 1982-04-19, leg. Besuchet & Löbl (MHNG); 1w, Golan, Kazabia, 1982-04-15, leg. Besuchet & Löbl (MHNG); 1w, Maagan Mikhael, 1982-04-16, leg. Besuchet & Löbl (MHNG); 2w, Mt Carmel, 100 m, 1982-04-17, leg. Besuchet & Löbl (MHNG); 1w, Mt Carmel, 500 m, 1982-04-17, leg. Besuchet & Löbl (MHNG); JORDAN: 7w, Ajloun gov., 3 km W of Ajloun, 32.33116 / 35.71835, 855 m, 2007-05-20, leg. Z. Kejval (MNH-DBET); 1w, Ajloun gov., 10 km N of Ajloun, 32.40137 / 35.68871, 304 m, 2007-05-22, leg. Z. Kejval (MNH-DBET); 1w, Ajloun gov., 30 km W Jarash, 32.31666 / 35.71666, 850 m, 2007-05-20, leg. J. Bezdek (MNH-DBET); 2w, Amman gov., 24 km N of Amman, 32.21507 / 35.88487, 249 m, 2007-05-19, leg. Z. Kejval (MNH-DBET); TURKEY: 6w, Siirt, Kurtalan, 37.91 / 41.7, 740 m, 2010-07-15, leg. F. Toprak (MNH-DBET, EMTU).

**Comparative notes.** *Aphaenogaster schmitzi* together with *A. festae*, *A. syriaca* and *A. transcaucasica* form a species complex characterized by yellow to rusty-yellow color of head and antennae, stout body and legs and distinct sculpturing on the entire surface of the head. *Aphaenogaster festae* and *A. syriaca* differ in mesonotum placed distinctly higher than posterior part of pronotum, more distinct head sculpture with rugae present also in area between frontal carinae, *A. syriaca* has also slightly longer and directed slightly more upward propodeal spines; *A. festae* differs also in slightly more elongated head with HL/HW 1.347 (1.313–1.390) vs. 1.279 (1.248–1.309) in *A. schmitzi*. *Aphaenogaster transcaucasica* is the most similar species to *Aphaenogaster schmitzi* but differs in slightly less elongate and less distinctly

sculptured head, stouter distal antennal segments, and longer scape SL/HW: 1.512 vs. 1.391 (1.326–1.467) in *A. schmitzi*. Because we examined in detail only one specimen of *A. transcaucasica* its separateness requires confirmation supported by studies on a larger number of specimens. The differences observed between *A. schmitzi* and *A. transcaucasica* are quite subtle and perhaps *A. transcaucasica* is only a northern geographical form of the same taxon, widely distributed in Transcaucasia and the Middle East (see also comments for *Aphaenogaster georgica* Arnoldi, 1968).

**Description.** Worker: Measurements and ratios (n = 15): HL: 1.178 (1.10–1.26), HW: 0.922 (0.84–1.01), GL: 0.300 (0.28–0.32), FLW: 0.326 (0.31–0.35), EL: 0.220 (0.20–0.24), SL: 1.280 (1.26–1.37), PNW: 0.618 (0.57–0.66), WL: 1.508 (1.41–1.60), PSL: 0.214 (0.18–0.26), PH: 0.286 (0.26–0.31), PL: 0.458 (0.43–0.54), PW: 0.228 (0.20–0.25), PPW: 0.316 (0.29–0.34), HTL: 1.058 (0.95–1.15), HBL: 1.036 (0.96–1.14), HL/HW: 1.279 (1.248–1.309), HTL/HW: 1.148 (1.131–1.167), SL/HW: 1.391 (1.326–1.467), SL/HL: 1.087 (1.050–1.128), WL/PNW: 2.441 (2.365–2.484), FLW/HW: 0.354 (0.347–0.369), PSL/HW: 0.231 (0.200–0.257), PL/PH: 1.600 (1.483–1.742), EL/HL: 0.187 (0.181–0.192).

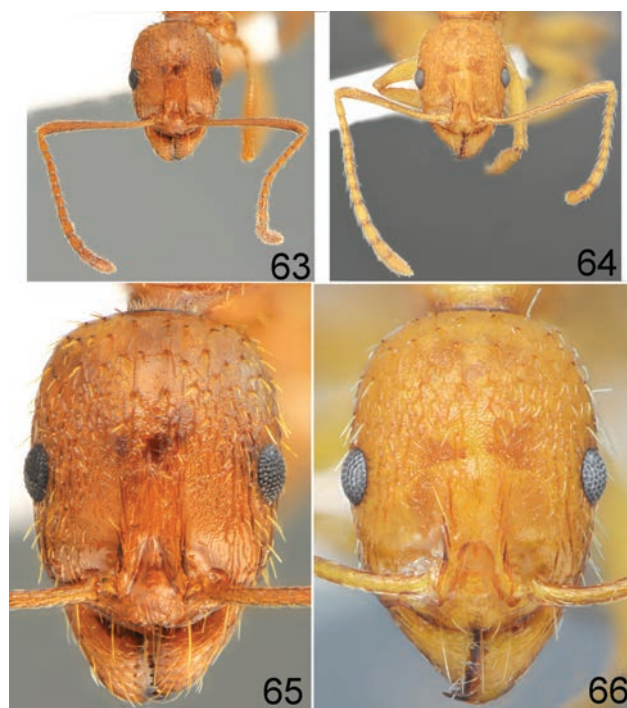
**Color.** Head, mesosoma and gaster yellow to rusty-yellow, only first gastral tergite in posterior 2/3 length yellowish-brown to brown and in anterior 1/3 length with pale, yellow to rusty-yellow spot, legs and antennae yellow (Figs 61, 62, 71). **Head.** 1.2–1.3 times as long as wide, not bulging behind eyes, in the middle almost parallel-sided, close to vertex regularly rounded, without vertexal corners, hind margin with narrow carina, straight or slightly concave (Fig. 65). Anterior margin of clypeus with deep median emargination. Eyes moderately large, approximately 0.2 times as long as length of lateral margin of head, placed slightly in front of the middle of head (Fig. 63). Mandibles elongate, with distinct striation, shiny. Clypeus in interantennal area only microreticulate, anterior and lateral parts with few short, longitudinal and oblique rugae but interspaces appear shiny. Antennal sockets only close to antennal insertions smooth and shiny, mostly distinctly microreticulate, not bordered externally by circular rugae or with rudiments of circular rugae. Frontal carinae short, as long as 1/4 length of head, subparallel, but often longitudinal rugae connected with frontal carinae then carinae extend to 1/3 length of head; frontal triangle smooth and shiny with median keel. Almost whole surface of head with longitudinal and oblique sculpture and with distinct microreticulation between rugosities, only narrow occipital part of head only microreticulate, rugae in area behind eyes tend to form reticulate sculpture, but in some populations whole head with only longitudinal and oblique sculpture but surface of head always appears more or less rugose.

Scape microreticulate, without striation or in distal half with indistinct striae, elongate, 1.33–1.47 times as long as width of head, at base 0.6 times as wide as in apex then gradually widened, without preapical constriction. Funicle elongate, approximately 1.4 times as long as scape, first segment elongate, approximately 2.5 times as long as wide on apex, 0.8 times as long as two subsequent segments combined, segments 2–7 elongate, segment 3 approximately 1.1–1.2 times as long as segment 2, segment 8 approximately 1.8–1.9 times as long as wide, last three segments slightly wider than preceding segments, but not forming a distinct club, 1.3 times as long as segments 5–8 combined (Fig. 63). **Mesosoma.** Promesonotum 1.5–1.6 times as long as wide, pronotum regularly convex in profile, anterior part of mesonotum not or only slightly higher than posterior part of pronotum thus promesonotal convexity more or less regular. Propodeum moderately elongate, propodeal spines short to moderate, spiniform, running obliquely upwards (Fig. 62). Entire pronotal surface with more or less distinct microreticulation, on top less distinct than on sides, often diffused then surface of top of pronotum appears more or less shiny. Mesonotum on top in anterior elevated part distinctly microreticulate in posterior half microreticulate and microgranulate, often with few longitudinal rugae, on sides mesonotum with distinct

microreticulation and granulation, with more or less distinct short longitudinal rugae, propodeum at the top anteriorly with transversely wrinkled sculpture and microreticulation between rugae, area in front of propodeal spines usually without or with indistinct transverse wrinkles but with diffused microreticulation its surface appears shiny, on sides propodeum distinctly microreticulate and granulate, without or with few longitudinal and oblique rugae (Figs 61, 62). Pronotum and mesonotum with 6–10 erect setae, propodeum with only a pair of long setae, the longest slightly longer than propodeal spines. **Petiole and postpetiole.** Petiole elongate with long stem, its anterior face deeply concave, node rounded. Posterior face shallowly concave. Ventral margin of petiole straight, without spine or distinct angulation (Fig. 62). In dorsal view, petiole only slightly widened behind base, then almost parallel-sided, petiolar node subangulate to subrounded in profile. Petiole on whole surface with background microreticulation, on anterior face of petiole the microreticulation more or less diffused thus surface often appears almost smooth and shiny, posterior face distinctly microreticulate, without or with 2–3 rudiments of longitudinal rugae. Postpetiole in profile regularly rounded. In dorsal view the postpetiole almost as long as wide with regularly rounded sides (Fig. 61), on entire surface more or less microreticulate, anterior



Figures 61, 62. *Aphaenogaster schmitzi*, worker (specimen from Jordan, Ajloun). (61) dorsal; (62) lateral (scale bar = 1 mm).



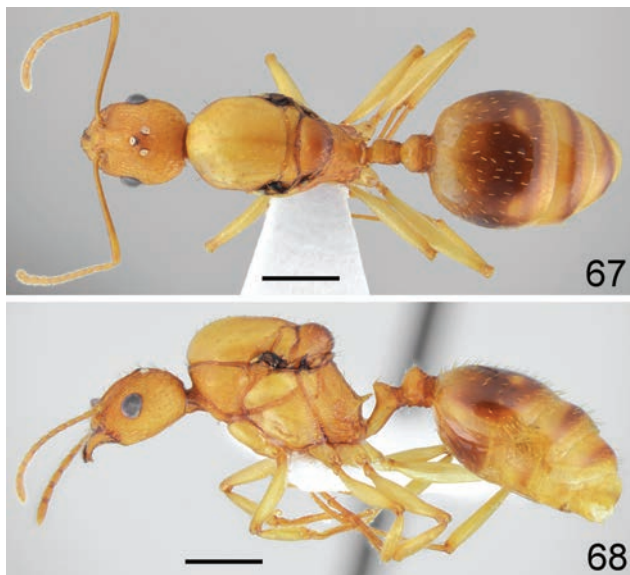
Figures 63–66. Head and antennae, worker. (63) *Aphaenogaster schmitzi*; (64) *Aphaenogaster transcaucasica*. Head sculpture, worker. (65) *Aphaenogaster schmitzi*; (66) *Aphaenogaster transcaucasica*.

face often with diffused microreticulation, partly appears almost smooth and shiny, posterior face distinctly microreticulate, without or with few rudiments of longitudinal rugae. **Gaster.** Lucid, only base close to postpetiole with distinct, short, longitudinal grooves and with distinct microreticulation. Petiolar node, postpetiole and gaster with long standing setae. **Legs.** Moderately thin and elongate, hind femora distinctly swollen in the middle then narrowed to base and to apex, tibiae moderately thin and elongate, distinctly widened from base to apex, tarsi moderately long.

**Variability.** Within the population small, manifested mostly by the body size and coloration, length of propodeal spines, and in the intensity of microsculpture on head and mesosoma.

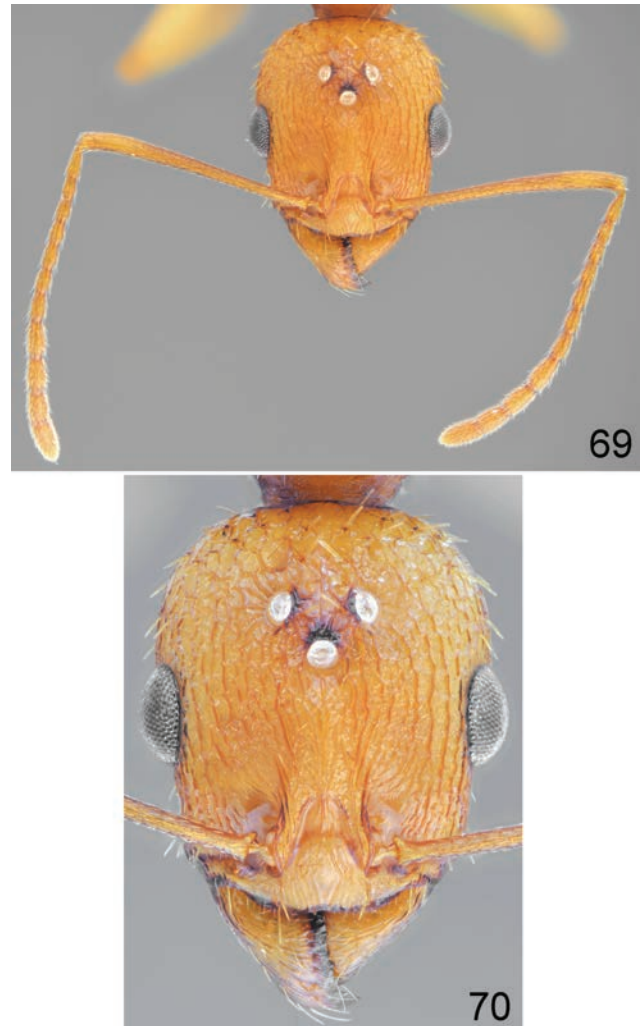
Gyne: Measurements and ratios ( $n = 1$ ): **HL:** 1.54, **HW:** 1.28, **SL:** 1.63, **EL:** 0.40, **WL:** 2.94, **PSL:** 0.47, **PH:** 0.51, **PL:** 0.72, **MW:** 1.47, **PW:** 0.37, **PPW:** 0.58, **HTL:** 1.47, **HL/HW:** 1.203, **SL/HW:** 1.273, **SL/HL:** 1.058, **WL/MW:** 2.000, **PL/PH:** 1.412, **EI2:** 0.260.

**Color.** Head and mesosoma yellow to rusty-yellow, only scutellum slightly darker, yellowish brown; petiolar nodes yellow to rusty-yellow with brown posterior margin, gaster bicolor, first tergite and sternite brown, tergite in anterior 1/3 length and sternite in anterior half yellow, also posterior margins narrowly yellow, subsequent sternites yellow, tergites yellow with narrow brown band subapically; in one of the two examined gyenes brown posterior part of first tergite with one small, oval yellow patch on each side (Figs 67, 68). Mandibles, antennae and legs yellow (Figs 69, 70).



Figures 67, 68. *Aphaenogaster schmitzi*, gyne (specimen from Israel, Galilée). (67) dorsal; (68) lateral (scale bar = 1 mm).

**Head.** Stout, HL/HW 1.09–1.18, broadly oval, not bulging behind eyes, without vertexal corners, weakly rounded behind eyes and anterad, hind margin straight. Anterior margin of clypeus with very shallow emargination. Eyes large, approximately 0.28 times as long as length of lateral margin of head, round, placed slightly in front of the middle of head (Fig. 70). Ocelli large, first ocellus placed on the line connecting posterior margin of the eyes. Scape moderately elongate, approximately 1.25 times as long as width of head, at base 0.5 times as wide as in apex then gradually widened, without preapical constriction. Funicle elongate, approximately 1.5 times as long as scape, first segment elongated, approximately twice as long as wide on apex, 0.6 times as long as two subsequent segments combined, segments 2–7 elongate, segments 3 approximately 1.2 times as long as segment 2, segment 8 approximately 1.9 times as long as wide, last three



Figures 69, 70. *Aphaenogaster schmitzi*, gyne. (69) head and antennae; (70) head sculpture.



segments indistinctly wider than preceding segments, not form a distinct club, as long as segments 5-8 combined (Fig. 69). Mandibles distinctly striate, shiny. Frontal carinae short, extending to 1/6 length of head, weakly divergent. Clypeus with diffused background microreticulation and distinct longitudinal rugae but appears more or less shiny, frontal triangle shiny with single median keel. Surface of head in anterior part up to ocelli mostly with distinct longitudinal rugae, behind eye and ocelli with reticulate rugosities, on whole surface with distinct background microreticulation, appears more or less dull (Fig. 70). Scape microreticulate, without striation. **Mesosoma.** Mesosomal plate (scutum) 1.15 times as long as wide, relatively high and robust, in profile regularly convex anteriorly and depressed posteriorly, without pronotal corners. Scutellum 1.5 times as wide as long, posterior margin regularly semicircular, in lateral view scutellum strongly convex, placed higher than top of mesonotal plate. Propodeum located considerably lower than mesosomal plate, propodeal spines moderately elon-

gate, finger-shaped, with rounded tips and narrow base, oriented slightly obliquely upwards (Fig. 68). In dorsal view the spines almost parallel. Pronotum with transverse rugae and distinct background microreticulation, scutum in basal 1/3-1/2 length with distinct longitudinal striation and distinct background microreticulation, in anterior part without striation, only with diffused microreticulation, appears more or less smooth and shiny. Scutellum only laterally or on whole surface with longitudinal striation, if only laterally then on top with diffused microreticulation and with more or less smooth and shiny area, if completely striated then on whole surface with distinct background microreticulation slightly diffused along middle. Anepisternum on whole surface with diffused microreticulation then without striation, appears mostly shiny or with distinct microreticulation then fine longitudinal striae in posterior third, katapisternum in anterior corner with distinct microreticulation, centrally with diffused microreticulation and shiny, in posterior 1/5 length with more or less distinct longitudinal striation gradually higher and sharper to metanotal suture (Fig. 68). Propodeum on sides and top with sharp transverse and oblique striation, also in area between propodeal spines. **Petiole and postpetiole.** Petiole elongate with long stem, distinctly concave anterior face, angulate top of node and depressed posterior face, frontal face microreticulate, sides and posterior face with distinct rugae. Postpetiole slightly wider than long, in lateral view with rounded top, anterior face with diffused microreticulation, appears smooth and shiny, posterior face with distinct microreticulation and transverse rugae interrupted in the middle (Fig. 68). **Gaster.** Smooth and shiny, only base close to postpetiole with more or less diffused microreticulation. All dorsum covered with short erect setae (Fig. 68).

**Biology.** Little is known. Menozzi (1933) communicated that a single worker was collected under a stone. Forel (1910) noted that the syntypes were collected inside a house.

**Distribution.** Israel, Jordan, Syria and Turkey (Siirt Province).

**Comments.** *Aphaenogaster schmitzi syria* was separated by Forel (1910) from *A. schmitzi* based on more matt head, more distinct reticulation of head and yellowish-brown body colouration. Study of the type specimen revealed that the mentioned characters were within the range of variability seen in *A. schmitzi* and thus we consider *A. schmitzi syria* to be a junior synonym.

### *Aphaenogaster splendida* (Roger, 1859)

*Atta splendida* Roger, 1859: 257.

Combination in *Aphaenogaster*: Roger 1863: 29.



Figures 71, 72. Worker lateral. (71) *Aphaenogaster schmitzi*, sample from Jordan, Ajloun; (72) *Aphaenogaster syriaca*, microworker from Cyprus, Avakas Gorge (scale bar = 1 mm).

Status as species: Roger 1863: 29; Mayr 1863: 397; Emery 1869: 17; Dours 1873: 167; Emery & Forel 1879: 462; Forel 1886: clxviii; Forel 1889: 257; Emery 1891: 9; Dalla Torre 1893: 105; Forel 1904: 5; Emery 1908: 325; Forel 1911: 346; Emery 1916: 131; Bondroit 1918: 160; Emery 1921a: 59; Emery 1921b: 208; Muller 1923: 54; Soudek 1925: 15; Karavaiev 1926: 97; Santschi 1926: 286; Kutter 1927: 98; Menozzi 1933: 51; Zimmermann 1935: 13; Santschi 1938: 37; Finzi 1939: 153; Donisthorpe 1950: 1059; Bernard 1967: 136; Baroni Urbani 1968: 418; Baroni Urbani 1971: 54; Arnoldi 1976: 1025; Hamann & Klemm 1976: 671; Schembri & Collingwood 1981: 423; Agosti & Collingwood 1987: 54; Arakelian 1994: 32; Schulz 1994: 425; Mei 1995: 761; Poldi *et al.* 1995: 3; Bračko 2006: 135; Petrov 2006: 90; Casevitz-Weulersse & Galkowski, 2009: 487; Vonshak & Ionescu-Hirsch 2009: 41; Legakis 2011: 8; Borowiec & Salata 2012: 467; Kiran & Karaman, 2012: 17; Bračko *et al.* 2014: 13; Tohmé & Tohmé 2014: 134; Lebas *et al.* 2016: 262; Radchenko 2016: 168.

**Type material examined.** Syntype worker of *Atta splendida* 1: Griechenland | coll. Roger | Aphaenogaster | splendida Rog. || Type (ZMHB) [AntWeb, FOCOL1224, photos by Christiana Kingenberg, available on <https://www.AntWeb.org>]; syntype worker of *Atta splendida* 2: the same labels as for syntype 1 (ZMHB) [AntWeb, FOCOL1225, photos by Christiana Kingenberg, available on <https://www.AntWeb.org>].

**Other material examined.** **CYPRUS:** 3w, Paphos, Avakas Pen., Avakas Gorge, 34.91666 / 32.33333, 117 m, 2012-05-03, leg. L. Borowiec (MNHW-DBET); **GREECE:** 1w, Aegean Islands, Samos, Pythagorion, 1984-05-02, leg. D. Agosti (MHNG); 1w, Crete, Iraklion, Pantanassa, 35.366 / 25.038, 10 m, 2010-04-10, leg. E. Panagiotou (MNHW-DBET); 1w, Dodecanese, Kos, Zia, 36.84555 / 27.20493, 328 m, 2015-07-07, leg. S. Salata (MNHW-DBET); **ISRAEL:** 1Q, 2w, Palästina, Tel Aviv, 1929, Bodenheimer (MNHW-DBET); 1w, Ramatayim, 1951, Dr. J. Carmin (BMNH); **ITALY:** 1w, 1m, Sardinia, Cagliari, Sette Fratelli Mts., San Pietro, 39.064 / 8.929, 120 m, 1990-02-05, leg. A. Scupola (MNHW-DBET); 4w, 1m, Sicily, Lampedusa, Conigli, 35.51525 / 12.55554, 54 m, 2017-10-08, leg. E. Schifani (MNHW-DBET); 2w, Pantelleria, Bagno dell'Acqua, 1990-03-31, leg. M. Mei (MNHW-DBET); **MALTA:** 6w, Malta, Salini resort, 35.948 / 14.43, 13 m, 2016-04-16, leg. C. Galkowski (MNHW-DBET); **TURKEY:** 3w, 3m, Hatay, 5 km S of Altınözü, 500 m, 1993-06-10, leg. Schulz (MHNG); 1w, Hatay, İskenderun, 2009-06-16, leg. E. Şahutoğlu (EMTU); 1Q, 2w, İstanbul, Karamustafa Paşa, 2012-09-04, leg. M. Kaya (EMTU); 1w, Mersin, Akdeniz Town, 2008-06-04, leg. K. Kiran (EMTU).

**Comparative notes.** *Aphaenogaster splendida* has intermediate characters between yellow slim species of the *A. kervillei* complex (*A. kervillei*, *A. hamaensis* and *A. vohraliki*) and more stout species of the *A. festae* complex (*A. festae*, *A. schmitzi*, *A. syriaca* and *A. transcaucasica*). *Aphaenogaster splendida* distinctly differs from species of the *A. kervillei* complex in head less converging posterad,

in the middle almost parallel-sided then weakly rounded posterad; it has also more developed head sculpture forming longitudinal to reticulate sculpture also in posterior half of head; from *A. kervillei* and *A. hamaensis* it differs in more elongate propodeal spines. From species of the *A. festae* complex *A. splendida* differs in slimmer body, legs and antennae, with HTL/HW above 1.37 vs. below 1.32 in the *A. festae* complex. It has also smoother and shinier pronotal surface than in any species of the *A. festae* group. Only in some specimens of *A. schmitzi* the surface has also partly diffused microreticulation but never is as shiny as in *A. splendida*. Similar slim body and appendages has *A. peloponnesiaca* from the *A. ovaticeps* complex but differs in regularly oval head. Other species: *A. aktaci*, *A. ovaticeps* and *A. rugosoferruginea* well differ in dark, rusty-brown to dark brown head and mesosoma.

**Description.** Worker: Measurements and ratios (n = 15): **HL:** 1.384 (1.31–1.48), **HW:** 0.976 (0.83–1.09), **GL:** 0.369 (0.31–0.42), **FLW:** 0.357 (0.31–0.38), **EL:** 0.229 (0.20–0.25), **SL:** 1.616 (1.46–1.74), **PNW:** 0.680 (0.60–0.73), **WL:** 1.820 (1.66–1.92), **PSL:** 0.237 (0.20–0.27), **PH:** 0.307 (0.27–0.32), **PL:** 0.521 (0.47–0.56), **PW:** 0.247 (0.23–0.26), **PPW:** 0.343 (0.32–0.35), **HTL:** 1.406 (1.24–1.45), **HBL:** 1.299 (1.17–1.41), **HL/HW:** 1.427 (1.343–1.578), **HTL/HW:** 1.446 (1.381–1.590), **SL/HW:** 1.661 (1.610–1.759), **SL/HL:** 1.167 (1.098–1.234), **WL/PNW:** 2.680 (2.629–2.770), **FLW/HW:** 0.367 (0.360–0.386), **PSL/HW:** 0.244 (0.218–0.271), **PL/PH:** 1.698 (1.655–1.742), **EL/HL:** 0.165 (0.153–0.177).

**Color.** Almost the whole body yellow, including legs and antennae, only first gastral tergite in posterior 1/2–2/3 length yellowish brown (Figs 73, 74). **Head.** 1.4–1.5 times as long as wide, not bulging behind eyes, in the middle almost parallelized, behind eyes regularly rounded, without vertexal corners, hind margin with narrow carina, straight (Fig. 29). Anterior margin of clypeus with more or less distinct median emargination. Eyes moderately large, approximately 0.2 times as long as length of lateral margin of head, placed slightly in front of the middle of head (Fig. 27). Mandibles elongate, with distinct striation, shiny. Clypeus in interantennal area only microreticulate, anterior and lateral parts with few short, longitudinal and oblique rugae but interspaces appear shiny. Antennal sockets inside smooth and shiny, outside microreticulate but shiny not bordered externally by circular rugae. Frontal carinae short, as long as 1/4 length of head, subparallel, frontal triangle smooth and shiny with median one or two keels. Almost whole surface of head with longitudinal and oblique sculpture and with distinct microreticulation between rugosities, only occipital part of head only microreticulate, rugae in area behind eyes tend to form reticulate sculpture, in some populations whole head with distinct

sculpture. Scape microreticulate but without striation, elongate, 1.60–1.75 times as long as width of head, at base 0.5 times as wide as in apex then gradually widened, without preapical constriction. Funicle elongate, approximately 1.6 times as long as scape, first segment elongate, approximately 3.5 times as long as wide on apex, 0.8 times as long as two subsequent segments combined, segments 2–7 elongate, segment 3 approximately 1.1–1.2 times as long as segment 2, segment 8 approximately 2.3 times as long as wide, last three segments slightly wider than preceding segments, but not forming a distinct club, 1.2 times as long as segments 5–8 combined (Fig. 27). **Mesosoma.** Promesonotum approximately 1.7 times as long as wide, pronotum weakly convex in profile, anterior part of mesonotum distinctly higher than posterior part of pronotum thus promesonotal convexity more or less angulate. Propodeum moderately elongate, propodeal spines long, spiniform, running distinctly upwards (Fig. 74). Entire pronotum with more or less diffused microreticulation, also in anterior part, without rugosities, appears more or less shiny. Mesonotum on

top microreticulate and microgranulate without longitudinal rugae or only basally with rudiments of rugae, on sides only with distinct microreticulation and granulation, without rugae, propodeum at the top anteriorly with transversely wrinkled sculpture and microreticulation between rugae, area in front of propodeal spines only with microreticulation, on sides propodeum mostly with microreticulate and granulate sculpture, only posterior corners with few longitudinal rugae, (Figs 73, 74). Pronotum and mesonotum with 6–8 erect setae, propodeum with two pairs of setae, the longest slightly longer than propodeal spines. **Petiole and postpetiole.** Petiole elongate with long stem, its anterior face deeply concave, node rounded. Posterior face shallowly concave. Ventral margin of petiole straight, without spine or distinct angulation (Fig. 74). In dorsal view, petiole only slightly widened behind base, almost parallel-sided, petiolar node subangulate to subrounded in profile. Petiole anteriorly and on top with diffused microreticulation, partly smooth and shiny, on sides and ventrally distinctly microreticulate but without longitudinal rugae. Postpetiole in lateral profile regularly rounded. In dorsal view the postpetiole almost as



Figures 73, 74. *Aphaenogaster splendida*, worker (specimen from Greece, Kos, Zia). (73) dorsal; (74) lateral (scale bar = 1 mm).



Figures 75, 76. *Aphaenogaster splendida*, gyne (specimen from Israel, Tel Aviv). (75) dorsal; (76) lateral (scale bar = 1 mm).



long as wide with regularly rounded sides (Fig. 73), on almost entire surface more or less microreticulate but without wrinkles, appears more or less shiny. **Gaster.** Lucid, only base close to postpetiole with indistinct, short, longitudinal grooves but without distinct microreticulation. Petiolar node, postpetiole and gaster with long standing setae. **Legs.** Thin and elongate, hind femora only slightly swollen in the middle then weakly narrowed to base and to apex, tibiae distinctly thin and elongate, weakly widened from base to apex, tarsi very long.

**Variability.** Within the population small, manifested mostly by the body size, more or less diffused microreticulation of the pronotum and the occipital part of head, and the intensity of reticular sculpture on the head.

Gyne: Measurements and ratios ( $n = 1$ ): **HL:** 1.63, **HW:** 1.30, **SL:** 1.70, **EL:** 0.41, **WL:** 2.93, **PSL:** 0.49, **PH:** 0.52, **PL:** 0.76, **MW:** 1.44, **PW:** 0.40, **PPW:** 0.63, **HTL:** 1.54, **HL/HW:** 1.254, **SL/HW:** 1.308, **SL/HL:** 1.043, **WL/MW:** 2.035, **PL/PH:** 1.462, **EL/HL:** 0.252.

**Color.** Head, mesosoma and petiolar nodes yellow; gaster mostly yellow, first tergite in basal half with brown band, subsequent tergites yellow with narrow brown band subapically (Figs 75, 76). Mandibles, antennae and legs yellow (Figs 36, 76). **Head.** Slightly elongate, HL/HW 1.23, not bulging behind eyes, without vertexal corners, weakly rounded behind eyes and anterad, hind margin straight (Fig. 36). Anterior margin of clypeus with very shallow emargination. Eyes large, approximately 0.32 times as long as length of lateral margin of head, round, placed slightly in front of the middle of head (Fig. 76). Ocelli large, first ocellus placed slightly the line connecting posterior margin of the eyes. Scape moderately elongate, approximately 1.30 times as long as width of head, at base 0.5 times as wide as in apex then gradually widened, without preapical constriction. Funicle elongate, approximately 1.4 times as long as scape, first segment elongate, approximately 2.4 times as long as wide on apex, 0.6 times as long as two subsequent segments combined, segments 2–7 elongate, segments 3 approximately 1.15 times as long as segment 2, segment 8 approximately twice as long as wide, last three segments indistinctly wider than preceding segments, do not form a distinct club, slightly longer than segments 5–8 combined (Fig. 32). Mandibles distinctly striate, shiny. Frontal carinae short, extending to 1/6 length of head, weakly divergent. Clypeus with diffused background microreticulation and distinct longitudinal rugae but appears more or less shiny, frontal triangle shiny with single median keel. Surface of head in anterior part up to ocelli mostly with distinct longitudinal rugae, behind eye and ocelli with reticulate rugosities, on whole surface with distinct background microreticulation, appears more or less shiny (Fig. 36).

Scape microreticulate, without striation. **Mesosoma.** Mesosomal plate (scutum) 1.05 times as long as wide, relatively high and robust, in profile regularly convex anteriorly and depressed posteriorly, without pronotal corners. Scutellum 1.4 times as wide as long, posterior margin regularly semicircular, in lateral view scutellum strongly convex, placed higher than top of mesonotal plate. Propodeum located considerably lower than mesosomal plate, propodeal spines moderately elongate, finger-shaped, with rounded tips and narrow base, oriented obliquely upwards (Fig. 76). In dorsal view the spines distinctly divergent. Pronotum anteriorly with broad, smooth and shiny area, laterally with transverse rugae and diffused background microreticulation, surface appears shiny, scutum in basal 1/3 length with distinct longitudinal striation and distinct background microreticulation, in the middle with diffused but visible microreticulation, in anterior part almost smooth, whole surface appears more or less smooth and shiny. Scutellum only laterally and posteriorly with longitudinal striation, anterior part only with microreticulation but whole surface appears shiny. Anepisternum on whole surface with diffused microreticulation, anteriorly the microreticulation less distinct than posteriorly, short striation visible only close to posterior margin, whole surface appears shiny; katepisternum on almost whole surface with diffused microreticulation, shiny, only close to posterior margin with short, longitudinal striae (Fig. 75). Propodeum on sides and top with sharp transverse and oblique striation, also in area between propodeal spines. **Petiole and postpetiole.** Petiole elongate with long stem, distinctly concave anterior face, angulate top of node and depressed posterior face, frontal face microreticulate, sides and posterior face with irregular rugae. Postpetiole slightly wider than long, in lateral view with rounded top, anterior face with diffused microreticulation, appears smooth and shiny, posterior face with distinct microreticulation and transverse rugae interrupted in the middle (Fig. 76). **Gaster.** Smooth and shiny, only base close to postpetiole with more or less diffused microreticulation. All dorsum covered with short erect setae (Fig. 76).

**Biology.** Little is known. In Italy, Malta and Greece this species was collected only in rural areas and tourist resorts, not in natural habitats. Ants were observed on walls, stones in shaded places in urban areas or close to the beach. On Cyprus it was found in a gorge which is probably its natural habitat. Foraging workers were observed on stones close to a stream and on the damp walls of the gorge. In Syria specimens were found under a stone. There is no available data on nest structure and colony size. Gathered data suggest that this species originated from the Middle East and was introduced to the Balkans, Italy and Malta perhaps in historical times.

**Distribution.** Confirmed records are from Malta, Italy (Sardinia, Sicily), Greece (Aegean Islands, Crete, Dodecanese), Cyprus, Israel, and Syria. However, all historical records of *A. splendida* from these countries require verification as they can represent misidentified specimens of other members of the *splendida* species-group known from this region. Due to the same reason, records from Ukraine, Transcaucasian countries and northern Africa also need verification and confirmation. Because the majority of historical records of this species in the W Mediterranean (Spain, France and Italy) come from anthropogenic sites (e.g. Tinaut & Pascual 1986, Scupola 2017) we concluded that this species can be present in these countries but it should be treated there as introduced.

*Aphaenogaster splendida* was described from “Greece” without detailed locality. Recent data showed that this species is very rare in this country and known only from three tourist resorts. Thus, it could also be introduced species in this region. Two other Greek members of the *splendida* species-group, *A. festae* and *A. peloponnesiaca* (treated by subsequent authors as *A. splendida*; see Borowiec & Salata 2013), appear to be common in Greek islands and southern region of the continental part of the country.

### *Aphaenogaster syriaca* Emery, 1908

*Aphaenogaster gibbosa* var. *syriaca* Emery, 1908: 335.  
Status as species: Emery 1915b: 258; Emery 1921a: 60; Mohamed *et al.* 2001: 49; Paknia *et al.* 2008: 153; Kiran *et al.* 2013: 49.

**Type material examined.** Syntype worker: *A. gibbosa* | *syriaca* Emery || Liban, André || ANTWEB | CASENT | 0904176 (MSNG) [AntWeb, CASENT 0904176, photos by Will Ericson, available on <https://www.AntWeb.org>].

**Other material examined.** CYPRUS: 1w, Larnaca, N of aeroport, 1981-04-05, leg. C. Besuchet (MHNG); 5w, Limassol, Agios Dymitrios, 1977-07-09, leg. C. Besuchet (MHNG); 1w, Limassol, 10 km N of Akrounda, 1981-04-09, leg. C. Besuchet (MHNG); 4w, Limassol, Moniatis, 700 m, 1981-04-13, leg. C. Besuchet (MHNG); 46w, Nicosia, Cedar Valley, 34.98333 / 32.68333, 1196 m, 2012-05-05, leg. L. Borowiec (MNH-DBET); 1w, Paphos, Avakas Pen., Aphrodite Bath area, 35.05 / 32.31666, 261 m, 2012-05-04, leg. L. Borowiec (MNH-DBET); 11w, Paphos, Avakas Pen., Avakas Gorge, 34.91666 / 32.33333, 117 m, 2012-05-03, leg. L. Borowiec (MNH-DBET); 1w, Paphos, Ayia, 700 m, 1977-07-12, leg. C. Besuchet (MHNG); 5w, Paphos, Diarizos riv., north of Kidasi, 34.8 / 32.7, 286 m, 2012-05-06, leg. L. Borowiec (MNH-DBET); 9w, Paphos, Kritou Terra, 1981-04-21, leg. C. Besuchet (MHNG); 12w, Paphos, Tala, 1981-04-19, leg. C. Besuchet (MHNG); ISRAEL: 1w, Akko, N. Naaman, 1982-04-18, leg. Besuchet & Löbl

(MHNG); 2w, Galilée, Eilon, N. Betzet, 1982-04-20 and 22, leg. Besuchet & Löbl (MHNG); 3w, Galilée, Hula, 1981-04-25, leg. Besuchet & Löbl (MHNG); 1w, Galilée, Mt. Meron, 1100 m, 1982-04-21, leg. Besuchet & Löbl (MHNG); 1Q, 1w, Galilée, Safad, 500 m, 1982-04-26, leg. Besuchet & Löbl (MHNG); 1w, Galilée, Tel Dan, 1982-04-24, leg. Besuchet & Löbl (MHNG); 1Q, 3w, Golan, Baniyas, 1982-04-24, leg. Besuchet & Löbl (MHNG); TURKEY: 4w, Adana distr, Aladağları Mts., 7 Km N of Darılık [37.633 / 35.505], 1445 m, 1993-06-10, leg. V. Vohralik (MNH-DBET).

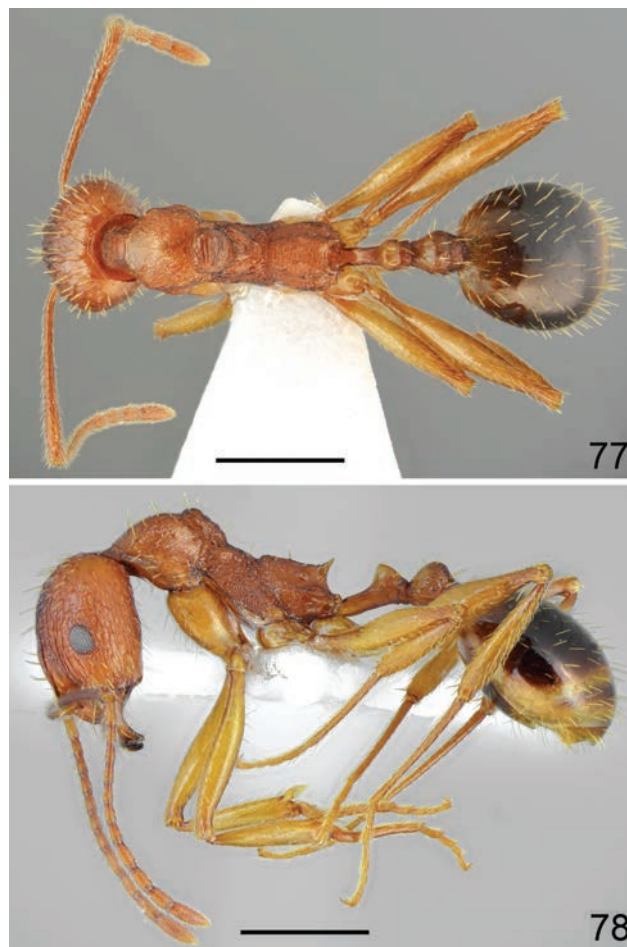
**Comparative notes.** *Aphaenogaster syriaca*, together with *A. festae*, *A. schmitzi* and *A. transcaucasica*, form a complex of similar species characterized by yellow to rusty-yellow coloration, moderately elongate legs and antennae, and distinct, reticulate head sculpture. *Aphaenogaster schmitzi* and *A. transcaucasica* differ in anterior part of mesonotum not protruded or protruded only slightly above pronotum, thus promesonotal convexity forms more or less regular arch. They differ also in shorter propodeal spines and less developed body sculpture, especially with more or less shiny pronotal surface with diffused microsculpture and without rugosities, while in *A. syriaca* whole pronotal surface is distinctly microreticulate and its lateral sides are more or less distinctly longitudinally rugate. *Aphaenogaster festae* is the most similar to *A. syriaca*, but differs in more distinctly elongated head, HL/HW: 1.347 (1.313–1.390) vs. HL/HW: 1.270 (1.220–1.307), slightly longer antennal scape in relation to head width, 1.541 (1.463–1.636) vs. 1.420 (1.340–1.469), and propodeal spines directed more upwards than in *A. syriaca*. Both species are separated geographically, *A. festae* has more western and northern distribution: north-western Greece, Bulgaria, Aegean Islands, Turkey east to Siirt Province and *A. syriaca* is known from Cyprus, Lebanon, Israel and Adana Province in Turkey. It is possible that they are sympatric in southeastern Turkey, but limited material from this region prevents that assessment.

**Description.** Worker: Measurements and ratios (n = 15): HL: 1.208 (1.10–1.32), HW: 0.952 (0.86–1.04), GL: 0.322 (0.29–0.37), FLW: 0.326 (0.29–0.35), EL: 0.216 (0.19–0.24), SL: 1.352 (1.21–1.52), PNW: 0.654 (0.59–0.71), WL: 1.596 (1.44–1.76), PSL: 0.264 (0.24–0.29), PH: 0.300 (0.27–0.32), PL: 0.488 (0.42–0.55), PW: 0.234 (0.21–0.26), PPW: 0.332 (0.29–0.37), HTL: 1.138 (0.99–1.29), HBL: 1.122 (1.00–1.27), HL/HW: 1.270 (1.220–1.307), HTL/HW: 1.194 (1.151–1.205), SL/HW: 1.419 (1.340–1.469), SL/HL: 1.118 (1.087–1.152), WL/PNW: 2.441 (2.382–2.492), FLW/HW: 0.343 (0.337–0.352), PSL/HW: 0.277 (0.273–0.280), PL/PH: 1.624 (1.556–1.719), EL/HL: 0.179 (0.168–0.191).

**Color.** Head, mesosoma and gaster yellow to rusty-yellow, only first gastral tergite in posterior 2/3 length

brown and in anterior 1/3 length with pale, yellow to rusty-yellow spot (Figs 72, 77, 78), legs and antennae yellow. **Head.** 1.2–1.3 times as long as wide, not bulging behind eyes, in the middle almost parallelized, close to vertex regularly rounded, without vertexal corners, hind margin with narrow carina, straight or slightly concave (Fig. 30). Anterior margin of clypeus with deep median emargination. Eyes moderately large, approximately 0.17 times as long as length of lateral margin of head, placed slightly in front of the middle of head (Fig. 26). Mandibles elongate, with distinct striation, shiny. Clypeus in interantennal area only microreticulate, anterior and lateral parts with few short, longitudinal and oblique rugae but interspaces appear shiny. Antennal sockets only close to antennal insertions smooth and shiny, mostly distinctly microreticulate, not bordered externally by circular rugae. Frontal carinae short, as long as 1/4 length of head, subparallel, but often longitudinal rugae connected with frontal carinae then carinae extend to 1/3 length of head; frontal triangle smooth and shiny with median keel. Almost whole surface of head with longitudinal and oblique sculpture and with distinct microreticulation between rugosities, only narrow occipital part of head only microreticulate, rugae in area behind eyes tend to form reticulate sculpture, in some populations whole head with distinct sculpture and surface of head appears more or less rugose. Scape microreticulate, without striation or in distal half with indistinct striae, elongate, 1.35–1.47 times as long as width of head, at base 0.6 times as wide as in apex then gradually widened, without preapical constriction. Funicle elongate, approximately 1.5 times as long as scape, first segment elongate, approximately 2.4 times as long as wide on apex, 0.8 times as long as two subsequent segments combined, segments 2–7 elongate, segment 3 approximately 1.1–1.2 times as long as segment 2, segment 8 approximately 1.8 times as long as wide, last three segments slightly wider than preceding segments, but not forming a distinct club, 1.2 times as long as segments 5–8 combined (Fig. 26). **Mesosoma.** Promesonotum approximately 1.5 times as long as wide, pronotum regularly convex in profile, anterior part of mesonotum distinctly higher than posterior part of pronotum thus promesonotal convexity more or less angulate. Propodeum moderately elongate, propodeal spines long, spiniform, running obliquely upwards (Fig. 78). Entire pronotal surface with distinct microreticulation, also in anterior part, on sides with more or less distinct longitudinal rugosities, surface appears more or less irregular. Mesonotum on top in anterior elevated part distinctly microreticulate in posterior half microreticulate and microgranulate, often with longitudinal rugae, on sides mesonotum with distinct microreticulation and granulation, with more or less distinct longitudinal rugae, propodeum at the top anteriorly with trans-

versely wrinkled sculpture and microreticulation between rugae, area in front of propodeal spines usually also with transverse wrinkles but with diffused microreticulation, on sides propodeum strongly microreticulate and granulate, with several longitudinal and oblique rugae (Figs 77, 78). Pronotum and mesonotum with 10–12 erect setae, propodeum usually with only a pair of long setae, sometimes with additional pair of short setae, the longest slightly longer than propodeal spines. **Petiole and postpetiole.** Petiole elongate with long stem, its anterior face deeply concave, node rounded. Posterior face shallowly concave. Ventral margin of petiole straight, without spine or distinct angulation (Fig. 78). In dorsal view, petiole only slightly widened behind base, then almost parallel-sided, petiolar node subangulate to subrounded in profile. Petiole on whole surface with distinct background microreticulation, posterior face with short longitudinal rugae. Postpetiole in profile regularly rounded. In dorsal view the postpetiole almost as long as wide with regularly rounded sides (Fig. 77), on entire surface



Figures 77, 78. *Aphaenogaster syriaca*, worker (specimen from Cyprus, Cedar Valley). (77) dorsal; (78) lateral (scale bar = 1 mm).



more or less microreticulate posterior face with several wrinkles. **Gaster.** Lucid, only base close to postpetiole with distinct, short, longitudinal grooves with distinct microreticulation. Petiolar node, postpetiole and gaster with long standing setae. **Legs.** Moderately thin and elongate, hind femora distinctly swollen in the middle then narrowed to base and to apex, tibiae moderately thin and elongate, distinctly widened from base to apex, tarsi moderately long.

**Variability.** In this species, microworkers were observed particularly often; they are very different from typical workers, about twice the size, with less developed body sculpture and with very small propodeal spines (Fig. 72).

Gyne unknown.

**Biology.** Little is known. On Cyprus, foraging workers were observed on a stone wall in a shaded area inside coniferous (pine and cedar) forest, on a wall of rock inside a deep gorge and on stones in a shaded area close to a river. There are no data about nest structure or size of the colony. Thirty-two foraging workers were observed in one small, alpine area in cedar forest but the nest, probably deeply hidden in a rock crevice, was not found.

**Distribution.** Turkey (Adana), Cyprus, Israel, Egypt (Sinai Peninsula) and Lebanon. Record from Iran (Paknia *et al.* 2008) needs confirmation as it could be *Aphaenogaster transcaucasica* Emery, 1908.

***Aphaenogaster transcaucasica* Karavaiev, 1926**  
new status

*Aphaenogaster (Aphaenogaster) splendida* var. *transcaucasica* Karavaiev, 1926: 97.

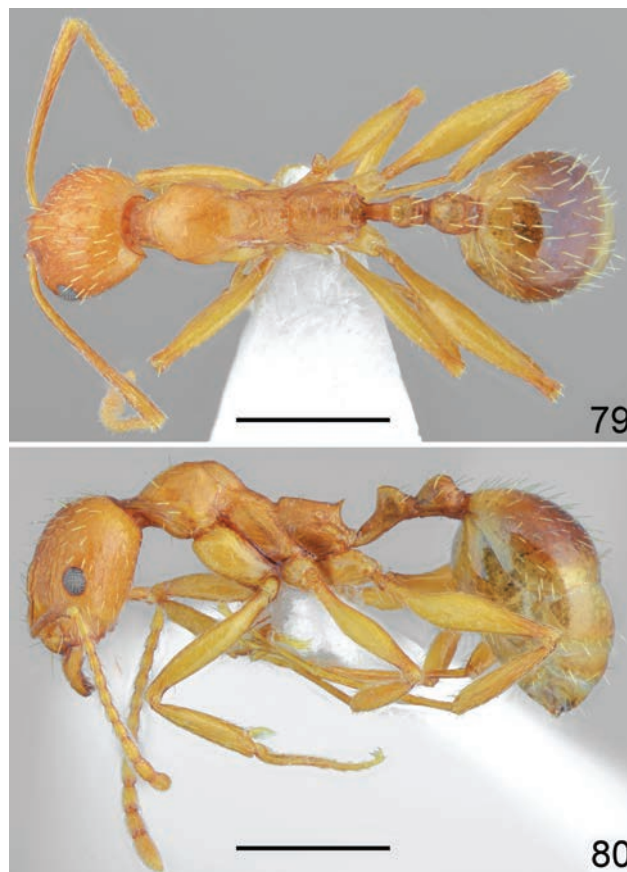
Subspecies of *Aphaenogaster splendida*: Arnoldi 1948: 211; Arnoldi 1976: 25; Gratiashvili & Barjadze, 2008: 137.

**Type material examined.** Syntype worker: Gouv. Baku |Kaukasus | |*Aphaenogaster splendida* | var. *transcaucasica* Karav. | (syntypus) (MNHW-DBET), personally investigated; syntype worker: Göglar | Caucasus | | Typus | | *Aphaenogaster* | *splendida* sbsp. | *caucasica* Kar. | Typus | | Sammlung | Dr. F. Santschi | Kairouan | | ANTWEB | CASENT | 0913131 (NHMB); syntype worker: Астанлы | Ленкоран | Казн. и Шелк. | 4915 Coll. | Karavaiev | | Syntypus *Aphaenogaster* | *splendida* v. | *transcaucasica* Kar. | | *Aphaenogaster* | (*Attomyrma*) | *splendida* Rog. | v. *transcaucasica* | Karavaiev typ. | | ANTWEB | CASENT | 0916920 (SIZK).

**Comparative notes.** *Aphaenogaster transcaucasica* together with *A. festae*, *A. syriaca* and *A. schmitzi* form a species complex characterized by yellow to rusty-yellow color of head and antennae, stout body and legs and head distinctly sculptured on whole surface. *Aphaenogaster festae* and *A. syriaca*

differ in mesonotum placed distinctly higher than posterior part of pronotum, more distinct head sculpture with rugae present also in the area between frontal carinae. *A. festae* differs also in slightly more elongate head with HL/HW above 1.3 (1.28 in *A. transcaucasica*). *Aphaenogaster schmitzi* is the most similar to *A. transcaucasica*, especially by mesonotum not protruded or protruded only slightly above posterior part of pronotum, but differs in slightly more elongated and more distinctly sculptured head, slimmer distal antennal segments and shorter scape SL/HW: 1.39 (1.326–1.467) vs. 1.512 in *A. transcaucasica*. Because we examined only one specimen of *A. transcaucasica*, its distinctness requires confirmation by studies on a larger number of specimens. The differences observed between this species and *A. schmitzi* are quite subtle and perhaps *A. transcaucasica* is only a northern geographical form of *A. schmitzi*.

**Description.** Worker: Measurements and ratios ( $n = 1$ ): HL: 1.06, HW: 0.82, GL: 0.27, FLW: 0.25, EL: 0.18, SL: 1.24, PNW: 0.56, WL: 1.41, PSL: 0.2, PH: 0.26, PL: 0.41, PW: 0.21, PPW: 0.28, HTL: 0.94, HBL: 0.94,



Figures 79, 80. *Aphaenogaster transcaucasica*, worker (syntype specimen from Azerbaijan, Baku). (79) dorsal; (80) lateral (scale bar = 1 mm).

HL/HW: 1.293, HTL/HW: 1.146, SL/HW: 1.512, SL/HL: 1.17, WL/PNW: 2.518, FLW/HW: 0.3086, PSL/HW: 0.244, PL/PH: 1.577, EL/HL: 0.17.

**Color.** Almost the whole body yellow, including legs and antennae, only first gastral tergite mostly yellowish-brown with yellow basal spot (Figs 79, 80). **Head.** Approximately 1.28 times as long as wide, not bulging behind eyes, in the middle almost parallelized, behind eyes regularly rounded, without vertexal corners, hind margin straight (Fig. 66). Anterior margin of clypeus with deep median emargination. Eyes moderately large, approximately 0.2 times as long as length of lateral margin of head, placed slightly in front of the middle of head (Fig. 64). Mandibles elongate, with distinct striation, shiny. Clypeus in interantennal area only microreticulate, anterior and lateral parts with few longitudinal and oblique rugae but interspaces appear shiny. Antennal sockets inside smooth and shiny, outside microreticulate but shiny not bordered externally by circular rugae. Frontal carinae short, as long as 1/4 length of head, subparallel, frontal triangle smooth and shiny with median keel. Almost whole surface of head with longitudinal and oblique sculpture and with distinct microreticulation between rugosities, only area between frontal carinae and occipital part of head only microreticulate, rugae in area behind eyes tend to form reticulate sculpture. Scape microreticulate but without striation, moderately elongate, approximately 1.5 times as long as width of head, at base 0.5 times as wide as in apex then gradually widened, without preapical constriction. Funicle elongate, approximately 1.5 times as long as scape, first segment elongate, approximately 2.6 times as long as wide on apex, 0.8 times as long as two subsequent segments combined, segments 2–7 moderately elongate, segment 3 approximately 1.2 times as long as segment 2, segment 8 approximately twice as long as wide, last three segments slightly wider than preceding segments, but not forming a distinct club, 1.4 times as long as segments 5–8 combined (Fig. 64). **Mesosoma.** Promesonotum approximately 1.5 times as long as wide, pronotum regularly convex in profile, anterior part of mesonotum indistinctly higher than posterior part of pronotum thus promesonotal convexity almost regular. Propodeum moderately elongate, propodeal spines long, spiniform, running obliquely upwards (Fig. 80). Entire pronotum microreticulate, also in anterior part, without rugosities, surface appears shiny. Mesonotum on top microgranulate with distinct longitudinal rugae, on sides only with distinct microreticulation and granulation, without rugae, propodeum at the top with transversely wrinkled sculpture and microreticulation between rugae, also area in front of propodeal spines with transverse wrinkles, on sides propodeum mostly microreticulate and granulate sculpture with few short oblique rugae (Figs 79, 80). Pronotum and mesonotum

with four erect setae, propodeum with a pair of setae, the longest slightly longer than propodeal spines. **Petiole and postpetiole.** Petiole elongate with long stem, its anterior face deeply concave, node rounded. Posterior face shallowly concave. Ventral margin of petiole straight, without spine or distinct angulation (Fig. 80). In dorsal view, petiole only slightly widened behind base, almost parallel-sided, petiolar node subangulate in profile. Petiole on almost entire surface distinctly microreticulate but without wrinkles, only petiolar node at top with few very short longitudinal rugae. Postpetiole in lateral profile regularly rounded. In dorsal view the postpetiole almost as long as wide with regularly rounded sides (Fig. 79), on almost entire surface distinctly microreticulate but without wrinkles, only on posterior face with few short longitudinal rugae, appearing more or less shiny. **Gaster.** Lucid, only base close to postpetiole with indistinct, short, longitudinal grooves but without microreticulation. Petiolar node, postpetiole and gaster with long standing setae. **Legs.** Moderately thin and elongate, hind femora swollen in the middle then distinctly narrowed to base and to apex, tibiae distinctly widened from base to apex.

Gyne unknown.

**Biology.** Unknown.

**Distribution.** Azerbaijan. Recorded also from Shiraki in Georgia (Jijilashvili, 1964a, b, 1966) but this record needs confirmation due to the unclear status of *Aphaenogaster georgica* Arnoldi, 1968 described from Georgia and Azerbaijan. The author of the description of *A. georgica* noted that this species is probably only a subspecies of *Aphaenogaster transcucasica* Emery, 1908. Additionally, the description lacks key characters that would distinguish these two taxa (Arnoldi 1968). The depository of the type of *A. georgica* is unknown and we treat this taxon as *nomen dubium*.

#### *Aphaenogaster vohraliki* sp. nov.

**Etymology.** Dedicated to the Czech collector Vladimir Vohralik, Praha, Czech Republic who collected this new species.

**Material examined.** Holotype worker: "Turkey, distr. Adana | Feke | 31.V.1993 | V. Vohralík lgt. || Sample Nr. | V 842" (CASENT0887540, MNHW-DBET); four paratype workers: the same data as holotype (CASENT0887541–CASENT0887544, MNHW-DBET, PWC).

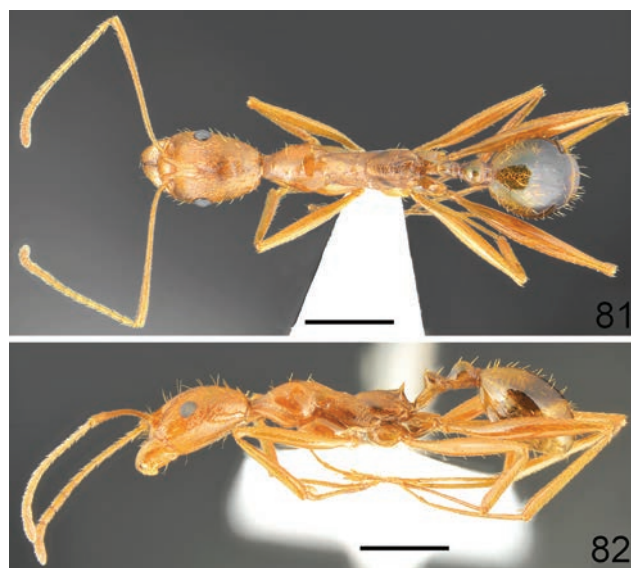
**Comparative notes.** A very distinct species. Its elongate head with distinctly converging posterior sides of head at first glance makes this species similar to some representatives of the *Aphaenogaster cecconii* species group but it differs in distinctly more developed sculpture of head and mesosoma than in any

species in the *A. ceconii* group. From species of the *A. splendida* group the most similar is *A. hamaensis*, described and known from Syria, which also has elongate head with distinctly converging posterior sides. *Aphaenogaster hamaensis* distinctly differs from *A. vohraliki* in extremely short propodeal spines of the shape of reduced teeth while in *A. vohraliki* propodeal spines are long and elongate. Also *A. kervillei*, due to elongate head and slim legs, appears similar to *A. vohraliki* but differs in short, dentiform propodeal spines and posterior sides of head weakly converging posterad.

**Description.** Worker: Measurements and ratios ( $n = 5$ ): **HL:** 1.482 (1.46–1.51), **HW:** 0.976 (0.96–1.00), **GL:** 0.472 (0.47–0.48), **FLW:** 0.368 (0.35–0.39), **EL:** 0.258 (0.25–0.27), **SL:** 1.994 (1.94–2.02), **PNW:** 0.704 (0.69–0.72), **WL:** 2.148 (2.10–2.19), **PSL:** 0.278 (0.24–0.3), **PH:** 0.356 (0.35–0.37), **PL:** 0.584 (0.57–0.60), **PW:** 0.248 (0.23–0.27), **PPW:** 0.350 (0.34–0.37), **HTL:** 1.972 (1.91–2.03), **HBL:** 1.716 (1.66–1.77), **HL/HW:** 1.518 (1.505–1.541), **HTL/HW:** 2.020 (1.99–2.05), **SL/HW:** 2.043 (2.020–2.063); **SL/HL:** 1.345 (1.329–1.364), **WL/PNW:** 3.051 (3.014–3.085), **FLW/HW:** 0.377 (0.354–0.406), **PSL/HW:** 0.285 (0.250–0.303), **PL/PH:** 1.641 (1.595–1.667), **EL/HL:** 0.174 (0.169–0.179).

**Color.** Head, mesosoma, legs and antennae pale yellow; gaster yellow, only first gastral tergite in posterior half dark brown (Figs 81, 82). **Head.** Elongate, approximately 1.5 times as long as wide, not bulging behind eyes, distinctly converging posterad, without vertexal corners, at base approximately twice narrower than behind eyes, hind margin sharply carinate, straight to shallowly concave (Fig. 46). Anterior margin of clypeus shallowly emarginate. Eyes moderately large, approximately 0.2 times as long as length of lateral margin of head, placed distinctly in front of the middle of head (Fig. 43). Mandibles elongate, with distinct striation and shiny background. Clypeus in anterior half with diffused microreticulation, in posterior part smooth, whole surface of clypeus appears shiny. Frontal carinae short, as long as 1/4 length of head, subparallel, frontal triangle with two short, longitudinal rugae but shiny between rugosities. Antennal sockets insides smooth and shiny, outside microreticulate and shiny bordered externally by rudiments of circular rugae. Anterior part of head with longitudinal rugae and microreticulate interspaces, rugae sometimes slightly irregular but never form reticulate sculpture, posterior third of head only with microreticulation, whole background of head appears slightly shiny, especially behind eyes and on vertex. Scape, with microreticulate background and fine, short, elongate striation, elongate, approximately twice longer than width of head, at base 0.7 times as wide as in apex then gradually widened, without preapical constriction.

Funicle elongate, approximately 1.4 times as long as scape, first segment elongated, approximately thrice as long as wide on apex, 0.6 times as long as two subsequent segments combined, segments 2–7 elongate, segment 3 only slightly longer than segment 2, segment 8 approximately thrice as long as wide, last three segments indistinctly wider than preceding segments, not forming a distinct club, approximately 1.2 times as long as segments 5–8 combined (Fig. 43). **Mesosoma.** Thin and elongate, approximately thrice longer than wide. Promesonotum approximately twice as long as wide, pronotum weakly convex in profile, anterior part of mesonotum placed slightly higher than posterior part of pronotum thus promesonotal convexity more or less regularly convex in profile. Propodeum elongate, propodeal spines moderate, spiniform, running distinctly upwards (Fig. 82). Entire pronotum with diffused microreticulation, without rugosities, appears shiny. Mesonotum on dorsal side with diffused microreticulation and shiny, on sides distinctly microreticulate to microgranulate with only rudiment of longitudinal rugae, especially close to posterior margin, propodeum dorsally in anterior 2/3 length with transverse fine striation and shiny background, in area front of propodeal spines distinctly microreticulate, on sides with distinct microreticulate and granulate sculpture, only in posterolateral corners with short longitudinal rugae (Figs 81, 82). Pronotum with 6–10, mesonotum 2–6 and propodeum 2–4 long, erect setae, the longest slightly longer than propodeal spines. **Petiole and postpetiole.** Petiole elongate, approximately 2.4 times as long as wide, with long stem, its anterior face deeply

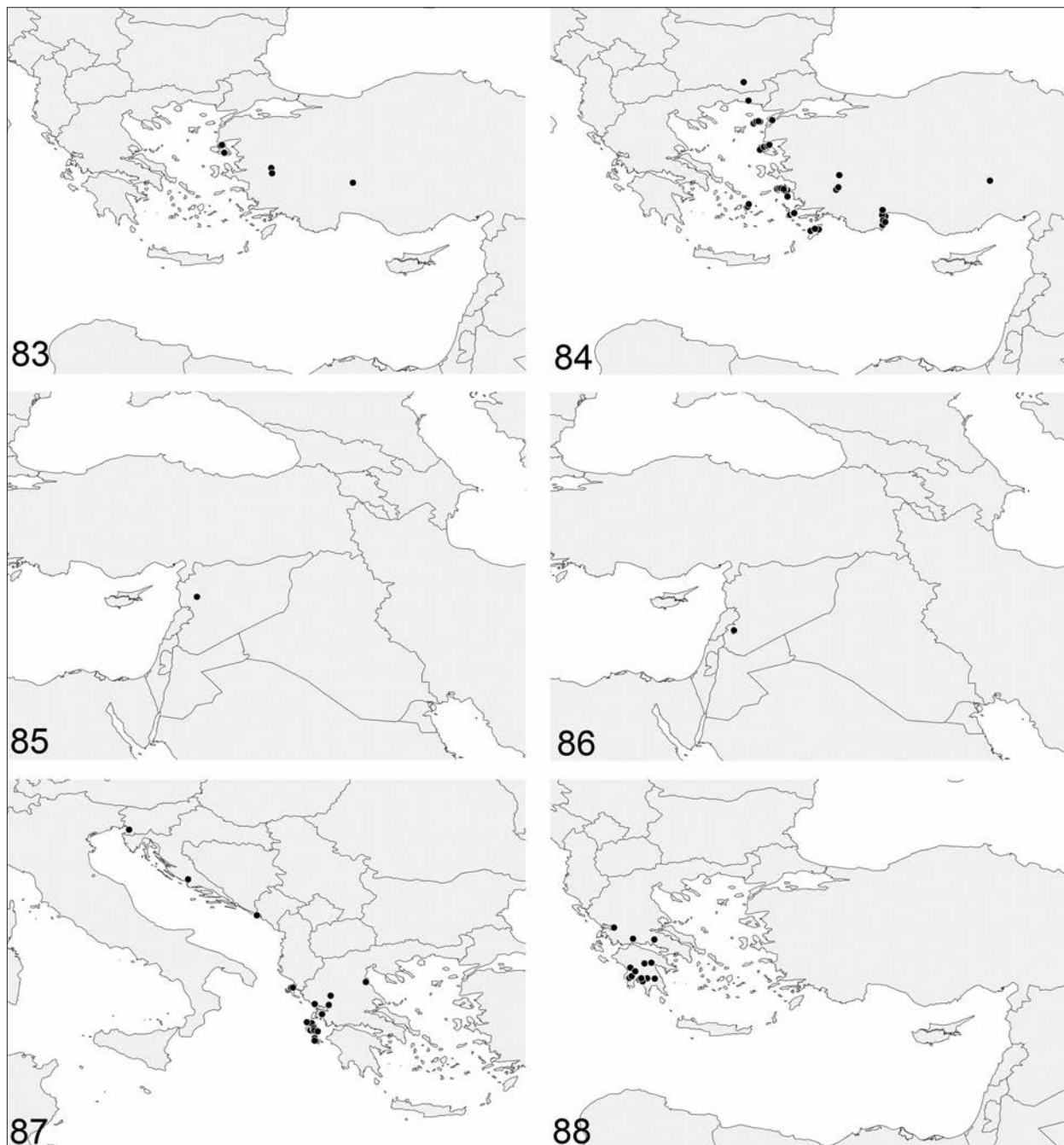


Figures 81, 82. *Aphaenogaster vohraliki*, worker (holotype specimen from Turkey, Feke). (81) dorsal; (82) lateral (scale bar = 1 mm).



concave, node subangulate in profile. Posterior face convex. Ventral margin of petiole straight, without spine or distinct angulation (Fig. 82). In dorsal view, petiole almost parallel-sided in basal part then weakly divergent. Petiole dorsally with diffused microreticulation, shiny, on sides and ventrally microreticulate but without wrinkles, appearing more or less shiny. Post-

petiolar node globular. In dorsal view the postpetiole approximately 1.2 times as long as wide with regularly rounded sides (Fig. 81), dorsally smooth and shiny, laterally with diffused and ventrally with distinct microreticulation but shiny. **Gaster.** Lucid, only base close to postpetiole with indistinct, very short, longitudinal grooves. Petiolar node, postpetiole and gaster with long



Figures 83–88. Distribution of studied samples. *Aphaenogaster aktaci* (83). *Aphaenogaster festae* (84). *Aphaenogaster hamaensis* (85). *Aphaenogaster kervillei* (86). *Aphaenogaster ovaticeps* (87). *Aphaenogaster peloponnesiaca* (88).

standing setae. **Legs.** Thin and elongate, hind femora only slightly swollen in the middle only gradually widened from base to the mid length then gradually narrowed to apex.

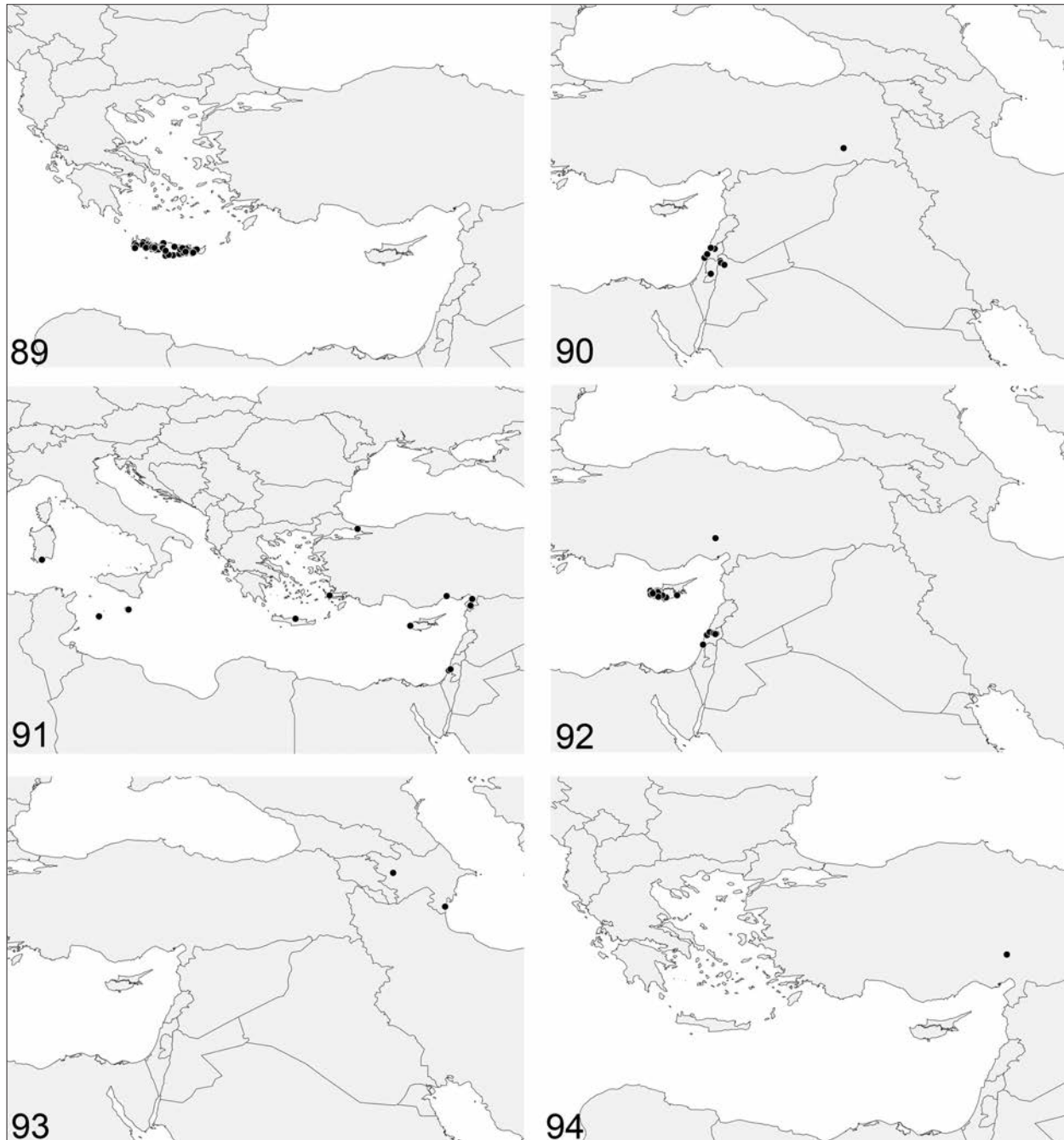
**Variability.** Within the population small, manifest-

ed mostly by more or less diffused background micro-reticulation.

Gyne unknown.

**Biology.** Unknown.

**Distribution.** Turkey (Adana).



Figures 89–94. Distribution of studied samples. *Aphaenogaster rugosoferruginea* Forel (89). *Aphaenogaster schmitzi* Forel (90). *Aphaenogaster splendida* (Roger) (91). *Aphaenogaster syriaca* Emery (92). *Aphaenogaster transcaucasica* Emery (93). *Aphaenogaster vohraliki* sp. nov. (94).

## Taxa with unclear taxonomic status

### *Aphaenogaster georgica* Arnoldi, 1968

*Aphaenogaster georgica* Arnoldi, 1968: 1804; Arnoldi 1976: 1024; Gratiashvili & Barjadze 2008: 137.

**Comments.** Arnoldi (1968) described *Aphaenogaster georgica* from Georgia (Dmanisi and Shiraki) and Azerbaijan (Alpout) based on 28 workers and compared this taxon only with *A. splendida*. In the comments section he noted that *A. georgica* is similar to *A. transcaucasica* Karavaiev and that the lack of sexual forms makes it difficult to compare both species. Later he concluded that if *A. georgica* is a separate taxon perhaps it should maintain a status of a subspecies of *A. transcaucasica*. All characters noted in the original description overlap with the features observed in the examined syntype of *A. transcaucasica*, thus *A. georgica* is probably a junior synonym of this species. Unfortunately, the location of Arnoldi's collection is unknown and types of *A. georgica* are probably lost. In this situation we decided to declare *A. georgica* as a *nomen dubium*.

### *Aphaenogaster dluskyi* Radchenko & Arakelian, 1991

*Aphaenogaster dluskyi* Radchenko & Arakelian, 1991: 72; Arakelian 1994: 31.

**Type material examined.** Holotype worker: “ Арм. ССР, окр. Мег- | ри No, 155-88 | А. Радченко 14.6.88 | | Holotype Aphaenogaster dluskyi Rad- | tschenko et Arake- | lian | | ANTWEB | CASENT | 0917359 (SIZK), personally investigated.

**Comments.** Radchenko & Arakelian described this species from Armenia (Megri dept.) and compared with members of the *A. ceconii* group known from Asia. Although one of the authors (SS) had opportunity to examine personally the holotype of *Aphaenogaster dluskyi* it was impossible to make detailed morphometric measurements of this specimen. Investigation of the photographs of the type specimen available on AntWeb and measurements made based on this documentation confirmed that this species is a member of the *Aphaenogaster splendida* group clustered close to *A. kervillei*. All the characters noted in the original description, especially the shape and sculpture of the head, overlap with these observed in *A. kervillei*. However, the type locality of *A. dluskyi* is located approximately 1000 km east from known localities of *A. kervillei*. Thus, it remains unclear if *A. kervillei* is a widespread species and *A. dluskyi* is its junior synonym or both represent cryptic taxa.

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