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Redescription of *Aphaenogaster muschtaidica* Emery, 1908 with a key to *gibbosa* species group

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ABSTRACT. *Aphaenogaster muschtaidica* Emery, 1908 **n. st.** is redescribed based on new material collected from Georgia. A neotype of this species is designated. Its sexual forms are described for the first time. Features defining members of *A. gibbosa* group are redefined and a status of *Aphaenogaster subterranea fiorii* Emery, 1915 **n. comb.** is recombined. A key to worker caste of species belonging to *gibbosa* group is given.

Keywords: Caucasus, new status, key, Stenammini, *Aphaenogaster gibbosa* group

INTRODUCTION

Aphaenogaster Mayr, 1853 is a widely distributed genus, which includes more than 200 species and subspecies. Among them, 97 species are known from the Palearctic Region (AntWiki 2017). In recent years some of them, based on their morphology, were divided into species groups (Schulz 1994). This work can be considered as a base for more advanced research, which resulted in describing new species, redefining few groups and creating new ones (Kiran *et al.* 2008, Boer 2013, Borowiec & Salata 2014).

According to Schulz's (1994) paper *A. muschtaidica* Emery, 1908 is a member of *A. gibbosa* group. This group was characterized by the following features: dark body colouration, delicate but visible head and mesosoma sculpture, with dull surface between rugosities, scape reaching well beyond the occipital margin of head, slightly striped base of gaster and postpetiole, funicular segments from 1.5 to 2 times longer than wide. The following taxa were listed as members of *gibbosa* group: *A. gibbosa* (Latreille, 1798), *A. strioloides* Forel, 1890, *A. laevior* Forel, 1892 (not *A. laevior* Emery, 1887), *A. mauritanica* Dalla Torre, 1893, *A. striativentris* Forel, 1895, *A. muschtaidica* Emery, 1908, *A. fiorii* Emery, 1915, *A. italica* Bondroit, 1918, *A. nadigi* Santschi 1923, *A. theryi* Santschi, 1923, *A. chorassanica* Arnol'di, 1968. Almost all taxa mentioned by Schulz have valid species status. Only *Aphaenogaster muschtaidica*, *A. chorassanica* and *A. laevior* are considered as junior synonyms of *A. gibbosa*.

After thorough examination of types of *A. laevior* Forel, 1892 (not *A. laevior* Emery, 1887) we have no doubts that this taxon is conspecific with *A. gibbosa* (Latreille, 1798). Therefore, there is no need to replace it with a new name and it should remain unavailable for nomenclature. The status of *A. gibbosa chorassanica* Arnol'di, 1968 remains unclear. According to characters noted in the original description (Arnol'di 1968) it seems to be a distinct species. Unfortunately, we had no possibility to study the types of this taxon and at the moment we propose keeping its status as a synonym of *A. gibbosa*.

During a field trip to Georgia by the senior author, specimens belonging to the *gibbosa* group were collected. Their morphology and biology matched with data provided in the description

of *A. muschtaidica* (Ruzsky 1905). Moreover, the material was collected only few kilometers from the type locality of *A. muschtaidica* (Mushthaid Garden, Tbilisi).

Aphaenogaster muschtaidica was described by Ruzsky (1905) under an unavailable quadrinominal name. For the first time its name was validated as trinomen by Emery (1908). He mentioned also features distinguishing *A. muschtaidica* from other subspecies of *A. gibbosa*. Afterwards *A. muschtaidica* was raised to species level (Collingwood 1985) and five years later recognized as a junior synonym of *A. gibbosa* (Dlussky *et al.* 1990). The authors of the last publication stated that they could not find any features allowing to separate *A. gibbosa* from *A. muschtaidica* and *A. chorassanica*. Unfortunately, they did not list studied material. Therefore, we cannot be certain if they investigated material of what we consider genuine *A. muschtaidica*.

Below we redescribe the worker caste of *A. muschtaidica* and describe its sexual forms for the first time. In the discussion chapter, we redefine the *gibbosa* group, reinvestigate a list of species belonging to it and provide a key to their identification.

MATERIAL AND METHODS

Specimens were compared using standard methods of comparative morphology. Photos were taken using a Nikon SMZ 1500 stereomicroscope, Nikon D5200 photo camera and Helicon Focus software. All given label data are in original spelling; a vertical bar (|) separates data on different rows and double vertical bars (||) separate labels. Additional information about the labels or explanatory notes is given in square brackets. The images of type and non-type specimens, with assigned CASENT number, are available at AntWeb (https://www.antweb.org). Examined specimens are housed in the following collections:

BMNH – Natural History Museum, London, UK;

CASC – California Academy of Sciences, San Francisco, California, USA;

DBET – Department of Biodiversity and Evolutionary Taxonomy, University of Wrocław, Poland;

MHNG – Museum d'Histoire Naturelle,Geneva, Switzerland;

MNHW – Museum of Natural History, University of Wrocław, Poland;

MSNG – Museo Civico di Storia Naturale, Genova, Italy;

NHMB – Naturhistorisches Museum, Basel, Switzerland.

The degree of inclination of pilosity follows Hölldobler & Wilson (1990) as follows: adpressed (0–5°) hairs run parallel, or nearly parallel to the body surface; decumbent hairs stand 10–15°; subdecumbent hair stands 30°; suberect hairs stand 35–45°; and erect hairs stand more than 45° from the body surface.

Measurements, Indices and Comparative Material:

Measurements

HL – head length; in full-face view, measured in straight line from mid-point of anterior clypeal margin to mid-point of posterior margin;

HW – head width; measured in full-face view directly above the eyes;

EL – eye length; measured along the maximum diameter of eye;

SL – scape length; maximum straight-line length of the scape;

PNW – pronotum width; maximum width of pronotum, in dorsal view;

ML – mesosoma length; measured as diagonal length from the anterior end of the neck shield to the posterior margin of the propodeal lobe;

PL – petiole length; maximum length of petiole in lateral view;

PW – petiole width; maximum width of petiole in dorsal view;

PPL – postpetiole length; maximum length of postpetiole in lateral view;

PPW – postpetiole width; maximum width of postpetiole in dorsal view;

PSL – propodeal spines length; distance measured from the middle of propodeal spiracle to the top of propodeal spine measured in lateral view.

Indices

HI cephalic index; HW\HL x 100;
SI scape index; SL\HL x 100;
MI mesosoma index; ML\PNW x 100;
PSI propodeal spines index; PSL\HL x 100.

All lengths are in mm.

Specimens of *Aphaenogaster muschtaidica* were compared with type or non-type specimens of other taxa from the *A. gibbosa* group mentioned below:

Type material

Aphaenogaster subterranea var. *strioloides* Forel, 1890: 2 syntype workers, *A. subterranea* | Latr. | variet | montagne | pres Souk Ahras | Algerie; trone | 1390 m / Forel ||Typus || v. *strioloides* Forel || Coll. Forel || ANTWEB | CASENT0907685 (MSNG), *aphaenogaster* | *subterranea* | *strioloides* | Forel | montagne pres | Souk Ahras | 1400 | m | Forel || ANTWEB | CASENT0904174 (MSNG);

Aphaenogaster striola var. *laevior* Forel, 1892: 1 syntype worker: Typus || *A. gibbosa* (...) | v. *levior* Forel | Cardova (…) || v. *levior* Forel || Coll. Forel || ANTWEB | CASENT0907684 (MHNG);

Aphaenogaster striola var. *mauritanica* Dalla Torre, 1893: 1 syntype worker, *aphaenogaster* | *gibbosa* Lat | subsp. *mauritanica* | Emery || Tlemcen | Leveille || ANTWEB | CASENT0904173 (MSNG);

Aphaenogaster gibbosa ssp. *fiorii* Emery, 1915: 1 lectotype worker, *Aph*. | *gibbosa* | *fiorii* Emery || LECTOTYPUS || ANTWEB | CASENT0904175 || Coll. C. Emery | Museo Genova (MSNG);

Aphaenogaster gibbosa var. *homonyma* Emery, 1921: 1 syntype worker, *Striola* | *subterraneoides* | Forel | (...) | Tunisia | Forel || ANTWEB | CASENT0904172 (MSNG);

Aphaenogaster gibbosa var. *nadigi* Santschi, 1923: 1 syntype worker, *Aphaenogaster* | *gibbosa* Latr. | v. *nadigi* Sant. || Marrakech | 7. 4. 23 | Dr. Ad. Nadig || Type || 84 || Sammlung | Dr. F. Santschi | Kairouan || ANTWEB | CASENT0913117 (NHMB);

Aphaenogaster theryi Santschi, 1923: 1 syntype worker, *Aphaenogaster* | Attomyrma | *theryi* Sant. | Santschi det. 1921 || type || Sale | Maroc | Coll. THERY || Sammlung | Dr. F. Santschi | Kairouan || ANTWEB | CASENT0913135 (NHMB);

Aphaenogaster aktaci Kiran & Tezcan, 2008: 1 paratype worker, *Aphaenogaster* | *aktaci* n. sp. | PARATYPUS | des. Kiran & Tezcan, 2008 || TURKEY, Izmir Prov. 1160 m | Odemis-Bozdag-Golcuk Village | 06.06.2001, 38°30’29” N/ 28°04’35” E | leg. S. Tezcan (DBET).

Non-type material

Aphaenogaster gibbosa (Latreille, 1798): 19 workers: SPAIN, Andalucia, Malaga | Pr. road Ojén-Refugio de | Juanar, 6 V 2014, 554 m, | 36,59358 N/4,85621 W | L. Borowiec; 1 worker: SPAIN, Catalonia, 700 m | Garrotxa, Volca Santa Mar- | garida n. Olot, 42°08/2°32 | 31 VIII 2011, L. Borowiec (DBET); 2 workers: PORTUGAL, Alentejo 146 m | Barragem de Santa Clara | 37,50889 N/-8,43632 W | 7 V 2016, L. Borowiec (DBET); 1 worker: PORTUGAL, Algarve | 6 km N of Silves, 138 m | 37,24327 N / -8,44363 W | 3 V 2016, L. Borowiec (DBET); 1 worker: PORTUGAL, Algarve 410 m | 2.3 km SW of Monchique | 37,3011 N / -8,57203 W | 6 V 2016, L. Borowiec (DBET); 1 worker: PORTUGAL, Algarve | n. Barao de S. Joao, 260 m | 37,14122 N

/ -8,78826 W | 4 V 2016, L. Borowiec (DBET); 1 worker, 1 gyne and 1 male: *Aphaenogaster gibbosa* | det. Gómez, K. 05/2006 | KG01850 || SPAIN Salamanca | residencia de ancianos (Béjar) | 40°23,35'N 5° 46,47'N 749m | K. Gómez 29/05/2006; Manual | KG01850 (2) || KG01850 (2) | Building | Nest on floor crack || AntWeb (CASC);

Aphaenogaster italica Bondroit, 1918: 1 worker: *Aphaenogaster* | *italica* EMERY | det. F. Rigato 1994 || ITALY | LOMBARDIA | Brescia prov. || Casalicolo | (Gavardo env.) | 30.iv89 | leg. R. Scialay || ANTWEB | CASENT0281585 || BMNH(E) | 1017827 (BMNH);

Aphaenogaster striativentris Forel, 1895: 1 worker: SPAIN | Malaga | Sierra del Rey | 23.viii.87 | A. Tinaut || ANTWEB | CASENT0280964 || BMNH(E) | 1017818 (BMNH).

RESULTS

Aphaenogaster muschtaidica Emery, 1908 **new status**
(Figs 1-12)

Aphaenogaster gibbosa subsp. *muschtaidica* Emery, 1908: 334 (w.) (=*Aphaenogaster subterranea gibbosa muschtaidica* Ruzsky, 1905: 719, unavailable name).

Type locality. Tbilisi, Georgia.
Material examined.
Type material: Neotype worker (designated here): GEORGIA, Tbilisi Pr. | Tbilisi Bot. Gard. 429 m | 41.68764 N / 44.80579 E, | 18 VII 2015, S. Salata (MNHW).
Non-type material: 22 workers, 7 gynes and 2 males: same data as neotype (DBET, MHNG, MSNG, NHMB).

Worker. Redescription. Measurements and indices (n=15): HL: 1.148 ± 0.09 (0.979-1.267); HW: 0.86 ± 0.07 (0.724-0.955); EL: 0.222 ± 0.02 (0.189-0.247); SL: 1.236 ± 0.1 (1.07-1.358); ML: 1.532± 0.12 (1.317-1.712); PSL: 0.197 ± 0.03 (0.152-0.235); PL: 0.487 ± 0.04 (0.395-0.543); PPL: 0.363 ± 0.03 (0.296-0.428); PNW: 0.635 ± 0.06 (0.527-0.708); PW: 0.226 ± 0.02 (0.181-0.255); PPW: 0.321 ± 0.03 (0.263-0.37); HI: 74.9 ± 0.6 (73.8-75.7); SI: 107.7 ± 2.3 (100.7-111.4); MI: 241.3 ± 6.3 (231.4-250.0); PSI: 17.1 ± 1.25 (15.3-19.1).

Head, mesosoma, petiole, postpetiole and gaster black. Legs, mandible and antennae dark brown to dark reddish brown. Sometimes lower part of gena and frons in the same colouration as antennae (Figs 1-5).

Head subrectangular, lateral surfaces below eyes straight, gently rounded on the posterior edges, occipital margin of head straight or slightly rounded (Fig. 4). Anterior margin of the clypeus gradually convex, lacking median anterior notch. Eyes small, oval, 0.2 times as long as length of the head. Antennal scape long, slightly curved, 1.1 times as long as length of the head, exceeding beyond occipital margin of head, in apex gradually widened, its base with small tooth. Pedicel more than 2 times longer than wide, average 1.5 times longer than second segment of funiculus. Other funicular segments from 1.5 to 2 times longer than wide (Figs 4-5).

Surface of scape with very fine microsculpture and thin, longitudinal rugae, shiny, covered with thick, dense, suberect to erect setae, longer than ¾ of scape width (Figs 4-5). Mesosoma elongate, 1.3 times as long as head; promesonotum arched in lateral view. Mesonotum not raised over pronotum. Pronotum rounded on sides (Figs 1-2). Propodeal spines triangular, short, with wide base, inclined at the 45° angle; dorsal surface of propodeum slightly convex. Petiole with long peduncle, node with anterior and posterior faces convex, its dorsal surface convex. Postpetiole, in lateral view, regularly rounded,1.1 times as long as wide, apical half with gently rounded sides (Figs 1-2). Mandibles rounded with thick, longitudinal striae, shiny. Clypeus shiny with thick, longitudinal striae, area between striae with gentle microreticulation, shiny. Frontal carinae short, slightly extending across the fronts of the antennal fossae. Antennal fossa deep, with sparse microreticulation or smooth, its inner edge with a few roundly curved striae. Frontal lobes narrow, smooth with thick longitudinal striae (Figs 4-5).

Figs 1 – 3. *Aphaenogaster muschtaidica* Emery – worker (scale bar – 0.5 mm). Fig. 1 – lateral view, Fig. 2 – dorsal view, Fig. 3 – scape pilosity and sculpture.

Frons and genae on the whole surface usually with thick, dense longitudinal striation, area between striae with microreticulation. Sometimes on frons longitudinal striation replaced by reticulation. Upper sides of genae and posterior part of head with weaker sculpture but never smooth (Figs 1, 4). Entire head bearing thick, suberect to erect, pale setae (Figs 4-5).

Lateral surfaces of pronotum with longitudinal, horizontal, weak but dense rugae, area between rugae smooth or with microreticulation. Dorsal surface of pronotum with irregular, thin and dense striae. Sometimes, its central part with reduced striation, but never smooth (Figs 1-2). Lateral surfaces of mesonotum with thin and dense reticulation, area between reticulation smooth and shiny. Dorsal surface of mesonotum with thin, irregular rugosity, its central part smooth and shiny. Lateral surfaces of propodeum with thin, irregular rugosity. Dorsal surface of propodeum with thin and dense transverse striation or rugosity. Area between striae smooth or with microreticulation, shiny (Figs 1-2). Peduncle with microreticulation or smooth, always shiny, nodes of petiole and postpetiole smooth or with weak microreticulation, always shiny. Whole mesosoma bearing few erect, long, pale setae (Figs 1-2).

Gaster smooth and shiny, bearing dense, long, semierect to erect setae. Legs long, shiny, with fine microreticulation. Dorsal surface of tibia and femora with long, dense, semierect setae, inner margins with a row of dense, long, semierect setae (Figs 1-2).

Gyne. Description. Measurements and indices (n=7): HL: 1.487 ± 0.03 (1.442-1.516); HW: 1.311 ± 0.02 (1.279-1.344); EL: 0.431 ± 0.02 (0.41-0.475); SL: 1.389± 0.03 (1.344-1.426); ML: 2.602± 0.05 (2.557-2.689); PL: 0.854 ± 0.04 (0.789-0.893); PPL: 0.521 ± 0.03 (0.491-0.557); PNW: 1.563 ± 0.06 (1.508-1.672); PW: 0.417 ± 0.02 (0.393-0.426); PPW: 0.621 ± 0.02 (0.59-0.656); HI: 88.2 ± 1.5 (87.0-91.0); SI: 93.4 ± 1.2 (91.6-95.5); MI: 166.6 ± 5.9 (156.9-174.5).

Head, mesosoma, petiole, postpetiole and gaster black. Legs, mandible and antennae dark brown to dark reddish brown. Sometimes lower part of genae and frons in the same colouration as antennae (Figs 6-8, 11).

Head subrectangular, lateral surfaces below eyes straight, gently rounded on the posterior edges, occipital margin of head straight (Fig. 11). Anterior margin of the clypeus gradually convex. Eyes big, oval, 0.3 times as long as length of the head. Antennal scape long, slightly curved, 0.9 times as long as length of the head, slightly exceeding beyond occipital margin of head, in apex gradually widened, its base with small teeth. Pedicel more than 2 times longer than wide; average 1.5 times longer than second segment of funiculus. Other funicular segments more than 1 ½ times longer than wide (Figs 6, 11).

Surface of scape with very fine microreticulation, shiny; covered with thin, rare, decumbent to suberect setae, shorter than ½ of scape width (Figs 6, 11). Mesosoma elongate, 1.7 times as long as head; promesonotum slightly convex in lateral view. Pronotum in dorsal view rounded on sides (Figs 7-8). Propodeal spines triangular, long, with wide base, inclined at the 45° angle; dorsal surface of propodeum inclined towards its posterior surface. Petiole with long peduncle, node with anterior and posterior faces convex, its dorsal surface convex. Postpetiole, in lateral view, regularly rounded,0.8 times as long as wide, apical half with gently rounded sides (Figs 7-8). Mandibles rounded with thick, longitudinal striae, shiny. Clypeus shiny with 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 reticulation and longitudinal striae, area between striation smooth. Frontal lobes narrow, smooth with thick longitudinal striae (Figs 6, 11). Frons and genae, most often, on the whole surface with thick, dense longitudinal striation, area between striae with microreticulation or smooth, always shiny. Sometimes on frons longitudinal striation replaced by reticulation. Longitudinal striation on the posterior part of head bent outward, top of posterior part of head with few horizontal, interrupted striae (Figs 6-8). Entire head bearing thick, suberect to erect, pale setae (Figs 6, 11).

Figs 4 – 6. *Aphaenogaster muschtaidica* Emery (scale bar – 0.5 mm). Fig. 4 – worker, head and antennae, Fig. 5 – worker, head sculpture, Fig. 6 – gyne, head sculpture.

Figs 9 – 10. *Aphaenogaster muschtaidica* Emery – male (scale bar – 0.5 mm). Fig. 9 – lateral view, Fig. 10 – dorsal view.

Figs. 11 – 12. *Aphaenogaster muschtaidica* Emery (scale bar – 0.5 mm). Fig. 11 – gyne, head and antennae, Fig. 12 – male, head.

Pronotum with longitudinal, horizontal, weak but dense striation, area between striae smooth or with microreticulation, shiny. Scutum with very rare, weak punctation or smooth, shiny. Scutellum with smooth and shiny centre, its lateral sides with weak, rare transverse striae, shiny. Propodeum shiny, with very weak transverse striation (Figs 7-8). Anepisternum and katepisternum smooth and shiny; sometimes lateral edges with very weak and dense reticulation. Metanepisternum and metakatepisternum shiny with dense, thin, longitudinal striation or reticulation (Fig. 7). Peduncle with microreticulation or smooth, always shiny; nodes of petiole and postpetiole smooth or with weak microreticulation, always shiny. Whole mesosoma bearing few erect, long, pale setae (Figs 7-8).

Gaster smooth and shiny, bearing dense, long, semierect to erect, pale setae. Legs long, shiny, with fine microreticulation. Dorsal surface of tibia and femora with long, dense, decumbent to suberect setae, inner margins with a row of dense, long, semierect setae (Figs 7-8).

Male. Description. Measurements and indices (n=2): HL: 0.741-0.734; HW: 0.667-0.669; EL: 0.407-0.42; SL: 0.259-0.222; ML: 1.827-1.778; PL: 0.506-0.469; PPL: 0333-0.296; PNW: 0.858-0.827; PW: 0.296-0.298; PPW: 0.444-0.407; HI: 90.0-91.1); SI: 35.0-30.3; MI: 212.9-214.9.

Head, mesosoma, petiole, postpetiole and gaster black. Legs, mandible and antennae dark brown to brown. Sometimes lower part of gena and frons in the same colouration as antennae (Figs 9-10, 12).

Head subrectangular, lateral surfaces below eyes straight, gently rounded on the posterior edges, occipital margin of head straight (Fig. 12). Anterior margin of the clypeus gradually concave. Eyes big, oval, 0.5 times as long as length of the head. Antennal scape short, straight, 0.3 times as long as length of the head. Pedicel more than 2 times longer than wide; average 1.5 times longer than second segment of funiculus. Other funicular segments more than 1 ½ times longer than wide (Fig. 12).

Surface of scape with very fine microreticulation, shiny; covered with thin, rare, decumbent setae, shorter than ¼ of scape length (Fig. 12). Mesosoma elongate, 2.5 times as long as head; promesonotum strongly arched in lateral view. Pronotum rounded on sides, placed above propodeum. Anterodorsal surface of mesonotum concave, placed above its posterodorsal part concave, its posterior part slightly concave. Propodeum rectangular, its dorsal surface slightly convex. Propodeal spines absent, or in shape of small lobes (Figs 9-10). Petiole, in lateral view, with long peduncle, node with anterior and posterior faces bended, its dorsal surface arched. Postpetiole, in lateral view, regularly rounded,0.8 times as long as wide, apical half with gently rounded sides (Figs 9-10). In dorsal view, petiolar node and postpetiole dorsum on centre with shallow suture, their sides convex (Fig. 10). Mandibles elongated, with rounded posterior edges, smooth, shiny. Clypeus shiny with a few thick, longitudinal striae, area between striae smooth and shiny. Frontal carinae short, not slightly extending across the fronts of the antennal fossae. Antennal fossa shallow, with rare reticulation or smooth, shiny. Frontal lobes narrow, smooth with thick longitudinal striae. Frons and genae covered on the whole surface with thick, sparse rugosity, area between rugae with microreticulation or smooth, always shiny. Upper sides of genae and posterior part of head with reduced sculpture, sometimes smooth (Fig. 12). Entire head bearing from suberect to thick, erect, pale setae (Figs 10, 12).

Pronotum, scutum, scutellum, anepisternum, katepisternum and lateral surface of propodeum smooth and shiny, sometimes with rare and weak striation on posterior edge of scutum. Metanepisternum and metakatepisternum shiny with dense, gentle reticulation (Figs 9-10). Peduncle with microreticulation or smooth, always shiny, petiolar node and postpetiole dorsum smooth or with weak microreticulation, always shiny. Whole mesosoma bearing few erect, long setae (Figs 9-10).

Gaster smooth and shiny, bearing dense, long, semierect to erect setae. Legs long, shiny, with fine microreticulation. Dorsal surface of tibia and femora with short, rare, decumbent setae (Figs 9-10).

Biology. The nest was located in dry, sandy soil, below medium size rock. It was situated on the slope of a small hill, overgrown by pine trees. Workers were surrounding gynes or trying to hide

in soil. Males were hiding below soil heaps. Other ant species collected at the site were: *Camponotus atricolor* (Nylander), *Cataglyphis nigripes* Arnol'di, *Crematogaster schmidti* (Mayr), *Dolichoderus quadripunctatus* (Linnaeus), *Formica clara* Forel, *Lasius turcicus* Santschi, *Lepisiota* cf. *frauenfeldi, Messor* cf. *structor*, *Pheidole koshewnikovi* Ruzsky, *Plagiolepis taurica* Santschi, *Ponera coarctata* (Latreille), *Solenopsis* cf. *fugax*, *Tetramorium* cf. *caespitum*. Ruzsky (1905) reported that the nest was located below a tree, in the shady part of Mushthaid Garden. Workers were also collected on the path of the same locality.

Distribution. Most recent data confirms its presence in Tbilisi town in Georgia. Nevertheless, *A. gibbosa* was recorded in few other Georgian localities (Gratiashvili & Barjadze 2008). Most probably however, these records might represent collections of *A. muschtaidica*. This species was also reported from Azerbaijan (Arnol'di 1948). Records of *A. gibbosa* from Armenia (Arakelian 1994) can also refer to this species. Therefore, its distribution is probably limited to the Transcaucasian region but requires a more detailed study.

Differential diagnosis.
See Table 1.

Comment. The type specimens of *A. muschtaidica* are considered lost (A. Radchenko, personal communication). According to the International Code of Zoological Nomenclature (article 75.3.4, 75.3.6), due to the possibility of misinterpretation of *A. muschtaidica* with other species of *gibbosa* group, we decided to designate a neotype, which comes from a locality situated 5 km at the south from the *locus typicus* noted by Ruzsky (1905).

DISCUSSION

Our material, collected recently from the Mediterranean region and Caucasus, together with examination of relevant type material, shows that species of the *A. gibbosa* group do not match all features mentioned by Schulz (1994).

Therefore, we propose to modify the *A. gibbosa* group definition as follows:

- body colouration from dark brown, reddish black to black;

Table 1. Differential diagnosis of members of the *gibbosa* group.

Feature	*A. muschtaidica*	*A. gibbosa*	*A. gibbosa homonyma*	*A. theryi*	*A. italica*	*A. striativentris*	*A. mauritanica*	*A. nadigi*
Striation on the base of gaster	absent	absent	absent	absent	absent	present	absent	absent
Shape of head	subrectangular	subrectangular	oval	oval	subrectangular	quadrate	subrectangular	subrectangular
Body colouration	black	dark brown	brown	black	black	brown	dark brown	dark brown
Scape setae	suberect to erect	adpressed	adpressed to decumbent	suberect to erect	decumbent	erect	suberect to erect	subdecumbent to suberect
Scape sculpture	longitudinal rugae	absent	absent	absent	absent	absent	absent	absent
Sculpture of dorsal surface of propodeum	thin, irregular rugosity	reduced, with smooth center	thick, irregular rugosity	thick, transverse striation	irregular, thick rugosity	thin, transverse striation	irregular, thin rugosity	gentle microreticulation
Median notch of clypeus	absent	present	present	present	present	present	present	present
Propodeal spines	triangular, with sharp tip	triangular, with sharp tip	triangular, with sharp tip	triangular, with sharp tip	triangular with sharp tip	triangular, with sharp tip	small, tooth-like, with rounded tip	triangular, with sharp tip

- head with longitudinal rugae or reticulation at least on its anterior part of head dorsum, sometimes rugae and reticulation replaced or co-occurring with punctuation;
- funicular segments from 1.5 to 2 times longer than wide;
- surface between rugae with dense micropunctuaction or smooth and shiny;
- scape reaches at least 1/5 of its length over the occipital margin of head;
- propodeal spines always present, short, triangular, inclined at an 45° angle, with wide base.

Males of *A. gibbosa* and *A. muschtaidica* are also characterized by extremely gibbous mesosoma (Fig. 9). Unfortunately, males of other species of the *gibbosa* group are unknown. Therefore, we are not able to confirm whether this feature is characteristic for all the representatives of this group.

After examining the type specimens and the descriptions of species listed by Schulz (1994) together with species recently described, we propose the following changes in the list of *gibbosa* group members:

Aphaenogaster strioloides Forel, 1890 has to be removed from *gibbosa* group. Its body colouration, shape of head and body sculpture classify this species as a member of *A. splendida* group.

Aphaenogaster gibbosa fiorii Emery, 1915 has to be removed from *gibbosa* group. Its body colouration, shape of head and funicular segments, and length of scape classify this species as a member of *A. subterranea* group. Therefore, we propose to recombine this subspecies to *Aphaenogaster subterranea fiorii* Emery, 1915 **n. comb.** Its proper status will be clarified after a revision of all Mediterranean taxa of *A. subterranea* group.

Aphaenogaster gibbosa homonyma Emery, 1921 has to be placed in *gibbosa* group. Its head and mesosoma sculpture differs strongly from those in *A. gibbosa.* Therefore, its status as subspecies should be revised.

Aphaenogaster aktaci Kiran & Tezcan, 2008 was described as a member of *gibbosa* group. After examining the paratype specimen of this species we concluded that its body colouration, shape of head and body sculpture allow to classify it as a member of *A. splendida* group.

Revised list of valid taxa belonging to the *gibbosa* group contains:

A. gibbosa (Latreille, 1798)
A. gibbosa homonyma Emery, 1921
A. theryi Santschi, 1923
A. italica Bondroit, 1918
A. striativentris Forel, 1895
A. muschtaidica Emery, 1908
A. mauritanica Dalla Torre, 1893
A. nadigi Santschi, 1923

Key to worker caste of species belonging to *A. gibbosa* group.

1. Pronotum with transverse striation (Figs 13-14) ..... 2.
- Pronotum with irregular rugosity, striation or partially smooth (Figs 15-17)..... 3.

2. Base of gaster with dense, longitudinal striation (Fig. 18). Spain ..... *A. striativentris*.
- Base of gaster smooth (Fig. 19). Morocco .... *A. theryi*.

3. Sculpture of pronotum reduced, its lateral surface at least in central part smooth and shiny (Fig. 15). Confirmed records from Iberian Peninsula and France ..... 4.
- Surface of pronotum lacking smooth areas (Figs 16-17) Confirmed records from Maghreb, Transcaucasus, Italy and Switzerland ..... 5.

4. Head dorsum with smooth microreticulation, scape with adpressed setae, mesonotum humped, body brown ..... *A. gibbosa*.
- Head dorsum smooth and shiny, scape with decumbent setae, mesonotum not humped, body brownish black to black ..... *A.* sp. Spain*****.

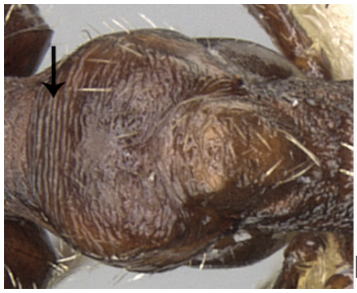


Fig.13

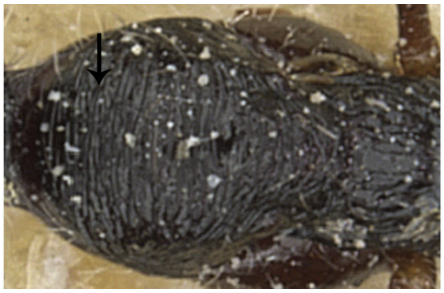


Fig.14

Figs 13 – 14. Mesosoma, sculpture. Fig. 13 – *A. striativentris* (Shannon Hartman, from www.AntWeb.org), Fig. 14 – *A. theryi* (Zach Lieberman, from www.AntWeb.org).

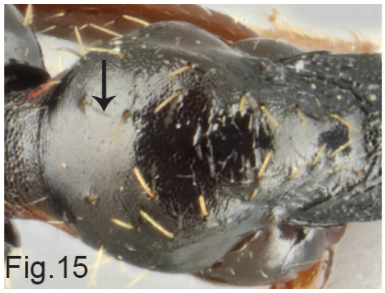


Fig.15


Fig.16


Fig.17

Figs 15 – 17. Mesosoma, sculpture. Fig. 15 – *A. gibbosa*, Fig. 16 – *A. muschtaidica*, Fig. 17 – *A. mauritanica* (Zach Lieberman, from www.AntWeb.org).

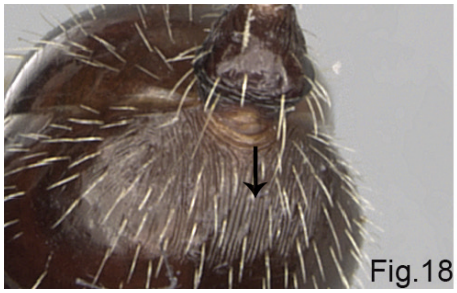


Fig.18

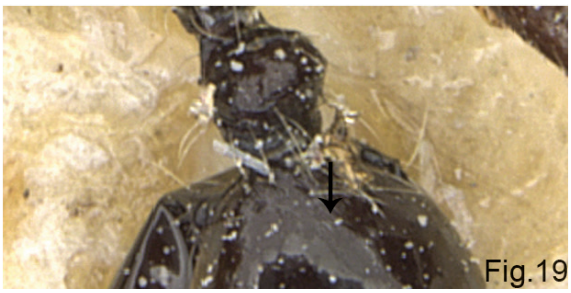


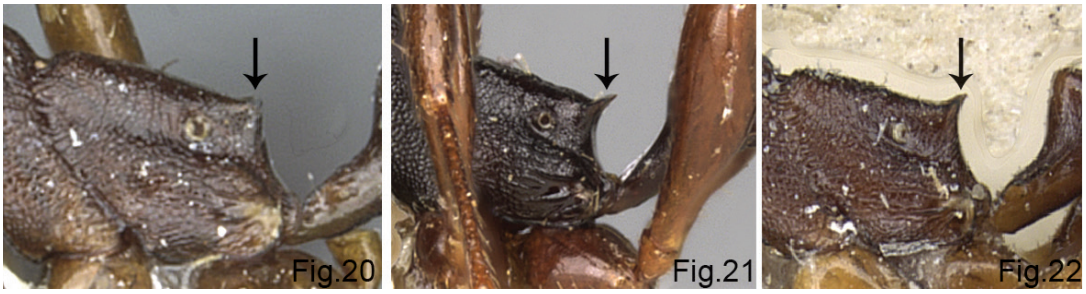
Fig.19

Figs 18 – 19. Gaster, first tergite. Fig. 18 – *A. striativentris* (Shannon Hartman, from www.AntWeb.org), Fig. 19 – *A. theryi* (Zach Lieberman, from www.AntWeb.org).

5. Propodeal spines small, tooth-like, with rounded tip (Fig. 20), longitudinal striation or reticulation limited to central part of frons (Fig. 23). Morocco ..... *A. nadigi*.
- Propodeal spines triangular, with sharp tip (Figs 2, 21, 22), longitudinal striation or reticulation exceeding beyond central part of frons (Figs 5, 24, 25). Italy, Switzerland and Transcaucasus .... 6.

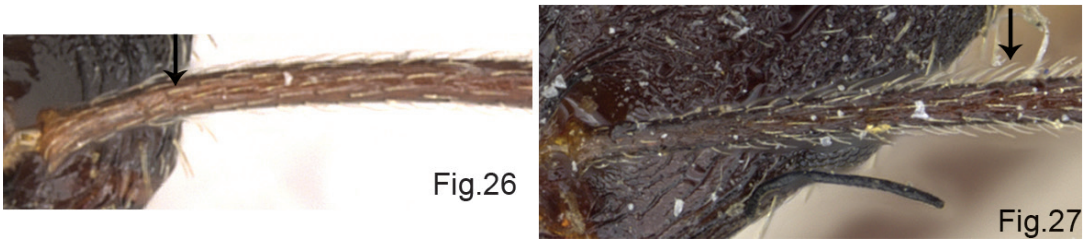
6. Scape with decumbent setae, not longer than half of scape width (Fig. 26), Italy and Switzerland..... *A. italica*.
- Scape with at least suberect setae, longer than half of scape width (Figs 3, 27) ..... 7.

7. Scape with longitudinal rugae (Fig. 3), Transcaucasus ..... *A. muschtaidica*.



Figs 20 – 22. Propodeal spines, shape. Fig. 20 – *A. nadigi* (Zach Lieberman, from www.AntWeb.org), Fig. 21 – *A. italica* (Shannon Hartman, from www.AntWeb.org), Fig. 22 – *A. gibbosa homonyma* (Zach Lieberman, from www.AntWeb.org).

Figs 23 – 25. Head, sculpture. Fig. 23 – *A. nadigi* (Zach Lieberman, from www.AntWeb.org), Fig. 24 – *A. italica* (Shannon Hartman, from www.AntWeb.org), Fig. 25 – *A. gibbosa homonyma* (Zach Lieberman, from www.AntWeb.org).



Figs 26 – 27. Scape pilosity and sculpture. Fig. 26 – *A. italica* (Shannon Hartman, from www.AntWeb.org), Fig. 27 – *A. mauritanica* (Zach Lieberman, from www.AntWeb.org).

- Scape lacking longitudinal rugae (Fig. 27), Maghreb .... *A. mauritanica* and *A. gibbosa homonyma*.

* *Aphaenogaster* sp. Spain is a species recently discovered from the Iberian Peninsula. The photos of all castes are available on AntWeb.org: specimens KG02103-1, KG03235-4, KG02101-1, and KG02103-2. Formal taxonomic description and natural history are currently in preparation and will be published in the near future (K. Gómez, personal communication).

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