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Taxonomic revision of the Palaearctic *Tetramorium chefketi* species complex (Hymenoptera: Formicidae)

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Abstract

The taxonomic status of 10 species of the Palaearctic *Tetramorium chefketi* species complex is discussed, and several nomenclatural problems are clarified. Three new species, *Tetramorium exile* Csősz & Radchenko **n. sp.**, *T. sanetrai* Schulz & Csősz **n. sp.**, and *T. anatolicum* Csősz & Schulz **n. sp.** are described. *Tetramorium caespitum* var. *sarkissiani* Forel, 1911 **n. syn.**, *Tetramorium turcomanicum* Santschi, 1921 **n. syn.**, *Tetramorium taurocaucasicum* Arnoldi, 1968 **n. syn.** are synonymized with *Tetramorium chefketi* Forel 1911; *T. biskrensis kahenae* Menozzi, 1934, **n. syn.** is synonymized with *T. alternans* Santschi, 1929; *T. karakalense* Dlussky & Zabelin, 1985, **n. syn.** is synonymized with *Tetramorium sulcinode* Santschi, 1927. Three taxa, *T. sulcinode* Santschi, 1927, *T. rhodium* Emery, 1922 and *T. annectens* Pisarski, 1969 are revived from synonymy. Lectotypes of *T. chefketi* Forel, 1911 and its junior synonym *T. caespitum* var. *sarkissiani* Forel, 1911, *T. sulcinode* Santschi, 1927, *T. alternans* Santschi, 1929 and its junior synonym *T. biskrensis kahenae* Menozzi, 1934 are designated. Gynes and males of *T. sulcinode*, *T. annectens* and *T. alternans* are described for the first time. An identification key to the workers and gynes of the Palaearctic species of the *chefketi* species complex is given. Seventy-one SEM photos and two tables with metric characters are provided for workers and gynes of all discussed species.

Key words: Formicidae, *Tetramorium*, *chefketi* species-complex, revision, new species, morphometry, statistics, key, Palaearctic Region

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Introduction

Tetramorium Mayr, 1855 is one of the most diverse ant genera comprising more than 400 species worldwide (Bolton, 1995a). Modern taxonomic revisions of this genus were carried out by Bolton (1976, 1977, 1979, 1980) for all zoogeographical regions except for the Palaearctic Region.

Although tropical *Tetramorium* species have very diverse biologies (habitat requirements, food preferences, nesting habits, etc.) the bionomics of the Palaearctic species is more or less uniform. They build nests mainly in the ground, often with soil mounds, frequently under stones and, rarely, in rotten wood. Biology, distribution and the life cycle of *Tetramorium caespitum* (López *et al.* 1990; López *et al.* 1992; Sanetra *et al.* 1999; Attygalle & Morgan 1984; Brian et al. 1967; Cammaerts & Cammaerts 2000, 2001; Gallé 1986; Sanetra & Buschinger 2000; Steiner et al. 2003) and related *T. impurum* (Stäger 1929; Poldi 1963; Cammaerts *et al.* 1984; Steiner *et al.* 2003; Csősz & Markó 2004)have been very well studied but other Palaearctic *Tetramorium* species have been little represented other than faunistic surveys. Colonies of Palaearctic *Tetramorium* are sometimes inhabited by several tens of thousands of workers and generally they live in dry and warm or even hot habitats including steppes and steppe-like grasslands, semi-deserts or deserts.

The first taxonomic revision (Emery 1909) of the Palaearctic *Tetramorium* includes five species and about 20 infraspecific forms. Later several reviews of the genus from different parts of the Western Palaearctic were provided by Santschi (1927), Stitz (1939) and Kratochvíl (1944); many infraspecific taxa were described by other authors. More recently, data on Palaearctic *Tetramorium* were published in regional monographs or special taxonomic papers, including descriptions of several new species from Morocco (Cagniant 1997), Iberian Peninsula (López 1991a, 1991b; López *et al.* 1992), South Europe (Bernard 1967), Balkans, Europe (Agosti & Collingwood 1987a, 1987b), Switzerland (Kutter 1977), North Europe (Collingwood 1979), Italy (Mei 1995; Sanetra *et al.* 1999), Germany (Schulz 1996; Seifert 1996), Poland (Radchenko *et al.* 1998), European part of the former Soviet Union and Caucasus (Arnoldi 1968; Radchenko & Arakelyan 1990), former Soviet Union (Radchenko 1992a, 1992b), Kazakhstan (Bursakov 1984), Turkmenistan (Dlussky & Zabelin 1985; Dlussky *et al.* 1990), Afghanistan (Pisarski 1967a, 1967b, 1969), Turkey (Poldi 1979), Saudi Arabia (Collingwood 1985; Collingwood & Agosti 1996), China (Wang *et al.* 1988; Xu & Zheng 1994; Zhou & Jiang 1998), Japan (Imai *et al.* 2003). As a result, about 60 species and infraspecific forms of *Tetramorium* were recorded from the Palaearctic up to now, mostly from the southern part of the region.

Depositories

BMNH—The Natural History Museum, London / UK
HNHM—Hungarian Natural History Museum, Budapest / Hungary
MHNG—Muséum d'Histoire Naturelle, Genève / Switzerland
MIZ—Museum and Institute of Zoology, Warsaw / Poland
MNHN—Muséum National d'Histoire Naturelle, Paris / France
MNMS—Museo Nacional de Ciencias Naturales, Madrid / Spain
MSNG— Museo Civico di Storia Naturale, Genova / Italy
MSNM—Museo Civico di Storia Naturale, Milano / Italy
NHMB—Naturhistorisches Museum Basel / Switzerland
NHMW—Naturhistorische Museum, Wien / Austria
PCAS—private collection of Andreas Schulz, Leverkusen / Germany
SIZK—Schmalhausen Institute of Zoology, Kiev / Ukraine
SMNK—Staatliches Museum für Naturkunde Karlsruhe / Germany
ZISP—Zoological Institute of Russian Academy of Sciences, St. Petersburg / Russia

ZMHB—Zoologisches Museum für Naturkunde der Humboldt Universität zu Berlin / Germany
ZMMU—Zoological Museum, Lomonosov Moscow State University, Moscow / Russia

Material and Methods

The current revision is based on the investigation of both types and non-type material. SEM photos were taken from uncoated specimens by a HITACHI S-2600 VP-SEM using low vacuum (15–25 Pa, 15–20kV) mode. More than 1200 specimens belonging to 224 nest samples were investigated. Morphometric measurements were taken from 480 workers and 44 gynes.

All measurements are given in µm and were taken using a pin-holding stage, permitting endless rotations around X, Y, and Z axes. An Olympus SZX9 stereomicroscope was used at a magnification of x100, and magnification x50 was used for larger (more than 1 mm) structures (e.g. ML, CL, CW). All measurements were made by the first author. Due to some newly introduced metric characters it was necessary to test the repeatability of measurements. All variables have been measured twice for 14 randomly chosen ant specimens, the average measure of intraclass correlation coefficient (R) were calculated (Lessells & Boag 1987) with SPSS 11.0 for PC. Measurements for one variable, SPL, were slightly repeatable ($R = 0.667$, $F_{1, 13} = 3.005$, $P = 0.025$), for two variables were moderately repeatable (PPL: $R = 0.876$, $F_{1, 13} = 8.060$, $P = 0.0002$, NOH: $R = 0.896$, $F_{1, 13} = 9.591$, $P = 0.0001$), whereas for all the remaining variables they were highly repeatable (ranges: $R = 0.953, 0.999$, $F_{1, 13} = 21.385, 963.231$, all $P < 0.00005$; Martin & Bateson 1986). Morphometric investigation is restricted to workers and gynes.

Because the number of the measured gynes was not enough for statistics, discriminant analysis was carried out on the workers only. SEM photos of the male genitalia of *T. chefketi* are provided as an example of the general appearance of genitalia in this species complex.

CL—length of head in full-face view, measured in a straight line from the anteriormost point of median clypeal margin to the mid-point of the occipital margin. Concavity of occiput reduce CL. (R=0.9990; $F_{1, 13}$=963.2308; P< 0.00005)

CW—maximum width of head in full-face view, including the eyes. (R=0.9984; $F_{1, 13}$=642.9121; P< 0.00005)

CS—cephalic size; the arithmetic mean of CL and CW. It is used as a less variable indicator of body size. For simplicity CS is used to describe body size, because it proved to be the most descriptive character, correlation to the ? of tested 17 characters was the highest amongst the examined seventeen ones. (Spearman r= 0.979, p<0.0001)

ED—the minimal distance between anterior (lower) margin of the eye and the anteriormost border of the gena (i.e. at the mandibular junction) in profile.

EH—the minimum diameter of the eye.

EL—the maximum diameter of the eye.

EYE—eye size index, the arithmetic mean of EL and EH is divided by CS.

FL—the maximum distance between external borders of the frontal lobes. (R=0.9893; $F_{1, 13}$=93.2821; P< 0.00005)

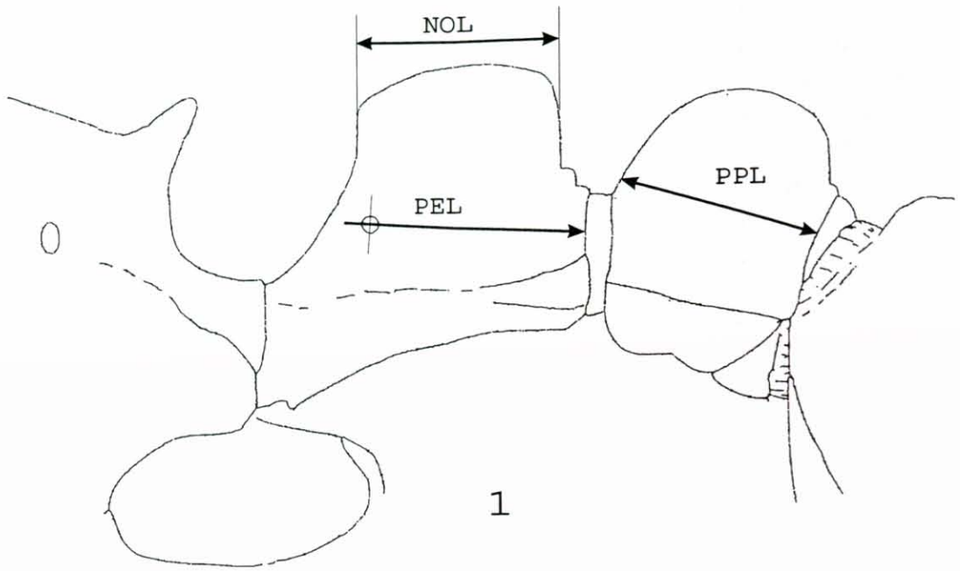
FR—the minimum width of the frons between the frontal carinae. (R=0.9931; $F_{1, 13}$=144.2308; P< 0.00005)

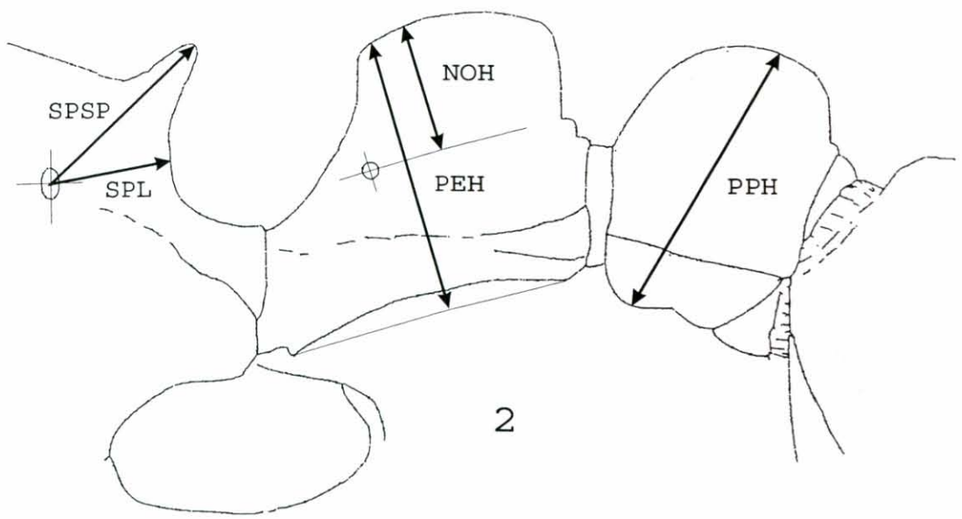
ML—the diagonal length of mesosoma measured in lateral view from the anteriormost point of the pronotal slope to the posterior (or posterio-vetral) margin of the metapleural lobes. (R=0.9814; $F_{1, 13}$=53.7474; P< 0.00005)

MRG—microreticulation of 1st gastral tergite (fig. 7). Measured medially from the postpetiole-gaster junction to the farthest continuous microreticulation on the median line.

MW—the maximum width of the pronotum from above (workers), or maximum width of scutum from above (gynes) (R=0.9943; $F_{1,13}$=175.1154; P< 0.00005)

NOH—the maximum height of the petiolar node measured as shown in Fig. 2. (R=0.8957; $F_{1,13}$=9.5911; P< 0.0001)





FIGURES 1–2. Fig. 1. Measurement method and reference lines for the length of the petiolar node (NOL), the distance between the posteriormost point of the petiole and the petiolar spiracle (PEL), and the length of the postpetiole in lateral view (PPL). Fig. 2. Measurement method and reference lines for the height of the petiolar node (NOH), the height of the petiole (PEH), the height of the postpetiole in lateral view (PPH), the length of propodeal teeth, measured in lateral view from the tip of spine to the propodeal spiracle (SPSP), and the minimal distance between propodeal spiracles and the propodeal declivity (SPL).

NOL—the length of the petiolar node, measured as shown in Fig. 1. Despite this character is fairly difficulty to measure, the accuracy of that measurement is quite high. (R=0.9737; $F_{1,13}$=104.0070; P< 0.00005)

PEH—the maximum height of the petiole, measured as shown in Fig. 2. (R=0.9910; $F_{1,13}$=111.2154; P< 0.00005)

PEL—the distance between the posteriormost point of the petiole and the petiolar spiracle, measured as shown in Fig. 1. (R=0.9904; $F_{1,13}$=38.0000; P< 0.00005)

PEW—the maximum width of the petiole in dorsal view. (R=0.9976; $F_{1,13}$=416.0256; P< 0.00005)

PPH—the maximum height of the postpetiole in lateral view, measured as shown in Fig. 2. (R=0.9532; $F_{1,13}$=21.3846; P< 0.00005)

PPL—the maximum length of the postpetiole in lateral view, measured as shown in Fig. 1. (R=0.8759; $F_{1,13}$=8.0592; P< 0.0002)

PPW—the maximum width of the postpetiole in dorsal view (R=0.9888; $F_{1,13}$=89.5068; P< 0.00005)

SL—the maximum length of the scape, measured from the proximal point of scape lobe to the distal end of scape. (R = 0.9978; $F_{1,13}$=454.6462; P< 0.00005)

SPL—the minimal distance between propodeal spiracles and the propodeal declivity, measured as shown in Fig. 2. (R=0.9780; $F_{1,13}$=45.4554; P< 0.0252)

SPSP—the maximum length of propodeal teeth, measured in lateral view from the tip of spine to the propodeal spiracle, measured as shown in Fig. 2. (R=0.6672; $F_{1,13}$=3.0045; P< 0.00005)

WAIST—(gynes only), waist index, calculated as (PEW+PPW)/CS.

These characters were used for indices and analyses, but the raw data were mentioned as an extra-information only in case of holotypes of new species, newly designated lectotypes and where description of the sexual forms were provided for the first time.

Definition of *chefketi* species complex

Species belonging to the *T. chefketi* species complex can be defined by the following combination of characters:

Workers

a) polygonal striae are continuous on 1st gastral tergite, and is sometimes microreticulate basally. Polygonal striation: interstices marked by feeble anastomosing striae (Fig. 8.), compare to microreticulation: interstices marked by very feeble elevated structures, like rugulae (Fig. 6, 7.);
b) head, alitrunk and waist coarsely sculptured, dorsum of petiolar node and postpetiole coarsely rugose and/or reticulate.
c) petiole and postpetiole relatively narrow (CS/PEW and CS/PPW, Table 1);
d) ground surface on the frons is usually coarsely microreticulate;

Gynes

e) alitrunk is low, dorsum is flattened in profile;
f) scutum in dorsal view is somewhat narrowed anteriorly and does not cover completely the pronotum, humeri are well visible;
g) head, alitrunk and waist are coarsely sculptured, and petiole and postpetiole dorsum coarsely rugose or/and reticulate;
h) polygonal striae disrupted on 1st first gastral tergite, sometimes microreticulate basally;
i) mandibles are longitudinally striate;

j) petiole and postpetiole are relatively narrow (WAIST, Table 2);

Males

k) head and alitrunk with usually coarsely sculpture, ground surface microreticulate;

l) sides of petiole and postpetiole not angulate as in the *ferox* species complex (in dorsal view);

m) first gastral tergite usually smooth and shiny, or feebly striate;

n) stipes of genitalia blunt, curved inwards at the top, with flattened apical plate (in caudal view);

We placed the following species into the *chefketi* species complex:

1) *Tetramorium alternans* Santschi, 1929
   Tetramorium biskrensis kahenae Menozzi, 1934 **new synonymy**
2) *Tetramorium anatolicum* Csősz & Schulz, **new species**
3) *Tetramorium annectens* Pisarski, 1969 **status revised**

TABLE 1. Morphometric comparison (mm) of the *Tetramorium* workers. Abbreviations of morphometric characters in Material and Methods. Upper line: arithmetic mean ± standard deviation, lower line, in [ ]: minimum and maximum values, n = number of measured specimens, EYE*: following number of individuals were measured for the EYE character: *T. chefketi* (n=18), *T. exile* (n=30), *T. moravicum* (n=18), *T. anatolicum* (n=14), *T. laurae* (n=15), *T. alternans* (n=20), *T. syriacum* (n=7), *T. rhodium* (n=17), *T. sulcinode* (n=13), *T. annectens* (n=8), *T. forte* (n=14).

	alternans (n=34)	*anatolicum* (n=38)	*annectens* (n=8)	*chefketi* (n=131)	*exile* (n=33)	*moravicum* (n=108)	*rhodium* (n=22)	*sanetrai* (n=15)	*sulcinode* (n=17)	*syriacum* (n=23)
CS	733 ±35.37 [652, 820]	702 ±23.87 [635, 743]	675 ±17.39 [645, 703]	869 ±51.36 [740, 972]	696 ±23.95 [620, 742]	833 ±60.74 [720, 953]	832 ±52.91 [720, 895]	740 ±31.90 [683, 783]	801 ±31.65 [773, 853]	832 ±16.18 [807, 865]
CL/CW	1.01 ±0.01 [0.97,1.05]	1.02 ±0.02 [0.99, 1.05]	1.02 ±0.02 [1.0, 1.05]	1.01 ±0.02 [0.97, 1.04]	1.06 ±0.01 [1.04, 1.08]	1.02 ±0.02 [0.97, 1.06]	0.99 ±0.01 [0.98, 1.02]	1.01 ±0.02 [0.98, 1.04]	1.02 ±0.02 [0.98, 1.03]	1.02 ±0.01 [0.99, 1.04]
FR/CS	0.39 ±0.01 [0.37,0.41]	0.37 ±0.01 [0.35, 0.39]	0.39 ±0.01 [0.38, 0.40]	0.37 ±0.01 [0.35, 0.39]	0.34 ±0.01 [0.33, 0.37]	0.36 ±0.01 [0.34, 0.38]	0.38 ±0.01 [0.36, 0.40]	0.37 ±0.01 [0.36, 0.38]	0.37 ±0.01 [0.36, 0.38]	0.50 ±0.01 [0.49, 0.55]
FL/FR	1.00 ±0.00 [1.0, 1.0]	1.02 ±0.05 [1.0, 1.08]	1.02 ±0.01 [1.0, 1.04]	1.03 ±0.02 [1.0, 1.09]	1.0 ±0.01 [1.0, 1.02]	1.01 ±0.01 [1.0, 1.04]	1.0 ±0.0 [1.00, 1.02]	1.00 ±0.00 [1.0, 1.02]	1.01 ±0.01 [1.0, 1.02]	1.01 ±0.01 [1.00, 1.02]
SL/CS	0.71 ±0.01 [0.69,0.74]	0.78 ±0.01 [0.76, 0.81]	0.76 ±0.01 [0.73, 0.77]	0.82 ±0.02 [0.78, 0.87]	0.84 ±0.01 [0.82, 0.85]	0.80 ±0.02 [0.77, 0.83]	0.73 ±0.01 [0.71, 0.75]	0.74 ±0.02 [0.72, 0.75]	0.78 ±0.01 [0.76, 0.81]	0.75 ±0.01 [0.70, 0.77]
EYE*	0.168±0.01 [0.155, 0.176]*	0.176 ±0.0 [0.167, 0.182]*	0.205±0.01 [0.196, 0.214]*	0.171±0.01 [0.165, 0.184]*	0.167±0.00 [0.158, 0.175]*	0.170±0.01 [0.165, 0.183]*	0.173±0.01 [0.163, 0.184]*	0.172±0.01 [0.164, 0.185]*	0.186±0.01 [0.180, 0.190]*	0.162±0.01 [0.155, 0.171]*
ML/CS	1.10 ±0.03 [1.04,1.14]	1.08 ±0.03 [1.06, 1.16]	1.13 ±0.04 [1.06, 1.16]	1.18 ±0.03 [1.10, 1.23]	1.14 ±0.02 [1.10 1.21]	1.18 ±0.03 [1.13, 1.26]	1.12 ±0.02 [1.08, 1.16]	1.13 ±0.02 [1.10, 1.18]	1.12 ±0.02 [1.09, 1.17]	1.16 ±0.02 [1.09, 1.20]
MW/CS	0.63 ±0.01 [0.60,0.65]	0.62 ±0.01 [0.60, 0.65]	0.65 ±0.02 [0.62, 0.68]	0.64 ±0.02 [0.60, 0.68]	0.63 ±0.01 [0.61, 0.65]	0.64 ±0.02 [0.59, 0.69]	0.64 ±0.01 [0.62, 0.66]	0.63 ±0.01 [0.62, 0.65]	0.65 ±0.01 [0.63, 0.67]	0.65 ±0.01 [0.63, 0.66]
PEW/ PPW	0.86 ±0.04 [0.80,0.91]	0.80 ±0.02 [0.74, 0.83]	0.73 ±0.02 [0.70, 0.75]	0.85 ±0.03 [0.76, 0.93]	0.86 ±0.03 [0.80, 0.92]	0.83 ±0.03 [0.75, 0.89]	0.84 ±0.02 [0.71, 0.90]	0.83 ±0.02 [0.78, 0.85]	0.84 ±0.01 [0.82, 0.85]	0.84 ±0.02 [0.81, 0.88]
NOH/ NOL	1.03 ±0.06 [0.94,1.13]	1.15 ±0.08 [1.0, 1.30]	1.10 ±0.11 [0.96, 1.25]	0.86 ±0.06 [0.76, 0.97]	1.04 ±0.06 [0.90, 1.17]	1.07 ±0.08 [0.90, 1.29]	0.84 ±0.03 [0.76, 0.97]	0.89 ±0.04 [0.83, 0.97]	1.14 ±0.06 [1.06, 1.21]	0.84 ±0.03 [0.78, 0.89]
PEH/ NOL	1.84 ±0.12 [1.68,2.04]	2.01 ±0.08 [1.74, 2.30]	2.06 ±0.08 [1.96, 2.12]	1.52 ±0.10 [1.37, 1.69]	1.83 ±0.06 [1.69, 1.96]	1.94 ±0.12 [1.72, 2.23]	1.50 ±0.04 [1.38, 1.73]	1.54 ±0.04 [1.47, 1.63]	1.99 ±0.07 [1.87, 2.07]	1.51 ±0.04 [1.43, 1.6]
NOL/ PEL	0.87 ±0.07 [0.73,1.00]	0.76 ±0.06 [0.67, 0.93]	0.78 ±0.05 [0.67, 0.83]	0.98 ±0.05 [0.81, 1.12]	0.86 ±0.03 [0.80, 0.94]	0.85 ±0.05 [0.77, 0.94]	1.01 ±0.03 [0.94, 1.06]	1.03 ±0.06 [0.95, 1.12]	0.83 ±0.03 [0.80, 0.88]	1.01 ±0.03 [0.97, 1.08]
CS/ PEW	3.11 ±0.13 [2.93,3.39]	3.49 ±0.14 [3.22, 3.75]	3.50 ±0.19 [3.35, 3.81]	3.16 ±0.15 [2.72, 3.49]	3.32 ±0.14 [3.09, 3.69]	3.18 ±0.14 [2.84, 3.50]	3.29 ±0.11 [3.07, 3.53]	3.05 ±0.09 [2.91, 3.20]	3.17 ±0.12 [3.03, 3.33]	3.26 ±0.11 [3.05, 3.52]
CS/ PPW	2.66 ±0.11 [2.42,2.85]	2.79 ±0.10 [2.56, 3.03]	2.55 ±0.13 [2.38, 2.80]	2.70 ±0.13 [2.33, 2.92]	2.84 ±0.09 [2.64, 3.01]	2.63 ±0.09 [2.40, 2.88]	2.80 ±0.06 [2.64, 3.0]	2.52 ±0.08 [2.38, 2.74]	2.67 ±0.09 [2.58, 2.82]	2.75 ±0.06 [2.65, 2.88]

TABLE 2. Morphometric comparison (mm) of the *Tetramorium* gynes. Abbreviations of morphometric characters in Material and Methods. Upper line: arithmetic mean ± standard deviation, lower line, in [ ]: minimum and maximum values, n = number of measured specimens.

	alternans (n=5)	*anatolicum* (n=3)	*annectens* (n=1)	*chefketi* (n=11)	*moravicum* (n=12)	*sanetrai* (n=3)	*sulcinode* (n=3)
CS	999 ±31.35 [948, 1025]	1012 ±38.84 [980, 1055]	997.5	1121 ±38.97 [1060, 1180]	1198 ±79.59 [1045, 1275]	986 ±11.81 [973, 995]	973 ±39.9 [940, 1018]
CL/CW	0.92 ±0.02 [0.90, 0.95]	0.93 ±0.04 [0.90, 0.98]	0.98	0.92 ±0.02 [0.89, 0.95]	0.88 ±0.02 [0.84, 0.92]	0.89 ±0.02 [0.86, 0.90]	0.94 ±0.02 [0.92, 0.97]
FR/CS	0.41 ±0.01 [0.40, 0.42]	0.37 ±0.02 [0.36, 0.40]	0.39	0.38 ±0.01 [0.36, 0.40]	0.36 ±0.01 [0.34, 0.38]	0.38 ±0.00 [0.37, 0.38]	0.37 ±0.01 [0.36, 0.37]
FL/FR	1.00 ±0.00 [1.0, 1.0]	1.01 ±0.03 [1.0, 1.03]	1.0	1.01 ±0.01 [1.0, 1.03]	1.0 ±0.01 [1.0, 1.02]	1.00 ±0.00 [1.0, 1.0]	1.00 ±0.00 [1.0, 1.0]
SL/CS	0.69 ±0.02 [0.65, 0.71]	0.75 ±0.03 [0.71, 0.77]	0.72	0.77 ±0.01 [0.75, 0.79]	0.73 ±0.01 [0.71, 0.75]	0.67 ±0.01 [0.66, 0.68]	0.73 ±0.01 [0.72, 0.74]
MW/CS	0.94 ±0.02 [0.92, 0.97]	0.96 ±0.05 [0.92, 1.01]	0.92	0.94 ±0.02 [0.88, 1.01]	1.07 ±0.02 [1.05, 1.13]	0.94 ±0.01 [0.94, 0.95]	0.93 ±0.01 [0.92, 0.94]
PEW/PPW	0.76 ±0.01 [0.74, 0.77]	0.72 ±0.04 [0.68, 0.75]	—	0.78 ±0.03 [0.75, 0.82]	0.71 ±0.03 [0.66, 0.76]	0.76 ±0.02 [0.73, 0.77]	0.75 ±0.01 [0.74, 0.76]
NOH/NOL	1.44 ±0.14 [1.31, 1.61]	1.70 ±0.25 [1.41, 1.86]	1.38	1.14 ±0.12 [1.0, 1.31]	2.07 ±0.21 [1.69, 2.42]	1.35 ±0.10 [1.28, 1.47]	1.51 ±0.17 [1.38, 1.70]
NOH/PEL	0.87 ±0.10 [0.73, 0.98]	0.95 ±0.07 [0.87, 1.0]	0.94	0.83 ±0.09 [0.71, 0.93]	0.90 ±0.07 [0.82, 1.0]	0.91 ±0.01 [0.90, 0.92]	0.92 ±0.08 [0.85, 1.0]
NOL/PEL	0.60 ±0.04 [0.56, 0.65]	0.56 ±0.05 [0.53, 0.62]	0.68	0.73 ±0.06 [0.60, 0.82]	0.44 ±0.05 [0.34, 0.52]	0.68 ±0.05 [0.63, 0.72]	0.61 ±0.02 [0.59, 0.62]
PEH/NOL	2.89 ±0.13 [2.75, 3.04]	3.04 ±0.47 [2.53, 3.46]	2.56	2.18 ±0.17 [2.0, 2.54]	3.95 ±0.36 [3.31, 4.50]	2.58 ±0.19 [2.44, 2.80]	2.77 ±0.33 [2.53, 3.15]
PEW/PEH	0.94 ±0.05 [0.86, 0.98]	0.86 ±0.03 [0.83, 0.88]	0.80	0.94 ±0.03 [0.89, 0.99]	0.89 ±0.04 [0.83, 0.94]	0.96 ±0.07 [0.89, 1.02]	0.82 ±0.01 [0.82, 0.83]
CS/PEW	2.49 ±0.20 [2.31, 2.83]	2.82 ±0.15 [2.72, 2.99]	2.85	2.52 ±0.06 [2.43, 2.60]	2.61 ±0.16 [2.33, 2.80]	2.37 ±0.06 [2.31, 2.43]	2.86 ±0.05 [2.81, 2.91]
CS/PPW	1.89 ±0.13 [1.76, 2.11]	2.01 ±0.04 [1.97, 2.04]	—	1.97 ±0.08 [1.82, 2.11]	1.86 ±0.10 [1.74, 2.02]	1.79 ±0.03 [1.77, 1.82]	2.15 ±0.06 [2.09, 2.21]
WAIST	0.93 ±0.06 [0.83, 1.0]	0.85 ±0.02 [0.83, 0.87]	—	0.90 ±0.03 [0.86, 0.96]	0.92 ±0.05 [0.86, 1.0]	0.98 ±0.01 [0.97, 0.99]	0.82 ±0.02 [0.80, 0.84]

4) *Tetramorium chefketi* Forel, 1911
   Tetramorium caespitum var. *sarkissiani* Forel, 1911 **new synonymy**
   Tetramorium turcomanicum Santschi, 1921 **new synonymy**
   Tetramorium taurocaucasicum Arnoldi, 1968 **new synonymy**
   Tetramorium forte Forel, 1904 [in part, only material from Crimea and Caucasus] (for details of clarification of synonymy see Taxonomic notes under *Tetramorium chefketi*)
5) *Tetramorium exile* Csősz & Radchenko, **new species**
6) *Tetramorium moravicum* Kratochvíl, 1941
   Tetramorium rhenanum Schulz, 1996
7) *Tetramorium rhodium* Emery, 1922 **status revised**
8) *Tetramorium sanetrai* Schulz & Csősz, **new species**
9) *Tetramorium sulcinode* Santschi, 1927 **status revised**

Tetramorium karakalense Dlussky & Zabelin, 1985 **new synonymy**

10) *Tetramorium syriacum* Emery, 1922

The newly defined *chefketi* species complex may not strictly reflect the phylogenetic relationship of the above-mentioned species. *T. sulcinode* and *T. annectens* possess several autapomorphic characters (e.g. relatively large eyes and a long psammophore) what probably may lead to place them into a separate group in a future.

Key to the species of the *Tetramorium chefketi* species complex

Workers

1. Ventral surface of head with a row of short and several very long setae, forming a psammophore (figs 3, 4) [sometimes setae can be broken or lost]. Eyes larger, EYE = 0.185 2
-. Ventral surface of head with several short and a few longer straight setae, psammophore not developed (fig. 5). Eyes smaller, EYE < 0.185 3

2(1). Dorsum of petiolar node and postpetiole with sinuous rugae and coarse irregular reticulation. Ground surface microreticulate. Petiole much narrower than postpetiole, PEW/PPW 0.73 [0.70, 0.75] (China and Mongolia) ..... ***T. annectens* Pisarski, 1969**
-. Dorsum of petiolar node usually with semi-circular rugulae, ground surface smooth and shiny, postpetiole longitudinally rugulose, and shiny. Petiole slightly narrower than postpetiole, PEW/PPW 0.84 [0,80; 0,88] (Afghanistan, Pakistan and Turkmenistan) ..... ***T. sulcinode* Santschi, 1927**

3(1). Frons extremely wide FR/CS 0.50 [0.49, 0.54] (Middle East) ..... ***T. syriacum* Emery, 1922**
-. Frons narrower FR/CS ≤ 0.41 4

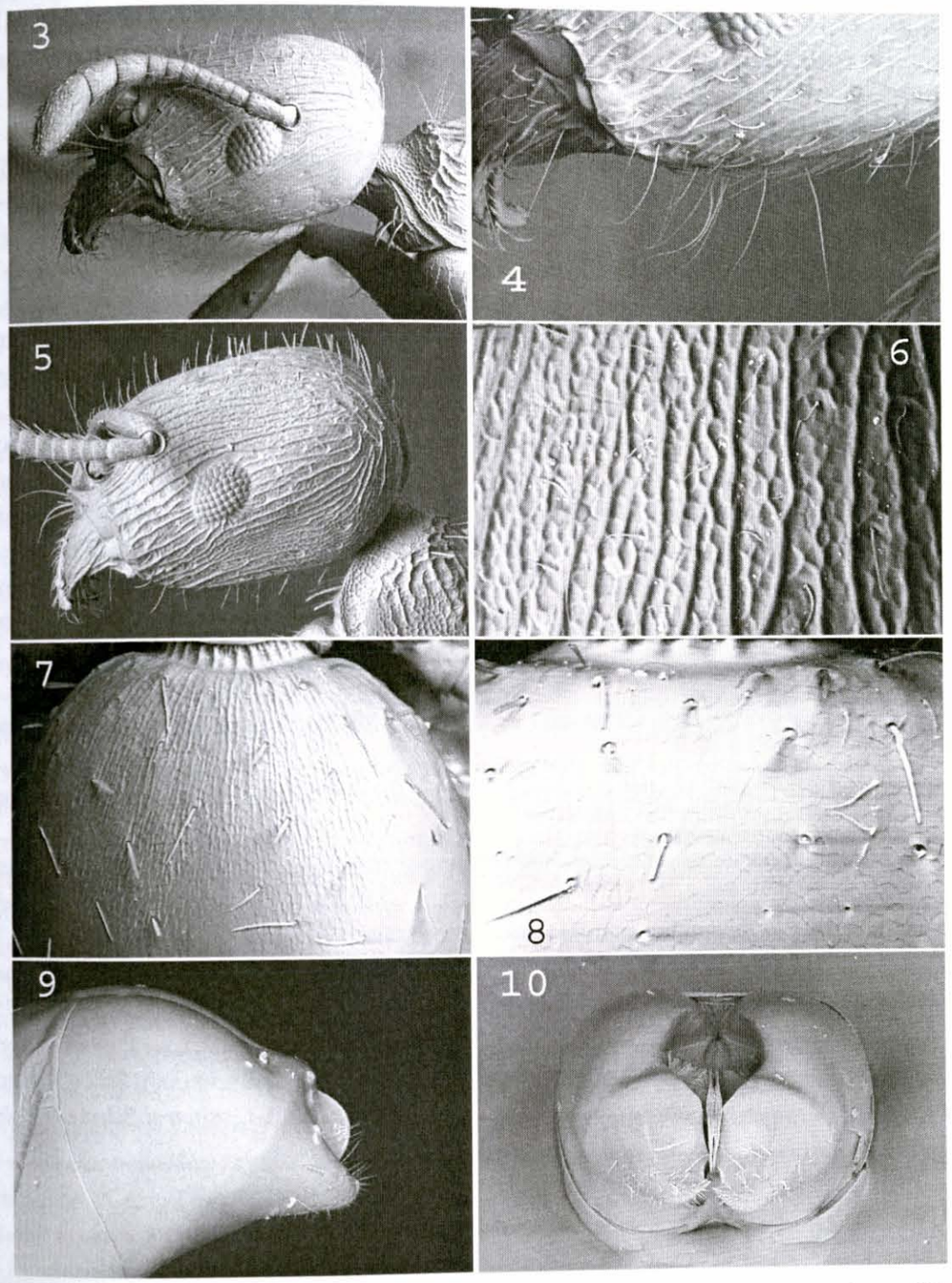
4(3). Scape shorter, SL/CS = 0.75 5
-. Scape longer, SL/CS = 0.76 7

5(4). Dorsal surface of petiole steeply rounded backward, NOH/NOL 1.03 [0.94, 1.13] petiole relatively high, PEH/NOL 1.84 [1.68, 2.04]. Dorsum of petiolar node and postpetiole with very feeble concentric sinuous rugulae and reticulation, medially microreticulate. $D(2_b)$ 0.093 FR - 0.148 NOL - 2.941 = +2.647 [+1.069, +4.647] (NW Africa) ..... ***T. alternans* Santschi, 1929**
-. Petiolar node cubic in profile, NOH/NOL 0.84 [0.76, 0.97], petiole relatively low and long, PEH/NOL 1.50 [1.38, 1.73]. Dorsum of petiolar node and postpetiole coarsely rugoso-reticulate. $D(2_b)$ 0.093 FR - 0.148 NOL - 2.941 < +0.369 [-4.206, +0.369] 6

6(5) Head dorsum and alitrunk coarsely rugoso-reticulate, ground surface coarsely microreticulate. Scape feebly costulate, first gastral tergite microreticulate. $D(3_b)$ 0.118 MW - 0.121 PEH - 0.084 PPH - 4.585 = +2.643 [-0.619, +4.595] (Asia Minor, Rhodes and Cyprus) ..... ***T. rhodium* Emery, 1922**
-. Head dorsum and alitrunk feebly rugoso-reticulate, ground surface feebly microreticulate. Scape always smooth, first gastral tergite never microreticulate but well polygonally striate. $D(3_b)$ 0.118 MW - 0.121 PEH - 0.084 PPH - 4.585 = -2.643 [-4.022, -0.882] (Italy) ..... ***T. sanetrai* Schulz & Csősz n. sp.**

7(4). Base of scape with well visible dorsal carina, elongate ridge and costulae extending whole scape length (fig. 49) (Central and East Europe, SE France and NW Italy, Caucasus, and Asia Minor) ..... ***T. moravicum* Kratochvìl, 1941**
-. Base of scape without dorsal carina, surface not costulate, smooth and shiny at least basally (figs 24, 38 and 42; see also figs 17, 31, 60 and 67) 8

8(7). Petiolar node cubic in profile, NOH/NOL 0.86 [0.76, 0.97], petiole relatively low and long, PEH/NOL 1.53 [1.37, 1.69] (fig. 37) (Eastern part of South Europe to Kyrgyzstan) ..... ***T. chefketi* Forel, 1911**
-. Petiolar node trapezoidal in profile, NOH/NOL = 0.96, petiole relatively high, PEH/NOL ≥ 1.74 (figs 23 and 40) 9



FIGURES 3–10. Various types of microreticulation, Fig. 3 and 4. long setae forming a psammophore of *Tetramorium sulcinode* worker, Fig. 5. very short setae posterior to buccal cavity of *T. rhodium* worker, Fig. 6. microreticulation of the fronto-lateral surface of head of *T. rhodium* worker, Fig. 7. microreticulation of the basal part of the 1st gaster tergite of *Tetramorium syriacum* worker, Fig. 8. polygonal striation of the 1st gaster tergite of *T. chefketi* worker, Figs. 9–10. male genitalia of *T. sulcinode*, Fig. 9. profile, Fig. 10. caudal view.

9(8) Dorsum of alitrunk rugoso-reticulate, ground surface microreticulate (fig. 39). Scape long, SL/CS 0.82 [0.82, 0.85], frons narrow, FR/CS 0.34 [0.33, 0.35], frontal lobes as wide as frons, FL/FR 1.0 [1.0, 1.02]. $D(2_a)$ 0.081 SL - 0.151 FL - 7.652 = +2.683 [+1.193, +3.493]. (Afghanistan) ..... ***T. exile* Csősz & Radchenko n. sp.**

- Dorsum of alitrunk with parallel rugulae, ground surface feebly microreticulate (fig. 22). Scape shorter, SL/CS 0.78 [0.76, 0.81], frons wider, FR/CS 0.37 [0.35, 0.39], frontal lobes wider, FL/FR 1.02 [1.0, 1.08]. $D(2_a)$ 0.081 SL - 0.151 FL - 7.652 = -2.683 [-4.682, -0.042]. (Anatolia, Turkey) ..... ***T. anatolicum* Csősz & Schulz n. sp.**

Gynes (gynes of *T. exile, T. rhodium,* and *T. syriacum* are unknown)

1. Ventral surface of head with a row of short and several very long setae, forming a psammophore (in gynes this character is less distinct than in workers) 2
-. Ventral surface of head with several short and a few straight, moderately long setae, psammophore absent 3
2(1). Dorsum of petiolar node and postpetiole with sinuous rugae and coarse irregular reticulation. Petiolar node relatively low, NOH/NOL 1.38, PEH/NOL 2.56 ..... ***T. annectens* Pisarski, 1969**
-. Dorsum of petiolar node usually with semi-circular rugulae, smooth medially, postpetiole longitudinally striate. Petiolar node relatively high, NOH/NOL 1.71 [1.52, 1.91], PEH/NOL 3.30 [3.12, 3.63] ... . ***T. sulcinode* Santschi, 1927**
3(1). Dorsal crest of petiolar node slightly convex with a well visible protuberance medially in frontal view (fig 43.). Scape basally with a well visible dorsal carina, elongated costulae sometimes extending whole scape surface (fig 45.). Head slightly narrower than scutum, MW/CS 1.07 [1.05, 1.13] .... ***T. moravicum* Kratochvìl, 1941**
-. Dorsal transversal crest of petiolar node straight, without protuberance medially (in frontal view). Scape basally without dorsal carina and without elongated costulae. Head wider than scutum, MW/CS < 1.0 4
4(3). Ventral part of katepisternum smooth and shiny. Petiolar node dorsum steeply rounded backward in profile 5
-. Ventral part of katepisternum rugoso-reticulate and microreticulate. Petiolar node dorsum flattened in profile 6
5(4). Dorsum of petiolar node and postpetiole finely microreticulate, smooth medially. Scape shorter, SL/CS 0.69 [0.65, 0.71] ..... ***T. alternans* Santschi, 1929**
-. Dorsum of petiolar node and postpetiole reticulate and microreticulate. Scape longer SL/CS 0.75 [0.71, 0.77] ..... ***T. anatolicum* Csősz & Schulz n. sp.**
6(4). Whole dorsum of petiolar node and postpetiole coarsely rugose. Scape longer, SL/CS 0.77 [0.75, 0.79]. ..... ***T. chefketi* Forel, 1911**
-. Dorsum of petiolar node and postpetiole coarsely rugose, but medially smooth. Scape shorter, SL/CS 0.67 [0.66, 0.68] ..... ***T. sanetrai* Schulz & Csősz n. sp.**

Review of species

The following abbreviations are used: ☿=worker; ♀=gyne; ♂=male; [/] = next line; and [—] = next label.

1. *Tetramorium alternans* Santschi, 1929 (figs 11–17)

Tetramorium caespitum var. *alternans* Santschi, 1929: 150 (☿); TYPE MATERIAL: LECTOTYPE ☿ and PARALECTOTYPE ☿☿ designated below (3☿ / NHMB); for the locality details see lectotype designation; raised to species rank: Güsten *et al.* 2006: 27;

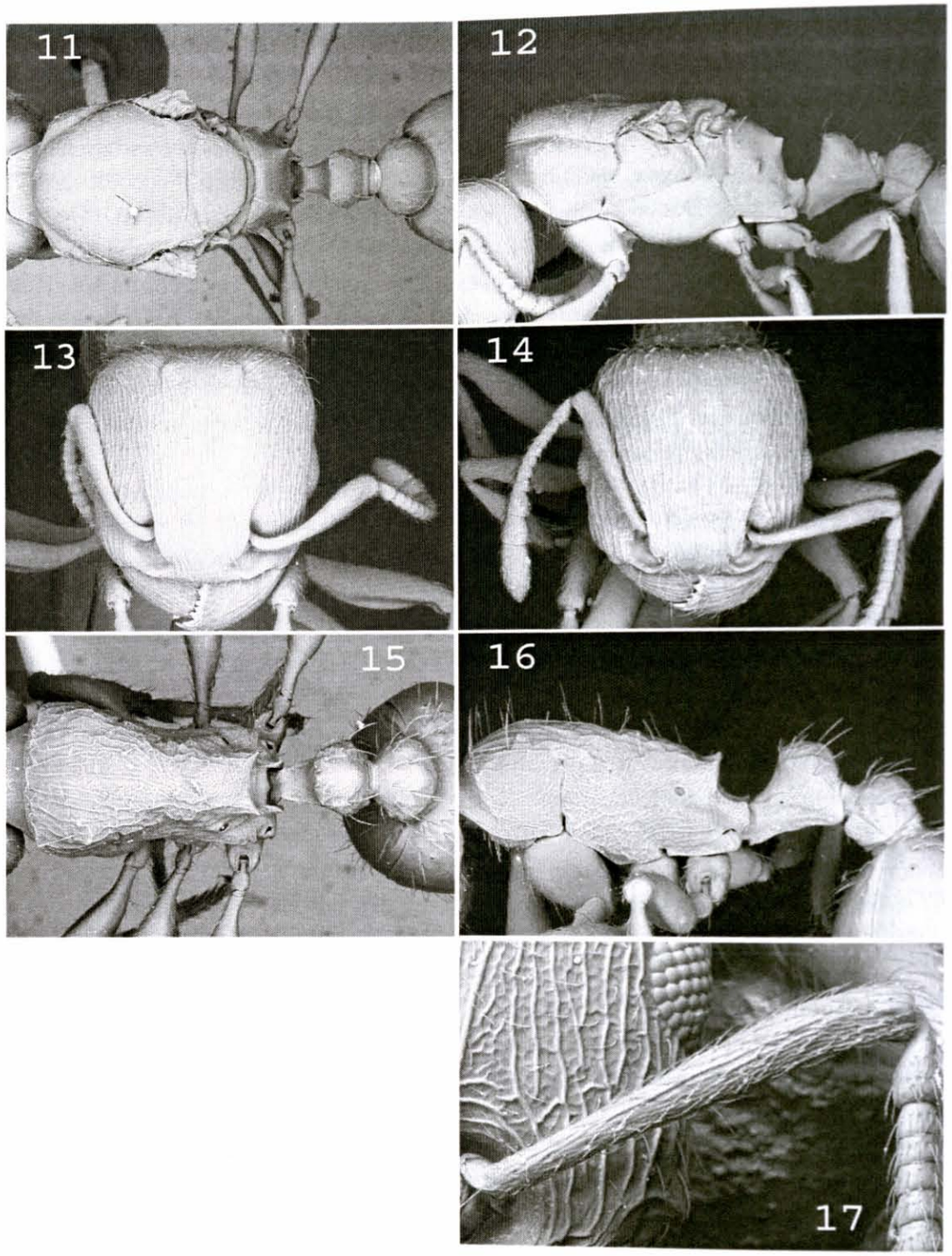
Tetramorium biskrensis var. *kahenae* Menozzi, 1934: 162; first available use of *Tetramorium caespitum* st. *biskrensis* var. *kahenae* Santschi, 1918: 155 (☿); TYPE MATERIAL: LECTOTYPE ☿ designated below, for locality details see lectotype designation (1☿ / MCSN); *Tetramorium biskrense kahenae*: Mei 1995: 764; **New synonymy**

Redescription of worker (figs 14–17). Small to medium size, CS 733 [652, 820]. Whole body and appendages greyish black to black.Head nearly square CL/CW 1.01 [0.97, 1.05], with very feebly convex sides, straight, or slightly concave occipital margin and narrowly rounded occipital corners. Eyes small, EYE 0.168 [0.155, 0.176]. Frons moderately wide, FR/CS 0.39 [0.37, 0.41], frontal lobes as wide as frons, FL/FR 1.0 [1.0, 1.0]. Scape very short, SL/CS 0.71 [0.69, 0.74], without dorsal carina basally, surface feebly costulate. Promesonotal dorsum slightly convex, metanotal groove shallow, but distinct. Propodeal teeth moderately long, slightly curving upwards. Dorsal surface of petiole steeply rounded backward, NOH/NOL 1.03 [0.94, 1.13], petiole relatively high, PEH/NOL 1.84 [1.68, 2.04]. Whole body and appendages greyish black to black. General appearance coarsely rugose, ground surface microreticulate. Head dorsum longitudinally rugose and microreticulate, occiput and sides rugoso-reticulate and microreticulate. Alitrunk dorsum rugose or rugoso-reticulate and microreticulate. Mesopleuron usually coarsely microreticulate. Dorsum of petiolar node ruguloso-reticulate and microreticulate, medially microreticulate. Dorsum of postpetiole microreticulate. Polygonal striation continuous on 1st gastral tergite (see fig. 8.). Ventral surface of head with several short and few moderately long setae arising posteriorly to buccal cavity (see fig. 5.).

Description of Gyne (figs 11–13). Small size, CS 999 [948, 1025]. Whole body and appendages greyish black. Head wider than long, CL/CW 0.92 [0.90, 0.95], with straight subparallel sides, straight occipital margin and narrowly rounded occipital corners. Frons moderately wide, FR/CS 0.41 [0.40, 0.42], frontal lobes as wide as frons, FL/FR 1.0 [1.0, 1.0]. Scape very short, SL/CS 0.69 [0.65, 0.71], without dorsal carina basally, moderately smooth and shiny. Head wider than scutum, MW/CS 0.94 [0.92, 0.97]. Propodeal teeth very short. Dorsal crest of petiolar node in frontal view straight. Petiolar node dorsum steeply rounded backward. Petiole and postpetiole relatively narrow, WAIST 0.93 [0.83, 1.0]. General appearance rugulose, ground surface smooth, more or less shiny. Head dorsum, occiput and sides ruguloso-reticulate, ground surface feebly microreticulate. Frons longitudinally rugulose and feebly microreticulate. Scutum and scutellum longitudinally rugulose, scutellum more or less smooth medially. Sides of alitrunk ruguloso-reticulate and feebly microreticulate, ventral part of katepisternum always smooth. Dorsum of petiolar node feebly reticulate and smooth, dorsum of postpetiole usually smooth. Polygonal striation disrupted on 1st gastral tergite, occasionally superficially striate basally. Ventral surface of head with several short and few longer setae, arising posteriorly to buccal cavity.

Description of Male. Whole body and appendages black. Head with feebly convex sides, slightly rounded occipital margin and widely rounded occipital corners. Scutum wider than head. Propodeal teeth very short, propodeum angulate in profile. Dorsal crest of petiolar node with sharp transversal edge, slightly emarginated in frontal view. Head, alitrunk and waist finely sculptured, ground surface microreticulate. Head feebly reticulate ground surface microreticulate, dull. Scutum feebly rugulose, laterally and anteriorly smooth and shiny. Scutellum longitudinally rugulose, usually shiny medially. Sides of alitrunk, smooth and shiny. Dorsum of petiolar node finely reticulate and microreticulate, postpetiole smooth and shiny. Polygonal striation disrupted on 1st gastral tergite.

Material examined (8 nest series including 34 workers, 6 gynes and 3 males). **ALGERIA** – Takersan 04.1893 leg. Anonymous (4☿ / MNHN); **MOROCCO** – Moyen Atlas, Rd 3211 14 Rkm N. Rd 3485, 40 km S. Ain Leuh, 1100 masl, leg. Aßmuth, Güsten, Sanetra, Schulz, Schumann (6☿ / PCAS); **TUNISIA** – Hammamet, 26.04.1982. nr. 8. leg. H. Sheratin (2☿, 1♀, 1♂ / HNHM), nr. 9, 27.04.1982. leg. H. Sheratin (7☿, 3♀ / MSNM), nr. 23, 30.04.1982. leg. H. Sheratin (2☿, 1♀, 2♂ / MSNM); Hammamet, Sousse, 03.1974. nr. 804. leg. Novellini (4☿ / MSNM); Kabylie, 31.05.65. leg. Cagniant (4☿ / MSNM); Sfax, 1904. leg. Bíró (5☿; 1♀ / HNHM).



FIGURES 11–17. *Tetramorium alternans* Santschi, 1929. Gyne: alitrunk petiole and postpetiole, Fig. 11. dorsal view, Fig. 12. lateral view, Fig. 13. head. Worker: Fig. 14. head. Alitrunk petiole and postpetiole, Fig. 15. dorsal view, Fig. 16. lateral view, Fig. 17. scape, dorsal view.

Morphometrics (34 workers and 5 gynes measured).

Diagnosis. Workers of *T. alternans* can be separated from related species by the lack of psammophore, relatively small eyes, (EYE, Table 1.), very short scape (SL/CS, Table 1.) without dorsal carina basally, less coarse body sculpture (i.e. dorsum of petiolar node is feebly ruguloso-reticulate and microreticulate), rounded petiolar node (NOH/NOL and PEH/NOL, Table 1.). Workers of *T. alternans* mostly resemble those of *T. sanetrai* **n. sp.**, but petiole and frons characters (NOH/NOL, PEH/NOL,FR/CS, Table 1.) give appropriate separation between them. To separate these species see Discriminant $D(2_b)$ function given under *T. sanetrai* **n. sp.**

Gynes of *T. alternans* can be recognised by the lack of psammophore, very short and smooth scape (SL/CS, Table 2.), wide scutum (MW/CS, Table 2.), relatively narrow petiole and postpetiole (WAIST, Table 2.), and feebly reticulate petiole and postpetiole.

For further combination of morphometric characters see Table 1-2.

Lectotype designation of *Tetramorium alternans* Santschi, 1929. In order to avoid further nomenclatural problems it is necessary to designate a lectotype. We investigated three syntype workers mounted on one pin, labeled as: "Type" [red label] [—] "Rabat" [Morocco] "Otin" [—] 1.quinz. Aout 28 [in original description: 04.1928] [—] "T. caespitum alternans Sant." SANTSCHI det. 19"29" [last two numbers are hardly readable] [—] Sammlung Dr. F. Santschi Kairouan;

These data correspond to the original description (Santschi, 1929: 150.). The lectotype is positioned on the distal end of the upper card (this is mentioned on the reverse side of lectotype label). The lectotype specimen is in very good condition.

Morphometric data of *alternans* lectotype worker: CL: 700; CW: 685; FR: 275; FL: 275; SL: 485; ML: 770; MW: 440; PEW: 230; PEH: 255; NOH: 145; NOL: 140; PEL: 150; PPW: 265; PPL: 165; PPH: 210; SPL: 90; SPSP: 140; EL: 135; EH: 100; ED: 180.

Lectotype designation of *Tetramorium biskrense kahenae* Menozzi, 1934. Santschi described this taxon based on several workers and gynes from different localities (Kairouan, Hammalif, Monastir, Pichon, Mines de Garn el Fyriat), and in order to prevent further nomenclatural problems it is necessary to designate a lectotype. Only one syntype worker specimen was investigated, labeled as: "T. caespitum" [/] "st. Biskrense For" [/] ìv. Kahenae Santì [/] "Garn el Fayah" [now Garn Alfaya mines] [/] "Tunisien" [/] "(Santschi)" [this label written with red ink].

These data correspond to the original description (Santschi, 1918: 155.). In the present designation we fix this specimen as the lectotype. The lectotype specimen is in good condition, partly covered by glue.

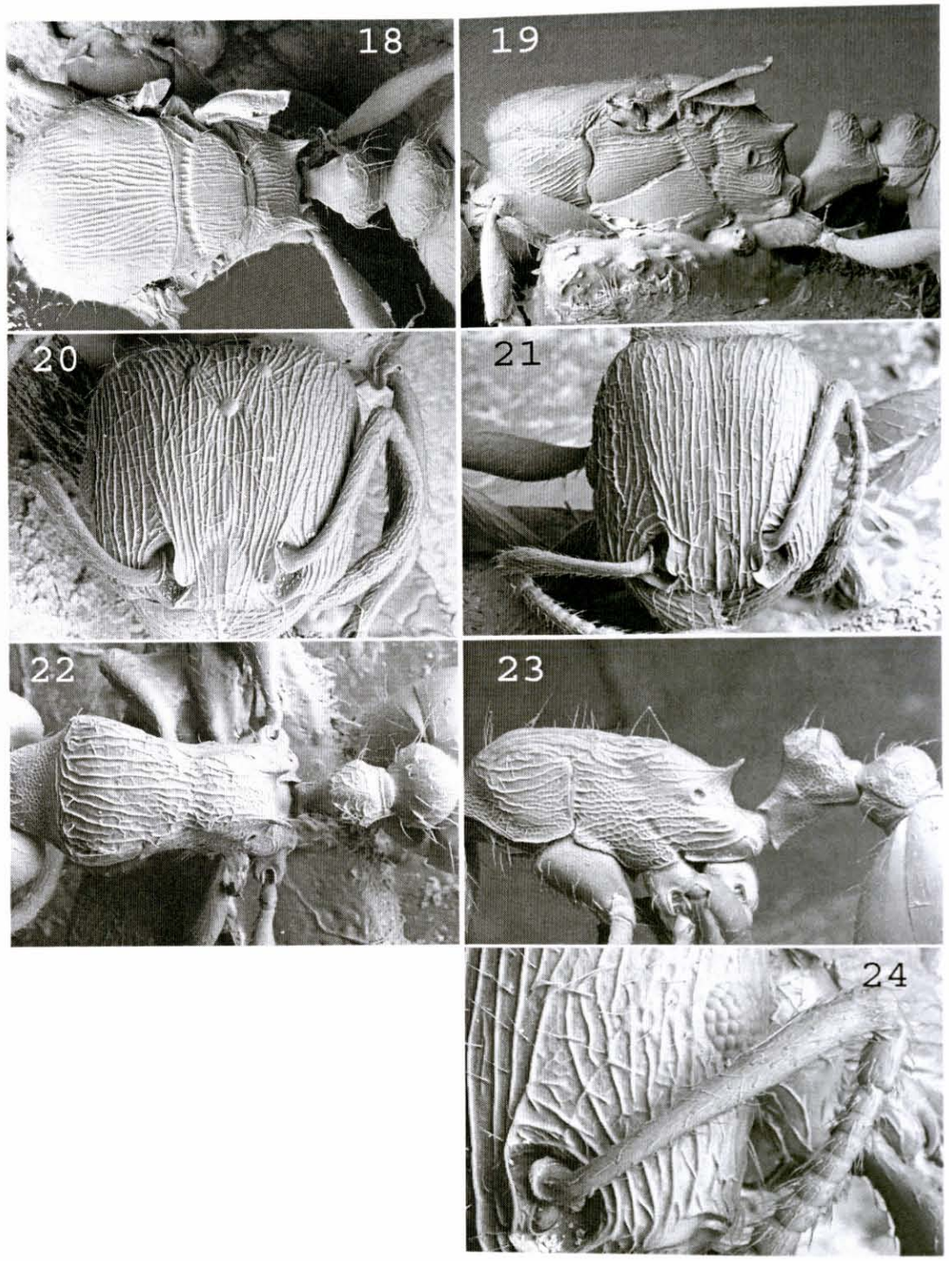
Morphometric data of *kahenae* lectotype worker:

CL: 790; CW: 790; FR: 305; FL: 305; SL: 555; ML: 880; MW: 485; PEW: 240; PEH: 285; NOH: 170; NOL: 165; PEL : 175; PPW: 305; PPL: 185; PPH: 265; SPL: 110; SPSP: 135; EL: 165; EH: 115; ED: 200.

Distribution. This species seems to be endemic to the Mediterranean coast of NW Africa. It is reported from Morocco, Algeria, Tunisia and a dubious record from Lampedusa (Aria Rossa) (Mei 1995).

2. *Tetramorium anatolicum* Csősz & Schulz, New species (figs 18–24)

Description of Worker (figs 21–24). Morphometric data of holotype worker: CL: 720; CW: 695; FR: 245; FL: 265; SL: 550; ML: 770; MW: 430; PEW: 200; PEH: 240; NOH: 140; NOL: 115; PEL: 155; PPW: 250; PPL: 155; PPH: 220; SPL: 80; SPSP: 140; EL: 145; EH: 100; ED: 190; Small size, CS 702 [635, 743]. Whole body and appendages light brown to brown. Head slightly longer than broad, CL/CW 1.02 [0.99, 1.05], with very feebly convex or straight sides and occipital margin, and rounded occipital corners. Eyes small, EYE 0.176 [0.167, 0.182]. Frons moderately narrow, FR/CS 0.37 [0.35, 0.39], frontal lobes usually wider, FL/FR 1.02 [1.0, 1.08]. Scape moderately long, SL/CS 0.78 [0.76, 0.81], without longitudinal dorsal carina basally, smooth and shiny. Promesonotal dorsum convex, metanotal groove shallow, but visible. Propodeal teeth moderately long, thin and acute. Petiolar node trapezoidal in profile, NOH/NOL 1.15 [1.0, 1.30], petiole relatively high, PEH/NOL 2.01 [1.74, 2.30]. General appearance finely rugose, or rugulose. Head dorsum longitudinally rugulose, ground surface feebly microreticulate, shiny. Alitrunk dorsum longitudinally rugulose and finely microreticulate. Mesopleuron usually feebly rugulose and microreticulate. Dorsum of petiolar node ruguloso-reticulate and microreticulate, dorsum of postpetiole feebly rugulose and microreticulate. Polygonal striation usually continuous on 1st gastral tergite, sometimes slightly disrupted posteriorly (see fig. 8.). Ventral surface of head with several short and few moderately long, straight, or few C-shape setae posteriorly to buccal cavity (see fig. 5.).



FIGURES 18–24. *Tetramorium anatolicum* Csősz & Schulz New species. Gyne: alitrunk petiole and postpetiole, Fig. 18. dorsal view, Fig. 19. lateral view, Fig. 20. head. Worker: Fig. 21. head. Alitrunk petiole and postpetiole, Fig. 22. dorsal view, Fig. 23. lateral view, Fig. 24. scape, dorsal view.

Description of Gyne (figs 18–20). Medium to small size, CS 1012 [980, 1055]. Whole body and appendages dark brown to black. Head wider than long, CL/CW 0.93 [0.90, 0.98], with feebly convex sides, straight occipital margin and rounded occipital corners. Frons moderately narrow, FR/CS 0.37 [0.36, 0.40], frontal lobes as wide as frons, or slightly wider, FL/FR 1.01 [1.0, 1.03]. Scape moderately long, SL/CS 0.75 [0.71, 0.77], without longitudinal dorsal carina basally, smooth and shiny. Head wider than scutum, MW/CS 0.96 [0.92, 1.01]. Propodeal teeth moderately long. Dorsal crest of petiolar node in frontal view straight. Petiolar

node dorsum steeply rounded backward. Petiole and postpetiole relatively narrow, WAIST 0.85 [0.83, 0.87]. General appearance rugulose, ground surface microreticulate, dull. Head dorsum, occiput and sides rugoso-reticulate, ground surface microreticulate. Frons longitudinally rugulose and microreticulate. Scutum longitudinally rugose, anteriorly smooth, scutellum medially more or less smooth; laterally finely rugulose. Sides of alitrunk ruguloso-reticulate and microreticulate, katepisternum smooth and shiny ventrally. Dorsum of petiolar node and postpetiole reticulate, petiolar node smooth medially. Polygonal striation disrupted on 1st gastral tergite, sometimes continuous basally. Ventral surface of head with several short and few longer, straight or "C"-shape setae, arising posterior to buccal cavity.

Description of Male. Whole body and appendages brownish black. ead with convex sides, round occipital margin and widely rounded occipital corners. Scutum wider than head. Propodeal teeth very short, propodeum nearly rounded in profile. Dorsal crest of petiolar node with sharp transversal edge, slightly emarginated in frontal view. Head, alitrunk and waist rugulose, ground surface reticulate to microreticulate, dull. Scutum finely rugulose, antero-laterally smooth and shiny. Scutellum transversally rugulose and microreticulate. Sides of alitrunk finely rugose and microreticulate. Dorsum of petiolar node finely reticulate and microreticulate. Postpetiole shiny, feebly striate. Polygonal striation disrupted on 1st gastral tergite.

Material examined: (6 nest series including 52 workers, 3 gynes and 1 male) HOLOTYPE ☿: **TURKEY** – Erzurum, 5km SW Aydogdu 20km SW Göle, 1400 mH nr.1148 leg. Schulz 26.06.1993 (1☿ / HNHM); PARATYPES: **TURKEY** – Digor 1650 mH 13.06.1991 leg. L^bl (4☿ / HNHM, 4☿, 1♀ MHNG); Erzurum, 5km SW Aydogdu 20km SW Göle, 1400 mH nr.1148 leg. Schulz 26.06.1993 (5☿, 1♂ / HNHM, 2☿, 1♀, PCAS); Van, 5km SE Dedeli 30km SE Patnos 1700mH, *Hochsteppe* 20.06.1993. nr.1104. leg. Schulz (3☿ PCAS); Van-5km Van, 5km SE Dedeli 30km SE Patnos 1700mH, Hochsteppe 20.06.1993. nr.1102. leg. Schulz (9☿ PCAS, 6☿ SMNK); Van, 5km SE Dedeli, 30km SE Patnos, 1700 mH *Hochsteppe* nr. 1104 leg. Schulz 20.06.1993 (6☿ / HNHM, 3☿ / PCAS); Van, 5km SE Dedeli, 30km SE Patnos, 1700 mH *Hochsteppe* nr. 1106 leg. Schulz 20.06.1993 (3☿, 1♀ / HNHM, 6☿ / PCAS, 3☿ / SMNK).

Morphometrics: (38 workers and 3 gynes measured).

Diagnosis. Workers of *T. anatolicum* **n. sp.** can be separated from related species by the lack of psammophore, relatively small eyes, (EYE, Table 1.), moderately long and smooth scape (SL/CS, Table 1.), without a dorsal carina basally, relatively fine and parallel body sculpture and trapezoidal petiolar node (NOH/NOL and PEH/NOL, Table 1.). Workers of *T. anatolicum* **n. sp.** are mostly similar to *T. exile* **n. sp.**, but differs by its relatively shorter scape and somewhat wider frons (SL/CS and FR/CS, Table 1.). Discriminant $D(2_a)$ function proves the separation between *T. anatolicum* **n. sp.** and *T. exile* **n. sp.** (see differential diagnosis of *T .exile* **n. sp.**). Workers of *T. anatolicum* **n. sp.** may look similar to those of *T. chefketi*, but can be distinguished by their lighter colour and shape of petiolar node: in *T. anatolicum* **n. sp.** it is relatively high and short, trapezoidal, in profile, while in *T. chefketi* it is relatively low and longer, cubic in profile, (PEH/NOL and NOH/NOL, Table 1.). Discriminant $D(3_a)$ function proves the separation between *T. anatolicum* **n. sp.** and *T. chefketi* (see differential diagnosis of *T .exile* **n. sp.**).

Gynes of *T. anatolicum* **n. sp.** can be distinguished by the lack of psammophore, moderately long, smooth scape (SL/CS, Table 2.), without a dorsal carina basally, wide scutum (MW/CS, Table 2.), relatively narrow petiole and postpetiole (WAIST, Table 2.), and partly smooth katepisternum.

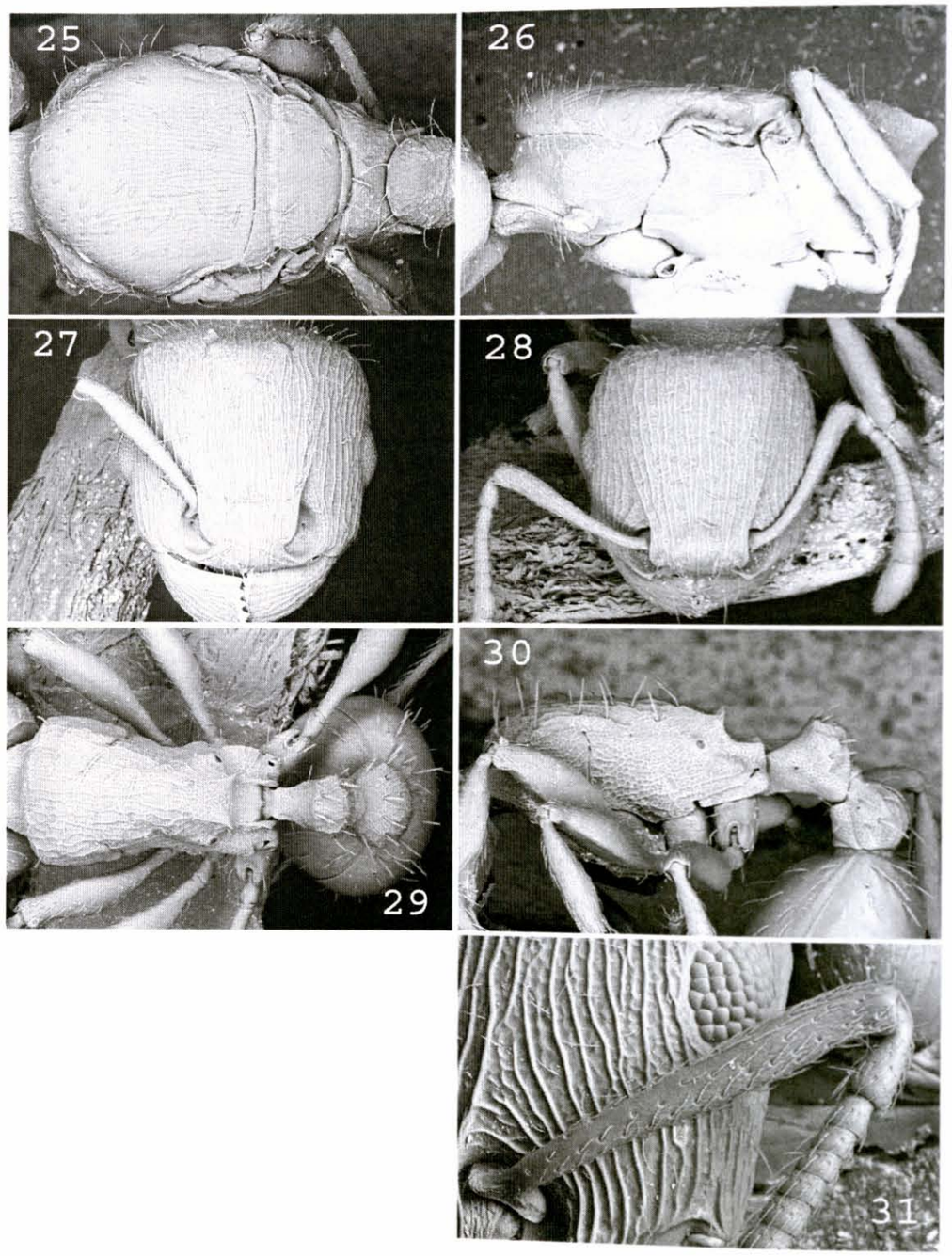
For further combination of morphometric characters see Table 1–2.

Distribution. It is known only from Turkey.

Etymology. This adjective [*anatolicum* (neutrum)] refers to the known distribution of this species in Anatolian part of Turkey.

3. *Tetramorium annectens* Pisarski, 1969 Status revised (figs 25–31)

Tetramorium annectens Pisarski 1969: 230; first available use of *Tetramorium caespitum* subsp. *jacoti* var. *annectens* Wheeler, 1927: 7. (☿); TYPE MATERIAL: SYNTYPE ☿☿ "Pei Hai" [/] "Peking, China" [CHINA] [/] "N. Gist Gee" [—] "cotypes" [—] W. M. Wheeler [—] M.C.Z. "es" type [/] "45. 210652" [—] Inst. Zool. P.A.N. [/] "65/66." [—] "*Tetramorium caespitum* subsp. *jacoti* var. *annectens* Whlr" (2☿ / MIIZ); junior synonym of *Tetramorium jacoti*: Radchenko 1992b: 51; revived from synonymy hereby.



FIGURES 25–31. *Tetramorium annectens* Pisarski, 1969. Gyne: alitrunk petiole and postpetiole, Fig. 25. dorsal view, Fig. 26. lateral view, Fig. 27. head. Worker: Fig. 28. head. Alitrunk petiole and postpetiole, Fig. 29. dorsal view, Fig. 30. lateral view, Fig. 31. scape, dorsal view.

Redescription of worker (figs 28–31). Small size, CS 675 [645, 703]. Whole body and appendages dark brown to black. Head slightly longer than broad, CL/CW 1.02 [1.0, 1.05], with very feebly convex sides, straight occipital margin and rounded occipital corners. Eyes very large, EYE 0.205 [0.196, 0.214]. Frons moderately wide, FR/CS 0.39 [0.38, 0.40], frontal lobes as wide as frons, or slightly wider, FL/FR 1.02 [1.0, 1.04]. Scape moderately long, SL/CS 0.76 [0.73, 0.77], with short, hardly visible dorsal carina basally, smooth and shiny. Promesonotal dorsum slightly convex, metanotal groove shallow, but distinct. Propodeal teeth very short. Petiolar node trapezoidal in profile, NOH/NOL 1.10 [0.96, 1.25], petiole relatively high, PEH/NOL 2.06 [1.96, 2.12]. General appearance rugose, ground surface coarsely microreticulate, dull. Head dorsum longitudinally rugoso-reticulate, ground surface coarsely microreticulate, occiput and sides rugoso-reticulate and coarsely microreticulate. Dorsum of alitrunk rugoso-reticulate and microreticulate, mesopleuron coarsely microreticulate. Dorsum of petiolar node rugoso-reticulate and microreticulate, dorsum of postpetiole longitudinally rugulose and microreticulate. Polygonal striation continuous on 1st gastral tergite (see fig. 8.), disrupted posteriorly. Basal part of 1st gastral tergite sometimes very feebly costulate (not microreticulate), extending to 120μm [80, 170] from gaster-postpetiole junction. Ventral surface of head with row of short and very long psammophore arising just posteriorly to buccal cavity (see fig. 3, 4.).

Description of Gyne (figs 25–27). Morphometric data of single known gyne: CL: 985; CW: 1010; FR: 385; FL: 385; SL: 715; ML: – ; MW: 920; PEW: 350; PEH: 435; NOH: 235; NOL: 170 ; PEL : 250; PPW: – ; PPL: – ; PPH: – ; SPL: 170; SPSP: 270; Small size, CS 997.5. Whole body and appendages black. Head nearly square, CL/CW 0.98 with feebly convex sides, straight occipital margin and rounded occipital corners. Frons wide, FR/CS 0.39, frontal lobes as wide as frons FL/FR 1.0. Scape short, SL/CS 0.72, without dorsal carina basally, smooth and shiny. Head wider than scutum, MW/CS 0.92. Propodeal teeth moderately long. Dorsal crest of petiolar node straight in frontal view; dorsum blunt in profile. Petiole extremely narrow, CS/PEW: 2.85. General appearance rugulose, ground surface feebly microreticulate, shiny. Head dorsum, occiput and sides ruguloso-reticulate, ground surface microreticulate. Frons longitudinally rugose and feebly microreticulate. Scutum longitudinally rugose (mainly medially), anteriorly and laterally smooth, scutellum more or less smooth medially, laterally finely rugulose. Sides of alitrunk ruguloso-reticulate and microreticulate, ventral part of katepisternum smooth and shiny. Dorsum of petiolar node reticulate, medially smooth.

Description of Male. Whole body and appendages black. Head with convex sides, straight occipital margin and widely rounded occipital corners. Scutum slightly wider than head. Propodeal teeth short, in profile thin, very short protuberance is visible. Dorsal crest of petiolar node with sharp, transversal edge, slightly emarginate in frontal view. Head with irregular rugulae ground surface microreticulate, dull. Scutum and scutellum irregularly rugulose, partially smooth and shiny. Sides of alitrunk longitudinally rugose, ventral part of katepisternum smooth and shiny. Dorsum of petiolar node coarsely reticulate, postpetiole finely longitudinally rugulose. Polygonal striae disrupted on 1st gastral tergite.

Material examined (4 nest series including 11 workers and 1 gyne and 1 male). **MONGOLIA–** Aimak, Bajanchongor, 8km E-SE Somon, Banjaleg, 1350m nr.879 02.07.1967. leg. Kaszab (1☿, 1♀ / HNHM); Aimak, Nojou, Nuruu, Grenzposten Ovot Chuural, 1500m Südgobi, nr.827 20.06.1967. leg. Kaszab (1♂ / HNHM); Aimak, Tachilga ul, zw. Zogt-Ovoo und Dalanzadgad 1550m S¸dgobi, nr.792 12.06.1967. leg. Kaszab (3☿ / HNHM, 2☿ MIZ); Sain-Sand, nr.3329 23.05.1962. leg. Pisarski (5☿ / MIZ);

Morphometrics: (8 workers and one gyne measured).

Diagnosis. Workers of *T. annectens* can be separated from related species (except for *T. sulcinode*) by the well visible psammophore and the large eyes, (EYE, Table 1.). For the separation between *T. annectens* and *T. sulcinode* see differential diagnosis of *T. sulcinode*, below.

Gynes of *T. annectens* can be distinguished by the well visible psammophore, short and smooth scape (SL/CS, Table 2.) without a dorsal carina basally, wide scutum (MW/CS, Table 2.), extremely narrow petiole (CS/PEW, Table 2.), and partly smooth katepisternum.

For further combination of morphometric characters see Table 1–2.

Distribution. This species is known from NE China and Mongolia.

Note. The only known gyne is poorly preserved: postpetiole and gaster are missing (figs 25 and 26.). ventral surface of head is very dusty and covered by glue, wherefore setae are not visible.

4. *Tetramorium chefketi* Forel, 1911 (figs 32–38)

Tetramorium caespitum var. *chefketi* Forel, 1911: 332 (☿); TYPE MATERIAL: LECTOTYPE ☿ and PARALECTOTYPE ☿☿ designated below, for the locality details see lectotype designation (3☿ / MHNG); raised to species rank: Agosti & Collingwood 1987a: 56; Senior synonymy fixed as the first reviser act hereby. (ICZN 1999. Art. 24.2.2.).

Tetramorium caespitum var. *sarkissiani* Forel, 1911: 332. (☿); TYPE MATERIAL: LECTOTYPE ☿ and PARALECTOTYPE ☿☿ designated below, for the locality details see lectotype designation (3☿ / MHNG); junior synonymy fixed as the first reviser act hereby. (ICZN 1999. Art. 24.2.2.). **New synonymy**

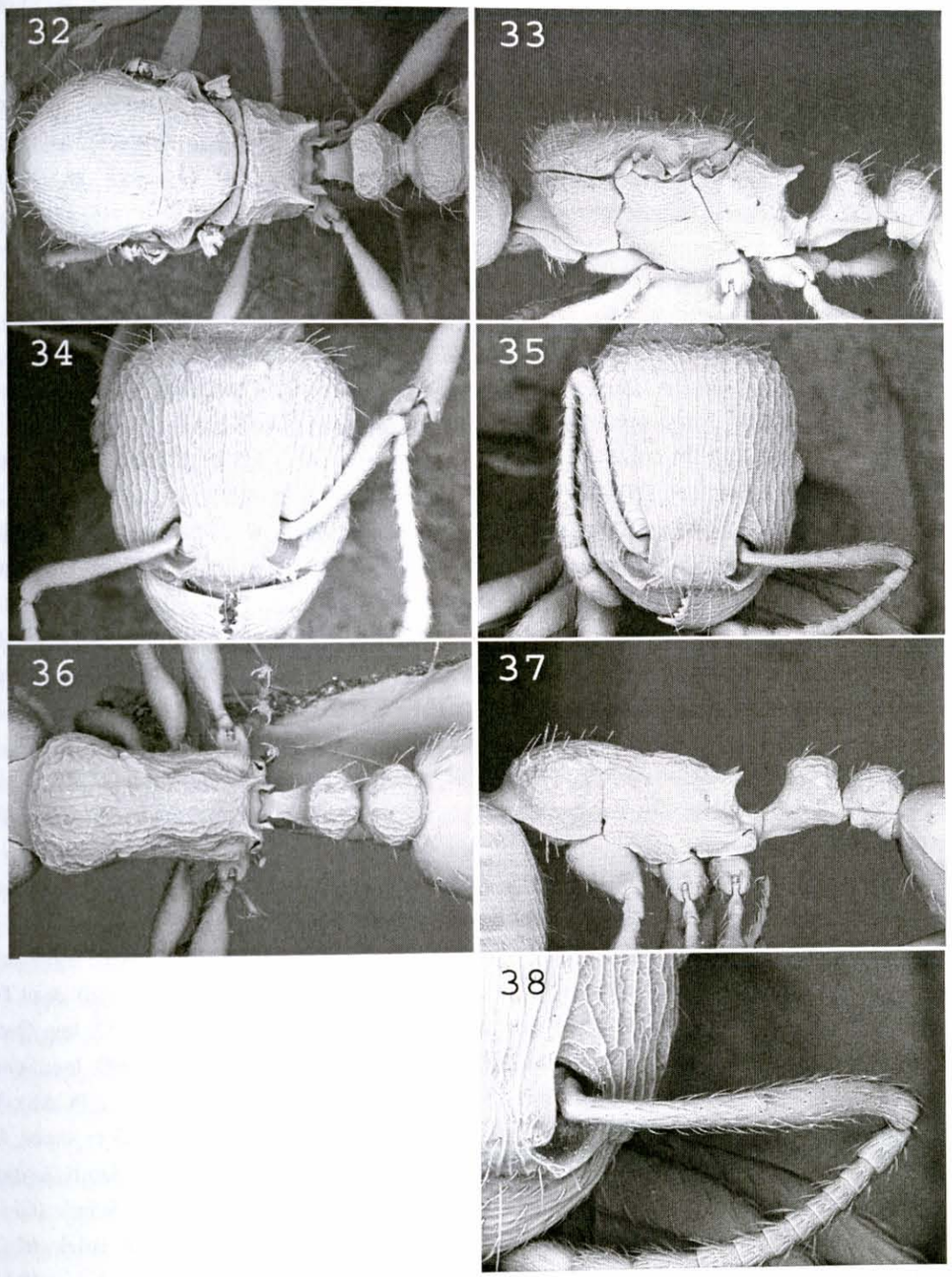
Tetramorium caespitum st. *turcomanica* Santschi 1921*a*: 111 [mispelled as *Tetramorium caespitum* st. *turcomana*: Emery (Sic!)]; first available use of *Tetramorium caespitum caespitum* var. *turcomanica* Emery, 1909: 702 (☿, ♀); TYPE MATERIAL: SYNTYPES "Dschilarik" [now TURKMENISTAN] (1☿, 1♀, / MSNG); raised to species rank: Tarbinsky 1976: 109; junior synonym of *T. forte* Forel: Dlussky *et al.* 1990: 202; not Radchenko 1992b: 52. **New synonymy**

Tetramorium taurocaucasicum Arnoldi, 1968: 1813 (☿, ♀, ♂); TYPE MATERIAL: HOLOTYPE ☿, [UKRAINE], "Crimea, Gurzuf, 16.vi.1948, K. Arnoldi" [original label is in Russian] (ZMMU); PARATYPES, 14 ☿, 4 ♀ and 3 ♂ from the nest of the holotype, and from Yalta (Crimea), Tuapse, Novorossiysk (NW Caucasus, RUSSIA) and GEORGIA (☿, ♀, ♂ ZMMU); junior synonym of *T. forte*: Dlussky *et al.* 1990: 202, Atanasov & Dlussky 1992: 152, Radchenko 1992b: 51. **New synonymy**

Redescription of worker (figs 35–38). Medium to large size, CS 869 [740, 972]. Whole body and appendages dark brown to black. Head nearly square, CL/CW 1.01 [0.97, 1.04], with very feebly convex sides, straight occipital margin and rounded occipital corners. Eyes small, EYE 0.171 [0.165, 0.184]. Frons moderately narrow, FR/CS 0.37 [0.35, 0.39], frontal lobes usually wider, FL/FR 1.03 [1.0, 1.09]. Scape long, SL/CS 0.82 [0.78, 0.87], without longitudinal dorsal carina basally, smooth and shiny. Promesonotal dorsum slightly convex, metanotal groove rather deep. Propodeal teeth long. Petiolar node cubic in profile, NOH/NOL 0.86 [0.76, 0.97], petiole relatively low and long, and PEH/NOL 1.52 [1.37, 1.69]. General appearance coarsely rugose, ground surface microreticulate. Head dorsum longitudinally rugose and microreticulate, occiput and sides rugoso-reticulate, ground surface microreticulate. Alitrunk dorsum, mesopleuron and dorsum of petiolar node rugoso-reticulate, ground surface coarsely microreticulate, dorsum of postpetiole longitudinally rugulose and microreticulate. Polygonal striation continuous on 1st gastral tergite (see fig. 8.). Ventral surface of head with several short and few longer straight setae, arising posterior to buccal cavity (see fig. 5.).

Redescription of gyne (figs 32–34). Large size, CS 1121 [1060, 1180]. Whole body and appendages black. Head wider than long, CL/CW 0.92 [0.89, 0.95] with sides and occipital margin straight, and widely rounded occipital corners. Frons moderately narrow, FR/CS 0.38 [0.36, 0.40], frontal lobes as wide as frons, or slightly wider FL/FR 1.01 [1.0, 1.03]. Scape long, SL/CS 0.77, without longitudinal dorsal carina basally, smooth and shiny. Head wider than scutum, MW/CS 0.94 [0.88, 1.01]. Propodeal teeth long. Dorsal crest of petiolar node straight in frontal view; in profile, node with flattened dorsal surface. Petiole and postpetiole relatively narrow, WAIST 0.90 [0.86, 0.96]. General appearance coarsely rugose, ground surface microreticulate, dull. Head dorsum, occiput and sides rugoso-reticulate, ground surface microreticulate. Frons longitudinally rugose and microreticulate. Scutum and scutellum longitudinally rugose, scutellum more or less smooth medially. Sides of alitrunk, rugoso-reticulate and microreticulate, ventral part of katepisternum always rugulose, or microreticulate. Dorsum of petiolar node and postpetiole coarsely reticulate and microreticulate. Polygonal striation disrupted on 1st gastral tergite, superficially microreticulate basally. Ventral surface of head with several short and few longer straight, or few C-shaped setae arising posterior to buccal cavity.

Redescription of male. Whole body and appendages black. Head with convex sides, rounded occipital margin and widely rounded occipital corners. Head as wide as scutum. Propodeal teeth short, propodeum angulate in profile. Dorsal crest of petiolar node in frontal view with sharp, slightly emarginate, transversal edge. Head, alitrunk and waist coarsely sculptured, ground surface microreticulate, dull. Head rugoso-reticulate, ground surface microreticulate. Scutum and scutellum longitudinally rugose. Sides of alitrunk longitudinally rugose. Dorsum of petiolar node and postpetiole coarsely reticulate. Polygonal striation disrupted on 1st gastral tergite.



FIGURES 32–38. *Tetramorium chefketi* Forel, 1911. Gyne: alitrunk petiole and postpetiole, Fig. 32. dorsal view, Fig. 33. lateral view, Fig. 34. head. Worker: Fig. 35. head. Alitrunk petiole and postpetiole, Fig. 36. dorsal view, Fig. 37. lateral view, Fig. 38. scape, dorsal view.

Lectotype designation of *Tetramorium chefketi* Forel, 1911.

In order to avoid any further nomenclatural problems it is necessary to designate a lectotype. We investigated three syntype workers mounted on one pin, labeled as: "T. caespitum L." [/] "Bou Youk Déré" [/] "Bosphore européen (Forel)" [—] "v. chefketi Type For" [—] "v. T. chefketi For" [—] Typus [—] Coll. Forel.

These data match the original description (Forel 1911: 332.). The lectotype is positioned on the distal end of the upper card (this is mentioned on the reverse side of lectotype label). The lectotype is in good condition, except that the left funiculus (excluding the first segment), the left foreleg and the tarsus of the right hind leg are missing.

Morphometric data of the lectotype of *T. chefketi* Forel, 1911:

CL: 990; CW: 990; FR: 370; FL: 385; SL: 810; ML: 1150; MW: 660; PEW: 360; PEH: 365; NOH: 220; NOL: 230; PEL: 225; PPW: 415; PPL: 230; PPH: 355; SPL: 135; SPSP: 230.

Lectotype designation of *Tetramorium caespitum* var. *sarkissiani* Forel, 1911

In order to avoid further nomenclatural problems it is necessary to designate a lectotype. We investigated three type workers mounted on one pin, labeled as: "T. caespitum L." [/] "v. sarkissiani" [/] "type" [/] "☿ Ismid Asia mineure" [/] "(Forel)" [—] "v. T. sarkissiani For" [—] Typus [—] coll. Forel.

These data match the original description (Forel 1911: 332.). The lectotype is positioned on the distal end of the upper card (this is mentioned on the reverse side of lectotype label). The lectotype is in good condition.

Morphometric data of the lectotype of *T. caespitum* var. *sarkissiani* Forel, 1911:

CL: 760; CW: 755; FR: 275; FL: 290; SL: 615; ML: 875; MW: 475; PEW: 225; PEH: 260; NOH: 150; NOL: 180; PEL: 200; PPW: 260; PPL: 195; PPH: 240; SPL: 85; SPSP: 160.

Material examined (67 nest series including 308 workers, 37 gynes and 22 males). **BULGARIA** – Blagiograd (1☿ / MIZ); Burgas (1♀ / MIZ); Kocerinovo (1☿ / MIZ); **GEORGIA** – nr. 341, Kvarely (Kvareli) (1♀, 2☿ / MIZ); **GREECE** –*Olympgebirge*, 3-5km W. Litóhoro, Prov.: Pieriá, 500–700mH, 13.05.1996. nr.191. leg. A. Schulz, K. Vock (9☿ / PCAS); Vlasti, 18.07.1979. leg. Holgersen (1☿ / MSNM); KAZAKHSTAN – Koksengir, 30 km W Kizyldjar, Karag. [Karaganda Prov.] (4☿ / ZISP); Pogodaevo, 60 km NW Uralska (1♀ / ZISP); Zapadno-Kazahstanskaya obl. Okr. Serebrjakova, (1☿ / ZISP); **KYRGYZSTAN** – Frunze, Con Aryk 13.6.1982. 1000m, leg. J. Odehnal (2♀,3☿ / PCAS); **MACEDONIA** – Tetovo, Zelino, prov. 30.05.1998. leg. Rozner (1♀ / HNHM); **TURKEY** – Aksaray-50km NW Aksaray 10km NW Acipinar 1000mH, *Artemisia Steppe, Straßenrand* 02.06.1993. nr.981. leg. Schulz (10♂,6☿,8♀ / PCAS); Ankara 20km SW. 04.08.1973. leg. Bacestrieri (1☿ / MSNM); Ankara Basbereket ca 30 km W Ankara14.5.1998. leg. P. Bilek (6☿ / PCAS); Ankara, 05.04.1947 leg. C.Kosswig (33☿ / NHM); Artvin ca 30 km S Artvin on the road Artvin-Tortum 25.5.1998. leg. P.Bilek (5☿,4♂,4♀ / PCAS); Artvin, 10km NW Sarig^l 50km SW Artvin 1300-1500mH 28.06.1993. nr.1166. leg. Schulz (1♀ / PCAS); Aydintepe vil. G¸m¸shane 1200mH, 01.07.1975. nr.11. leg. Osella (3☿, 4♀, 1♂ / MSNM); Ayranci 20 km SW 1100mH, Prov. Mersin, 07.05.1997. nr.220. & nr.T685. leg. A. Schulz, K. Vock, M. Sanetra (12☿ / PCAS); Calecit vil. Pukeva Sorgente, 01.07.1972. leg. Osella (1☿ / MSNM); Denizli-Kizikbeli Gecidi 20km SE Denizli 1250mH, *Steppe* 22.05.1993. nr.900. leg. Schulz (6☿ / PCAS); Dinitzli 50km SW 1000mH, *Stra,enrand* 19.08.1992. nr.798. leg. Schulz (3☿ / PCAS); Giresun-Bulancak 15km W Giresun *Strandgebiet* 04.07.1989. leg. Schulz (2♀,2☿ / PCAS); G¸m¸shane, Bayburc, 05.06.1958 leg. E.S.Brown (1☿ / NHM); Istambul, 14.07.1968. leg. Poldi (3☿ / MSNM); Izmir-Zeytinlik, Boz Dag 10km NE Ödemis, 70km SEE Izmir, *Kastanienstreuwiese* 18.05.1993. nr.854. leg. Schulz (6☿ / PCAS); Kars Karakurt 23.5.1998. leg. P. Bilek (6☿ / PCAS); Kars Sarikamish 24.5.1998. leg. P. Bilek (6☿ / PCAS); Kars-Dagpinar 25km SE Kars 1800mH, *Steppe mit Vulkangesteinen* 23.06.1993. nr.1122. leg. Schulz (3☿ / PCAS); Kastamon Kastamonu env.30.5.1998. leg. P. Bilek (6☿ / PCAS); Kastamonu-Seydiler 30km S Inebolu, 50km N Kastamonu, 1200mH, *Stra,enrand* 04.07.1993. nr.1213., nr.1214. & nr.1215. leg. Schulz (3☿, 9♀, 3♂ / PCAS); Kayseri-*Sultan Salz Sümpfe* 10km W Develi, 40km S Kayseri *Artemisia Steppe* 1000mH, 01.06.1993. nr.965. leg. Schulz (6☿ / PCAS); Kirobasi 8 rkm S, 900mH, Prov. Mersin, 07.05.1997. nr.206. leg. A. Schulz, K. Vock, M. Sanetra (9☿ / PCAS); Kizikadag, 70km W Antalya 1300-1500mH, *Steppe* 21.05.1993. nr.890. leg. Schulz (3☿ / PCAS); Konya-40km S Beysehir 15km W Seydisehir 1400mH, *Laub-Tannenmischwald* 90% 05.06.1993. nr.1092. leg. Schulz (3☿ / PCAS); Konya-Belören 70km S Konya 1400mH, *Quercus Juniperus Mischwald* 70% 04.06.1993. nr.1007. & nr.1005. leg. Schulz (6☿ / PCAS); Konya-Eregli *Sümpfe* 15km NW Eregli 1000mH, *Steppe und Überschwemmungsg* 02.06.1993. nr.991. & nr.992. leg. Schulz (13☿ / 1♀ PCAS); Kücükgezbeli 6 km W, ca. 100 km SE Kayseri, 1700mH, Prov. Adana, 10.05.1997. nr.274. leg. A. Schulz, K. Vock, M. Sanetra (4☿ / PCAS); Mersin-30–40km NW Mersin *zwischen* Arstanköy und Yeniköy 1000–1500mH, 29.05.1993. nr.940. leg. Schulz (6☿ / PCAS); Mersin-Arslankoy 45km N Mersin 2000mH, *Tannenwald und Wiese* 30.05.1993. nr.951. leg. Schulz (6☿ / PCAS); Mersin-Gülek Bogazi 15km SW Pozanti 1300 mH, *Juniperus* 30% 31.05.1993. nr.954 leg. Schulz (3☿ / PCAS); Osmeneli vil. Blekik, 13.07.1972. leg. Osella (5☿ / MSNM); Prov. Kayseri, 10 km E Bakirdagi, ca. 80 km SE Kayseri, 1500mH, 10.05.1997. nr.272. leg. A. Schulz, K. Vock, M. Sanetra (9☿ / PCAS); Prov. Kayseri, 12 km W Develi, 1000mH, 10.05.1997. nr.270 leg. A. Schulz, K. Vock, M. Sanetra (9☿ / PCAS); Prov. Kayseri, 2 rkm NE Incesu, 30 km SW Kayseri, 1100mH, 10.05.1997. nr.267. & nr.268. leg. A. Schulz, K. Vock, M. Sanetra (21☿ / PCAS); Sarkisla 15 rkm S, ca. 80km SW Sivas, 1400mH, Prov. Sivas, 09.05.1997. nr.273. leg. A. Schulz, K. Vock, M. Sanetra (3☿ / PCAS); Sertavul Gecidi, 1600mH, Prov. Mersin, 07.05.1997. nr.214. & nr.684. leg. A. Schulz, K. Vock, M. Sanetra (9☿ / PCAS); Sinop-5km S Kabali 30km S Sinop 500mH, *Kiefernwald* 50% *Südhang* 03.07.1993. nr.1207. leg. Schulz (6☿, 3♂ / PCAS); Tavsanli, Prov. Kütahya 01.05.1982. leg. Heinze (9☿ / PCAS); Yellibeli Gecidi 5km S. 27km N. Emenek, Prov. Konya, 1800mH, 05.05.1997. nr.171. & nr.T678. leg. A. Schulz, K. Vock, M. Sanetra (12☿ / PCAS); Yozgat Akdagmadeni 16.5.1998. leg. P. Bilek (6☿ / PCAS); **RUSSIA**—Lysaja Gora, okr. Anapy, Kub. Obl. [NW Caucasus] (3☿ / ZISP); **UKRAINE**—"nr. 253" leg. Radchenko (3☿ / NHM); Aluschta (*Crimea*) 13–15.v.1900 leg. Kuznetzov (10☿ / ZISP; 1☿ / MIZ); Kerch, Tavr. g. (Crimea) (1☿ / ZISP); Krim, Kara-Dah, E Kurortne, 100–500mH, 15.08.1995. leg. Sanetra (6☿ / PCAS, 3☿ / MHNG); Semidvor'e, Yaltinsky uezd, Krim (1☿ / ZISP).

Morphometrics: (131 workers and 11 gynes measured).

Diagnosis. Workers of *T. chefketi* can be separated from related species by the lack of psammophore, relatively small eyes, (EYE, Table 1.), long and smooth scape (SL/CS, Table 1.) without dorsal carina basally, coarse body sculpture and cubic petiolar node (NOH/NOL and PEH/NOL, Table 1.). Workers of *T. chefketi* mostly resemble those of *T. rhodium* and *T. sanetrai* **n. sp.**, but SL/CS (Table 1.) gives appropriate discrimination between them. Discriminant $D(3_a)$ function between workers of *T. chefketi* vs. *T. exile* **n. sp.** and *T. chefketi* vs. *T. anatolicum* **n. sp.** proves the-separation (see differential diagnosis of *T. exile* **n. sp.**).

Gynes of *T. chefketi* can be distinguished by lacking of psammophore, long and smooth scape (SL/CS, Table 2.), wide scutum (MW/CS, Table 2.), relatively narrow petiole and postpetiole (WAIST, Table 2.), and rugoso-reticulate katepisternum. Gynes of *T. chefketi* mostly resemble those of *T. sanetrai* **n. sp.**, but SL/CS (Table 2.) gives appropriate discrimination between them. For further combination of morphometric characters see Table 1–2.

Distribution. SE Europe (Greece, Bulgaria, Macedonia, Romania), S Ukraine, south of the European part of Russia, NW Caucasus, Turkey, Turkmenistan, N Kazakhstan, SW Siberia, to the east – to Kyrgyzstan and Altai Mts.

Taxonomic notes. The nomenclatural uncertainty of *T. forte* originally was caused by Forel (1904). He described this taxon based on workers from southern France, on workers and gynes from Crimea, and on gynes and males from Georgia; type localities originally are given as: "*Cette variété se trouve dans le midi de l'Europe (Camargue, Nice, Drôme, Palavas prés Montpellier). Au Musée Zoolog. Ac. Imp. Sc., elle se trouve de Crimée (Alupka, 1 β, 2.vi.1889; mont Kastel, 1 β, 26.vi.1900; Alushta, 15 ☿, 13–15.v.1900. N. Kuznecov!) et de Transcaucasie (les β et ♂ douteux): (Gouv. Kutais, Artwin, 1 β, 23.vi.1898; K. Derjugin!).*" (Forel 1904: 371.). From this we infer that Forel described workers and sexual forms from different nests.

One of the authors (AR) investigated Eastern workers and males from the original type series (Crimea and

Caucasus) deposited at ZISP, and definitely concluded that gynes and males were *T. caespitum* (L.) *s. l.*, but workers were *T. forte*. Arnoldi (1968) described a new species, *T. taurocaucasicum*, based on all three castes from Crimea and Transcaucasus. He also noted that Forel's syntype gynes of *T. forte* from Crimea belong to *T. caespitum*, however "... *several workers* [e.g. from Forel's type series, AR] *belong to my described species...*' (loc. cit., p. 1815, translation from Russian, AR). Finally, Arnoldi believed that the ìtrueî *T. forte* was a S European species. Under the name ì*taurocaucasicum*î this species was also included into the key to the identification of the ants of the European part of former USSR (Arnoldi & Dlussky, 1978). Later Atanassov & Dlussky (1992) considered *taurocaucasicum* as junior synonym of *T. forte*, that was confirmed by Radchenko (1992b), based on the investigation of the type material of both *T. forte* (workers from Crimea), and *T. taurocaucasicum*.

The fact that *T. forte* was described from distant parts of Europe makes additional complication on its nomenclature. Thus, west and east European authors (Emery 1909, Santschi 1936, Bernard 1967, Collingwood 1978, Schulz 1996, Seifert 1996, etc. *vs.* Ruzsky 1905, Dlussky *et al.* 1990, Atanasov & Dlussky 1992, Radchenko 1992a, 1992b, Radchenko *et al.* 1998, Czechowski *et al.* 2002) determined from the south-western and the south-eastern Europe two assuredly different species under the name "*Tetramorium forte*".

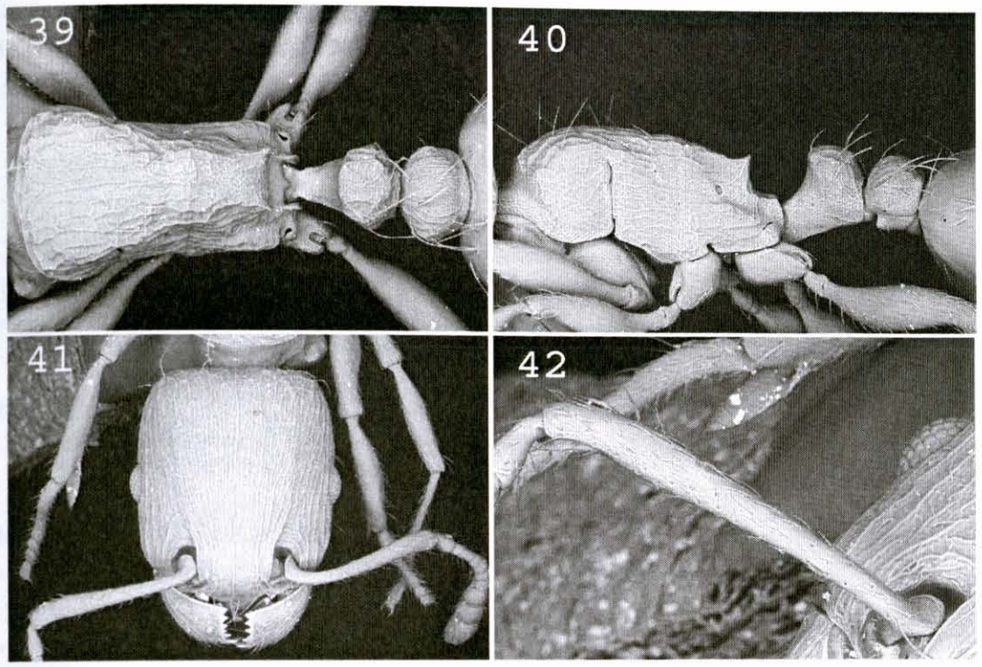
In order to solve the complexity on the taxonomy of *T. forte* Güsten *et al.* (2006) designated the lectotype of *T. forte* from the syntype series from Albaron, Camargue, France, which conforms to *T. forte* as recognized by West European authors.

So, what is the species wrongly recognized by Eastern authors as *T. forte*? A direct comparison of the type specimens of *T. chefketi*, *T. caespitum* var. *sarkissiani*, *T. turcomanicum*, "*T. forte*" from Crimea and *T. taurocaucasicum* does not show any morphological or morphometrical differences between these taxa. *Tetramorium chefketi* and *T. caespitum* var. *sarkissiani* are synonyms and were published on the same date in the same work (Forel 1911: 332.) the senior synonymy of *Tetramorium chefketi* Forel, 1911 is now fixed as the first reviser act (ICZN 1999. Art. 24.2.2.) in this paper.

Radchenko (1992a) considered *T. turcomanicum* as a good species, but material, referred by him to *T. turcomanicum*, apparently belong to *T. sulcinode* (see notes under *T. sulcinode*). Radchenko (1992a, 1992b), examined the syntype workers of *T. moravicum* Kratochvíl, 1944 (ZMMU), and synonymised it with "eastern *T. forte*" (i.e. *T. chefketi* acording current paper). However, further reinvestigations of types and non-type material of *T. moravicum* show the heterospecifity of these species.

5. *Tetramorium exile* Csősz & Radchenko New species (figs 39–42)

Description of Worker (figs 39–42). Morphometric data of the holotype worker: CL: 725; CW: 675; FR: 240; FL: 240; SL: 585; ML: 790; MW: 440; PEW: 215; PEH: 240; NOH: 130; NOL: 130; PEL : 155; PPW: 240; PPL: 160; PPH: 210; SPL: 90; SPSP: 130; EL: 135; EH: 100; ED: 170; Small size, CS 695 [620, 743]. Whole body and appendages brown to dark brown. Head elongated, CL/CW 1.06 [1.04, 1.08], with very feebly convex sides, straight occipital margin and narrowly rounded occipital corners. Eyes small, EYE 0.167 [0.158, 0.175]. Frons very narrow, FR/CS 0.34 [0.33, 0.35], frontal lobes as wide as frons, FL/FR 1.0 [1.0, 1.02]. Scape very long, SL/CS 0.84 [0.82, 0.85], without longitudinal dorsal carina basally, smooth and shiny. Promesonotal dorsum slightly convex, metanotal groove very shallow or completely absent. Propodeal teeth moderately long and acute, directed mainly upwards. Petiolar node trapezoidal in profile, NOH/NOL 1.04 [0.90, 1.16], petiole relatively high, PEH/NOL 1.83 [1.70, 1.96]. General appearance moderately rugose, ground surface microreticulate, dull. Head dorsum longitudinally rugose, ground surface microreticulate, occiput rugoso-reticulate. Alitrunk dorsum and petiolar node rugoso-reticulate ground surface microreticulate, mesopleuron usually rugulose and microreticulate, dorsum of postpetiole longitudinally rugulose and microreticulate. Polygonal striation continuous on 1st gastral tergite (see fig. 8.). Ventral surface of head with several short and few moderately long, straight setae arising posterior to buccal cavity (see fig. 5.).



FIGURES 39–42. *Tetramorium exile* Csősz & Radchenko New species. Worker: alitrunk petiole and postpetiole, Fig. 39. dorsal view, Fig. 40. lateral view, Fig. 41. Head, Fig. 42. scape, dorsal view.

Gynes and **Males** are unknown.

Material examined: HOLOTYPE ☿: **AFGHANISTAN** – O-Afghanistan, Walang, 2520m, Salangtal, Hindukusch, 29.09.1952. leg. J. Klapperich (HNHM); PARATYPES: 35 ☿☿ from the same nest (3☿ / HNHM, 4☿ / MIZ, 25☿ / NHMW 1☿ /PCAS).

Morphometrics: (33 workers were measured).

Diagnosis. According to the literature (Collingwood 1961a, 1961b, Pisarski 1967a, 1967b, 1969) and collection materials there are no similar *Tetramorium* species, described from Afghanistan. Workers of *T. exile* **n. sp.** differ from related species by absence of psammophore, relatively small eyes, (EYE, Table 1.), extremely narrow frons, the very long and smooth scape (FR/CS and SL/CS, Table 1.), and by the trapezoidal petiolar node (NOH/NOL and PEH/NOL, Table 1.). *Tetramorium exile* **n. sp.** is mostly similar to *T.anatolicum* **sp.n.** and *T. chefketi*, but differs from the latter by the shape of petiolar node: in *T. exile* **n. sp.** it is relatively high and short, trapezoidal in profile, while in *T. chefketi* it is relatively low and longer, cubic in profile, (PEH/NOL and NOH/NOL, Table 1.). The following Discriminant $D(3_a)$ function proves the separation between *T. exile* **n. sp.** and *T. chefketi*: $D(3_a)$ = 0.052 PPW -0.057 FL -0.081 NOL +14.667, *T. exile* **n. sp.** $D(3_a)$ = +3.418 ±0.901 [+2.169, +4.756] (n=33), *T. exile* **n. sp.**, holotype $D(3_a)$ = +3.023, p< 0.001, *T. anatolicum* **n. sp.** $D(3_a)$ = +3.164 ±0.796 [+1.746, +4.606] (n=38), *T. anatolicum* **n. sp.**, holotype $D(3_a)$ = +3.246, p< 0.001, *T. chefketi* $D(3_a)$ = -3.417 ±1.004 [-5.680, -0.524] (n=107), *T. chefketi* lectotype $D(3_a)$ = -4.179, p< 0.001; *T. sarkissiani* lectotype $D(3_a)$ = -2.809, p< 0.001; *T. turcomanicum* syntype worker $D(3_a)$ = -4.169, p< 0.001.

T. exile **n. sp.** differs from *T. anatolicum* **n. sp.** by its longer scape and narrower frons (SL/CS and FR/CS, Table 1.). The following Discriminant $D(2_a)$ function provides the separation between *T. exile* **n. sp.** and *T. anatolicum* **n. sp.**: $D(2_a)$ = 0.081 SL - 0.151 FL - 7.652

T. exile **n. sp.** $D(2_a)$ = +2.683 ±0.762 [+1.193, +3.493] (n=33), *T. exile* **n. sp.**, holotype $D(2_a)$ = +3.493, p< 0.001, *T. anatolicum* **n. sp.** $D(2_a)$ = -2.683 ±1.064 [-4.682, -0.042] (n=38), *T. anatolicum* **n. sp.**, holotype $D(2_a)$ = -3.117, p< 0.001.

For further combination of morphometric characters see Table 1–2.

Distribution. Known from the type locality only.

Etymology. This adjective [exilis / -e; exile (neutrum) = slender] refers to the elongate body of this species.

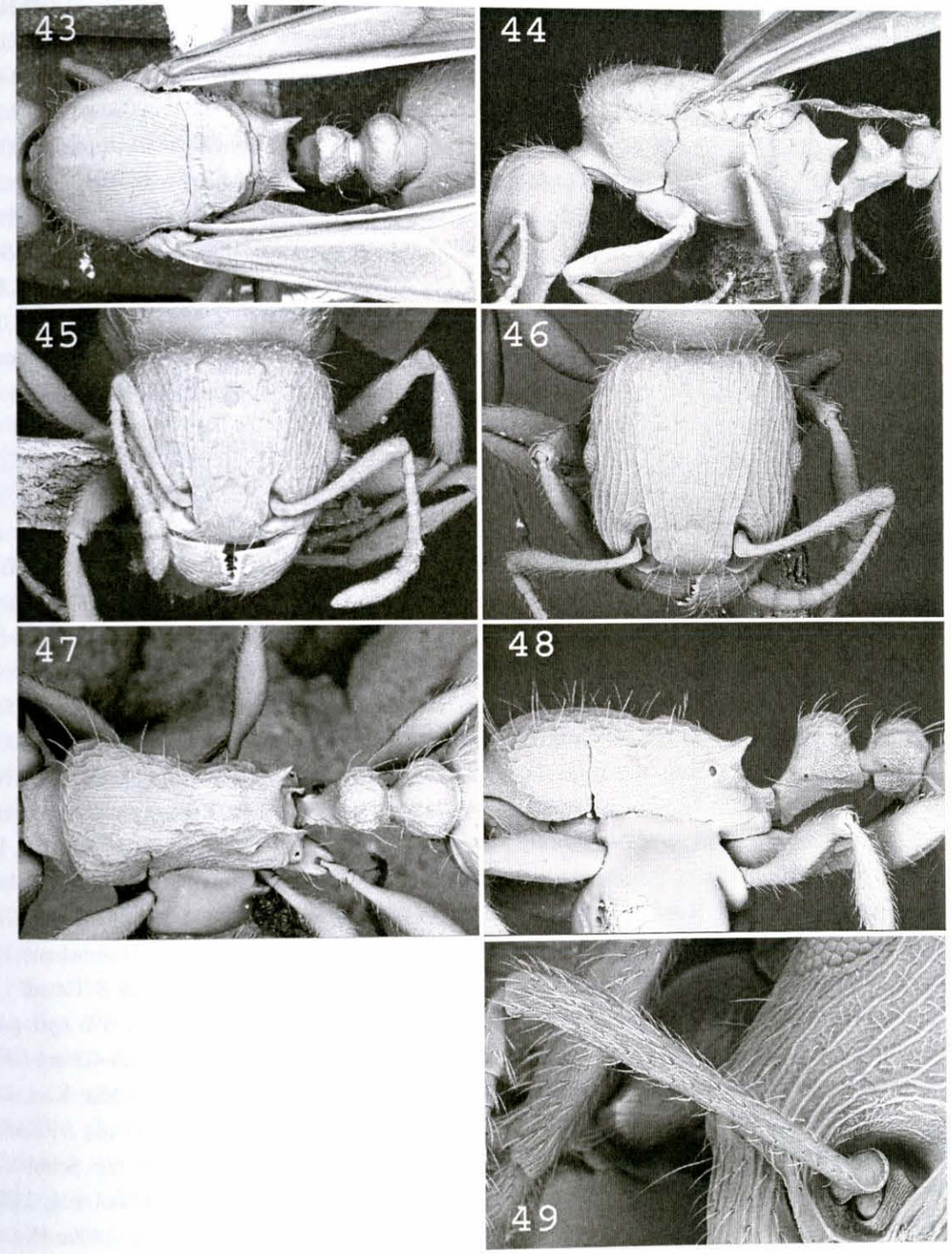
6. *Tetramorium moravicum* Kratochvíl, 1941 (figs 43–49)

Tetramorium moravicum Kratochvíl, 1941: 86 (☿, ♀); also described as new in Kratochvíl 1944: 71 (☿, ♂); TYPE MATERIAL: PARATYPES "Tetramorium moravicum" [—] "1941" [/] "Mohelno" [now CZECH REPUBLIC] [/] "l. Dr Kratochvíl" [—] Paratypus [/] "Tetramorium" [/] "moravicum Kratochv." (1☿, 2♂ / ZMMU); junior synonym of *Tetramorium forte*: Radchenko 1992b: 51; revived from synonymy: Seifert 1996: 160, not Radchenko et al 1998: 110, Czechowski *et al.* 2002: 66, Radchenko *et al.* 2004: 77;
Tetramorium rhenanum Schulz, 1996: 391 (☿, ♀, ♂) TYPE MATERIAL: HOLOTYPE and PARATYPES: Hessen, Rheinland, [GERMANY] 3km N. Lorchhausen, 35km W. Wiesbaden, 100mH, 15.06.1994. leg. Schulz (3☿, 1♀ / MHNG, 12☿, 3♀, 2 ♂ / PCAS); junior synonym of *T. moravicum* Schlick-Steiner *et al.* 2005: 1;

Redescription of worker (figs 46–49). Medium to large size, CS 833 [720, 953]. Whole body and appendages dark brown to black. Head nearly square, CL/CW 1.02 [0.97, 1.06], with very feebly convex sides, straight occipital margin and narrowly rounded occipital corners. Eyes small, EYE 0.170 [0.165, 0.183]. Frons moderately narrow, FR/CS 0.36 [0.34, 0.38], frontal lobes usually as wide as frons, rarely slightly wider, FL/FR 1.01 [1.0, 1.04]. Scape long, SL/CS 0.80 [0.77, 0.83], with well developed longitudinal dorsal carina basally, parallel costulae extending scape. Promesonotal dorsum slightly convex, metanotal groove deep. Propodeal teeth long. Petiolar node trapezoidal in profile, NOH/NOL 1.07 [0.90, 1.29], petiole relatively high, PEH/NOL 1.94 [1.72, 2.23]. General appearance coarsely rugoso-reticulate, ground surface microreticulate, dull. Head dorsum longitudinally rugose and microreticulate, occiput rugoso-reticulate. Alitrunk dorsum, mesopleuron and dorsum of petiolar node rugoso-reticulate, ground surface coarsely microreticulate, dorsum of postpetiole longitudinally rugulose and microreticulate. Polygonal striation continuous on 1st gastral tergite (see fig. 8.). Ventral surface of head with several short and few moderately long, straight, or few ìCî-shape setae arising posteriorly to buccal cavity (see fig. 5).

Redescription of gyne (figs 43–45). Medium to large size, CS 1198 [1045, 1275]. Whole body and appendages dark brown to black. Head distinctly wider than long, CL/CW 0.88[0.84, 0.92], with straight, subparallel sides, straight occipital margin and widely rounded occipital corners. Frons narrow, FR/CS 0.36 [0.34, 0.38], frontal lobes as wide as frons, FL/FR 1.0 [1.0, 1.02]. Scape moderately short, SL/CS 0.73 [0.71, 0.75], with well developed longitudinal dorsal carina basally, parallel costulae extending scape. Head as wide as scutum, MW/CS 1.07 [1.05, 1.13]. Propodeal teeth long. Dorsal crest of petiolar node convex, with well visible protuberance medially in frontal view; in profile petiolar node dorsum blunt. Petiole and postpetiole relatively narrow, WAIST 0.92 [0.86, 1.0]. General appearance coarsely rugose, ground surface microreticulate, dull. Head dorsum, occiput and sides rugoso-reticulate, ground surface microreticulate. Frons longitudinally rugose and microreticulate. Scutum longitudinally rugose, anteriorly smooth, scutellum more or less smooth, sides finely rugulose. Sides of alitrunk, ruguloso-reticulate and microreticulate, ventral part of katepisternum usually smooth and shiny. Dorsum of petiolar node and postpetiole coarsely reticulate; median protuberence of petiolar node smooth. Polygonal striation disrupted on 1st gastral tergite, sometimes continuous basally. Ventral surface of head with several short and few moderately long, straight, or few C-shape setae arising posterior to buccal cavity.

Redescription of male. Whole body and appendages black. Head with feebly convex sides, straight occipital margin and rounded occipital corners. Head narrower than scutum. Propodeal teeth very short, propodeum nearly rounded in profile. Dorsal crest of petiolar node blunt not emarginate in frontal wiew. Head, alitrunk and waist finely sculptured, partly shiny, the rest of ground surface microreticulate. Head finely reticulate ground surface microreticulate. Scutum finely rugulose, laterally and anteriorly smooth and shiny. Scutellum longitudinally rugulose, usually shiny medially. Sides of alitrunk finely rugose and microreticulate. Dorsum of petiolar node feebly reticulate and microreticulate, postpetiole generally smooth and shiny. Polygonal striation disrupted on 1st gastral tergite.



FIGURES 43–49. *Tetramorium moravicum* Kratochvíl, 1941.Gyne: alitrunk petiole and postpetiole, Fig. 43. dorsal view, Fig. 44. lateral view, FIGURE 45. head. Worker: Fig. 46. head. Alitrunk petiole and postpetiole, Fig. 47. dorsal view, Fig. 48. lateral view, Fig. 49. scape, dorsal view.

Material examined (64 nest series including 374 workers, 28 gynes and 43 males). **AUSTRIA**—Setzberg, 1,5km N. Spitz, Wachau, 48°23'N 15°25'E 300mH, 05.05.2001. nr.251. & nr.253. leg. Schulz (4☿ /

PCAS); **BULGARIA**—Blagoierbad, 15.06.1972. leg. Poldi (2☿ / MSNM); Malko Trnovo, 25.05.1958, leg. Pisarski (7☿ / HNHM); **FRANCE**—Breil-sur-Roya 6km N, Dep. Alpes Maritimes, vic. Mauriou, 450–700mH, 17.07.1994. leg. Schulz (3☿ / MHNG, 20☿, 4♂ / PCAS); Camargue, Albaron, 15.06.1974. leg. Poldi (2☿, 2♀ / MSNM), 20.06.1974. leg. Poldi (2W, 2♂ / MSNM); GEORGIA–Nr.3672. Kavkaz, Gumista, Suchumi, 21.11.1963, leg Pisarski (6☿, 3♂ / HNHM, 6☿, 4 ♂ / MIZ); **GERMANY**—Hessen, Mittleres Rheintal, *oberhalb* Lorchhausen, 250m, 18.IV.2003, leg. A. Schulz, R. Güsten & M. Sanetra (3☿ /HNHM, 6☿ / PCAS); Kaiserstuhl, Badberg ¾km w Steinbr., Bd.-Wtmbg., 320m, 13.IV.2003, leg. A. Schulz, R. Güsten & M. Sanetra (3☿ /HNHM, 6☿ / PCAS); Kaiserstuhl, Schelingen, Bd.-Wtmbg., (*Südteil*), 300-320m, 12.IV.2003, leg. A. Schulz & R. Güsten (3☿ /HNHM, 6☿ / PCAS), (*Nordteil*), 320-340m, 13.IV.2003, leg. A. Schulz, R. Güsten & M. Sanetra (3☿ /HNHM, 6☿, 3♀, 6♂ / PCAS); Mittleres Rheintal, obh. Bacharach-Steeg 200m Rheinland-Pfalz, 18.IV.2003, leg. A. Schulz, R. Güsten & M. Sanetra (3☿ /HNHM, 6☿ / PCAS); Nahetal, 1km e Burg Layen, 120m, Rheinland-Pfalz, 14.IV.2003, leg. G. Heller, A. Schulz & R. Güsten (3☿ /HNHM, 6☿ / PCAS); Nahetal, 2km SE Schloßböckelheim, 150m, Rheinland-Pfalz, 14.IV.2003, leg. G. Heller, A. Schulz & R. Güsten (3☿ /HNHM, 10☿, 8♀, 8♂ / PCAS); Nahetal, 2km w Norheim, 120m, Rheinland-Pfalz, 14.IV.2003, leg. G. Heller, A. Schulz & R. Güsten (3☿ /HNHM, 6☿ / PCAS); **GREECE** —Ossa Mt., 28.05.1989, nr.GR001. leg. R. Sciaky (6☿ / HNHM); Parnon, 4km WSW. Kastanitsa, 37°17'N 22° 40'E, Peleponnes, Prov. Arkadia, 1200-1400mH, 22.04.2000. nr.03–19. leg. A. Schulz (4☿ / PCAS); Mani, 20 km SW Githeo, 36°40' N 22°24'E, Peleponnes, Prov. Lakonia, 50 mH, 23.04.2000. nr.04-31. leg. A. Schulz (1♀,5☿ / PCAS); Peloponesos Aetos, 27.06.1986. leg. Sabbadini (4☿ / MSNM); Pilion, vic. Chania, Prov. Magnissía, 1000–1400mH, 14.05.1996. nr.11-213., nr.11–214. & nr.11–215. leg. A. Schulz, K. Vock (12☿ / PCAS); Smolikos Mt., N.slope, 28.05.1989, nr.GR003. leg. R. Sciaky (2☿ / HNHM); **HUNGARY**—Mátrafüred, Szent-Iványi, 02.05.1937. leg. Móczár (8☿ / HNHM);. Sóshartyán, 24.04.1999. nr.04. leg. Bálint (1☿ / HNHM); **ITALY**—Casola, 670m Appennines, Parmense, 09.1991. leg. Grasso (4☿ / MSNM); Em.Rom (Re) Cinquecerri, 24.04.1978. leg. Ferri (4☿ / MSNM); Forti di Genova, 15.04.1993. leg. Poldi (3☿ / MSNM); Mts. Subasio, (PG) 05.06.1993. leg. Platania (2☿, 1♀ / MSNM); Novafeltria, Emilia, 21.09.1951, leg. E.C.M.Yarrow (11☿ / NHM); Piemonte, Cuneo prov., Valdieri env. 800mH, 16.06.1988, leg. Rigato (8☿, 1♀, 1♂ / NHM); Sulmona, AQ, 05.02.1962. leg. Poldi (2☿ / MSNM); Umbria, Spoleto Protte [?], 01.04.1989. leg. Poldi (5☿ / MSNM); Valdieri (CN) 800–850m, 03.07.1989. leg. Rigato (2☿, 1♀ / MSNM); **ROMANIA**—Kolozsvár (Cluj Napoca), Szénafüvek, Transylvania, 07.08.2003. no.AA087. leg. Markó (10☿ / HNHM); Kolozsvár, Szénafüvek, Transylvania, 17.09.2003. leg. Markó (5☿ / HNHM); **SERBIA-MONTENEGRO**—Brezoviza, Mts. Sar, Kosovo, 900–1200mH, 23.05.1971, nr.16. leg Papp & Horvatovich (6☿ / HNHM); Nis. Jugo nr.384, 18.1984. leg. Poldi (1☿ / MSNM); Peč Pečka, Banja, Kosovo, 600mH, 18.05.1971. nr.14. leg. Papp & Horvatovich (2☿ / HNHM); Titograd, 10.06.1972. leg. Poldi (2☿, 1§, 1♂ / MSNM); **TURKEY**—Aydintepe, vil. Gümüshane 1200mH, 01.07.1975. nr.10. leg. Osella (3☿, 3♀, 1♂ / MSNM); Bitlis, 10km SW Kücüksu 15km S Tatvan 1700mH, *Rasenfläche an Bachlauf* 16.06.1993. nr.1084. leg. Schulz (6☿ / PCAS); Erzurum, 5km SW Aydogdu 20km SW Göle, 1400mH, 26.06.1993. nr.1149. leg. Schulz (6☿,1♂/ PCAS); Erzurum, Sac Gecidi 40km SE Horasan, 2300mH, *Hochsteppe und Bachlauf, Wiese* 22. 06. 1993. nr. 1114. leg. Schulz (6☿ / PCAS); Kars, Dagpinar 25km SE Kars 1800mH, *Steppe mit Vulkangesteinen* 23.06.1993. nr.1121. leg. Schulz (6☿ / PCAS); Kars, *nahe* Posof, 1700mH, *an der Georgischen Grenze* 25.06.1993. nr.1144. nr.1145. nr.1146. leg. Schulz (30☿, 6♀, 5♂ / PCAS); Kars, *zwischen* Cildir *und* Camlicatak, ca 20-40km E Ardahan, 1800–2000mH, 24.06.1993. nr.1125. leg. Schulz (3☿ / PCAS); Rize, 20km NW Ovitdagi Gecidi 30km SE Rize 1000–1400mH, *Laubwald 50% auf Sand* 30.06.1993. nr.1199. leg. Schulz (6☿ / PCAS); Van, 20kmN-NW Catak 2300–2700mH, *Steppenvegetation* 18.06.1993. nr.13-1098. leg. Schulz (5☿ / PCAS); Van, 5km SE Dedeli 30km SE Patnos 1700mH, *Hochsteppe* 20.06.1993. nr.1103. & nr.1105. leg. Schulz (12☿ / PCAS); Van, 8km E Budakli 40 km W Gevas, 2200mH, *feuchte Wiese und Steppe* 17.06.1993. nr.1086., nr.1088. & nr.1090. leg. Schulz (29☿, 1♀ / PCAS); Van, Migaros, 15.08.1987. leg. Pavesi (2☿ / MSNM); **UKRAINE** – Manhup-Kale, Krim, SW Bachcysaraj, 300–500mH, 12.08.1995. nr.04-T524. leg. M. Sanetra (6☿ / PCAS); Simferopol, S-Krim, vic. Zalis's'a. 300–500mH, 13.08.1995. nr.05-T527. & nr.05-T528. leg. leg. Sanetra (3☿ / MHNG, 11☿ / PCAS);

Morphometrics: (108 workers and 12 gynes measured).

Diagnosis. Workers of *T. moravicum* are distinguishable from most species of the *chefketi* species complex (except for *T. rhodium* and *T. syriacum*) by their usually finely costulate scapes bearing a well visible and long dorsal carina basally. The most distinctive features, to separate *T. moravicum* from *T. rhodium* workers, the shape of the petiole in profile (NOH/NOL, PEH/NOL, Table 1.), and the relative length of scape (SL/CS, Table 1.); the frontal width (FR/CS, Table 1.) gives appropriate discrimination of the workers of *T. moravicum* and *T. syriacum*.

Gynes of *T. moravicum* differ from known gynes of other species of the *chefketi* species complex by the relatively wide scutum, MW/CS 1.07 [1.05, 1.13] and by the dorsal carina of the scape.

For further combination of morphometric characters see Table 1–2.

Distribution. Widespread in the western Palaearctic from S France to Caucasus. The westernmost known locality of this species is Camargue, France.

7. *Tetramorium rhodium* EMERY, 1922 Status revised (figs 50–53)

Tetramorium caespitum var. *rhodia* EMERY, 1922: 277; first available use of *Tetramorium caespitum* ssp. *caespitum* var. *rhodia* EMERY, 1915: 3 (☿); TYPE MATERIAL: SYNTYPE ☿☿, "Rodes" [GREECE] [/] "Kattabea" [—] "Tetr. caesp." [/] "var. rhodia Emery" (2☿ / MHNG, 2☿ MSNG); *Tetramorium caespitum rhodia*: EMERY 1925: 179; Raised to species rank hereby.

Redescription of worker (figs 50–53.). Medium to large size, CS 832 [720, 895]. Whole body and appendages black. Head square, CL/CW 0.99 [0.98, 1.02], with somewhat convex sides, slightly concave occipital margin and rounded occipital corners. Eyes small, EYE 0.173 [0.163, 0.184]. Frons moderately wide, FR/CS 0.38 [0.36, 0.40], frontal lobe as wide as frons, FL/FR 1.0 [1.00, 1.02]. Scape short, SL/CS 0.73 [0.71, 0.75], with short dorsal carina basally, well visible parallel costulae extending scape. Promesonotal dorsum convex, metanotal groove shallow, but distinct. Propodeal teeth moderately long. Petiolar node cubic in profile, NOH/NOL 0.84 [0.76, 0.97], petiole relatively low, PEH/NOL 1.50 [1.38, 1.73]. General appearance coarsely rugose, ground surface coarsely microreticulate, dull. Head dorsum and occiput longitudinally rugose and coarsely microreticulate, its sides rugoso-reticulate and microreticulate. Alitrunk dorsum rugoso-reticulate and coarsely microreticulate, mesopleuron coarsely microreticulate. Dorsum of petiolar node rugoso-reticulate and microreticulate, dorsum of postpetiole longitudinally rugulose and microreticulate. Polygonal striation continuous on 1st gastral tergite, posteriorly disrupted. Basal part of first gastral tergite microreticulate (see fig. 7.), MRG 319.7 ±126.5 [50, 500]. Ventral surface of head with several short and moderately long, straight, or few C-shape setae arising posteriorly to buccal cavity (see fig. 5.).

Gynes and **Males** are unknown.

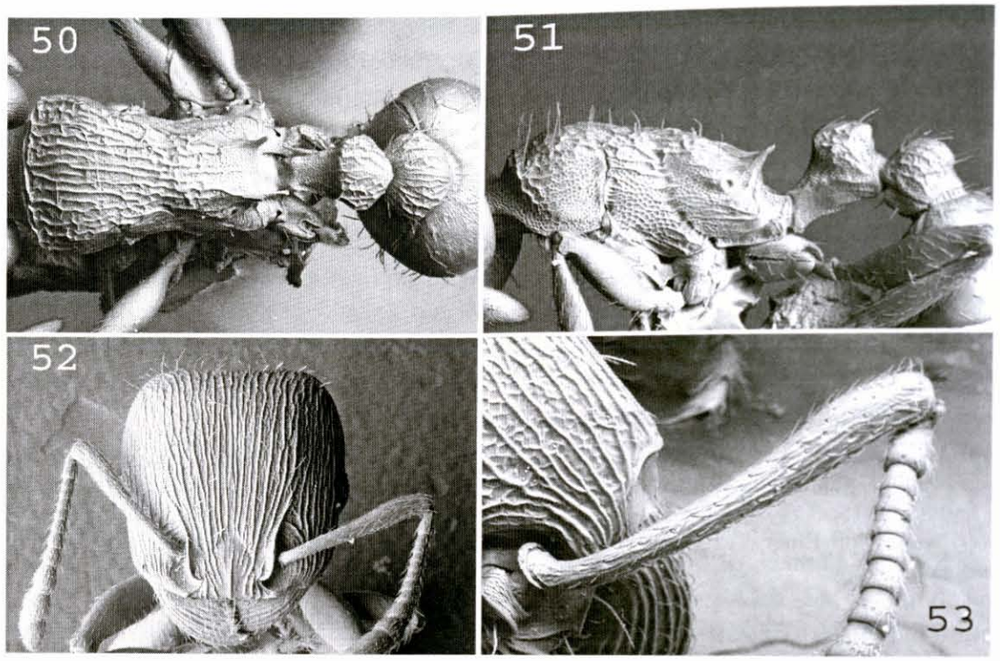
Material examined (3 nest series including 18 workers). **CYPRUS**—Platres 1km E Mandria, 900mH, Prov. Limassol, 30.03.1994. nr.13. leg. Sanetra (3☿); **TURKEY**— Denizli, Yahsiler, 35 km SEE Karacasu, 30 km SW Denizli 800 mH *Kiefernwald*, 20.05.93. nr.886, leg Schulz (6☿ /HNHM); Izmir, 10km SE. Beydag, 50km NE. Aydin, 600mH, *Bachlauf, Bewaldet*, 20.05.1993. nr. 879, leg. Schulz (1☿ / MHNG, 8☿ HNHM).

Morphometerics: (22 workers were metrically investigated).

Diagnosis. Workers of *T. rhodium* differ from related species by the lack of psammophore, relatively small eyes, (EYE, Table 1.), very short and very feebly costulate scape (SL/CS, Table 1.), cubic petiolar node and moderately wide frons (FR/CS, Table 1.). Workers of *T. rhodium* mostly resemble those of, *T. syriacum, T. sanetrai* **n. sp.** and *T. chefketi*. Workers of *T. rhodium* well differ from those of *T. syriacum* by their narrower frons, FR/CS (Table 1.), from those of *T. chefketi* by their shorter scape SL/CS (Table 1.). *Tetramorium rhodium* and *T. sanetrai* **n. sp.** are very similar in both, general appearance and metric characters. For separation

between *T. rhodium* and *T. sanetrai* **n. sp.** see differential diagnosis of *T. sanetrai* **n. sp.** below. For further combination of morphometric characters see Table 1–2.

Distribution. This species seems to be widespread over Asia Minor, Rhodes and Cyprus.



FIGURES 50–53. *Tetramorium rhodium* EMERY, 1922. Worker: alitrunk petiole and postpetiole, Fig. 50. dorsal view, Fig. 51. lateral view, Fig. 52. Head, Fig. 53. scape, dorsal view.

8. *Tetramorium sanetrai* Schulz & Csősz New species (figs 54–60)

Description of Worker (figs 57–60.). Morphometric data of holotype worker: CL: 720; CW: 695; FR: 245; FL: 265; SL: 550; ML: 770; MW: 430; PEW: 200; PEH: 240; NOH: 140; NOL: 115; PEL : 155; PPW: 250; PPL: 155; PPH: 220; SPL: 80; SPSP: 140; EL: 145; EH: 100; ED: 190; Small to medium size, CS 740 [683, 783]. Whole body and appendages dark brown to black. Head nearly square, CL/CW 1.01 [0.98, 1.04], with very feebly convex sides, straight occipital margin and rounded occipital corners. Eyes small, EYE 0.172 [0.164, 0.185]. Frons moderately narrow, FR/CS 0.37 [0.36, 0.38], frontal lobes as wide as frons, FL/FR 1.0 [1.0, 1.02]. Scape short, SL/CS 0.74 [0.72, 0.75], without, or with very short dorsal carina basally, moderately shiny, or very feebly costulate distally. Pronotum with weakly marked humeri formed by stronger rugae. Promesonotal dorsum slightly convex, metanotal groove rather deep. Propodeal teeth rather long. Petiolar node cubic, robust, with broad, slightly convex node in profile, NOH/NOL 0.89 [0.83, 0.97], petiole relatively low and long, PEH/NOL 1.54 [1.47, 1.63]. General appearance coarsely rugose, ground surface microreticulate, dull. Head dorsum longitudinally rugulose and feebly microreticulate. Alitrunk dorsum rugoso-reticulate and microreticulate. Mesopleuron usually coarsely rugoso-reticulate and microreticulate. Dorsum of petiolar node and dorsum of postpetiole rugoso-reticulate and microreticulate. Polygonal striation continuous on 1st gastral tergite (see fig. 8.). Ventral surface of head with several short and few moderately long, straight, or few C-shape setae arising posterior to buccal cavity (see fig. 5.).

Description of Gyne (figs 54–56.). Small size, CS 986 [973, 995]. Whole body and appendages black. Head clearly wider than long, CL/CW 0.89 [0.86, 0.90], with feebly convex sides, straight occipital margin and rounded occipital corners. Frons moderately narrow, FR/CS 0.38 [0.37, 0.38], frontal lobes as wide as frons, FL/FR 1.0 [1.0, 1.0]. Scape very short, SL/CS 0.67 [0.66, 0.68], without dorsal carina basally, moderately smooth and shiny. Head wider than scutum, MW/CS 0.94 [0.94, 0.95]. Propodeal teeth long. Dorsal crest of petiolar node straight in frontal view; node with flattened dorsal plate in profile. Petiole and postpetiole relatively narrow, WAIST 0.98 [0.97, 0.99]. General appearance coarsely rugose, ground surface microreticulate, dull. Head dorsum, occiput and frons longitudinally rugose, ground surface feebly microreticulate. Scutum and scutellum usually longitudinally rugose, lateral and antero-medial surfaces of scutum smooth and shiny, scutellum more or less smooth medially. Sides of alitrunk, including anepisternum and katepisternum, rugoso-reticulate and microreticulate, ventral part of katepisternum always rugulose, or microreticulate. Dorsum of petiolar node coarsely reticulate and microreticulate, medially shiny, dorsum of postpetiole coarsely reticulate and microreticulate. Polygonal striation disrupted on 1st gastral tergite, superficially microreticulate basally. Ventral surface of head with several short and few longer, straight or "C"-shape setae, arising posterior to buccal cavity.

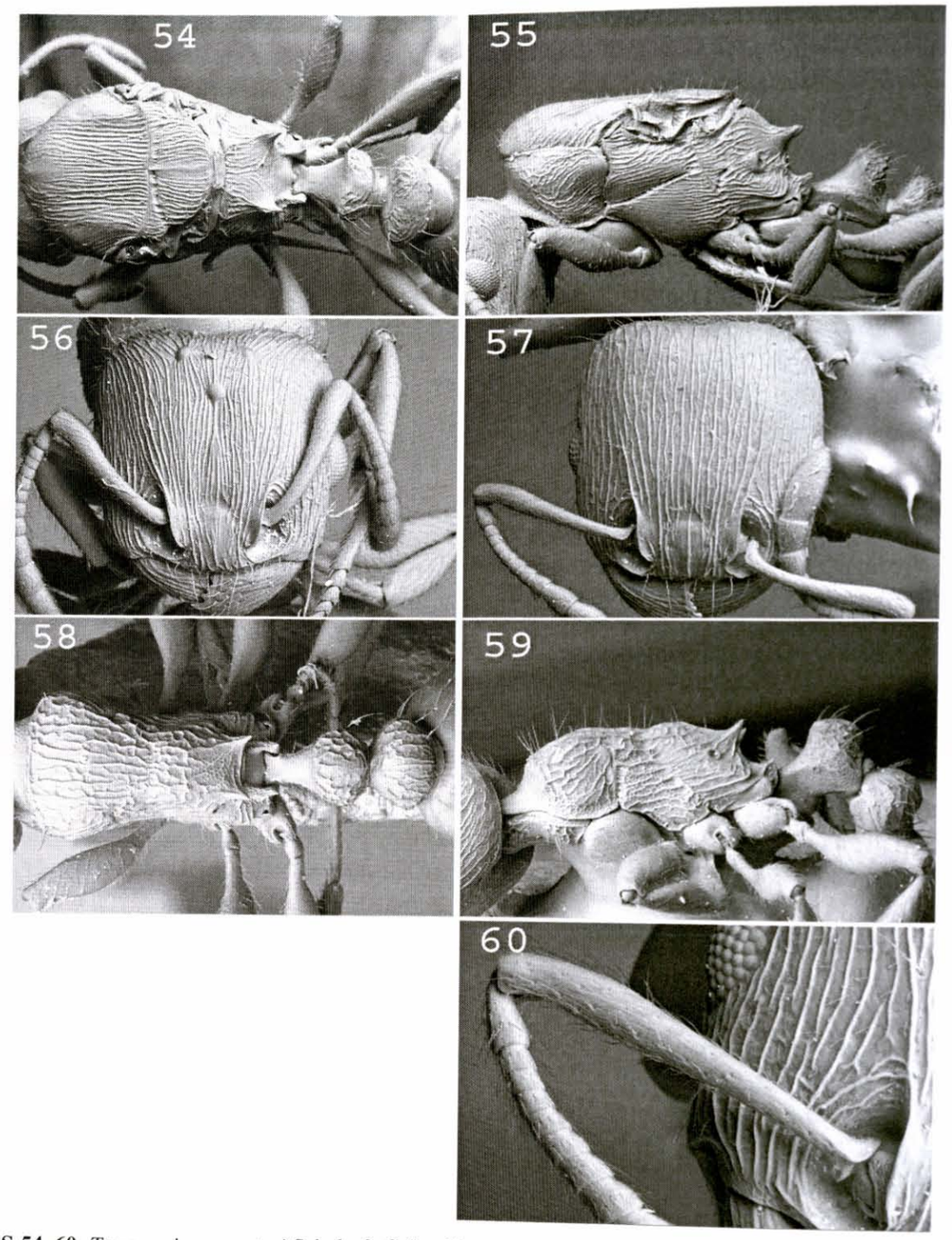
Description of Male. Whole body and appendages brownish black. Head with convex sides, rounded occipital margin and widely rounded occipital corners. Scutum wider than head. Propodeal teeth very short, propodeum slightly angulate in profile. Dorsal crest of petiolar node with sharp, slightly emarginated, with transversal edge in frontal view. Head and waist rugulose to reticulate, ground surface microreticulate, dull. Scutum finely rugulose, antero-laterally smooth and shiny. Scutellum rugulose and microreticulate. Sides of alitrunk finely rugose and microreticulate. Ventral part of katepisternum smooth and shiny. Dorsum of petiolar node finely reticulate and microreticulate. Postpetiole finely striate, shiny. Polygonal striae hardly visible on 1st gastral tergite.

Material examined (5 nest series including 43 workers, 11 gynes and 12 males).

HOLOTYPE ☿: **ITALY**—Calabria Prov. Catanzaro, 3 km NW Umbriatico, 350 mH, 19.05.1994, nr. 1305 leg. A. Schulz, R. Güsten, M. Sanetra (1☿ / HNHM); PARATYPES: **ITALY**—Catanzaro, 3 km NW Umbriatico, 350 mH, Calabria Prov. 19.05.1994, nr. 1305 leg. Schulz, Güsten, Sanetra (2☿ / HNHM); Catanzaro, 3km NW. Umbriatico, 350mH, Calabria, Prov. 19.05.1994, Nr. 1305 & 1309 leg. A. Schulz, R. Güsten, M. Sanetra (2☿ / HNHM, 3☿, 1♀, 1♂ / PCAS, 3☿, 1♀ / SMNK); Cosenza, 1km NW. Frascineto, 500mH, Calabria, Prov. 21.05.1994, Nr. T350 & 1366 leg. A. Schulz, R. Güsten, M. Sanetra (2☿, 2♀, 1♂ / HNHM, 2☿, 1♀, 1♂ / MCSN, 1☿, 1♀, / PCAS); Foggia, Gargano N. 528, ca. 2 km NE Abzweig n. Carpino, 700 mH Puglia Prov. 23.05.1994, nr. T353 leg. R. Güsten, M. Sanetra (3☿ / HNHM, 3☿ / MCSN, 3☿ / PCAS); Foggia, Gargano N. 528, ca. 2 km NE Abzweig n. Carpino, 700 mH Puglia Prov. 23.05.1994, nr. 383 leg. R. Güsten, M. Sanetra (3☿, 2♀, 3♂ / HNHM, 6☿, 2♀, 3♂ / PCAS, 3☿, 1♀, 2♂ / SMNK);

Morphometrics: (15 workers and 3 gynes measured).

Diagnosis. Workers of *T. sanetrai* **n. sp.** can be separated from related species by the absence of psammophore, relatively coarse body sculpture, cubic petiolar node (NOH/NOL and PEH/NOL, Table 1.) and very short scape (SL/CS, Table 1.). Workers of *T. sanetrai* **n. sp.** mostly resemble those of *T. rhodium* and *T. alternans*. *Tetramorium alternans* has microreticulate sculpture on dorsum of petiole and postpetiole with very feeble rugulae, and microreticulate, in contrast with *T. sanetrai* **n. sp.** dorsum of petiolar node and postpetiole rugoso-reticulate and microreticulate. Differentiation between *T. sanetrai* **n. sp.** and *T. rhodium* is based on microreticulation of the body including gaster and scape sculpture. *Tetramorium rhodium* has stronger microreticulation between the primary ornamentation, best visible on head, petiole and postpetiole dorsum, which is strongly and irregularly rugose with densely microreticulate ground surface. In *T. sanetrai* **n. sp.** especially the dorsal surface of petiole is partially unsculptured and shining between the rugulae. The scape of *T. rhodium* is strongly sculptured, parallel costulae cover the whole surface of scape, in contrast to *T. sanetrai* **n. sp.** the scape is smooth and shinning at least proximally, distal end sometimes very feebly costulate. First gastral tergite of *T. rhodium* is basally microreticulate, that of *T. sanetrai* **n. sp.** is never microreticulate, but polygonally striate. Moreover, CS/PEW and CS/PPW give appropriate discrimination between *T. sanetrai* **n. sp.** and *T. rhodium* (Table 1.).



FIGURES 54–60. *Tetramorium sanetrai* Schulz & Csősz New species. Gyne: alitrunk petiole and postpetiole, Fig. 54. dorsal view, Fig. 55. lateral view, Fig. 56. head. Worker: Fig. 57. head. Alitrunk petiole and postpetiole, Fig. 58. dorsal view, Fig. 59. lateral view, Fig. 60. scape, dorsal view.

For separation between *T. sanetrai* **n. sp.** and *T. rhodium* the following Discriminant D(5) function is provided: 0.114 FR - 0.016 CS + 0.043 SL - 0.026 PEW - 0.086 PPW - 13.907 results of D(5) analysis: *T. sanetrai* **n. sp.** D(5) = -2.448 ±0.833 [-3.977, -1.137] (n= 15), *T. sanetrai* **n. sp.** holotype D(5) = -1.257, p< 0.001. *T. rhodium* D(5) +2.425 ±1.155 [+4.643, +1.155] (n= 22), *T. rhodium* syntype series D(5) mean = +2.652 (n= 4). The less complicate Discriminant $D(3_b)$ function gives separation: $D(3_b)$ = 0.118 MW - 0.121 PEH - 0.084 PPH - 4.585. *T. sanetrai* **n. sp.** $D(3_b)$ = -2.643 ±0.901 [-4.022, -0.882] (n= 15), *T. sanetrai* **n. sp.** holotype $D(3_b)$ = -1.302, p< 0.001. *T. rhodium* $D(3_b)$ = +2.643 ±1.449 [-0.619, +4.595] (n= 22), *T. rhodium* syntype series $D(3_b)$ mean +3.665 (n= 4). Petiole and frons characters (NOH/NOL, PEH/NOL, FR/CS, Table 1.) give appropriate separation between *T. sanetrai* **n. sp.** and *T. alternans*.

For separation between *T. sanetrai* **n. sp.** and *T. alternans* the following Discriminant $D(2_b)$ function is provided below: *T. sanetrai* **n. sp.** vs. *T. alternans* $D(2_b)$= 0.093 FR - 0.148 NOL - 2.941 results of $D(2_b)$ analysis. *T. sanetrai* **n. sp.** $D(2_b)$ = -2.647 ±0.866 [-4.206, -0.982] (n= 15), *T. sanetrai* **n. sp.** holotype $D(2_b)$ = -1.528, p< 0.001 ; *T. alternans* $D(2_b)$ +2.647 ±0.878 [+1.069, +4.647] (n= 34), *T. alternans* lectotype $D(2_b)$ = +1.969, p<0.001, *T. kahenae* lectotype $D(2_b)$ = +1.070, p =0.01.

Gynes of *T. sanetrai* **n. sp.** can be distinguished by lacking of psammophores, smooth scape, wide scutum, (MW/CS Table 2.) relatively narrow petiole and postpetiole, (WAIST Table 2.) and rugo-reticulate katepisternum. Gynes of *T. sanetrai* **n. sp.** mostly resemble those of *T. chefketi*, but scape length (SL/CS, Table 2.) gives discrimination between them.

For further combination of morphometric characters see Table 1–2.

Distribution. Based on the studied material this species seems to be endemic to the South Italian mountains.

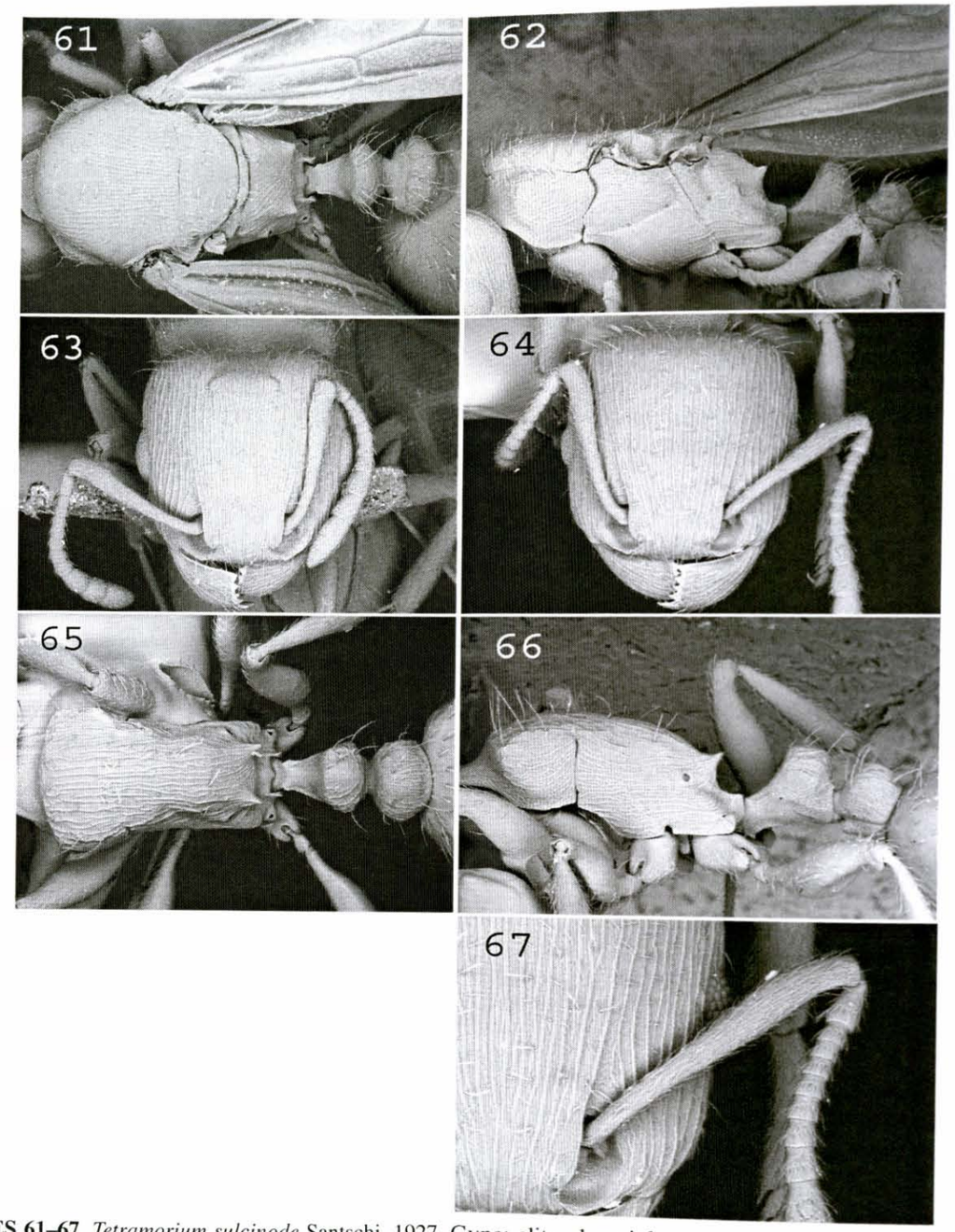
Etymology. This species [*sanetrai*] is dedicated to Matthias Sanetra for his fundamental work with the genus *Tetramorium*.

9. *Tetramorium sulcinode* Santschi, 1927 Status revised (figs 61–67)

Tetramorium caespitum var. *sulcinode* Santschi, 1927: 53 (☿); TYPE MATERIAL: LECTOTYPE ☿ and PARALECTOTYPE ☿☿ designated below (3☿ / NHMB); for the locality details see lectotype designation; junior synonym of *Tetramorium turcomanicum*: Radchenko, 1992b: 52; Raised to species rank hereby.

Tetramorium karakalense Dlussky & Zabelin, 1985: 229 (♀, ☿, ♂); TYPE MATERIAL: HOLOTYPE: "Typ. SSR, okr. [vicinity] p." [poselok=village] [/] "Kara-Kala 81–135" [now TURKMENISTAN] [/] "G. Dlusskij 3v.81." [Cyrillic letters] [—] Holotypus "Tetramorium karakalense" [/] "Dlussky et Zabelin" [Latin letters] (1§ / ZMMU); PARATYPES: Kopet-Dag, "g. [gora=mount] Gindere" [/] "ur. [urochishche] Karankidere" 19.6. [/] C. Zabelin "1981" [Cyrillic letters] [—] "T. karakalense" [Latin letters] (2☿, 1§, 1♂ / ZMMU); Kopet-Dag "31. V." [/] "n.tech. [lower flow] Najbirja [river]" [/] S. Zabelin "82" [Cyrillic letters] [—] "T. karakalense" [Latin letters] (3☿ / ZMMU); "Kopetdag 13. [/] "ur. Dashtoj VI." [/] G. Kuznetzov "84" [Cyrillic letters] [—] "T. karakalense"[Latin letters] (3☿ / ZMMU); **New synonymy**

Redescription of worker (figs 64–67.). Medium size, CS 801 [773, 853]. Whole body and appendages black. Head slightly longer than broad, CL/CW 1.02 [0.98, 1.03], with very weakly convex or straight sides, feebly convex or straight occipital margin and rounded occipital corners. Eyes large, EYE 0.186 [0.180, 0.190]. Frons moderately narrow, FR/CS 0.37 [0.36, 0.38], frontal lobes as wide as frons, or slightly wider, FL/FR 1.01 [1.0, 1.02]. Scape moderately long, SL/CS 0.78 [0.76, 0.81], without dorsal carina basally, smooth and shiny. Promesonotal dorsum convex, metanotal groove very shallow or completely absent. Propodeal teeth short. Dorsal surface of petiole steeply rounded backward, NOH/NOL 1.14 [1.06, 1.21], petiole relatively high, PEH/NOL 1.99 [1.87, 2.07]. General appearance finely rugulose, ground surface usually smooth and shiny (except for head). Head dorsum and occiput longitudinally rugulose and microreticulate, and sides ruguloso-reticulate, ground surface microreticulate. Alitrunk dorsum longitudinally rugulose ground surface smooth. Mesopleuron longitudinally rugulose and microreticulate. Dorsum of petiolar node semi-circularly rugulose, ground surface smooth, dorsum of postpetiole longitudinally rugulose and finely microreticulate. Polygonal striation continuous on 1st gastral tergite basally, disrupted posteriorly. Basal part of 1st gastral tergite sometimes very feebly costulate (not microreticulate), extending to 80µm [0, 120] posteriorly. Ventral surface of head with a row of short setae and very long psammophore arising just posteriorly to buccal cavity (see fig. 3, 4.).



FIGURES 61–67. *Tetramorium sulcinode* Santschi, 1927. Gyne: alitrunk petiole and postpetiole, Fig. 61. dorsal view, Fig. 62. lateral view, Fig. 63. head. Worker: Fig. 64. head. Alitrunk petiole and postpetiole, Fig. 65. dorsal view, Fig. 66. lateral view, Fig. 67. scape, dorsal view.

Redescription of gyne (figs 61–63). Small size, CS 973 [940, 1018]. Whole body and appendages black. Head slightly wider than long, CL/CW 0.94 [0.92, 0.97], with feebly convex sides, straight occipital margin and rounded occipital corners. Frons moderately narrow, FR/CS 0.37 [0.36, 0.37], frontal lobes as wide as frons, FL/FR 1.0 [1.0, 1.0]. Scape moderately short, SL/CS 0.73 [0.72, 0.74], without dorsal carina basally, smooth and shiny. Head wider than scutum, MW/CS 0.93 [0.92, 0.94]. Propodeal teeth short. Dorsal crest of petiolar node straight in frontal view; in profile petiolar node dorsum blunt. Petiole and postpetiole relatively narrow, WAIST 0.81 [0.80, 0.84]. General appearance rugulose, ground surface feebly microreticulate, shiny.

Frons and occiput longitudinally rugulose, ground surface feebly microreticulate, sides ruguloso-reticulate, ground surface microreticulate. Scutum longitudinally rugose (mainly medially), anteriorly and laterally smooth, scutellum more or less smooth medially, laterally finely rugulose. Sides of alitrunk ruguloso-reticulate and microreticulate, ventral part of katepisternum usually smooth and shiny. Dorsum of petiolar node reticulate, medially smooth, dorsum of postpetiole reticulate. Polygonal striation disrupted on 1st gastral tergite, superficially microreticulate basally. Ventral surface of head with a row of short and several very long C-shaped setae arising just posteriorly to buccal cavity.

Redescription of male. Whole body and appendages black. Head with convex sides, nearly semi-circular occipital margin and widely rounded occipital corners. Scutum wider than head. Propodeal teeth poorly developed. Dorsal crest of petiolar node with sharp edge, slightly emarginated in frontal view. Head, alitrunk and waist quite coarsely sculptured, ground surface microreticulate, dull. Head longitudinally rugulose, ground surface microreticulate. Scutum and scutellum longitudinally rugose. Sides of alitrunk with longitudinal rugae, katepisternum sometimes smooth and shiny ventrally. Dorsum of petiolar node coarsely reticulate, postpetiole longitudinally rugulose. First gastral tergite shiny.

Material examined (4 nest series including 7 workers, 1 gyne and 3 males). **AFGHANISTAN**—Oubeh, 12.06.1962 nr.a.1040. leg. K. Lindberg (3☿, 1♀, 1♂ / MIZ); **PAKISTAN**—Sirana (Sirani) nr.158d. leg. Anonymous (3☿, 2♂ / MIZ); **TURKMENISTAN**—Ipaj-kala, n 71–117, 29.05.1971 leg. Dlussky [paratype worker of *Tetramorium feroxoide* Dlussky & Zabelin, 1985] (1☿ / ZMMU).

Morphometerics: (16 workers and 3 gyne measured).

Evidences for heterospecifity of *T. sulcinode* type series. The syntype series of *Tetramorium caespitum* var. *sulcinode* Santschi, 1927 consists of six workers on two pins. One pin with four workers labeled: [label with Latin letters] "Ssemiretschie 14/vii.24" [/] "Ssukuluk, westlich" [/] "von Pishpek, NB.ii" [/] "N.Kusnetzow" [—] Type.

Another pin with two workers, collected at the same locality: [label with Cyrillic letters] ìSsemiretschie. Ssukulukî [/] 14-vii-1924. "N. Kusnetzov". This locality (Ssemiretschie, Ssuskuluk; Pishpek, leg. Kusnetzov) is mentioned as the type locality of *T. caespitum* var. *sulcinode* in the original description (Santschi 1927: 53, 54).

After the investigation of the types of *T. caespitum* var. *indocile* Santschi, 1927 (see below) we conclude that the type material of *T. caespitum* var. *sulcinode* consists of two species (three workers are *sulcinode* and three others *indocile*).

The syntype workers, gynes and males of *T. caespitum* var. *indocile* are labeled as: TYPE [—] "Ssemiretschie" [/] "Kisil-Kija'pass" [/] "Kusnetzov" [—] T. caespitum v. indocile [/] Santschi det. 19 "26" [—] " Ssemiretschie" [/] "Kisil-Kija-Pass W A 14" [/] "15-vii-1924 N. Kusnetzov [the collector's name on the label is hardly readable]" (1☿, 1♀, / NHMB); three further (syntype) series from the same locality were also investigated (4☿, 1♀, 1♂ / NHMB); (6☿ / NHMB); (6☿ / NHMB); The taxonomic status of *Tetramorium caespitum* var. *indocile* Santschi will be discussed in a forthcoming publication, hereby we mention it as infraspecific name.

Workers of *T. sulcinode* and *T. caespitum indocile* can be separated by a combination of features. *Tetramorium sulcinode* has the post-ocular region coarsely rugulose, with the integumental surface microreticulate and dull; the alitrunk dorsum and sides have parallel rugulae; the dorsum of petiolar node has semi-circular rugulae with the integumental surface shiny; and the postpetiole is longitudinally rugose. *Tetramorium caespitum indocile* has the post-ocular region feebly rugulose or smooth with the integument shiny; the alitrunk dorsum and sides have sinuous rugulae; the dorsum of the petiolar node is smooth and shiny; and the postpetiole is feebly rugulose.

Altogether nine *T. sulcinode* workers, including type series, were compared with the 16 syntype workers of *T. caespitum indocile* by using unstandardized Discriminant D(4) function: D(4) 0.084 SL - 0.185 FL + 0.088 MW - 0.085 PPW - 14.038. Results of D(4) analysis: *T. indocile* D(4) = -3.998 ±0.935 [-5.991, -1.478]

(n=16); *T. sulcinode* D(4) = +3.998 ±1.091 [+2.601, +5.805] (n=14); and *T. sulcinode* lectotype D(4) = 3.942 (p< 0.001).

Lectotype designation of *Tetramorium sulcinode* Santschi, 1927.

In order to prevent further nomenclatural problems it is necessary to designate the lectotype of *T. sulcinode*. Only one worker of the investigated type material is nearly intact, hence we designate this specimen, positioned on the distal end of the upper card, as the lectotype. The right antenna, the left funiculus and the right foreleg are missing. Lectotype is labeled as: [label with Latin letters] "Ssemiretschie 14/vii.24" [/] "Ssukuluk, westlich" [/] "von Pithpek, NB.ii" [/] "N. Kusnetzow" [—] Type.

Morphometric data of the *T. sulcinode* lectotype:

CL: 865; CW: 840; FR: 305; FL: 310; SL: 665; ML: 945; MW: 540; PEW: 280; PEH: 310; NOH: 170; NOL: 160; PEL: 185; PPW: 330; PPL: 195; PPH: 290; SPL: 105; SPSP: 120; EL: 185; EH: 130; ED: 195.

Paralectotype worker on the same pin are positioned on the distal end of the lower card. Its head is missing, other parts are intact and have other features corresponding to the species characteristics. Two erroneously designated syntype specimens (D(4) =-4.074, p< 0.001, and =-1.571, p< 0.01 respectively) on that pin are in fact *T. caespitum indocile*; these are positioned on the proximal end of both, upper and lower, cards.

We designated one worker from the second pin (see above) as the paralectotype of *T. sulcinode*, the other worker cannot be determined correctly due to its very poor condition.

Diagnosis. Workers of *T. sulcinode* can be separated from related species (except for *T. annectens*) by well developed psammophore, relatively large eyes, (EYE, Table 1.). The most distinctive features to separate *T. sulcinode* from *T. annectens*, is the PEW/PPW index and the sculpture of petiolar node: semi-circular rugulose in *T. sulcinode*, reticulate in *T. annectens*. Workers of *T. sulcinode* mostly resemble *T. anatolicum* **n. sp.** by the fine, parallel body sculpture and the scape characters. These two species can also be separated by the absence/presence of the psammophore and by the non-overlapping relative size of the eyes (EYE, Table 1).

Gynes of *T. sulcinode* are distinguishable by the well developed psammophore, short and smooth scape (SL/CS, Table 2.) without a dorsal carina basally, wide scutum (MW/CS, Table 2.) and relatively narrow petiole and postpetiole (WAIST, Table 2). Between *T. sulcinode* and *T. annectens* the relative petiole width (CS/PEW, Table 2.) gives separation. For further combination of morphometric characters see Table 1–2.

Distribution. The species is known from Turkmenistan, Afganistan and Pakistan.

10. *Tetramorium syriacum* Emery, 1922 (figs 68–71)

Tetramorium caespitum var. *syriaca* Emery, 1922: 277 (☿) first available use of *Tetramorium caespitum* var. *syriaca* Emery, 1909: 702 (☿); TYPE MATERIAL: HOLOTYPE ☿: I. a. Brul. [/] "Jaffa" [now Tel Aviv, ISRAEL] [—] "Tetramorium" [/] "caespitum. caesp." [/] "v. syriaca Em" [Emery's handwriting] (1☿ / MSNG); raised to species rank: Collingwood 1985: 265;

Redescription of worker (figs 68–71). Morphometric data of *syriacum* holotype:

CL: 850; CW: 835; FR: 460; FL: 470; SL: 615; ML: 940; MW: 560; PEW: 260; PEH: 285; NOH: 165; NOL: 215; PEL : 190; PPW: 290; PPL: 210; PPH: 270; SPL: 125; SPSP: 205; EL: 145; EH: 110; ED: 215; Large size, CS 832 [807, 865]. Whole body and appendages dark brown to black. Head slightly longer than broad, CL/CW 1.02 [0.99, 1.04], with slightly convex sides, straight occipital margin and rounded occipital corners. Eyes relatively small, EYE 0.162 [0.155, 0.171]. Frons very wide, FR/CS 0.50 [0.49, 0.55], frontal lobes as wide as frons, or slightly wider FL/FR 1.01 [1.00, 1.02]. Scape short, SL/CS 0.75 [0.70, 0.77], with short dorsal carina basally, strong parallel costulae extending scape. Promesonotal dorsum convex, metanotal groove shallow, but visible. Propodeal teeth long. Petiolar node cubic in profile, NOH/NOL 0.84 [0.78, 0.89], petiole relatively low, PEH/NOL 1.51 [1.43, 1.60]. General appearance coarsely rugose, ground surface microreticulate, dull. Head dorsum longitudinally rugose and microreticulate, occiput and sides rugoso-reticulate and microreticulate. Alitrunk dorsum rugoso-reticulate and coarsely microreticulate. Mesopleuron usually microreticulate. Dorsum of petiolar node rugoso-reticulate and microreticulate, dorsum of postpetiole longitudinally rugulose and microreticulate. Polygonal striation continuous on 1st gastral tergite, posteriorly disrupted. Basal part of first gastral tergite microreticulate (see fig. 7.), MRG 181.7 ±26.4 [150, 230]. Ventral surface of head with several short and few moderately long, straight, or few "C"-shape setae arising posterior to buccal cavity (see fig. 5.).

Gynes and **Males** are unknown.

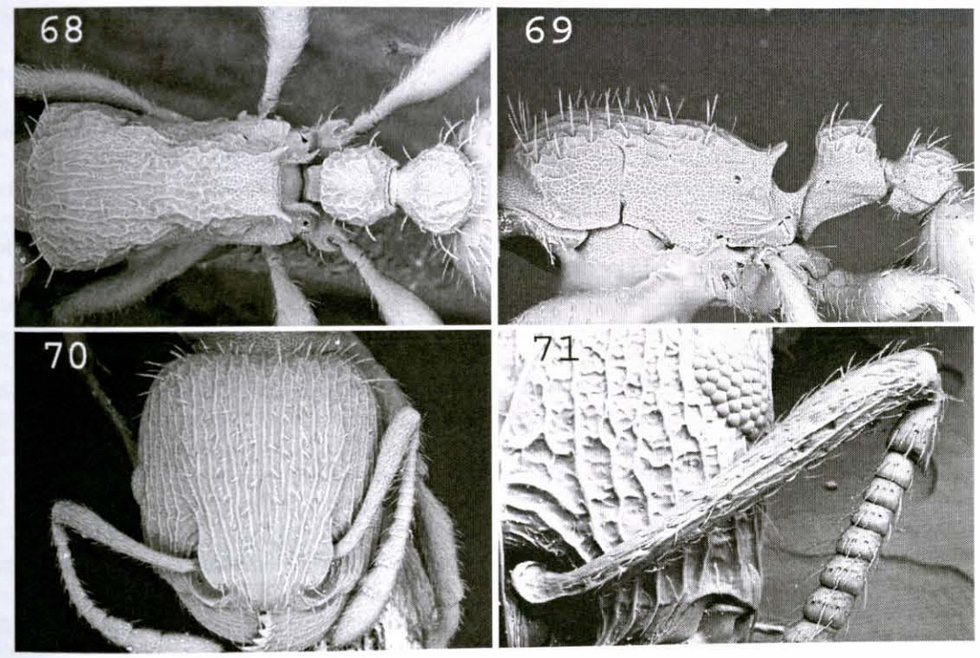
Material examined (5 nest series, included 22 workers). **ISRAEL**—Migdal, Zedek, 15.02.1966. leg. Kosler (1☿ / MSNM); **TURKEY**—Islahiye 7 rkm N, ca. 70km W Gaziantep, Prov. Gaziantep, 500mH 11.05.1997 leg. Schulz & K. Vock (11☿ / PCAS, 6☿ / HNHM); Sanliurfa, Camlidere 25km E Sanliurfa 500mH, *Steppe* 11.05.1997 leg. Schulz (4☿ / PCAS);

Morphometrics. (23 workers measured).

Diagnosis. *T. syriacum* workers differ from related species by the extremely wide frons, FR/CS 0.50 [0.49, 0.55].

For further combination of morphometric characters see Table 1–2.

Distribution. This species seems to be widespread over the Middle East.



FIGURES 68–17. *Tetramorium syriacum* Emery, 1922. Worker: alitrunk petiole and postpetiole, Fig. 68. dorsal view, Fig. 69. lateral view, Fig. 70. Head, Fig. 71. scape, dorsal view.

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