



New species and records of pollen and sap beetles for Iran (Coleoptera: Kateretidae, Nitidulidae)

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Abstract

During recent expeditions in North and Southwest Iran, 10 species of Kateretidae and Nitidulidae (Coleoptera) were found. One species of Kateretidae, *Brachyleptus bicoloratus* Reitter, 1896, and three nitidulid species, *Afrogethes schilskyi* (Reitter, 1897), *Stachygethes khnzoriani* (Kirejtshuk, 1979), and *S. nigerrimus* (Rosenhauer, 1856) are recorded for the first time for the Iranian fauna (the latter is also a new record for Asia). *Thymogethes ahriman* (Jelínek, 1981) is herein resurrected to species rank, and two species, *Thymogethes kassites* sp. nov. and *T. khorasanicus* sp. nov., are described as new. An updated key to the known Near East and Afghan species of the genus *Thymogethes* Audisio & Cline, 2009 is also provided. Available and recently collected biological and distributional data, as well as short taxonomic comments, are given for the discussed species.

Key words: Cucujoidea, Meligethinae, *Thymogethes*, resurrected species, faunistics, Palearctic

Introduction

The Kateretidae and Nitidulidae, which were recently confirmed as sister taxa in a phylogenetic framework (Cline *et al.* 2014), are two small- and medium-sized families, respectively, collectively known as pollen- and sap-beetles. The fauna of Kateretidae and Nitidulidae in Iran were revised by Audisio *et al.* (2000) and an updated distributional checklist was provided by Lasoń & Ghahari (2013). The current total number of listed species, i.e. six Kateretidae species and 84 Nitidulidae species, should be considered as a severe underestimate when compared to the much better known fauna of these beetle families in Turkey (18 Kateretidae, 163 Nitidulidae: Jelínek 1967; Audisio *et al.* 2000, and unpublished data; Avgin *et al.* 2015).

The opportunity of a scientific joint-venture between the first author PA and some members of the Iranian Research Institute of Plant Protection, Tehran, and Plant Protection Department at Ferdowsi University of Mashhad, allowed for common fieldtrips on June 2014 in Iran. Collecting with specialized methods resulted in finding new interesting material of both target families. Also, recent research carried out by A. Lasoń in Iran (vi. 2015) provided additional material of these beetles.

In this paper we present updated data on the Iranian fauna of Kateretidae and Nitidulidae, mainly based on the above cited material which also include the description of two new species and the resurrection from synonymy of a third species in the genus *Thymogethes* Audisio & Cline, 2009 (Audisio *et al.* 2009c).

Depositories. CAR = P. Audisio collection, Museum of Zoology, Sapienza Rome University, Rome, Italy; HMIM = Hayk Mirzayans Insect Museum, Iranian Research Institute of Plant Protection, Tehran, Iran; NKME = Naturkundemuseum, Erfurt, Germany; NMPC = Národní Muzeum, Prague, Czech Republic; CLA = Collection A. Lasoń, Białystok, Poland.

Study methods. Morphological terminology follows Audisio (1993b), Audisio *et al.* (2009a, 2009b, 2009c), and Jelínek *et al.* (2010). Total length of specimens is defined as the distance between anterior margin of clypeus and posterior apex of pygidium. Maximum width of body is defined as the maximum (combined) width of elytra. Most studied characters involving measurements of external body shape were analyzed using a digital camera mounted on a MZ8 WILD® stereomicroscope (40–80×), and the image processing software package WINVISION® (Delta Sistemi®, Rome). Drawings were made with a drawing tube mounted on the same stereomicroscope, and some measurements were taken with an ocular-micrometer mounted on the same stereomicroscope. Measurements of morphological characters were made using the same device/software as well as accurate drawings made with a drawing tube mounted on a BX50 OLYMPUS® upright microscope (magnification = 200–1000×). SEM images were acquired using a Hitachi® model 3000 SEM under variable pressure conditions (150–2000×), from uncoated specimens.

Abbreviations. WFTA/LFTA= ratio between maximum width and length of the protarsal plates.

Results

Kateretidae

Brachyleptus bicoloratus Reitter, 1896

Examined material. IRAN: North Khorasan Province, road Quchan-Ashabad, ca. 24 km NNW Quchan, 37°20'25"N 58°30'11"E, 1930 m, 6.VI.2014, on small red-flowering *Papaver* sp. (Papaveraceae), leg. P. Audisio, 1 female (CAR).

This species has been known thus far from Afghanistan, Kazakhstan, Tajikistan, Turkmenistan, and Uzbekistan (Audisio 1989, 1993b; Jelínek & Audisio 2007). New country record for Iran.

Brachyleptus aurosus Reitter, 1896

Examined material. IRAN: North Khorasan Province, road Quchan-Ashabad, ca. 24 km NNW Quchan, 37°20'25"N 58°30'11"E, 1930 m, 6.VI.2014, on small red-flowering *Papaver* sp. (Papaveraceae), leg. P. Audisio, 1 female (CAR).

This widespread but uncommon SE European and SW Asiatic species is known from Afghanistan, Armenia, Azerbaijan, Bulgaria, northern Egypt, Greece, Iran (Khorasan and Tehran), Iraq, Israel, Jordan, Lebanon, southern Russia, Syria, Turkey and Turkmenistan (Reitter 1919; Jelínek 1980, 1981; Audisio 1989, 1993b; Audisio *et al.* 2000; Jelínek & Audisio 2007; Lasoń & Gahari 2013). In Iran, this species appears to be confined to northern regions of the country.

Nitidulidae

Afrogethes schilskyi (Reitter, 1897)

Examined material. IRAN: Lorestan Province, Zagros Mts., SE Dorud, Oshtoran Kuh, 33°25'17"N 49°09'02"E, 1700 m, 14.VI. 2014, leg. P. Audisio, on *Trichodesma incanum* (Bunge) A. DC. (Boraginaceae), 5 males, 7 females (CAR, HMIM, NMPC).

This species is known (under *Meligethes schilskyi*) from Afghanistan, Tajikistan, Turkmenistan and Uzbekistan, with an old and doubtful museum record from N Algeria (Audisio 1993b; Jelínek & Audisio 2007). The species is strictly associated as larvae with members of the botanical genus *Trichodesma* R. Br. (Boraginaceae). New country record for Iran.

***Thymogethes ahriman* (Jelínek, 1981), species resurrected**

Examined material. IRAN: Kerman Province, Dehbakri, 29°03'N 57°56'E, 1700–1750 m, 30.IV/–3.V.1973, river bed and irrigation channel, on *Mentha aquatica*, (loc. no. 186), Exp. Nat. Mus. Prague, 3 males, 2 females (holotype and paratypes; NMPC, CAR); Fars Province, Tang-e Chogan, 29°47'N 51°38'E, 1050–1200 m, 10/11.VI.1973, (loc. no. 234), Exp. Nat. Mus. Prague, 4 males (NMPC); Mazandaran Province, E Alborz Mts, Veresk, 35°57'N 52°56'E, 800 m, 2.VIII.1970, (loc. no. 81), Exp. Nat. Mus. Prague, 1 male (NMPC); Fars Province, Mian Jangal, 29°09'N 53 42'E, 30.V. –5.VI.1973, on *Mentha aquatica* and/or *M. longifolia*, (loc. no. 223), Exp. Nat. Mus. Prague, 3 males, 1 female (NMPC); Esfahan Province, Eskandari, near Singerd, 32°49'N 50°26'E, 2000 m, 1.VII.1970, (loc. no. 36) 6 males, 24 females (NMPC, CAR); Lorestan Province, Zagros Mts, SE of Dorud, Oshoran Kuh, small village near Chamnar, 33°25'05"N 49°09'44"E, 1695 m, 14.VI.2014, leg. P. Audisio, on *Mentha longifolia* (L.) Huds. (Lamiaceae), 4 males, 5 females (CAR, HMIM, NMPC); Yazd Province, Shir-Kuh, 5 km S Taft, 1600–1700 m, 23.V.2008, leg. Mühle, 1 ex. (NKME). Refer to Jelínek (1981), Audisio (1993b), Audisio *et al.* (2000) and Lason & Ghahari (2013) for references where part of the above listed material was previously published.

This taxon, described as *Meligogethes ahriman* by Jelínek (1981) from Iran, was tentatively and doubtfully considered a possible synonym of *Thymogethes klapperichi* (Easton, 1957) from Afghanistan and Middle Asia by Audisio (1993b), and later reported as *T. klapperichi* by Audisio *et al.* (2000, 2009c), Jelínek & Audisio (2007), and Lason & Ghahari (2013).

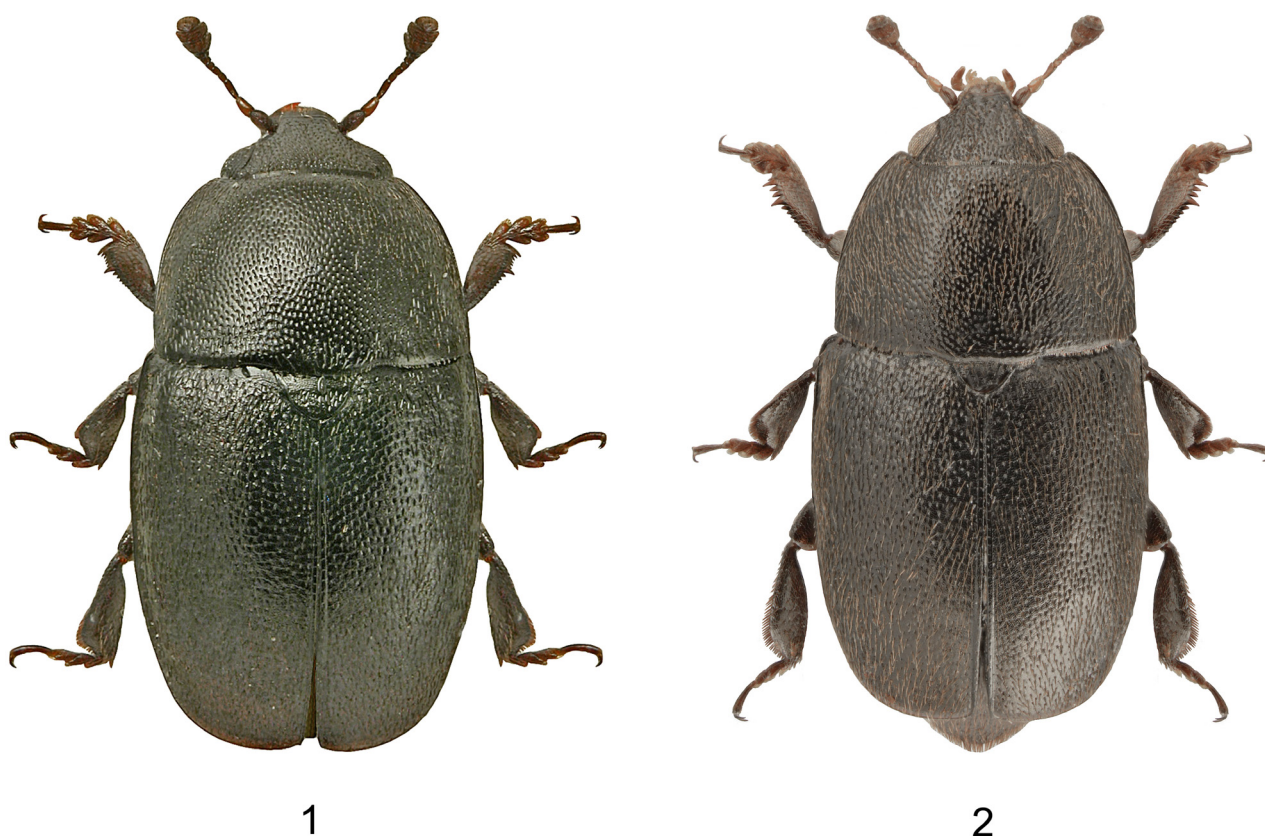
Comparing the recently collected specimens from W Iran, with available material in NMPC allowed the authors to conclude that Iranian populations of *T. ahriman* do not exhibit any significant N/S or E/W variation in the shape of male genitalia, linking them with the Afghan populations of *T. klapperichi*. Iranian populations, in fact, with the possible exception of a single specimen from southern Zagros Mts drawn in Audisio (1993b; Figs 129 *q-r* therein), probably erroneously attributed to *T. klapperichi* (an immature specimen showing apparently more elongate but poorly sclerotized tegmen), appear on the contrary to be rather uniform, and also the specimens recently collected along the central-southern portion of the Zagros seem to differ distinctly from central and NE Afghan populations (Easton 1957) of the true *T. klapperichi*. Therefore, we are now convinced that the above cited Iranian specimen previously tentatively attributed to *T. klapperichi* belongs to *T. ahriman*, and this latter taxon should be resurrected to a specific rank. This species appears to exhibit a rather wide geographic range from the Zagros Chain and the surrounding mountain systems to the E Elborz Mts (Fig. 25). We summarized in Figs 3–5 and in the key to identification the diagnostic differences between these two taxa, as well as those between *T. egenus* Erichson, 1845 (s.l.: see comments below), *T. otini* Easton, 1954, and *T. khorasanicus* **sp. nov.** See Figs 3–24 also for a summary of the diagnostic characters separating *T. ahriman* from *T. rebmanni* Easton, 1957 (from Afghanistan and NW Pakistan: Easton 1957) and *T. kassites* **sp. nov.** (the latter taxon being syntopic with *T. ahriman* on the Zagros Mts).

Note. According to the thus far known distributions (Easton 1954; Audisio 1993b) of the Euro-Siberian *Thymogethes lugubris* (Sturm, 1845) and *T. gagathinus* (Erichson, 1845), both known to occur in N Turkey and Caucasus (see key to identification of the Near East *Thymogethes* below), the presence of these two taxa in some mountain localities of the NW Iran cannot be excluded.

***Thymogethes kassites* sp. nov.**

(Figs 7–8, 21)

Diagnosis. Medium-sized (length 2.48), body shiny black, legs blackish with protibiae chestnut brown to blackish, and antennae chestnut brown with blackish antennal club. Maximum pronotal width near posterior angles. Similar to the widespread European species *T. lugubris* (Sturm, 1845), revised by Easton (1954) and re-described by Audisio (1993b), but with interspaces between dorsal punctures on pronotum and most of elytra smooth and shining. Differentiated (see key to identification of the Near East *Thymogethes* below) from the closely related *T. rebmanni* (Easton, 1957) by the comparatively larger male genitalia, the paramera much more extruded laterad, and by the more raised and centrally-placed concave tubercle on male last abdominal ventrite (Fig. 21) (less raised, flattened, wider, not concave nor evidently bicuspid, and placed closer to the posterior edge of the ventrite in *T. rebmanni*: Fig. 22).



FIGURES 1–2. 1. *Thymogethes lugubris* (Sturm, 1845) habitus (male from Poland); 2. *T. egenus* (Erichson, 1845) (s.l.), habitus (male from Poland). Both specimens ca. 2.2 mm long. Photos L. Borowiec.

Type material. 1 ♂, male holotype, **IRAN**: Lorestan Province, Zagros Mts, SE Dorud, Oshtoran Kuh, small village near Chamnar, 33°25'05"N 49°09'44"E, 1695 m, 14.VI. 2014, leg. P. Audisio, on *Mentha longifolia* (L.) Huds. (Lamiaceae) (CAR).

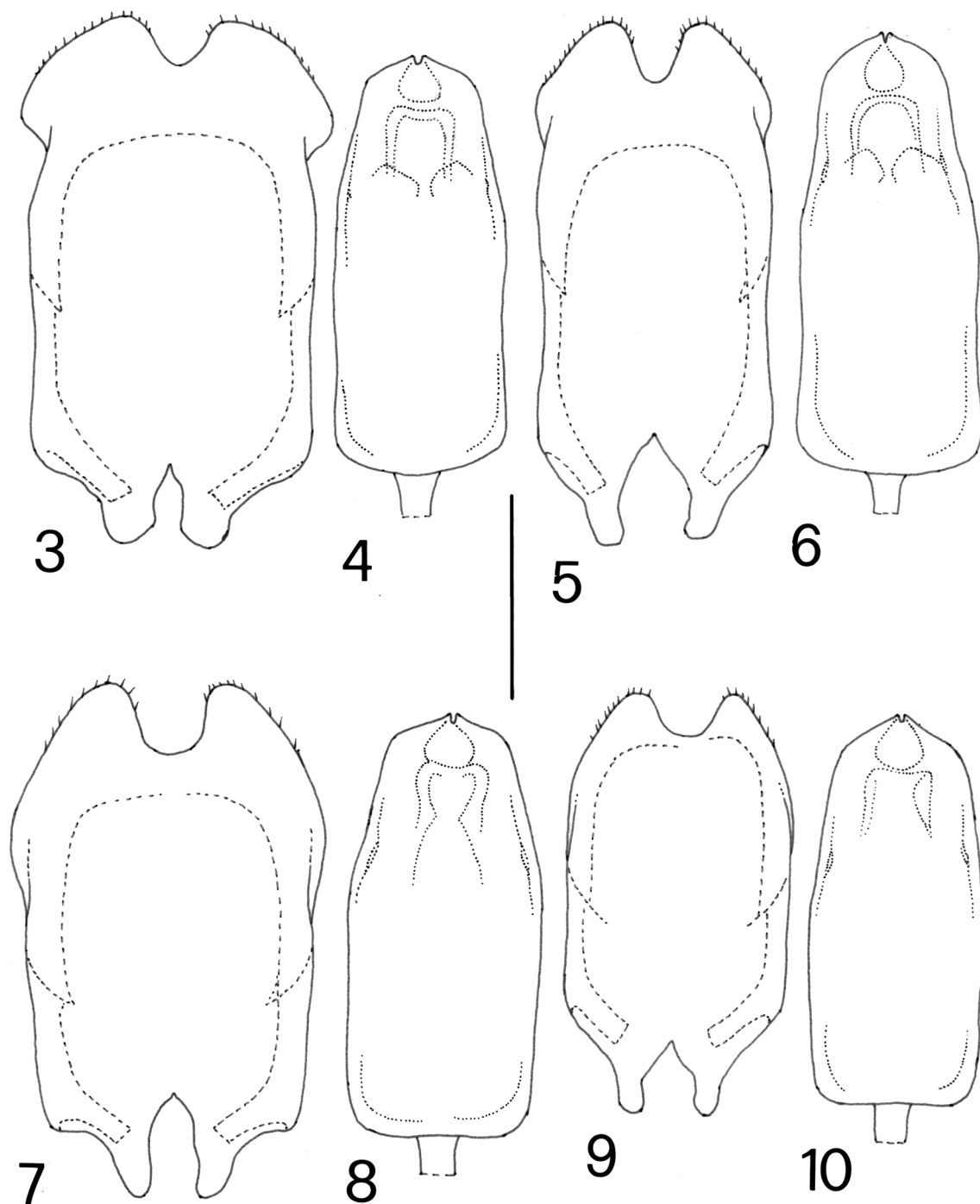
Description. Male [holotype]. Length 2.48 mm; width (at elytral widest point) 1.28 mm. Body elongate, narrow, transversely convex and moderately parallel-sided (nearly as in Fig. 1), black and shining, with short and fine silvery to golden-olivaceous pubescence. Legs blackish with protibiae chestnut brown to blackish, and antennae chestnut brown with blackish antennal club.

Head with dorsal punctures as large as or slightly smaller than an eye facet, moderately impressed, separated by one diameter or less, surface smooth and shining; front margin of clypeus regularly arcuately emarginate, completely bordered, with rather acute angles. Fronto-genal grooves narrow and shallow, but distinct. Antennae small, of normal size for group (cf. Fig. 1), with third antennomere slender, slightly longer than second; antennal club small.

Pronotum markedly narrowed anteriorly, 1.68× as wide as long, broadest close to posterior angles (cf. Fig. 1); sides narrowly bordered; posterior angles slightly obtuse but markedly distinct. Posterior base faintly sinuate on either side of scutellum; pronotal punctures and surface smooth and shining, each puncture nearly as large as an eye facet and separated by one diameter or less.

Scutellar shield medium-sized, densely and uniformly punctate; surface exhibiting a faint trace of reticulate microsculpture.

Elytra nearly 1.17× as long as combined width (if length measured from posterior edge of pronotum; 1.04× if measured from posterior apex of scutellar shield), broadest in basal fifth, distinctly wider (1.12×), and approximately twice as long (1.95×) as pronotum; humeral angle rounded, humeral striae absent. Elytral punctures in basal half as on head and pronotum, but slightly coarser and more elongate, exhibiting a feeble transverse rugosity and with a shiny surface between punctures. Elytral punctures becoming finer and shallower towards posterior end.



FIGURES 3–10. Male genitalia (median lobe of aedeagus and tegmen) of: **3–4.** *Thymogethes ahriman* (Jelínek, 1981) (male from Iran, Zagros Mts., Mt. Oshtoran); **5–6.** *T. klapperichi* (Easton, 1957) (male from Pakistan, Madaglasht); **7–8.** *T. kassites* **sp. nov.** (male holotype from Iran, Zagros Mts., Mt. Oshtoran); **9–10.** *T. rebmanni* (Easton, 1957) (male from Afghanistan, Kabul). Scale bar = 0.17 mm (Figs 3–6); = 0.20 mm (Figs 7–10).

Ventral surface black, with sparse fine silvery pubescence. Prosternal antennal furrows (at notosternal sutures) strongly raised, reaching near the middle point of the hypomeron. Prosternal process moderately long, subtruncate at apex, ventral surface (excluding predistal lateral expansions) only moderately wider before apex (as in Fig. 23), widest subdistal portion approximately 1.28× wider than narrowest basal portion.

Metaventricle moderately convex (punctures as on head and pronotum, surface shiny), with a barely distinct and posteriorly widened longitudinal impression on posterior two-thirds, and a slightly raised elongate medial tubercle. Posterior angles only slightly raised.

Caudal marginal line of metacoxal cavity closely following posterior edge, turning back just before outer end. Last visible abdominal ventrite with a markedly raised obtuse projection nearly in middle, distally concave and bicuspid (Fig. 21), similar to males of *T. lugubris* and *T. gagathinus*.

Protibiae (cf. Fig. 1) with outer edges finely crenulate from basal third, with subapical group of 5 sharp teeth, the first and penultimate tooth markedly bigger than the other teeth; protarsi distinctly wider than antennal club, ratio WFTA/LFTA = 0.35–0.36; metatibiae narrow, inner edges not sinuate (as in Fig. 1); tarsal claws simple.

Genitalia. Tegmen as in Fig. 7, rather strongly sclerotized, brownish, with a moderately deep, U-shaped median excision, and paramera markedly arcuately protruded at sides in anterior half; median lobe of aedeagus elongate, narrow, about 2.4× as long as wide (Fig. 8), nearly as sclerotized and coloured as tegmen, widest at distal three-fifths, subparallel-sided proximad, narrowed distad, apex subtruncate and minutely incised.

Female. Unknown.

Comparative notes. *Thymogethes kassites* sp. nov. exhibits a dorsal habitus similar to large specimens of *T. lugubris* (a rare but widespread species in Europe and N Anatolia), but with larger and slightly less elongate body size, and a much shinier dorsal surface, similar to the recently described *T. foddaii* Audisio, De Biase & Trizzino, 2009 from Sardinia and Corsica (Audisio *et al.* 2009a). This new species is recognizable from the closely related *T. rebmanni* from Afghanistan chiefly by parameres more protruding laterad in distal portion of tegmen (Figs 7, 9), and the more raised and concave (bicuspidate) tubercle on the ventral side of last abdominal ventrite (Figs 21, 22). The partial morphological convergence observed in tegmen shape between *Thymogethes kassites* sp. nov. and *T. khorasanicus* sp. nov. is remarkable (Figs 7, 13); however, these two Iranian species obviously belong to two quite distinct groups of species (former in the *T. lugubris*-group, latter in the *T. egenus*-group).

Geographic distribution. The single known male specimen is from SW Iran (Central Zagros Mts; Fig. 25). This species is likely rare (a single male specimen collected in company with a series of about 10 specimens of the related *T. ahriman*), but could be more widely distributed, in suitable habitats, throughout the Zagros Chain. Likewise, the host plant is also widespread in the region.

Biological notes. The type specimen was collected from flowering apical stems of the common *Mentha longifolia* (L.) Huds. (Lamiaceae), a widespread species known to occur in most West Palearctic areas, in wet places near lakes and ponds, and along the edges of river banks and small springs, from sea level up to 2000 m. Based on the local host-plant flowering period, adults are probably active on mint flowers from May to September, but reproduction likely occurs mainly between early June and August.

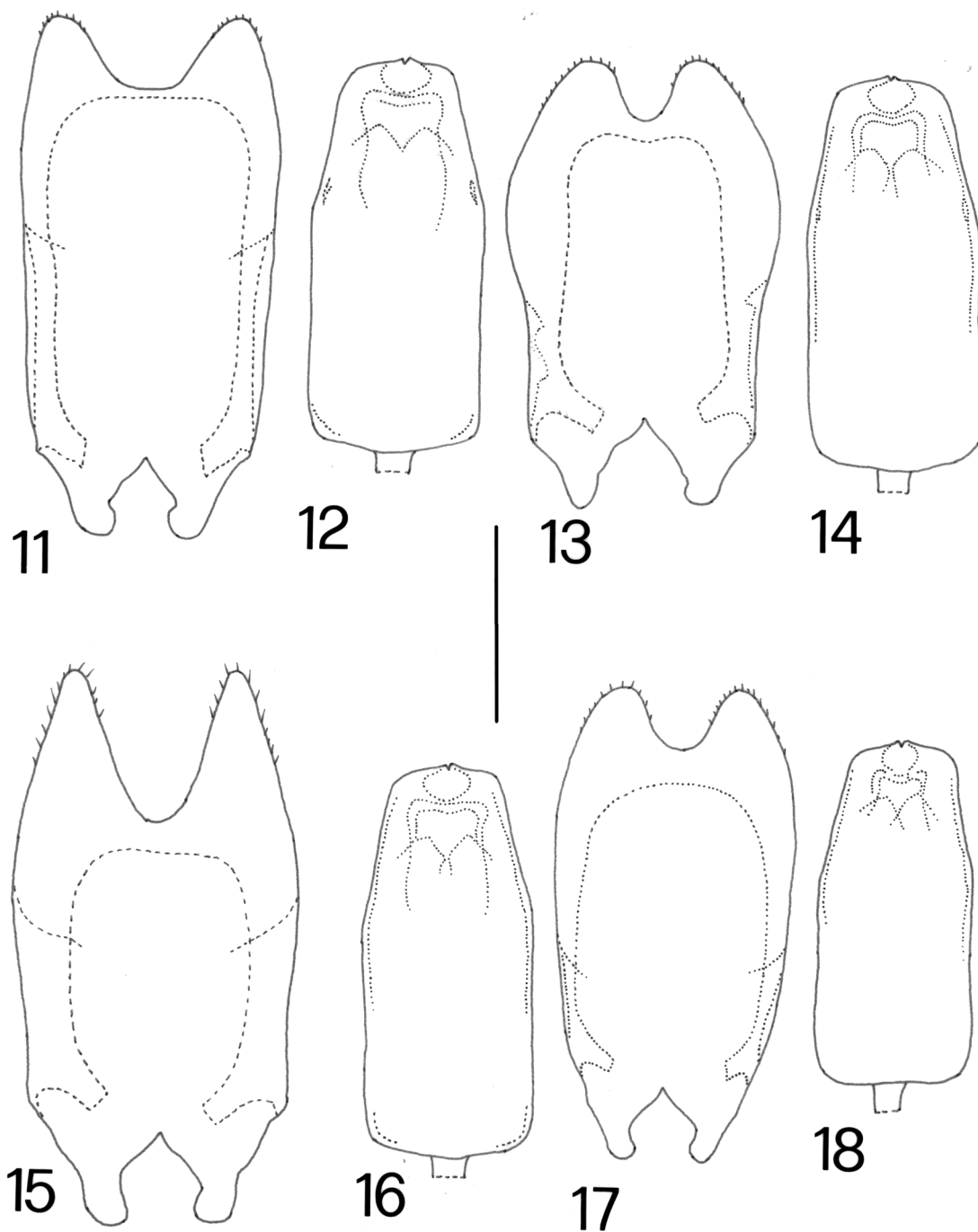
Etymology. This species is named after the Kassites, an ancient Near Eastern people who controlled Babylonia and the Zagros Mts after the fall of the Old Babylonian Empire (ca. 1531–1155 BC).

Thymogethes khorasanicus sp. nov.

(Figs 13–14, 19)

Diagnosis. Medium-sized (length 2.53), body shiny black, legs blackish, and antennae chestnut brown with blackish antennal club and first antennomere. Maximum pronotal width near posterior angles (similar to Fig. 2). Similar to the widespread European species *T. egenus* (Erichson, 1845), re-described by Audisio (1993b), but with interspaces between dorsal punctures on pronotum and most of elytra rather smooth and shining, and distinctly narrower male protarsal plates (Ratio WFTA/LFTA = 0.31–0.33). Differentiated from *T. egenus* as well as from the closely related *T. otini* (Easton, 1954) from North Africa by the wider male genitalia, and the paramera being more arcuately extruded laterad in dorsal view (Fig. 13).

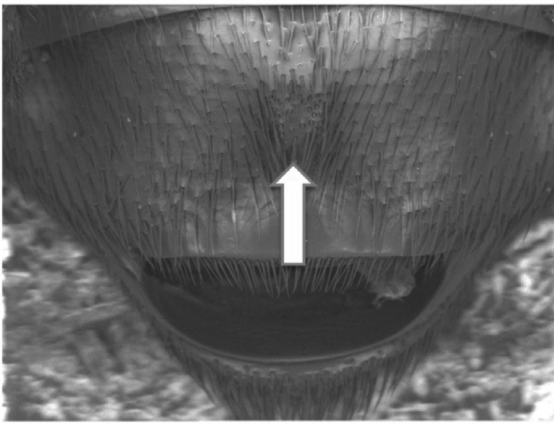
Type material. 1 ♂, male holotype, **IRAN**: North Khorasan Province, Zoshk Valley above Shandiz, Binalud Mts, 36°17'N 59°07'E, 1800–2400 m, 5.VI.2014, leg. P. Audisio, on *Mentha longifolia* (L.) Huds. (CAR). Paratypes: **IRAN**: same data as holotype, on *Mentha spicata* (L.) and *M. × piperita*, 4 males, 4 females (NMPC, HMIM, CAR, CLA); South Khorasan Province, 25 km N Birjand, 33°05'N 59°18'E, 2000 m, 6–7.VI.1977, (loc. no. 360), Exp. Nat. Mus. Prague, leg. J. Jelínek, on *Mentha* sp. (Lamiaceae), 6 males, 4 females (NMPC, HMIM, CAR, CLA); Razavi Khorasan Province, Bonarg village, Esger Mts, 33°53'29"N 58°47'0.1"E, 1850 m, 4.VI.2014, leg. P. Audisio, 3 males, 4 females (NMPC, HMIM, CAR). Other examined material: Mazandaran Province, E Alborz Mts, Veresk, 35°57'N 52°56'E, 800 m, 2.VIII.1970, Exp. Nat. Mus. Prague, 7 males, 24 females (NMPC, CAR, CLA); North Khorasan Province, Kalat 37°09'N 59°20'E, (loc. no. 373), Exp. Nat. Mus. Prague, 17.VI.1977, 1 male (NMPC).



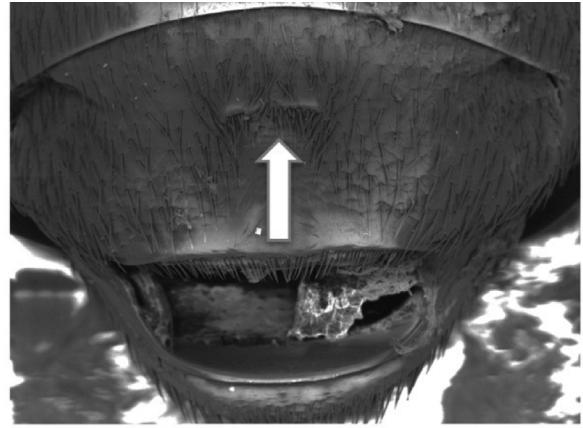
FIGURES 11–18. Male genitalia (median lobe of aedeagus and tegmen) of: **11–12, 15–16,** *Thymogethes egenus* (Erichson, 1845) s.l. (11–12: male from Italy, Lazio, Tivoli; 15–16: male from N Iran, Kadkan); **13–14.** *T. khorasanicus* **sp. nov.** (male paratype from N Iran, Zoshk Valley above Shandiz); **17–18.** *T. otini* (Easton, 1954) (male from Morocco, near Taza). Scale bar = 0.24 mm.

Description. Male [holotype]. Length 2.53 mm; width (at elytral widest point) 1.25 mm. Body elongate, narrow, transversely convex and moderately parallel-sided (similar to Fig. 2), black and shining, with short and fine silvery to golden-olivaceous pubescence. Legs blackish, antennae chestnut brown with blackish antennal club and first antennomere.

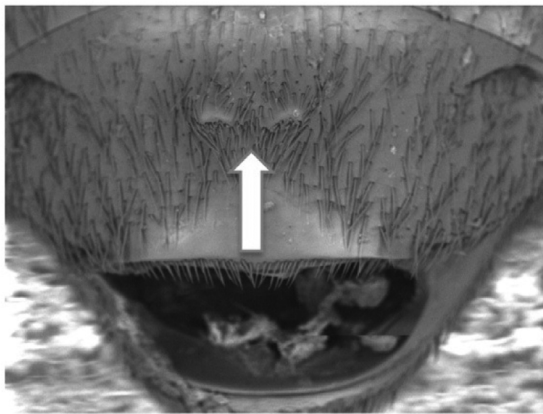
Head with dorsal punctures as large as or slightly smaller than eye facet, markedly impressed, separated by less than one diameter, surface smooth and shining; front margin of clypeus widely arcuately emarginate, completely bordered, with moderately acute angles. Fronto-genal grooves narrow and shallow, but distinct. Antennae small, normal size for group (Fig. 1), with third antennomere slender, slightly longer than second; antennal club small, about 1.3× as long as wide, as wide as male protarsi (excluding tarsal pubescence).



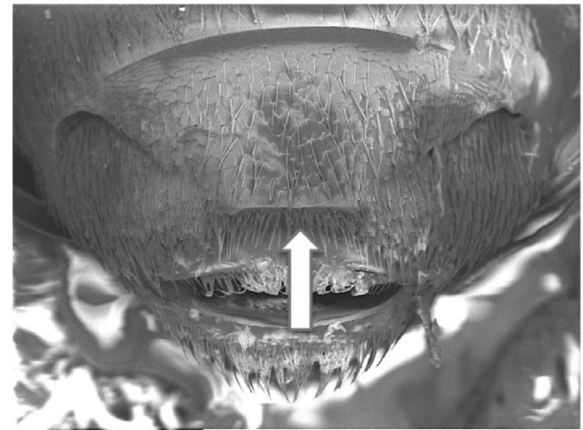
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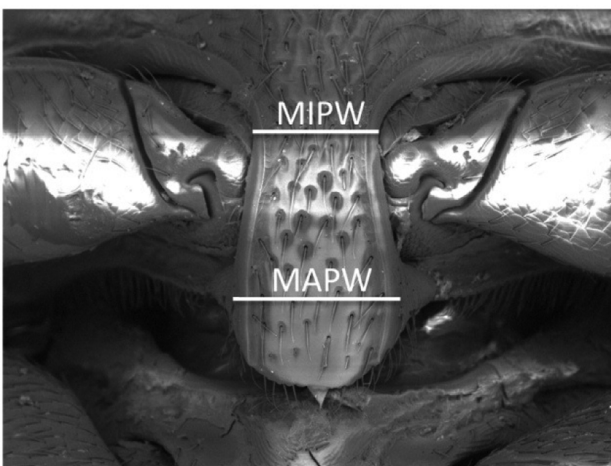


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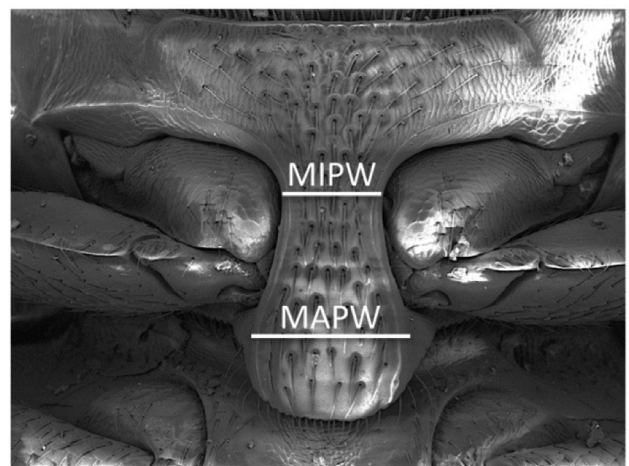


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FIGURES 19–22. SEM images of tubercles on last abdominal ventrite in males of: **19.** *Thymogethes khorasanicus* **sp. nov.** (male paratype from N Iran, Zoshk Valley above Shandiz); **20.** *T. ahriman* (Jelínek, 1981) (male from Iran, Zagros Mts., Mt. Oshtoran); **21.** *T. kassites* **sp. nov.** (male holotype from Iran, Zagros Mts, Mt. Oshtoran); **22.** *T. rebmanni* (Easton, 1957) (male from Afghanistan, Kabul). Scale bar = 0.20 mm.



23



24

FIGURES 23–24. SEM images of prosternal process of: **23.** *Thymogethes kassites* **sp. nov.** (male holotype from Iran, Zagros Mts., Mt. Oshtoran); **24.** *T. otini* (Easton, 1954) (male from Morocco, near Taza). Scale bar = 0.24 mm.

Pronotum markedly narrowed anteriorly, about 1.57× times as wide as long, broadest close to posterior angles (similar to Fig. 2); sides narrowly bordered; posterior angles slightly obtuse but distinct. Posterior base faintly sinuate on either side of scutellar shield, pronotal punctures and surface smooth and shining (near posterior base are few traces of microsculpture), each puncture nearly as large as eye facet and separated by less than one diameter.

Scutellar shield medium-sized, densely and uniformly punctate; surface exhibiting faint trace of reticulate microsculpture.

Elytra about 1.14× as long as combined width (length measured from posterior edge of pronotum; 1.02× from posterior apex of scutellar shield), broadest in basal fifth, distinctly wider (1.07×), and approximately 2× longer (1.92×) than pronotum; humeral angle rounded, humeral striae absent. Elytral punctures in basal half as those on head and pronotum, but slightly coarser and more elongate, exhibiting a faint transverse rugosity with a shiny surface between punctures. Elytral punctures becoming finer and shallower toward posterior end.

Ventral surface black, with sparse fine silvery pubescence. Prosternal antennal furrows (at notosternal sutures) strongly raised, approximating middle point of hypomeron. Prosternal process moderately long, subtruncate at apex, ventral surface (excluding predistal lateral expansions) distinctly arcuately wider before apex (as in Fig. 24), widest subdistal ventral portion about 1.58× wider than narrowest basal portion.

Metaventrite moderately convex (punctures as on head and pronotum, surface shiny), with a faintly distinct and posteriorly widened longitudinal impression on posterior two-thirds, and a slightly raised elongate medial tubercle. Posterior-outer angles strongly raised (partly turned-up).

Caudal marginal line of posterior coxal cavity closely following posterior edge, turning back just before outer end. Last visible abdominal ventrite with a blunt, distinctly raised and simple (not concave and bicuspid) obtuse projection (Fig. 19), similar to males of *T. egenus* and *T. otini*.

Protibiae (similar to Fig. 2) with outer edges finely crenulate from basal third, with subapical group of 4–5 sharp teeth, the first and penultimate tooth markedly bigger than the rest; protarsi nearly as wide as antennal club, ratio WFTA/LFTA = 0.32; metatibiae narrow, inner edges not sinuate (similar to Fig. 2); tarsal claws simple.

Genitalia. Tegmen as in Fig. 13, rather strongly sclerotized, brownish, with a moderately deep, U-shaped median excision, paramera at sides arcuately projected outward; median lobe of aedeagus elongate, narrow, about 2.3× as long as wide (Fig. 14), nearly as sclerotized and colored as tegmen, widest at base, narrowed in distal third, apex subtruncate and minutely incised.

Female. Protarsi narrower, ratio WFTA/LFTA = 0.25. Metaventrite with posterior-outer angles less markedly raised, and last abdominal ventrite without tubercles. Ovipositor not significantly differing from that known to occur in *T. lugubris*, *T. egenus*, and most other species of *T. lugubris* species-group (see Fig. 160l in Audisio 1993b).

Comparative notes. *Thymogethes khorasanicus* **sp. nov.** exhibits a dorsal habitus similar to *T. egenus* (Fig. 2; widespread in Europe and Anatolia), but with a shinier dorsal surface, chiefly on pronotum and elytra. Easily distinguishable from the closely related *T. otini* from N Africa and the widespread *T. egenus* by the proportionally wider tegmen, the parameres being more arcuately protruded laterad (dorsal view) in distal half of tegmen (Figs 11–17), and narrower protarsi in both sexes (ratio WFTA/LFTA in males = 0.31–0.33 in *T. khorasanicus* **sp. nov.**, 0.38–0.44 in *T. egenus* and *T. otini*).

Geographic distribution. This species (Fig. 25) appears to be moderately common in E Iran, and could be more widely distributed, in suitable habitats, throughout most of the North, Central, and South Khorasan, as well as in Kerman and Sistan Provinces. The species is apparently absent along the northern and central portions of the Zagros Chain.

Biological notes. The type specimens were collected from apical stems of the common *Mentha longifolia* (L.) Huds. (Lamiaceae), a widespread species known in most West Palaearctic areas, in wet places near lakes and ponds, and at edges of river banks, streams and small springs, from sea level up to or higher than 2000 m. Also collected on *M. × piperita* (a widespread cultivated or semi-cultivated hybrid form of *M. spicata* and *M. aquatica* L.). Adults are probably active on host-plants from May to October, but reproduction likely occurs mainly between early June and September.

Etymology. This species is named after the Khorasan (alternatively transliterated as Chorasán), an ancient geographic name given to the eastern Province of Persia during the Sassanid Empire, which now corresponds with the three NE Provinces, North, central (Razavi), and South Khorasan Provinces of the Islamic Republic of Iran.

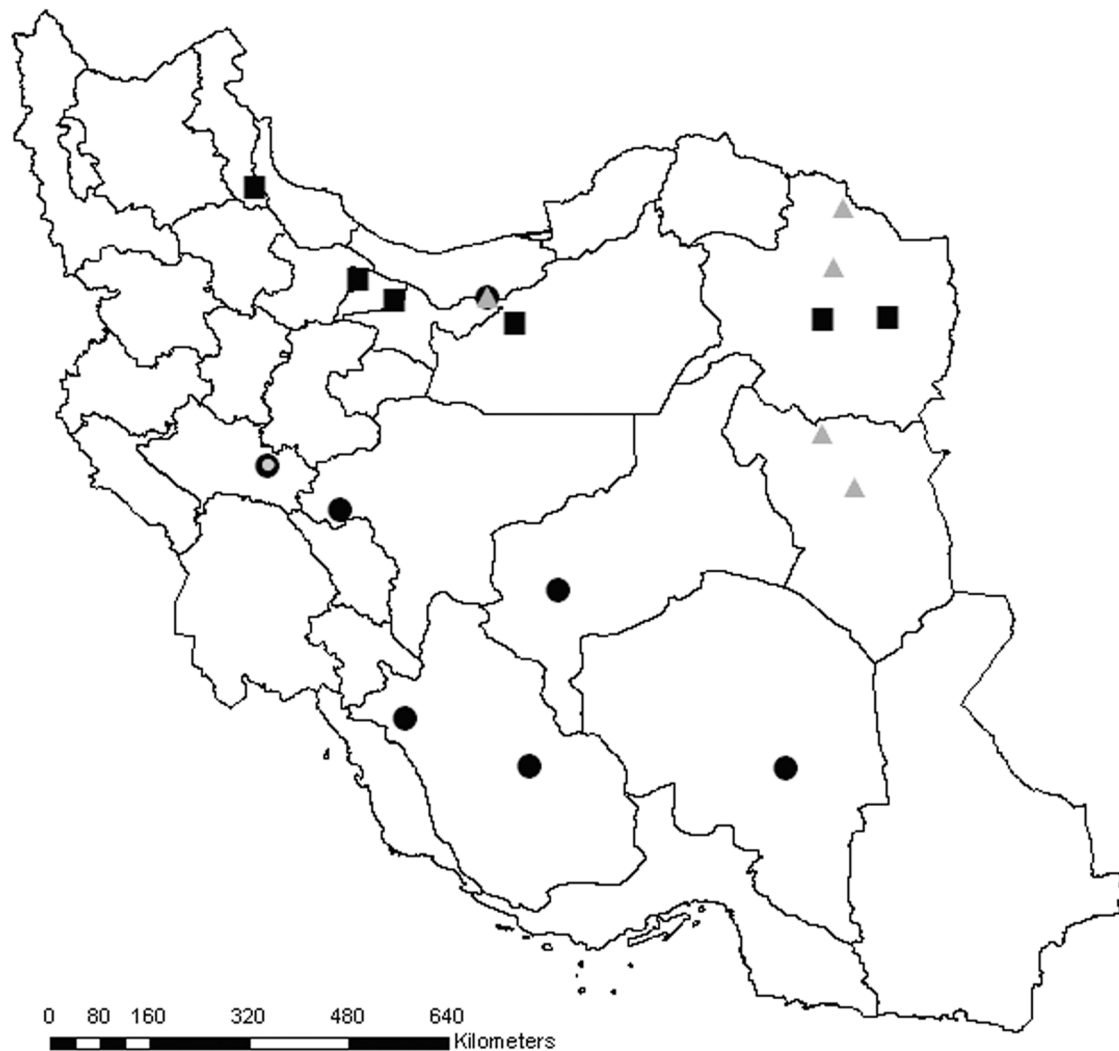


FIGURE 25. Distribution of *Thymogethes* species in Iran: ● *T. ahriman*, ▲ *T. khorasanicus* sp. nov., ■ *T. egenus*, ● *T. kassites* sp. nov.

***Thymogethes egenus* (Erichson, 1845) (s.l.)**

This common and widespread nominal species (Fig. 2) exhibits a marked geographic variation, with a corresponding variable expression of male genitalia shape; eastern Mediterranean and Near East populations (from Greece to Turkey, Caucasus, Jordan, Iraq and N Iran) are characterized by distinctly more elongate and much more acute paramera (Figs 15–16) in contrast with populations from W and central Europe (eastern Spain to northern Balkans) (Figs 11–12). We cannot deny that this (in some cases remarkable) variation could reflect a specific distinction of two different taxa, requiring the description of a new species to encompass the variation expressed by the East Mediterranean and near East populations (Audisio *et al.* 2000). However, we prefer to postpone this possible taxonomic decision until our upcoming revision of the whole genus (Audisio *et al.* in prep.) is completed, and a better supported hypothesis can be offered based on more detailed distributional data in Greece and the Balkan areas of both purported taxa, as well as by more accurate molecular and morphological data. Therefore, we tentatively report here the above mentioned eastern and western Mediterranean populations under the provisional name of *T. egenus* s.l. Iranian populations (Fig. 25) are apparently identical morphologically to those known in Turkey and E Greece.

Examined material. IRAN: North Khorasan Province, Sorb Mts, above Kadkan, 35°31'44"N 58°52'17"E, 2200 m a.s.l., 4.VI.2014, leg. P. Audisio, on *Mentha longifolia* (L.) Huds. (Lamiaceae), 5 males, 6 females (CAR, HMIM, NMPC); Qazvin Province, 8 km NE Ziaran 36°10'N 50°35'E, 2400 m, 10–16.VII.1977, (loc. no. 400), Exp. Nat. Mus. Prague, 20 males, 34 females (CAR, HMIM, NMPC); Ardabil Province, 5 km NW Kolor, Shahrud river valley, 37°26.1'N 48°41.2'E, 1670 m, 4–5.VI.2006, leg. Jiří Hájek and Pavel Chvojka, 1 male (NMPC); Razavi Khorasan Province, 2 km S Karizbalagh, 35°29.6'N 60°00.3'E, 1590–1925 m, stream valley, at light, 16–17.V.2006, leg. Jiří Hájek and Pavel Chvojka, 1 male (NMPC); Tehran Province, Sangar, 1900 m (CAR); Semnan Province, Semnan, 1300 m (CAR); (see also Jelínek 1981; Audisio *et al.* 2000; Lasoń & Gahari 2013).

Stachygethes nigerrimus (Rosenhauer, 1856)

Examined material. IRAN: North Khorasan Province, Koppe Mts (= Kopet Dag), Valley above the village of Mareshk, 36°49'N 59°33'E, 1750 m, 7.VI.2014, leg. P. Audisio, by sweeping, 1 female (CAR).

This species, associated as larva with *Marrubium* spp. (Lamiaceae), typically with the common *M. vulgare* L., was only known thus far from Western Mediterranean countries: i.e. southern France, Spain, Portugal, Sardinia, and North Africa (eastwards to Tunisia) (Easton 1956; Audisio 1988a, 1993b; Jelínek & Audisio 2007). This taxon was previously mentioned also from Israel and Jordan by Jelínek (1965), but subsequent analyses (Audisio 1988a) demonstrated that these records were the closely related Middle East endemic *Stachygethes syriacus* (C. Brisout de Barneville, 1872). The actual presence of the true *S. nigerrimus* in NE Iran is quite surprising, but exhibits a biogeographic parallelism with other nitidulid species known to share more or less disjunct North-African and W Mediterranean/Iranian or Middle East distributions, e.g. *Lamiogethes leati* (Easton, 1956), *Clypeogethes elongatus* (Rosenhauer, 1856), or *Afrogethes schilskyi* discussed above (Easton 1956; Audisio 1993a, b; Audisio *et al.* 2000). Also, some sister species pairs are known to occur in W Mediterranean areas and the Near East respectively, e.g., *Xenostromylus lateralis* Chevrolat, 1861 + *X. levantinus* Audisio & Jelínek, 2001 (Audisio *et al.* 2001a), *Oxystrongylus ovulum* (Fairmaire, 1875) + *O. sanctissimus* (Roubal, 1927), *Xerogethes brisouti* (Reitter, 1871) + *X. kraatzi* (Reitter, 1871), and *Epuraea latipes* Grouvelle, 1896 + *E. sutcuimamun* Avgin, Lasoń & Audisio, 2012. These distributions are likely associated with past (middle and late Pleistocenic) presence of these taxa or of recent common ancestors throughout previously more homogeneous biota present from eastern North Africa to the neighboring countries of Middle East (Avgin *et al.* 2012). New record for the Iranian and the Asiatic fauna.

Stachygethes khnzoriani (Kirejtshuk, 1979)

Examined material. IRAN: Hamadan Province, Gardaneye Avaj, SE Avaj, 35°29'N 49°13'E, 2600 m, 12.VI.2014, leg. P. Audisio, on the white-flowering *Salvia staminea* Montbret & Aucher ex Benth. (Lamiaceae), 3 males, 4 females (CAR, HMIM, NMPC).

This species was only known thus far from Turkey and Armenia (Kirejtshuk 1979; Audisio 1988b, 1993a, b; Jelínek & Audisio 2007; Lasoń 2007). The newly collected material shows that this species in Iran is associated as larvae with *Salvia staminea*, one of its previously recognized larval host-plants also in NE Turkey (Audisio 1988b, 1993a, b). New country record for Iran.

Stachygethes zarudnyi (Kirejtshuk, 1984)

Examined material. IRAN: Lorestan Province, Zagros Mts, canyon joining Dorud to Sepiddašt, 33°24'N 48°58'E, 1400 m, 14.VI. 2014, leg. P. Audisio, on the white-flowering *Salvia spinosa* L. (Lamiaceae), 4 males, 5 females (CAR, HMIM, NMPC).

This rare species was previously known from an unspecified locality in Northern Iran (Kirejtshuk 1984) and a few localities from SE Provinces of Turkey (Audisio 1993a, b; Audisio *et al.* 2000; Jelínek & Audisio 2007; Avgin *et al.* 2014). The new record on *Salvia spinosa* (a species not closely related to the previously known larval host-plant in SE Turkey, *Salvia limbata* C.A. Meyer: Audisio 1993a, b) demonstrates that this *Stachygethes* species is

likely oligophagous on different white-flowering species of this genus, and lives in rather heterogeneous habitats (found in sandy areas along xeric, middle-altitude river flats in SE Turkey on *Salvia limbata*, and in xeric rocky meadows along abruptly sloping hill sides in Iran).

Key to identification of the Near East *Thymogethes* of the *T. lugubris* and *T. egenus* groups (Figs 1–2), from Balkan Peninsula to Afghanistan

1	Male specimens (last abdominal ventrite with distinctly raised tubercles, ridges or bulges)	2
-	Female specimens (last abdominal ventrite simple, flat, without tubercles, ridges or bulges)	10
2	Male genitalia characterized by tegmen markedly and more or less abruptly widened at sides near apex (Figs 3, 5, 7 herein and 144e, 144i, 144m in Audisio 1993b).	3
-	Male genitalia characterized by tegmen never abruptly widened at sides near apex (Figs 9, 13, 15, herein)	8
3	Male genitalia characterized by tegmen narrowly and deeply medially incised distad (Fig. 144i in Audisio 1993b). Larval stages monophagous on <i>Mentha pulegium</i> L. Distributed nearly throughout whole southern portion of Palaearctic, except North Africa and Iberian Peninsula; Balkans, Ukraine, S Russia, Kazakhstan, Turkey.	1. <i>T. submetallicus</i> (Sainte-Claire Deville, 1908)
-	Male genitalia characterized by tegmen much less narrowly and deeply medially incised distad (Figs 3, 5, 7 herein and 144e, 144m in Audisio 1993b)	4
4	Male metaventrite characterized by posterior angles between metacoxae flat, not raised. Male genitalia as figured (Figs 144e, 144m in Audisio 1993b). Larval host-plants: <i>Thymus</i> spp. of <i>T. serpyllum</i> group, or <i>Mentha</i> spp. of <i>M. aquatica</i> and <i>M. longifolia</i> groups. Species from Europe and S Siberia; N Balkans, N Turkey, Ukraine and Caucasus	5
-	Male metaventrite characterized by posterior angles between metacoxae at least slightly raised. Male genitalia as figured (Figs 3, 5, 7 herein). Larval host-plants: <i>Mentha</i> spp. of <i>M. longifolia</i> group. Species from Iran and Middle Asia	6
5	Spaces between punctures of posterior portion of pronotum moderately shagreened with distinct traces of duller microreticulation (Fig. 1). Metaventrite more strongly and closely punctured, with the median keel shorter and less prominent. Ridge on last abdominal ventrite markedly narrower than the hind tibia, distinctly bicuspid, in profile the ridge slopes evenly forwards and backwards, behind it the hind edge of the ventrite is slightly excised. Male genitalia characterized by tegmen more abruptly widened at sides near apex (Fig. 144m in Audisio 1993b). Average body size smaller (length: 1.6–2.2 mm). Larval host-plants: <i>Thymus</i> spp. of <i>T. serpyllum</i> group. Distributed nearly throughout whole central and southern portion of Palaearctic, except North Africa and southern Iberian Peninsula; northern Balkans, Northern Anatolian Peninsula, Caucasus	2. <i>T. lugubris</i> (Sturm, 1845)
-	Spaces between punctures of posterior portion of pronotum shining, without distinct traces of duller microreticulation. Metaventrite less strongly and closely punctured, with the median keel longer and more prominent. Ridge on last abdominal ventrite scarcely narrower than the hind tibia, almost straight and overhanging posteriorly, so that in profile the hind slope is markedly concave, behind this the hind edge of the ventrite is simple. Male genitalia characterized by tegmen less abruptly widened at sides near apex (Fig. 144e in Audisio 1993b). Average body size larger (length: 2.1–2.6 mm). Larval host-plants: <i>Mentha</i> spp. of <i>M. aquatica</i> and <i>M. longifolia</i> group. Distributed nearly throughout whole central and southern portion of Palaearctic, except North Africa and southern Iberian Peninsula; Northern Balkans, Ukraine, NE Turkey, Caucasus	3. <i>T. gagathinus</i> (Erichson, 1845)
6	Male genitalia characterized by tegmen wider and more arcuately protruded outwards, maximum width at distal 2/3 (Fig. 7 herein). SW Iran	6. <i>T. kassites</i> sp. nov.
-	Male genitalia characterized by tegmen narrower and more angulately protruded outwards, maximum width at distal 3/4 or 4/5 (Figs 3, 5 herein)	7
7	Male genitalia characterized by tegmen more strongly and widely protruded outwards, maximum width at distal 3/4 (Fig. 3 herein). SW, central and NE Iran	4. <i>T. ahriman</i> (Jelinek, 1981)
-	Male genitalia characterized by tegmen less strongly and widely protruded outward, maximum width near distal 4/5 (Fig. 5 herein). Afghanistan, Pakistan, W Middle Asia	5. <i>T. klapperichi</i> (Easton, 1957)
8	Male metaventrite characterized by posterior angles between metacoxae barely raised. Male genitalia characterized by tegmen smaller and with more shallow median excision distad (Fig. 9 herein). Male last ventrite medially with a slightly bicuspid transverse ridge, placed closer to posterior edge (Fig. 22 herein). Afghanistan, Pakistan, W Middle Asia	7. <i>T. rebmanni</i> (Easton, 1957)
-	Male metaventrite characterized by posterior angles between metacoxae markedly raised. Male genitalia characterized by tegmen larger and with deeper median excision distad (Figs 11, 13, 15 herein). Male last ventrite medially with a blunt monocuspid tubercle, placed more distantly from posterior edge (Fig. 19 herein). Species from Balkans, Ukraine, Anatolia, Caucasus, and Iran	9
9	Ratio WFTA/LFTA (male) 0.38–0.44. Male genitalia characterized by tegmen larger, paramera more acute distad, and with deeper median excision (Fig. 15 herein). (W Europe), Balkan Peninsula, Anatolia, Caucasian areas, N Iran	8. <i>T. egenus</i> s.l.
-	Ratio WFTA/LFTA (males) 0.31–0.33. Male genitalia characterized by tegmen smaller, paramera more blunt distad, and with shallower median excision (Fig. 13 herein). E Iran	9. <i>T. khorasanicus</i> sp. nov.
10	Female metaventrite characterized by posterior angles between metacoxae flat, not raised	11
-	Female metaventrite characterized by posterior angles between metacoxae slightly raised. Larval host-plants: <i>Mentha</i> spp. of	

	<i>M. longifolia</i> group	15
11	Ovipositor characterized by slightly inversely V-shaped basicoxites (outer apices directed proximad: Fig. 160i in Audisio 1993b), “central point” placed near distal two-fifths	1. <i>T. submetallicus</i> (Sainte-Claire Deville, 1908)
-	Ovipositor characterized by basicoxites distinctly aligned (outer apices positioned near same transverse line: Fig. 160l in Audisio 1993b), “central point” placed near median position	12
12	Species from Afghanistan, Pakistan and S Middle Asia.	5. <i>T. klapperichi</i> (Easton, 1957), 7. <i>T. rebmanni</i> (Easton, 1957)
-	Species from N Balkans, Turkey, Ukraine, Caucasus, and Iran	13
13	Species from Iran. [female of <i>T. kassites</i> unknown]	4. <i>T. ahriman</i> (Jelinek, 1981), 6. <i>T. kassites</i> sp. nov.
-	Species from Europe and Siberia, including N Balkans, Turkey, Ukraine, and Caucasus	14
14	Spaces between punctures of posterior portion of pronotum moderately shagreened and with distinct traces of dull microreticulation (Fig. 1). Metaventrite more strongly and closely punctured. Average body size smaller (length: 1.6–2.2 mm). Larval host-plants: <i>Thymus</i> spp. of <i>M. serpyllum</i> group. Northern Balkans, Northern Anatolian Peninsula, Caucasus	2. <i>T. lugubris</i> (Sturm, 1845)
-	Spaces between punctures of posterior portion of pronotum shining, without distinct traces of dull microreticulation. Metaventrite less strongly and closely punctured. Average body size larger (length: 2.1–2.6 mm). Larval host-plants: <i>Mentha</i> spp. of <i>M. aquatica</i> and <i>M. longifolia</i> groups. Northern Balkans, Ukraine, NE Turkey, Caucasus.	3. <i>T. gagathinus</i> (Erichson, 1845)
15	Ratio WFTA/LFTA (female) slightly larger, 0.28–0.30. Balkan Peninsula, Anatolia, Caucasian areas, N Iran	8. <i>T. egenus</i> s.l.
-	Ratio WFTA/LFTA (female) slightly smaller, 0.25–0.26. E Iran.	9. <i>T. khorasanicus</i> sp.nov.

Conclusions

The number of species of Nitidulidae and Kateretidae present in Iran is now updated to 90 and 7, respectively. Results of our recent field expeditions to Iran (2014–2015) clearly suggest that the Iranian fauna of both families is still poorly known, and that several new records should be foreseen with further specialized and focused field researches for local pollen- and sap-beetles.

Considering the high number of plant species endemic to Iran (more than 1800), representing a little less than 1/3 of the entire flora (Ghahreman & Attar 2000), we hypothesize that several rare or elusive anthophagous species, chiefly in Kateretidae and in Nitidulidae of the subfamily Meligethinae, will be discovered as new in the next years, with particular attention to members of the genera *Brassicogethes* Audisio & Cline, 2009 (Brassicaceae associated), *Meligethes* (Rosaceae associated), *Sagittogethes* Audisio & Cline, 2009 and *Stachygethes* (both Lamiaceae associated), which are highly diversified in the SW Asiatic areas (Audisio 1993b; Audisio *et al.* 1999, 2000, 2001b, 2002, 2003, 2005, 2006, 2015; De Biase *et al.* 2003; Mancini *et al.* 2008, 2016).

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