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Revision of the genus *Kolopterna* Graham (Hymenoptera: Eulophidae), with description of three new species

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ABSTRACT

All 14 species of the genus *Kolopterna* Graham known from the Palearctic and Oriental regions are revised, and three new species are described: *Kolopterna nettae* n. sp. from Israel, *K. turkmenica* n. sp. from Turkmenistan and *K. lao* n. sp. from Laos. *Kolopterna grahami* Kostjukov & Khomchenko is synonymized under *K. desulcata* (Kostjukov). Females are redescribed for *Kolopterna nartshukae* (Kostjukov) and *K. salina* Graham, with males being described for the first time for both species. The distribution of *Kolopterna aymani* Doğanlar, *K. kurdjumovi* Kostjukov & Yegorenkova, *K. nartshukae* and *K. salina* is updated with new records of *K. nartshukae* from Israel and Cyprus and of *K. salina* from Israel and Jordan. Two new host records are reported: *Baldratia arida* Dorchin (Cecidomyiidae) for *K. salina* and *Asphondylia* spp. (Cecidomyiidae) for *K. nettae* n. sp. Molecular identifications for two species *K. nettae* n. sp. and *K. salina* Graham are provided. *Kolopterna trjapitzini* Kostjukov & Kosheleva is excluded from *Kolopterna*, moved to *Aprostocetus*, as *A. mashuk* nom. nov. An identification key to females of all known species and to males of part of species of *Kolopterna* is presented.

KEYWORDS: Biodiversity, identification key, new species, redescription, taxonomy, Tetrastichinae, Eulophidae, parasitoids, East Mediterranean, Levant, Middle Asia, Indochina, South-East Asia.

INTRODUCTION

Graham (1987) described the genus *Kolopterna* based on a female of *K. salina* Graham, 1987 and provided a key for three species: the Palearctic *K. salina* and *K. quartensis* Graham, 1987, and the Oriental *K. kohatensis* Graham, 1987.

Until recently, the Palearctic fauna of *Kolopterna* comprised 12 species: *K. aymani* Doğanlar, 2013, *K. blascoi* Askew, 1997, *K. desulcata* (Kostjukov, 1978), *K. grahami* Khomchenko & Kostjukov, 2004, *K. kasparyani* Kostjukov & Kosheleva, 2014, *K. kurdjumovi* Yegorenkova & Kostjukov, 2007, *K. nartshukae* (Kostjukov, 1976*a*), *K. nikolskayae* Yegorenkova & Kostjukov, 2007, *K. quartensis*, *K. salina*, *K. sugonjaevi* Kostjukov, 2014 and *K. trjapitzini* Kostjukov & Kosheleva, 2018. *K. desulcata* and *K. nartshukae* were transferred from *Tetrastichius* Haliday, 1844 to *Kolopterna* by Kostjukov and Kosheleva (2006). Males were known for six species: *K. aymani*, *K. blascoi*, *K. kohatensis*, *K. nikolskayae*, *K. quartensis* and *K. trjapitzini*.

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In this study we revise the taxonomy of the genus *Kolopterna*, describe three new species, redescribe two, synonymize one species and transfer one species to other genus. In addition, we provide new host information, new geographical records and give an illustrated identification key to females and known males of *Kolopterna*.

MATERIALS AND METHODS

The material used in this review includes more than 490 specimens that are deposited in the entomological collections of the following isntitutions: ZISP – Zoological Institute, Russian Academy of Sciences, St Petersburg, Russia; NHMUK – Natural History Museum, London, United Kingdom; SMNHTAU – The Steinhardt Museum of Natural History, Tel Aviv University, Israel.

Specimens were studied with Leica M125 and Olympus SZX10 stereomicroscopes. Photographs were taken with the Olympus SZX10 and digital cameras (Olympus OM-D). Images were stacked using the Helicon Focus software. The final illustrations were produced using Adobe Photoshop®.

Morphological terminology follows Gibson *et al.* (1997), except for the male antennal whorl of setae that follow Graham (1987). The following abbreviations are used: F1–F4 – lengths of first, second, third and fourth antennal flagellomeres; SMV, MV, PMV, STV – lengths of submarginal, marginal, postmarginal and stigmal veins respectively; POL – minimum distance between posterior ocelli; OOL – minimum distance between eye margin and adjacent posterior ocellus; T1, T2 – lengths of the tarsomere 1 and tarsomere 2 respectively on mid and hind legs.

Absolute measurements in millimeters are given for the body (in dry specimens); relative measurements are used for the forewing, forewing veins, antenna, male genitalia, ovipositor (on slides) and antennal flagellomeres.

Old or alternative geographical names are given in brackets.

New distribution records of previously known taxa are noted with an asterisk (*).

TAXONOMY

Order Hymenoptera Linnaeus, 1758
Superfamily Chalcidoidea Latreille, 1817
Family Eulophidae Westwood, 1829
Subfamily Tetrastichinae Graham, 1987
Genus *Kolopterna* Graham, 1987

Type species: *Kolopterna salina* Graham, 1987: 80.

Diagnosis: The genus *Kolopterna* was first diagnosed by Graham (1987): “First segment of mid and hind tarsi much shorter than second segment. Forewing with marginal vein shorter than or at most as long as costal cell. Antenna of ♀ with 3 anelli, the first two discoid, the third large … funicle and clava each with 3 segments.

Antenna of ♂ with ventral plaque of scape placed in upper half; with 2 anelli, 4 funical segments and 3 claval segments. … Malar sulcus with oblong or sublinear fovea below eye. Genitalia of ♂ very elongate, as in *Sigmophora*."

Identification: The first key to species of *Kolopterna* was published by Graham (1987). More than 30 years later, Kostyukov and Kosheleva (2018) produced a key for 13 Palearctic species, without illustrations. Our illustrated key includes 14 species from the Palearctic and Oriental regions; females are known for all species, while males are known for seven species only.

Hosts: *Asphondylia punica* Marchal, 1897 (Diptera, Cecidomyiidae) on *Atriplex halimus* L. (Doğanlar & Elsayed 2013,). New host record for *Kolopterna* is *Baldratia arida* Dorchin, 2019 (Cecidomyiidae).

Distribution: Palearctic: Europe (Greece, Spain, Italy, Russia (European part), East Mediterranean (*Cyprus, Egypt, *Israel, *Jordan), Middle Asia (Kazakhstan, Turkmenistan), and Oriental: Pakistan, *Laos.

Keys to species of *Kolopterna*

(males are known for seven species only)

1 Forewing with apical margin, between PMV and apex of wing, bare; speculum open below (Fig. 7F) 2
– Forewing with apical margin, between PMV and apex of wing, ciliate; speculum closed below (Fig. 6F) 5

2 Submedian lines on scutellum present (Fig. 5B) 3
– Submedian lines on scutellum absent 4

3 Gaster 1.7–2.0× as long as wide; F1 2.8–3.0×, clava 2.0× as long as wide (Fig. 7A). Male with ventral plaque 0.30× length of scape, F1 1.6×, clava 4.6× as long as wide, whorls of F1 reaching ½ of F2 (Fig. 7H) ..... ***K. nettae*** n. sp.
– Gaster 2.3× as long as wide; F1 2.75 ×, clava 2.6× as long as wide (Fig. 3D, E). Male with ventral plaque 0.27× as long as scape, F1 1.8×, clava 5.0× as long as wide; whorls of F1 reaching tip of F3 (Fig. 3F) ..... ***K. kohatensis*** Graham

4 POL 2.2× OOL; F1 2.6×, clava 3.2× as long as wide (Fig. 4F). Male unknown. ..... ***K. lao*** n. sp.
– POL 1.3× OOL; F1 3.4×, clava 2.2× as long as wide. Male with ventral plaque 0.23× as long as scape, F1 1.6×, whorls of F1 reaching basal ⅓ of F3 (Doğanlar, 2013: 1802, fig. 2e) ..... ***K. aymani*** Doğanlar

5 Submedian lines on scutellum present 6
– Submedian lines on scutellum absent 11

6 Legs with at least hind coxae brown 7
– Legs with all coxae yellow 9

7 All coxae brown in both sexes. Male with ventral plaque 0.30× as long as scape, F1 1.8×, clava 6.0× as long as wide, antenna with whorled setae of F1 reaching ½ of F3 ..... ***K. quartensis*** Graham
– Only hind coxae brown. Males unknown 8
8 Gaster 2.4× as long as wide; F1 1.5× as long as wide .... ***K. kasparyani*** Kostjukov & Kosheleva
– Gaster 2.8× as long as wide; F1 2.0× as long as wide ....***K. sugonjaevi*** Kostjukov
9 F1 4.7–5.0× as long as wide. Male with ventral plaque 0.40× as long as scape, F1 2.3×, clava 6.0–6.7× as long as wide (Fig. 10B, C), whorls of F3 reaching ½ of C1..... ***K. salina*** Graham
– F1 1.4–3.2× as long as wide (Fig. 1C). Male with different combination of characters..... 10
10 POL 1.8× as long as OOL. Male with ventral plaque 0.50× as long as scape, F1 1.5× as long as wide, clava 4.8× as long as wide..... ....***K. nikolskayae*** Kostjukov & Yegorenkova
– POL 1.5× as long as OOL (Fig. 1C). Male with ventral plaque 0.20× as long as scape (Fig. 1D), F1 2.4× as long as wide, clava 6.0–7.0× as long as wide .... ***K. blascoi*** Askew
11 Gaster entirely brown (Figs 5A, 6A, C) in both sexes. Male with ventral plaque 0.75× as long as scape (Fig. 6E), F1 2.5×, F2, F3 3.0×, F4 2.5×, clava 5.0× as long as wide, whorled setae of F1 reaching apex of F2 .... ***K. nartshukae*** (Kostjukov)
– Gaster yellow with brown transverse bands in females. Males unknown 12
12 Gaster 4.0× as long as wide (Fig. 4A) .... ***K. kurdjumovi*** Kostjukov & Yegorenkova
– Gaster 2.0–3.4× as long as wide 13
13 F1 3.2× as long as wide, F1 1.25× as F2. Gaster 3.3–3.4× as long as wide ....***K. desulcata*** Kostjukov
– F1 3.8× as long as wide F1 1.5× as F2. Gaster 2.0–2.3× as long as wide..... .....***K. turkmenica*** n. sp.

Kolopterna aymani Doğanlar, 2013

(Fig. 1A, B)

Kolopterna aymani Doğanlar, 2013: 1800.

Diagnosis (after Doğanlar 2013): ***Female.*** Body length 1.8–2.7 mm. POL 1.25× as long as OOL. F1 about 3.4×, F2 2.0×, clava 2.2× as long as wide. Fovea sublinear 0.50× as long as gena. Pronotum 0.4× as long as mesoscutum, mesoscutum with several setae in 3 rows on each side, scutellum without submedian lines. Forewing

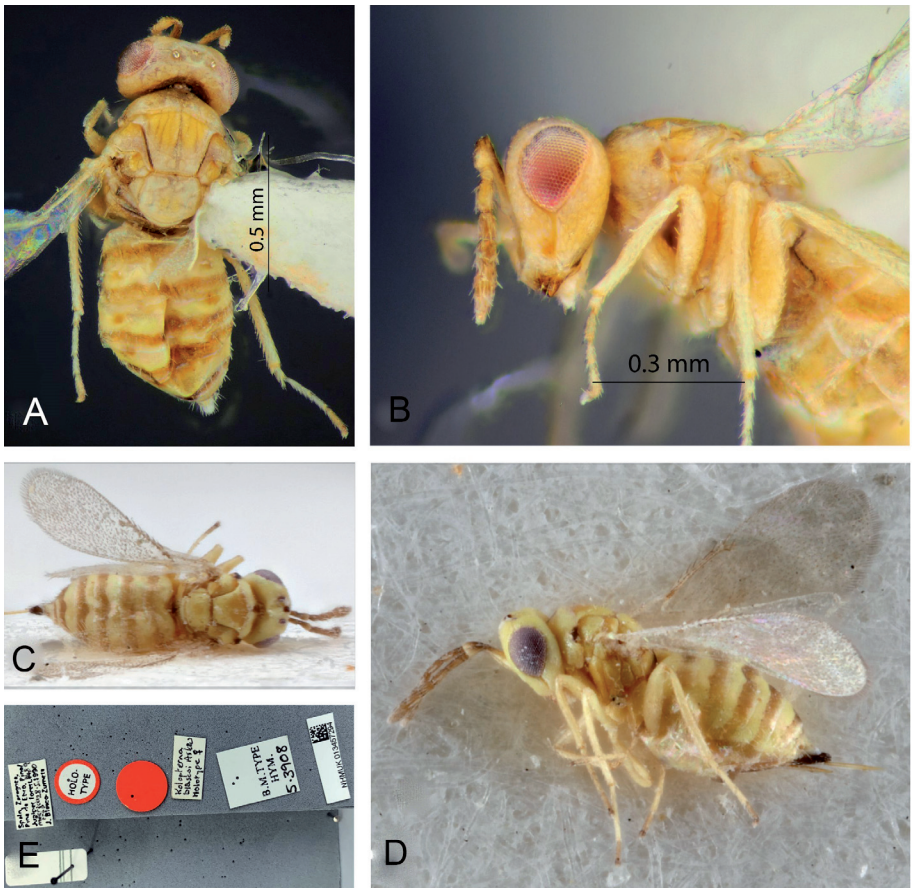

Fig. 1: (A, B) *Kolopterna aymani* Doğanlar, female: (A) body, dorsal view, (B) head, mesosoma and metasoma partly, lateral view; (C–E) *Kolopterna blaskoi* Askew, holotype, female (NHMUK 013457294]: (C) body, dorsal view, (D) body, lateral view, (E) labels.

with apical margin, between PMV and apex of wing, bare, speculum open below, SMV with 4 setae, MV 1.3× shorter than costal cell. Gaster 2.2× as long as wide. Body yellow (Fig. 1A, B). ***Male.*** Body length 1.3–2.0 mm. Antennal scape with ventral plaque 0.23× length of scape, F1 1.6×, F2 2.6×, F3 2.6×, clava 7.0× as long as wide, whorled setae of F1 reaching about level with about basal ⅓ of F3. Genitalia 10.4× as long as broad.

Israeli specimen. ***Female***. Body length 1.4 mm. Malar sulcus with sublinear fovea 0.6× length of gena. Mid T1 1.6× shorter than T2 and hind T1 2.0× shorter than T2. MV 1.3× shorter than costal cell.

Holotype (not examined): **Egypt:** ♀, Alexandria, Alameria District, 30°59'54"N 29°49'70"E, 6.iii.2013, emerged as solitary parasites from galls of *Asphondylia conglomerata* on *Atriplex halimus*, A. Elsayed (Mustafa Kemal University, Hatay, Turkey, Cat. No: 005–01).

Material examined: Israel: 1♀, Mizpe Shalem, 13.iv.1995, N. Dorchin, ex *Asphondylia* sp. (Cecidomyiidae) on *Salsola tetrandra* (SMNHTAU).

Distribution: Egypt, * Israel.

Hosts: *Asphondylia punica* Marchal (recorded also by its junior synonym *Asphondylia conglomerata* De Stefani, 1900) (Diptera: Cecidomyiidae) on *Atriplex halimus* L. (Chenopodiaceae) (Doğanlar 2013). In Israel, the species was reared from *Asphondylia* sp. on *Salsola tetrandra* Forssk. (Chenopodiaceae).

Remark: *Asphondylia punica* Marchal is very common around the Mediterranean basin, including Algeria, Tunisia, Egypt, Israel, Syria, Greece, Italy and Spain (Dorchin *et al*. 2014).

Kolopterna blascoi Askew, 1997

(Fig. 1C–E)

Kolopterna blascoi Askew, 1997: 243.

Diagnosis: ***Female***. Body length 0.9–1.4 mm. POL 1.5× as long as OOL. Malar sulcus with sublinear fovea below eye is extending about or slightly more than half-length of gena. F1 2.5×, F2 2.2×, clava 3.3× as long as wide (Fig. 1D). SM with 2–3 dorsal setae. MV 1.3× shorter than costal cell. Pronotum 0.50× as long as mesoscutum, mesoscutum with one row of 3–4 adnotaular setae, scutellum with submedian lines. Forewing with apical margin, forewing between PMV and apex of wing, ciliate, and speculum closed below. Gaster 1.7–1.8× as long as wide. Body completely pale yellow, gaster with brown transverse bands (Fig. 1C, D). ***Male***. Body length 0.9–1.4 mm. Antennal scape with ventral plaque 0.20× as long as scape, F1 1.03× shorter than pedicel, F1 2.4×, F2 2.9×, F3 3.3×, F4 3.3×, clava 6.0–7.0× as long as wide, whorled setae of F1 reaching apical half of F3. Forewing with apical margin, between PMV and apex of wing, ciliate, speculum closed below. **Holotype** (examined)**: Spain:** ♀, Zaragoza, Pina de Ebro, juniper forest, in Moericke trap, 28.v.1990, J. Blasco-Zumata (NHMUK 013457294).

Distribution: Spain.

Host: Unknown. Associated with *Salsola vermiculata* L. (Chenopodiaceae).

Kolopterna desulcata (Kostjukov, 1978)

(Fig. 2A–H)

Tetrastichus desulcatus Kostjukov, 1978: 460.
Kolopterna desulcatus (Kostjukov, 1978); Kostjukov & Kosheleva, 2006: 105.
Kolopterna grahami Kostjukov & Khomchenko in Khomchenko & Kostjukov, 2004: 78, **n. syn.**

Diagnosis: ***Female***. Body length 1.7–2.4 mm. POL 2.0× as long as OOL. F1 3.0–3.3×, F2 1.4–2.3×, clava 2.2–3.0× as long as wide. Mesoscutum with 7 adnotaular setae

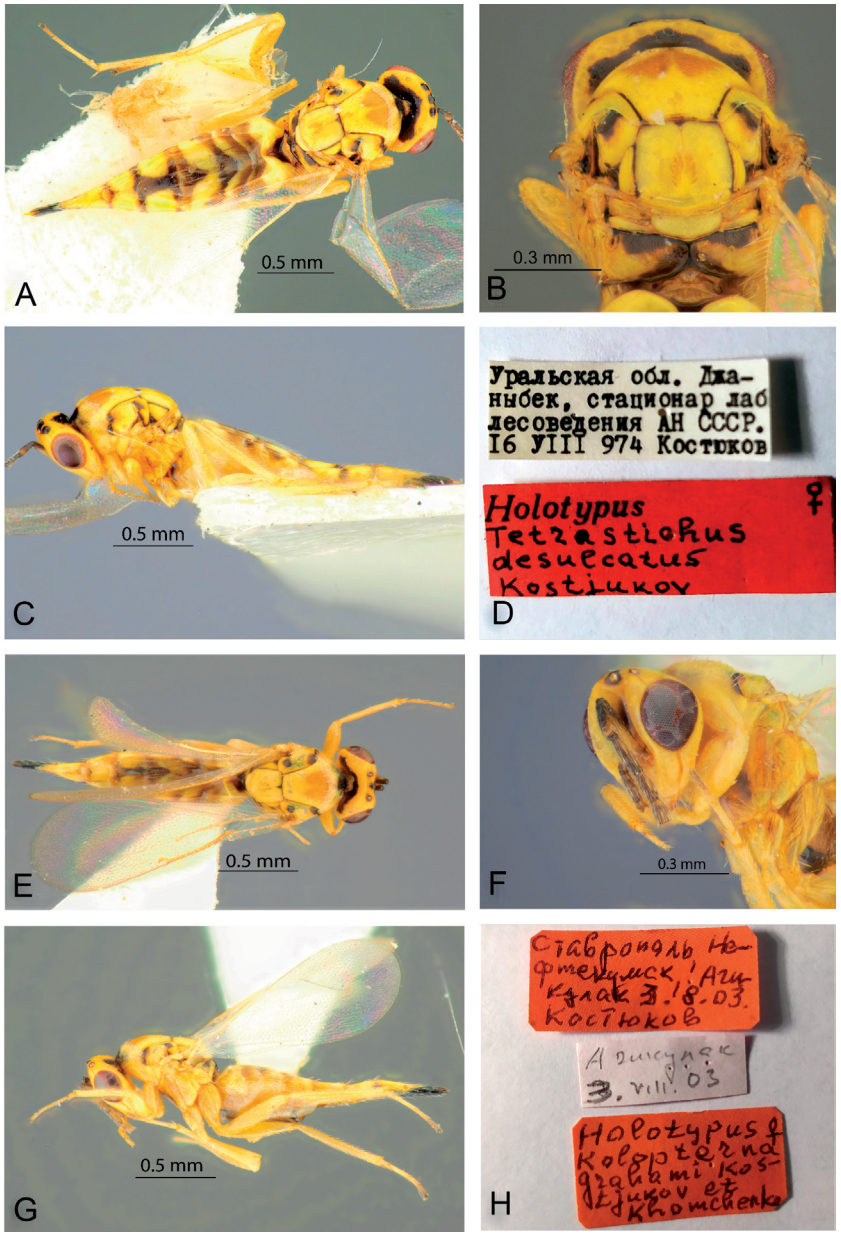

Fig. 2: (A–D) *Kolopterna desulcatus* Kostjukov, holotype, female: (A) body, dorsal view, (B) mesosoma, dorsal view, (C) body, lateral view (antennae broken), (D) labels; (E–H) *Tetrastichus grahami* Kostjukov & Khomchenko, holotype, female: (E) body, dorsal view, (F) head and antenna, frontal view, (G) body, lateral view, (H) labels.

in two rows on each side: 5 setae in first and 2 in second. Scutellum without submedian lines. Forewing with apical margin, between PMV and apex of wing, ciliate, speculum closed below, SMV with 5 setae, MV 1.1–1.2× shorter than costal cell. Gaster 3.3–3.4× as long as wide. Hind T1 2.3–2.4× shorter than T2. ***Male***. Unknown.

Description (amended): ***Female.*** Body length 1.7–2.4 mm. POL 2.0× as long as OOL. Malar sulcus with sublinear fovea below eye is extending 0.75× length of gena. Antennal flagellomeres: F1 3.2×, F2 2.2×, and clava 3.2× as long as wide. Mesoscutum with two rows of adnotaular setae on each side: 5 in first and 2 in second. Scutellum without submedian lines. Forewing with apical margin, between PMV and apex of wing, ciliate, speculum closed below. SM with 5 dorsal setae. MV 1.1–1.2× shorter than costal cell. Gaster 3.3× as long as broad. Hind T1 2.25× shorter than T2. Body yellow with dark spots on head around lateral ocellus, occiput, pronotum and scapulae. Gaster with brown transverse bands. The ovipositor sheaths brown. Eyes red, lateral ocelli yellow.

Male. Unknown.

Holotype (*K. desulcata*, examined, Fig. 2A–D): **Kazakhstan:** ♀, West Kazakhstan Region [Ural prov.], Zhanibek [Dzhanybek stationary laboratory of forestry of the USSR Academy of Sciences], 49°25'N 46°50'E , 16.viii.1974, V. Kostjukov, det. *Tetrastichus desulcatus* Kostjukov, 1978 (ZISP).

Holotype (*K. grahami*, examined, Fig. 2E–H): **Russia:** ♀, Stavropol Territory, Neftekumsk District, Achikulak, 44°32'N 44°49'E, 3.viii.2003, V. Kostjukov (ZISP).

Paratypes (*K. grahami*, examined): **Russia:** same data as holotype: 1 ♀, 5.viii.2003; 2 ♀, 8.viii.2003 (ZISP).

Distribution: Kazakhstan (west part, near Ural River), Russia (North Caucasus).

Host: Unknown.

Remark: The comparison of the types of *K. desulcata* and *K. grahami* based on measurements and color, suggests they belong to the same species, and are therefore synonymized here under *K. desulcata*.

Kolopterna kasparyani Kostjukov & Kosheleva, 2014

(Fig. 3A–C)

Kolopterna kasparyani Kostjukov & Kosheleva, 2014: 163.

Diagnosis: ***Female.*** Body length 0.8–1.1 mm (Fig. 3A, B). POL 1.9–2.1× as long as OOL. F1 1.4–1.5×, F2 1.4×, clava 2.2–2.4× as long as wide (Fig. 3B). Pronotum 0.70–0.85× as long as mesoscutum (Fig. 3A), mesoscutum with 4 adnotaular setae in two rows: 3 setae in first, 1 in the second on each side, scutellum with submedian lines. Forewing with apical margin, between PMV and apex of wing, ciliate, speculum closed below, SMV with 4 setae, MV 1.25× shorter than costal cell. Gaster 2.30–2.45× as long as wide. Hind T1 1.7× shorter than T2. Body pale yellow with extensive pale brownish spots on the face. Antennae yellow, legs yellow excluding brown coxae. ***Male.*** Unknown.

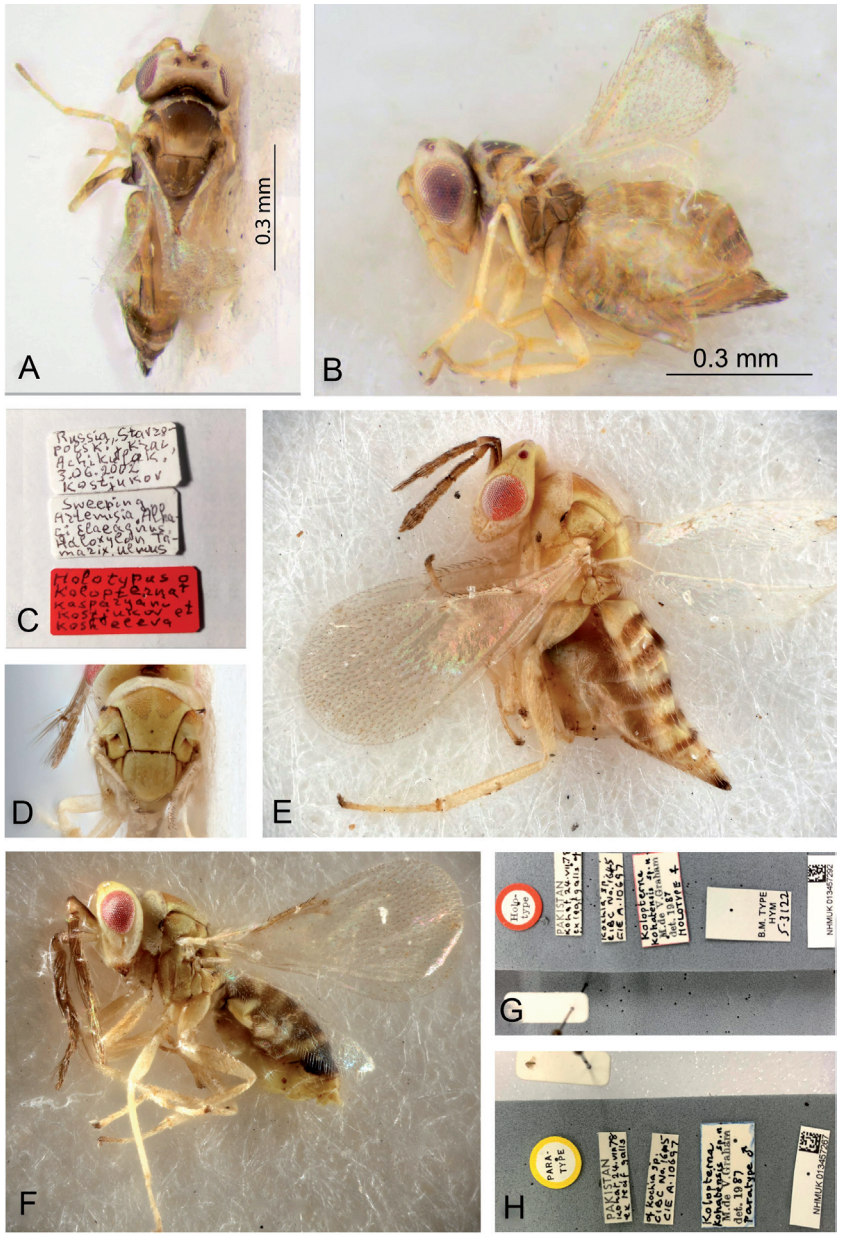

Fig. 3: (A–C) *Kolopterna kasparyani* Kostjukov & Kosheleva, holotype, female: (A) body, dorsal view, (B) body, lateral view, (C) labels; (D–H) *Kolopterna kohatensis* Graham: (D) paratype, male, mesosoma, dorsal view, (E) holotype, female, body, lateral view, (F) male, body, lateral view, (G) labels of holotype (NHMUK 013457292), (H) labels of paratype (NHMUK 013457267).

Holotype (examined, Fig. 3C): **Russia:** ♀, Stavropol Territory, Achikulak, 44°32'N 44°49'E, 3.vi.2002, V. Kostjukov, sweeping on *Artemisia*, *Alhagi*, *Elaeagnus*, *Haloxylon*, *Tamarix* and *Ulmus* (ZISP).

Paratypes (examined): **Russia:** 4♀, same data as holotype: 2♀, Terkum, 44°45'N 44°39'E, 22.vii.2004, O. Kosheleva, sweeping on *Artemisia* (ZISP); 2♀, Velichaevskoe, 44°56'N 45°07'E, 23.vii.2004, O. Kosheleva sweeping on *Artemisia*, *Euphorbia*, *Alhagi* and *Elitrigia* (ZISP); 5♀, Arzgir, 45°22'N 44°13'E, 17.vii.2005, O. Kosheleva, sweeping on *Artemisia* (ZISP).

Distribution: Russia (North Caucasus).

Host: Unknown.

Kolopterna kohatensis Graham, 1987

(Fig. 3D–H)

Kolopterna kohatensis Graham, 1987: 82.

Diagnosis: ***Female.*** Body length 1.5 mm. POL 1.30× as long as OOL. F1 2.75×, F2 2.0×, clava 2.6× as long as wide (Fig. 3E). Pronotum 0.8–0.9× as long as mesoscutum, mesoscutum with adnotaular setae in two rows: 7 setae in first and 3 in the second on both sides, scutellum with submedian lines. Forewing with apical margin, between PMV and apex of wing, bare, speculum open below, SMV with 4 setae, MV 1.7× shorter than costal cell. Gaster 2.3× as long as wide; body yellow with transverse fuscous band on the each gastral tergite. ***Male.*** Antenna. Pedicel plus flagellum about equal to wide of mesoscutum; scape with ventral plaque 0.27× as long as scape. Whorled setae of F1 reaching apex of F3. F1 as long as pedicel, F1 1.8×, F2 2.2×, F3 2.4×, F4 2.5×, clava 5.0× as long as wide (Fig. 3F). Thorax 1.2× as long as wide (Fig. 3D). Forewing with apical margin, between PMV and apex of wing, bare; speculum open below, MV 1.7× shorter than costal cell. Genitalia 5.7× as long as broad (Graham, 1987). Hind T1 2.7× shorter than T2. Gaster 2.3× as long as wide. Body length of male not mentioned by Graham (1987).

Holotype (examined, Fig. 3G): **Pakistan:** ♀, Kohat, 33°34'N 71°28'E, 24.vii.1978, ex leaf galls on *Kochia* sp. "CIBC No. 1645 CIE A.106.95" (NHMUK 013457292).

Paratype (examined, Fig. 3H): **Pakistan:** ♂, same locality as holotype (NHMUK 013457267).

Distribution: Pakistan (Graham 1987), Spain (Askew 1997).

Host: Unknown. Associated plant *Kochia* sp. (Chenopodiaceae) (Graham 1987).

Kolopterna kurdjumovi Kostjukov & Yegorenkova, 2007

(Fig. 4A, B, D)

Kolopterna kurdjumovi Kostjukov & Yegorenkova in Yegorenkova & Kostjukov, 2007: 105.

Diagnosis: ***Female.*** Body length 2.4 mm. POL 1.7–1.8× as long as OOL; F1 2.9–3.3×, F2 1.9–2.1×, clava 3.1–3.3× as long as wide (Fig. 4B). Pronotum 0.16–0.20× as long as mesoscutum, mesoscutum with two rows of 4 adnotaular setae, scutellum without submedian lines (Fig. 4A). Forewing with apical margin, between PMV and apex of wing, ciliate, speculum closed below, SMV with 4–5 setae, MV 1.1× longer than costal cell. Gaster about 4.0× as long as wide. Hind T1 1.8× shorter

than T2. Body yellow, head with brown vertex around lateral and median ocelli; antenna yellow, mesoscutum with testaceous spots; pronotum and axillae brown; propodeum brown; tegulae yellowish. Gaster yellow with transverse brown bands. Legs yellow (Yegorenkova & Kostjukov 2007). ***Male.*** Unknown.

Holotype (examined, Fig. 4D): **Russia:** 1♀, Ulyanovsk Province, Radishchevo district, Vyazovka village, 60 km S Ulyanovsk, 52°53'N 48°26'E, 21.vii.2005, E. Yegorenkova (ZISP).

Paratype (examined): **Russia:** 1 ♀, same data as holotype (ZISP).

Additional material examined: Israel: 1♀, Newe Ativ, 33°27'N 35°74'E, 26.vi.2015, I. Zonstein, sweeping (SMNHTAU).

Distribution: *Israel, Russia (the central part of European Russia, Middle Volga region).

Host: Unknown.

Kolopterna lao n. sp.

Fig. 4C, E, F

LSID: urn:lsid:zoobank.org:pub:D0226141-A53C-4B54-80FC-4547C9300C87.

Etymology: The species is named after the country of its origin.

Diagnosis: ***Female.*** Body length 2.0–2.2 mm. POL 2.25× OOL (Fig. 4C). Antenna. F1 2.6×, F2 2.1×, clava 3.2× as long as wide (Fig. 4F). Pronotum 0.20× as long as mesoscutum, mesoscutum with two rows of 4–5 setae adnotaular setae on each side, scutellum without submedian lines (Fig. 4C). Forewing with apical margin, between PMV and apex of wing, bare, speculum open below, SMV with 4 setae, MV 1.2× shorter than costal cell. Gaster 2.0× as long as wide. Body yellow. ***Male.*** Unknown.

Description: ***Female***. Body length 2.0–2.2 mm (HT 2.0 mm); forewing length 1.75. Color. *Head* yellow; occiput brown, antenna brownish, eye red; ocelli red. Mandibles brown. Mesosoma yellow. Legs yellow; gaster yellow with fuscous bands on each gastral tergite (Fig. 4E). Head. 2.0× as long as wide; eye 1.1× as long as wide. Malar sulcus with sublinear fovea below eye is extending 0.65× length of gena. Mandibles with three big teeth. POL 2.25× OOL. Antenna (Fig. 4F) inserted at lower level of eyes. Scape 5.0× as long as wide and 1.1× as long as eye. Pedicel 1.75× as long as wide; flagellum first two anelli lenticular, third almost quadratic with many setae. F1 2.6× as long as wide, and 1.1× as long as F2, F1 1.1× as long as pedicel, F2 2.1× as long as wide, and F3 1.8× as long as wide, F3 1.1× shorter than F2, clava 3-segmented, 3.2× as long as wide and 2.1× as long as F3. *Mesosoma*. Pronotum 6.0 × as wide as long and 0.2× as long as mesoscutum. Mesoscutum finely reticulate 1.1× as wide as long, with two rows of adnotaular setae with 4–5 setae on each side, median line indistinct. Scutellum 1.2× as wide as long, finely reticulate, with submedian lines. Dorsellum 4.2× as wide as long. Propodeum 3.0× as wide as long, callus with 6 setae in one row. Forewing 2.4× as

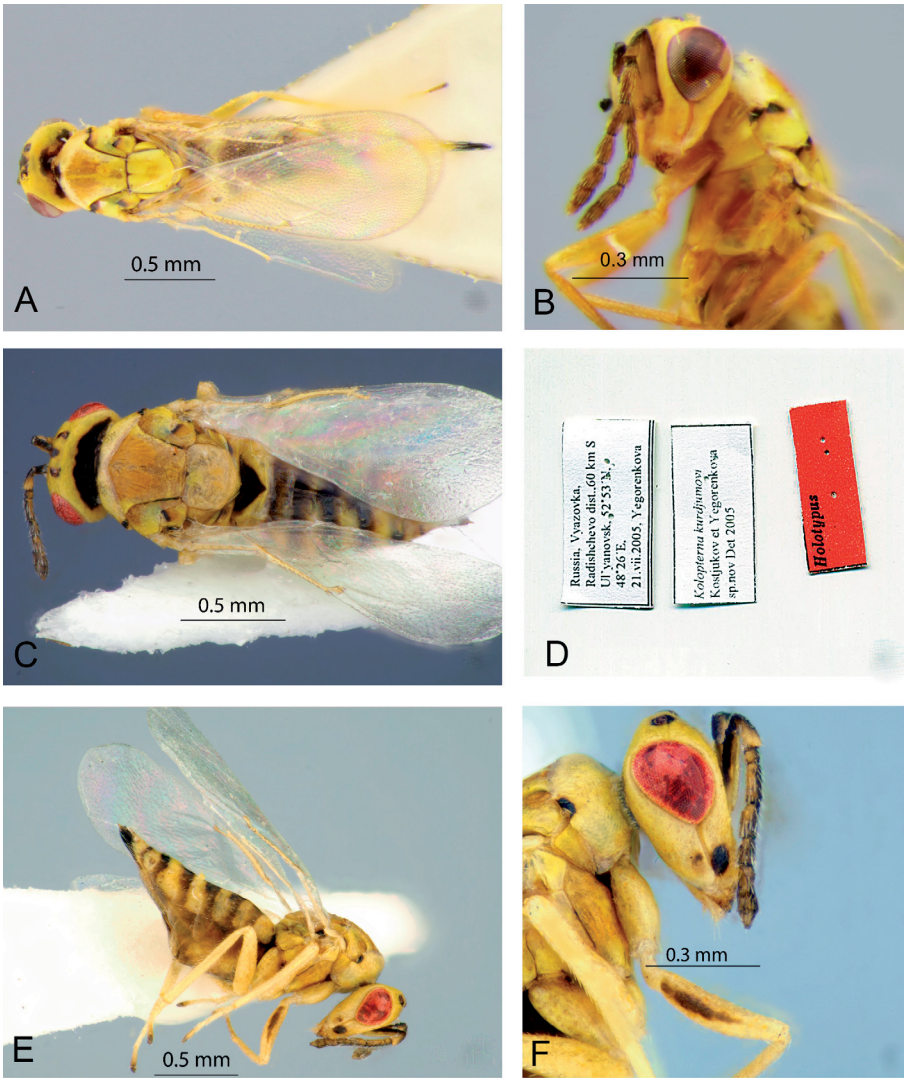

Fig. 4: (A, B, D) *Kolopterna kurdjumovi* Kostjukov & Yegorenkova, holotype, female: (A) body, dorsal view, (B) head, pronotum and mesoscutum, lateral view, (D) labels; (C, E, F) *Kolopterna lao* sp. nov., holotype, female: (C) dorsal view (E) body, lateral view, (F) head, antennae and pronotum, lateral view.

long as wide with apical margin, between PMV and apex of wing, bare; speculum open below; MV 1.2× shorter than costal cell, SMV with 4 setae; MV 1.1× as long as SMV and 5.0× length of STV, STV bare except for 1 seta in the middle of the stigma. Hindwing apically rounded. Legs: hind tarsi with T2 1.8× longer than T1.

Metasoma. Petiole small, smooth. Gaster 2.3× as long as wide, about 1.4× as long as mesosoma. Ovipositor sheaths slightly projecting beyond apex of gaster.

***Male*.** Unknown.

Holotype: Laos: *Phonsavan Xiangkhouang Prov.:* 1 ♀, Phongsavan, Kongkeo Guest House, 19°29'51"N 103°17'41"E, elevation 1130 m, 10.xi.2018, E. Yegorenkova, Z. Yefremova (SMNHTAU).

Paratype: Laos: 1 ♀, same data as holotype (ZISP).

Distribution: Laos.

Host: Unknown.

Kolopterna nartshukae (Kostjukov, 1976*a*)

(Figs 5A–F, 6A–F)

Tetrastichus nartshukae Kostjukov, 1976*a*: 89.
Kolopterna nartshukae (Kostjukov): Kostjukov & Kosheleva 2006: 106.

Diagnosis: *Female*. POL 1.2× OOL; F1 4.8×, F2 2.6×, clava 2.5× as long as wide (Fig. 5B, D). Pronotum 0.50× as long as mesoscutum (Fig. 5A), mesoscutum with three rows of 9 adnotaular setae on each side, scutellum without submedian lines (Fig. 5B). Forewing with apical margin, between PMV and apex of wing, ciliate, speculum closed below, SMV with 4 setae, MV 1.32× longer than costal cell. Gaster 2.0× as long as wide (Fig. 5C). Color of mesosoma yellow, gaster dark brown. ***Male*.** Antenna (Fig. 6E). Scape with ventral plaque about 0.75× length of scape, F1–4 with whorled setae. Whorled setae of F1 reaching apex of F2, F2 reaching apex of F3, whorls of F3 reaching base of clava.

Description: *Female*. Body length 2.0–2.3 mm (HT 2.2 mm).Color. Head yellow, occiput yellow, antenna brownish, scape yellow in apical ⅓ and dorsally brownish, eyes dark red; ocelli red, mandibles yellow. Mesosoma yellow, legs yellow, coxae brownish. Gaster brown. *Head*. 2.25× as wide as long; eye 1.4× as long as height and 1.3× as long as malar space. Malar sulcus with sublinear fovea below eye, extending 0.6× length of gena. POL 1.2× OOL. Antenna inserted above lower level of eyes; with scape 4.5× as long as wide and 1.3× as long as eye. Pedicel 2.2× as long as wide**,** 1.4× as long as F1. Flagellum with 2 anelli, the second anellus with 2 setae, F1 3.8× as long as wide, and 1.4× as long as F2, F2 2.6× as long as wide, and F3 1.75× as long as wide, clava 3-segmented, 2.5× as long as wide and 2.1× as long as F3 (Fig. 5D, E). Antenna with pedicel plus flagellum 1.45× as long as width of mesoscutum. *Mesosoma*. Pronotum 3.8× as wide as long and 0.5× as long as mesoscutum. Mesoscutum, finely reticulate 1.25× as wide as long, with three rows of adnotaular setae on each side: first row with 4 setae, second with 3 setae, third with 2 setae, median line indistinct. Scutellum 1.1× as wide as long, without distinct submedian lines. Dorsellum 2.7× as wide as long. Propodeum 4.0× as wide as long, and 1.1× as long as dorsellum, callus with 4 setae in one row (Fig. 5B), spiracles small with paraspiracular rim. Forewing 2.4× as long as wide; apical

Fig. 5: (A–F) *Kolopterna nartshukae* (Kostjukov): (A–D) holotype, female: (A) body, dorsal view, (B) mesosoma, dorsal view, (C) mesosoma, dorsal view, (D) head and antenna, lateral view; (E) paratype, female, antenna; (F) labels of holotype.

margin, between PMV and apex of wing, ciliate; speculum large and extending along MV, closed; MV 1.1× shorter than costal cell, SMV with 4 setae; MV 1.1× as long as SMV and 5.4× length of STV, its front edge with 8 setae; ST bare except for 4 setae in the middle of the stigma; PMV as stub. Hindwing apically rounded. Legs: hind tarsi with T2 2.0× as long as T1. *Metasoma*. Petiole small, conical. Gaster 1.6–2.0× as long as wide (1.85× in Fig. 5C).

Male. Body length 1.53 mm. Color as in female (Fig. 6A, C). *Head*. 2.7× as wide as long. Malar sulcus with sublinear fovea below eye extending 0.6× length of gena (Fig. 6D). POL 1.2× OOL. Antenna (Fig. 6E) with scape 4.0× as long as

wide, with ventral plaque about 0.75× as long as scape, pedicel 2.0× as long as wide, with 1 anellus; F1 2.5× as long as wide, F2, F3 3.0× as long as wide, F4 2.5× as long as wide, clava 3-segmented, 5.0× as long as wide and 2.3× as long as F4. Clava with long apical sensillum. F1–4 with whorled setae, whorled setae of F1 reaching apex of F2, F2 reaching apex of F3, whorls of F3 reaching base of clava. *Mesososma*. Pronotum 3.3× as wide as long. Mesoscutum finely reticulate 1.0×

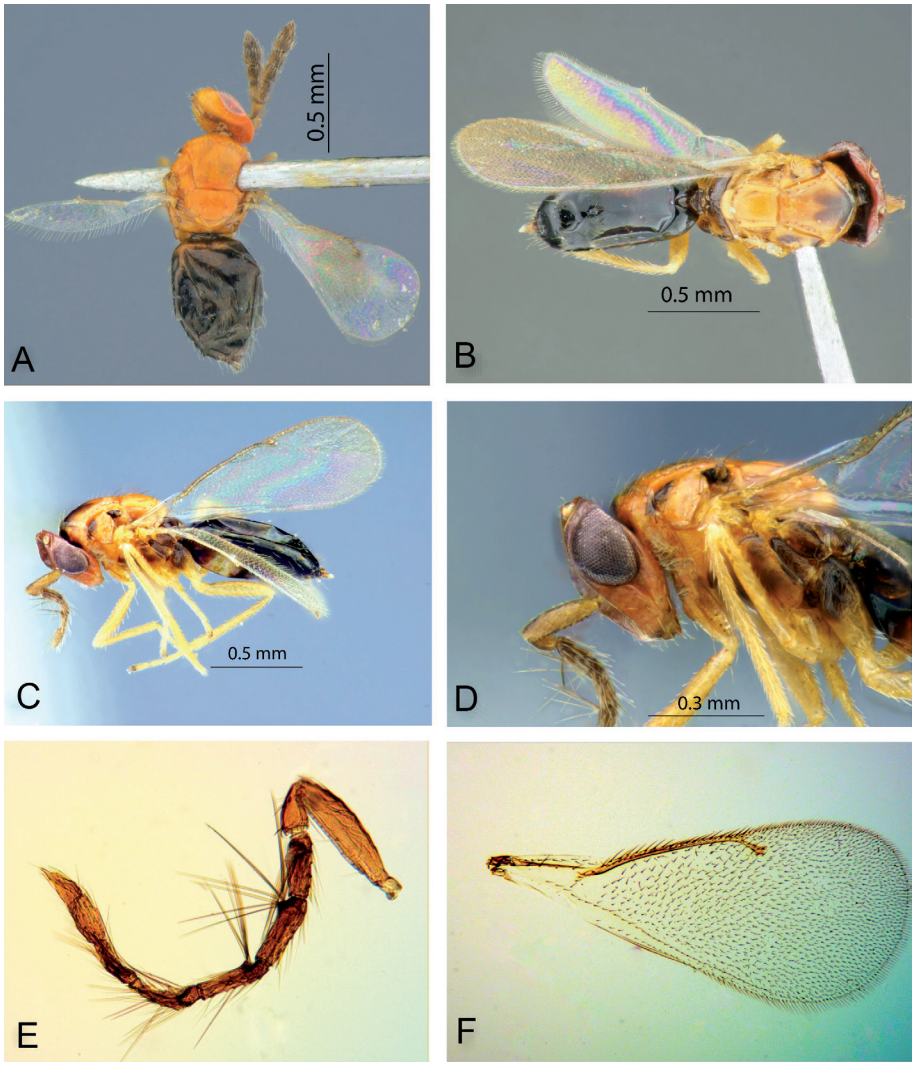

Fig. 6: (A–F) *Kolopterna nartshukae* (Kostjukov), Israel (SMNHTAU): (A) female, body, dorsal view, (B) female, body, dorsal view, (C) male, body, lateral view, (D) male, head and antenna, lateral view, (E) male, antenna, (F) male, forewing.

as wide as long, with 6 adnotaular setae on each side. Scutellum 1.3× as wide as long, with two pair of setae. Propodeum 3.1× as wide as long, reticulate (Fig. 6A). Callus with 4 setae in one row. Forewing 2.4× as long as wide. SMV with 4 setae, speculum extending ⅓ below MV (Fig. 6F). *Metasoma*. Petiole small, conical. Gaster 2.3× as long as wide.

Holotype (examined, Fig. 5A–F): **Turkmenistan:** ♀, Karabil, 36°15'N 63°30'E, 17.viii.1973, E. Narchuk, on *Sphaerophysa salsula* (ZISP).

Additional material examined: **Turkmenistan:** 14♀, Karabil, '15 km E from Humala' [36°02'N 63°05'E], 16.viii.1973, E. Narchuk (ZISP; specimens not included in type series by Kostjukov (1976)). **Cyprus:** 1♀, Troodos Mts, Pedoulas, 34°58'03"N 32°49'43"E 5.viii. 1993, F. Kaplan (SMNHTAU); **Israel:** 1 ♂, Tel Dan, 33°14'52"N 35°39'05"E, 8.xi.1984, A. Freidberg (SMNHTAU); 1♀, Kokhav haYarden, 32°35'44"N 35°31'15"E, 12.ix.1987, A. Freidberg (SMNHTAU); 1♀, Kokhav haYarden, 32°35'44"N 35°31'15"E, 12.ix.1987, A. Freidberg (SMNHTAU); 2♀, Herzliyya, beach, 32°12'N 34°39'E, 27.viii.2007, A. Freidberg (SMNHTAU); 1♀, same data, 23.vi.2007, A. Freidberg (SMNHTAU).

Distribution: *Cyprus, *Israel, Turkmenistan.

Host: Collected in Turkmenistan on *Sphaerophysa salsula* (Pall.) DC. (Fabaceae). This plant is native to Central Asia, has been introduced in the USA, and is considered as an invasive pest and noxious weed in part of the Western states of the USA (DiTomaso *et al.* 2013; CABI 2024)

Remark: The male of *K. nartshukae* is described here for the first time.

Kolopterna nettae n. sp.

(Fig. 7A–H)

LCID: urn:lsid:zoobank.org:pub:D0226141-A53C-4B54-80FC-4547C9300C87.

Etymology: This species is named after the first name of Prof. Netta Dorchin, the chief curator of the National Collection of Insects, SMNHTAU, Israel and the president of the Entomological Society of Israel, who collected the hosts and reared the wasps.

Diagnosis: ***Female.*** POL 1.6× OOL. Antenna. F1 2.8–3.0×, F2 2.1–2.4×, clava 2.0–2.2× as long as wide (Fig. 7E). Pronotum 0.4× as long as mesoscutum (Fig. 7A), mesoscutum with two rows of 4 adnotaular setae on each side. Forewing (Fig. 7C) with apical margin, between PMV and apex of wing, bare, speculum open below, SMV with 4 setae (Fig. 7F), MV 1.4× shorter than costal cell. Gaster 1.7–1.9× as long as wide. Body yellow (Fig. 7B). ***Male.*** Antenna with pedicel plus flagellum 1.2× as long as width of mesoscutum; scape with ventral plaque 0.30× as long as scape, F1 1.6×, F2 2.1×, F3 2.0×, F4 2.2×, clava 4.6× as long as wide; forewing with apical margin, between PMV and apex of wing, bare (Fig. 7H); speculum open below.

Description: ***Female.*** Body length 1.4–1.9 mm (HT 1.7 mm). Color: Body yellow. Head yellow; occiput brown, antenna brownish, eye red; ocelli red. Mandibles brown. Legs yellow; gaster yellow with brownish bands (Fig. 7A, B). *Head*. 2.2×

as long as wide; eye 1.2× as long as height and as long as malar space. Malar sulcus with sublinear fovea below eye extending 0.50× length of gena. Mandibles with two big teeth. POL 1.6× OOL. Antenna (Fig. 7E) inserted above lower level of eyes, with scape 5.7× as long as wide and 1.1× as long as eye. Pedicel 2.0× as long as

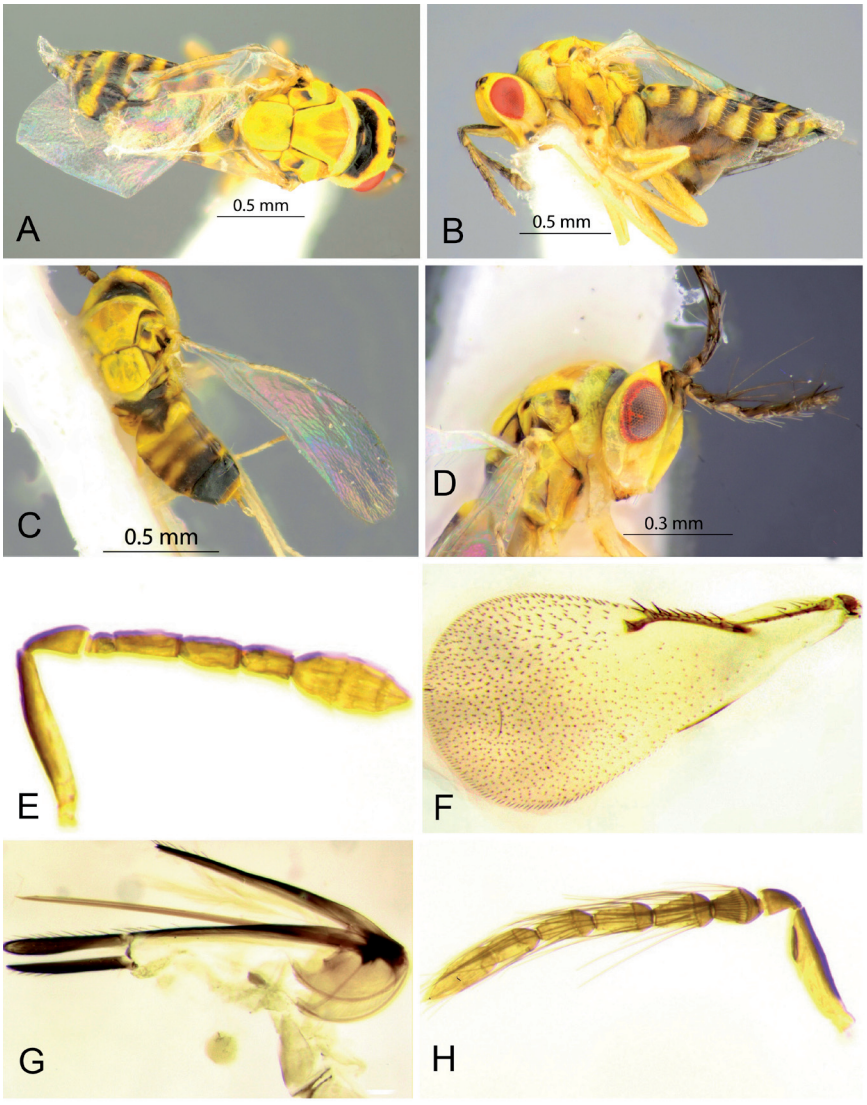

Fig. 7: (A–H) *Kolopterna nettae* n. sp.**:** (A) holotype, female, body, dorsal view, (B) holotype, female, body, lateral view, (C) male, body, dorsal view, (D) male, head+antennae, latero-frontal view, (E) female, antenna, (F) female, forewing, (G) female, ovipositor, lateral view, (H) male, antenna.

wide. Flagellum: first two anelli lenticular, third almost quadrate with two setae, F1 2.8–3.0× as long as wide, and 1.2× as long as F2, F1 1.1× as long as pedicel, F2 2.1–2.4× as long as wide, and F3 2.3× as long as wide, clava 3-segmented, 2.0–2.2× as long as wide and 2.1× as long as F3. *Mesosoma*. Pronotum 4.0× as wide as long and 0.4× as long as mesoscutum. Mesoscutum finely reticulate 1.3× as wide as long, with two rows of adnotaular setae on each side first with 2, second with 2 setae; median line indistinct not complete. Scutellum 1.05× as wide as long, finely reticulate with submedian lines (Fig. 7A). Dorsellum 4.2× as wide as long. Propodeum 8.6× as wide as long, and 1.1× as long as dorsellum; callus with four setae in one row. Forewing (Fig. 7F) 2.2× as long as wide, with apical margin, between PMV and apex of wing, bare; speculum open below; MV 1.4× shorter than costal cell, about 7.0× as long as broad; SMV with 4 setae; MV 1.1× as long as SMV and 3.4× length of STV, its front edge with 7 setae; STV bare except for 1 seta in the middle of the stigma; STV 3.0× as long as PM. Hindwing apically rounded. Legs: hind tarsi with T2 1.9× as long as T1. *Metasoma*. Petiole small, smooth. Gaster 1.7–1.9× as long as wide, about 1.1× as long as mesosoma (Fig. 7B). Ovipositor (Fig. 7G) sheaths sclerotized (dark brown), covered by numerous trichoid sensillae, extended part of them short (Fig. 7C).

***Male*.** Body length 1.1–1.3 mm. Color as in female (Fig.7C, D, H). *Head*. 2.5× as wide as long. Malar sulcus with sublinear fovea below eye extending 0.5× length of gena (Fig. 7D). POL 1.6 × OOL. Antenna (Fig. 7H) with scape 4.0× as long as wide; pedicel plus flagellum about 1.2× width of mesoscutum. Scape with ventral plaque about 0.30× as long as scape, situated in upper part; pedicel 1.6× as long as wide**,** with 1 anellus; flagellomeres F1–F4: F1 1.3× as long as pedicel, 1.6× as long as wide, and 1.2× shorter than F2, F2 2.1× as long as wide, and F3 2.0× as long as wide, F3 1.1× shorter than F2, F4 2.2× as long as wide, F4 as long as F3, clava 3-segmented, 4.6× as long as wide and 2.3× as long as F4, C1 1.4× long as wide, C2 1.3× as long as wide, C3. Whorled setae of F1 reaching middle of F2, F2 reaching middle of F4, whorls of F3 reaching middle of C1 (Fig. 7H). *Mesosoma*. Mesoscutum finely reticulate 1.3× as wide as long, with two rows of adnotaular setae: in first row and in the second by 2 setae on each side, median line indistinct. Scutellum 1.1× as wide as long, finely reticulate with yellow setae. Propodeum 8.6× as wide as long, callus with 4 setae in one row. Forewing 2.2× as long as wide; SMV with 4 setae; MV with 7 setae. PMV as stub. MV 4.7× as long as STV, speculum large and extended behind MV, open. Hindwing apically rounded. Legs: hind tarsi with T2 1.9× as long as T1. *Metasoma*. Petiole small smooth. Gaster 1.6× as long as wide.

Molecular identification: 28S rRNA sequence was deposited in GenBank under accession number OR607986.

Holotype: Israel: ♀, Nahal Paran, 30°19'54"N 34°56'12"E, 7.iii.2017, N. Dorchin, ex *Asphondylia* sp. 1, ex *Salsola imbricata* (SMNHTAU).

Paratypes: Israel: 13♀, 11♂, same data as holotype, 1♀, on slide [SMNHTAU]; 12♀, 31♂, Nahal Paran, 30°19'54"N 34°56'12"E, 7.iii.2017, N. Dorchin, ex *Asphondylia* sp. 2, ex *Salsola tentrandra* (SMNHTAU) (1♀ used for DNA analysis); 10♀, HaMeshar, 30°27'19"N 34°56'08"E, 27.ii.2020, N. Dorchin, ex *Asphondylia* sp. 1, ex *Salsola tentrandra* (SMNHTAU); 5♀, Nahal Shezaf Nature Reserve, 30°44'N 35°15'E, 7.iii.2022, N. Dorchin, ex *Asphondylia* sp. 3, ex *Salsola cyclophylla* [SMNHTAU].

Distribution: Israel.

Hosts: Endoparasitoid of gall midges *Asphondylia* spp. (Diptera: Cecidomyiidae), causing galls on *Salsola imbricata* (Forssk.), *Salsola cyclophila* Baker and *S. tetrandra* Forssk. (Chenopodiaceae).

Kolopterna nikolskayae Kostjukov & Yegorenkova, 2007

(Fig. 8A–E)

Kolopterna nikolskayae Kostjukov & Yegorenkova in Yegorenkova & Kostjukov, 2007: 103.

Diagnosis: ***Female.*** Body length 1.4 mm. POL 1.6–1.8× OOL; F1 2.7–3.2×, F2 2.8–3.2×, clava 3.1–4.1× as long as wide (Fig. 8B, C). Pronotum 0.5–0.7× as long as mesoscutum, mesoscutum with two or three rows of 10–12 adnotaular setae on each side, short, pale and decumbent, scutellum with submedian lines indistinct (Fig. 8D). Forewing with apical margin, between PMV and apex of wing, ciliate, speculum closed below, SMV with 3–4 setae; MV 1.1× longer than costal cell. Hind tarsi with T2 1.8× as long as T1. Gaster 2.2–2.4× as long as wide (Fig. 8A). Body pale yellow. Body length 1.65–2.0 mm. ***Male.*** Antenna, scape with ventral plaque 0.50× as long as scape, F1 1.1× as long as pedicel, F1 1.5×, F2 2.5×, F3 4.0×, clava 4.8× as long as wide. Forewing with apical margin, between PMV and apex of wing, ciliate; speculum closed below.

Holotype (examined, Fig. 8E): **Russia:** ♀, Ulyanovsk Province, Radishchevo district, Vyazovka village, 60 km S Ulyanovsk, 52°53'N 48°26'E, 21.vii.2005, E. Yegorenkova (ZISP).

Paratypes: Russia (examined): 4 ♀, same data as in holotype (ZISP); 1♀, Ulyanovsk Region, Novospasskiy district, Mar'evka, 133 km SW Ulyanovsk, 53°13'N 47°46'E, 19.vii.2005, E. Yegorenkova (ZISP); 1♀, Ulyanovsk Region, Radishchevo district, Vyazovka village, 60 km S Ulyanovsk, 52°53'N 48°26'E, E. Yefremova (ZISP); 1♂, Ulyanovsk Region, Radishchevo district, Vyazovka village, 60 km S Ulyanovsk, 52°53'N 48°26'E, 16.v.1995, Z. Yefremova (ZISP).

Distribution: Russia (the central part of European Russia, Middle Volga region).

Host: Unknown.

Kolopterna quartensis Graham, 1987

(Fig. 8F–J)

Kolopterna quartensis Graham, 1987: 83.

Diagnosis: ***Female.*** Body length 1.35–1.95 (Graham 1987). POL 1.4–1.7× OOL. Antenna. F1 3.2–3.5 4.0×, F2 2.1–2.5×, clava 2.2–2.6× as long as wide (Fig. 8F, G). Mesoscutum with 2–3 rows of adnotaular setae on each side; scutellum with submedian lines. Forewing with apical margin, between PMV and apex of wing,

Fig. 8: (A–E) *Kolopterna nikolskayae* Kostjukov & Yegorenkova: (A–C) holotype, female: (A, B) body, dorsal and lateral views, (C) head and mesosoma, lateral view, (D) paratype, female, head and mesosoma, dorsal view, (E) labels of holotype; (F–J) *Kolopterna quartensis* Graham: (F, G) holotype, female: (F) body, lateral view, (G) head and antenna (frontal view) and mesosoma, lateral view, (H) labels of holotype, (I) paratype, male, body, lateral view, (J) labels of paratype.

ciliate, speculum closed below, MV 1.3× longer than costal cell. Gaster 2.1–2.5× as long as wide; mesocutum black with yellow pattern on sides and on anterior and posterior margins; face yellow with black spot on vertex; scutellum fully yellow; gaster black with yellow spots laterally on first tergite; hind coxae black, hind femora black (Fig. 8F, G, I). Mid T1 1.75× shorter than T2. ***Male*.** Body length *ca* 1 mm (Graham 1987). Antennal scape with ventral plaque 0.30× as long as scape, F1 1.8×, F2 2.5×, F3 3.0×, F4 2.8×, clava 4.8–6.0× as long as wide (Fig. 8I); whorled setae very long, those on F1 reaching halfway of F3. Genitalia about 11× as long as broad (Graham 1987). Genitalia with phallobase 11.0× as long as broad. Body mostly black with yellow pattern on sides of pronotum and mesoscutum, face black.

Holotype (examined, Figs 8H, J): **Italy:** ♀, Aosta Valley, Quart, 45°44'N 7°25'E, 13.ix.1969, Z. Bouček (NHMUK 013457293).

Paratype (examined): **Italy:** 1 ♂, same data as holotype (NHMUK 013457268**)**.

Distribution: Italy.

Host: Unknown.

Kolopterna salina Graham, 1987

(Figs 9A–G, 10A–E)

Kolopterna salina Graham, 1987: 81.

Diagnosis: ***Female*.** POL 1.4–1.7× OOL. F1 4.7–5.0×, F2 2.5–3.0×, clava 2.9–3.1× as long as wide (Fig. 9C) Pronotum 0.25× as long as mesoscutum, mesoscutum with two–three rows of adnotaular setae on each side, pale and decumbent, short, scutellum with weak submedian lines (Fig. 9A). Forewing with apical margin, between PMV and apex of wing, ciliate, speculum closed below, SMV with 3–5 setae. Gaster 2.3–3.0× as long as wide; body testaceous (Fig. 9A, C). Body length 2.0–2.1 (Graham 1987). ***Male*.** Antennal scape with ventral plaque 0.43× as long as scape, F1 1.6× as long as pedicel, F1 2.3×, F2 3.8×, F3 2.9×, F4 3.3×, clava 6.0–6.7× as long as wide (Fig. 10B, C). Forewing with apical margin, between PMV and apex of wing, ciliate; speculum closed below (Fig. 10D), MV as long as costal cell. Body testaceous (Fig. 10A). Body length 0.8–1.3.

Description (based on the numerous specimens of both sexes from Israel): ***Female*** (n=45). Body length 1.7–2.1 mm. POL 2.0–2.3× OOL (Fig. 9D). F1 3.8–4.7×, F2 2.0–2.5×, clava 2.8–3.4× as long as wide (Fig. 9G). Gaster 1.7–2.0× as long as wide (Fig. 9D). Mid T1 1.75–2.0× shorter than T2.

Male (n=220). Body length 0.8–1.3 mm. Color. Body yellow (Fig. 10A, B). Head and antenna yellow, scape and pedicel brownish, eyes red; ocelli white. Legs and gaster yellow. Specimens with less size more brownish. *Head*. 2.8× as long as wide; eye height 1.2× as long as malar space. Malar sulcus with sublinear fovea below eye, extending about from ⅓ to ½ length of gena. Mandibles with 2 big teeth. Antenna (Fig. 10C) with scape 4.0× as long as wide; scape in malles with ventral plaque

about 0.4× as long as scape, situated in upper part of face. Pedicel 1.5× as long as wide. Flagellum with 2 anelli and flagellomeres 1–4. F1 2.3× as long as wide, and 1.36× shorter than F2, F1 1.6× as long as pedicel, F2 3.8× as long as wide, and F3 2.9× as long as wide, F3 1.1× shorter than F2, F4 3.3× as long as wide, F4 1.04×

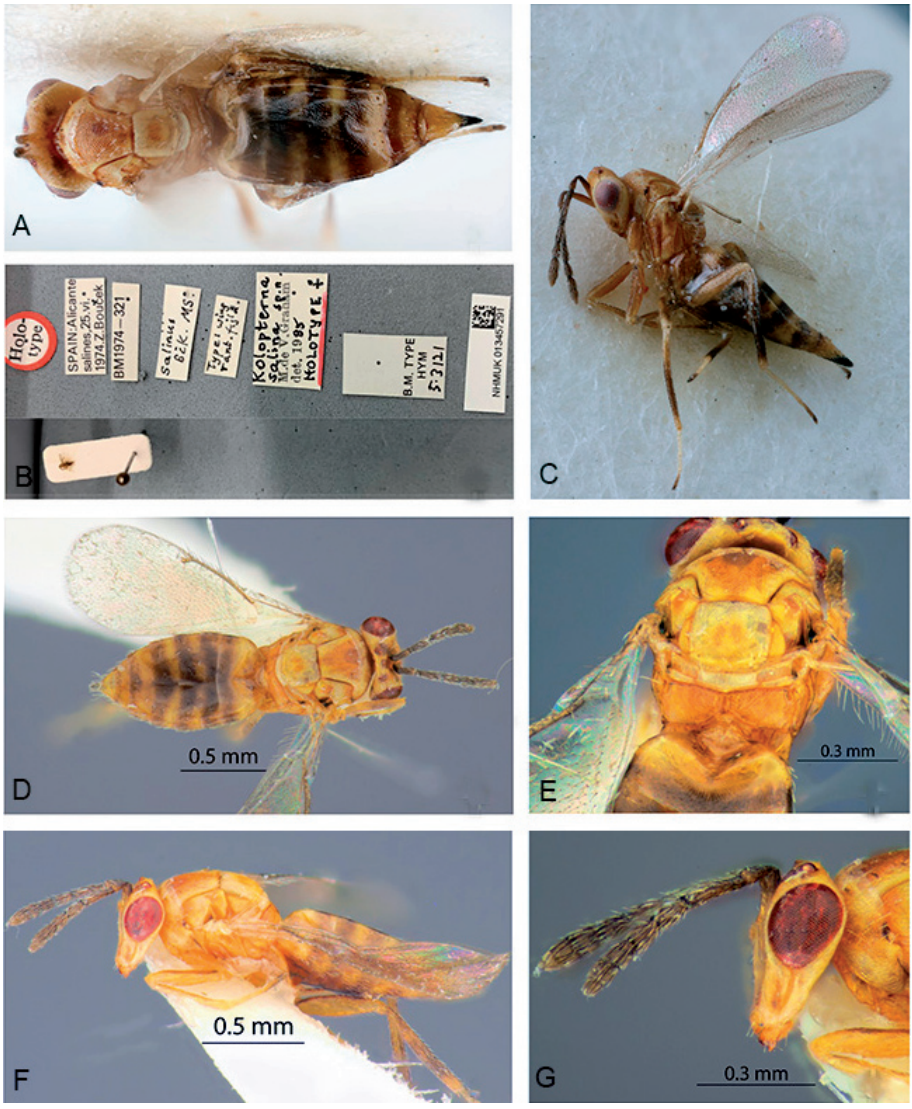

Fig. 9: *Kolopterna salina* Graham: (A–C) holotype, female: (A) body, dorsal view, (B) labels, (C) body, lateral view; (D–G) female from Israel: (D) body, dorsal view, (E) mesosoma, dorsal view, (F) body, lateral view, (G) head and antenna, lateral view.

as long as F3, clava 3-segmented, 6.0–6.7× as long as wide and 2.2× as long as F4. Whorled setae of F1 reaching middle of F3, F2 reaching middle of F4, whorls of F3 reaching half of C1, whorls of F4 reaching top of C1. *Meososma*. Pronotum 4.0× as wide as long. Mesoscutum finely reticulate 1.2× as wide as long, with 2–3 rows of adnotaular setae: in one row of 4–7 setae, in second 3–4 setae, in third 2–3 setae on each side, median line absent. Scutellum finely reticulate with submedian lines. Propodeum 4.4× as wide as long, and 1.6× as long as dorsellum; callus with 3–5 setae in one row. Forewing (Fig. 10D) 2.3–2.4× as long as wide, SMV with 3–4 setae, MV 1.1× shorter than costal cell, MV 1.1× as long as SMV, MV with 8–9 setae, MV 5.5× as long as STV, STV bare and 3–4 setae in the middle of the stigma, PMV as stub, speculum narrow and along ⅘ MV, closed. Hindwing apically rounded. Legs: hind T1 2.4× shorter than T2. *Metasoma*. Petiole small, smooth. Gaster 1.7–2.0× as long as wide. Genitalia (Fig. 10E) 14.5× as long as wide, digiti with one spine, parameres with 1 seta, ratio between length of phallobase and aedeagus 3.5:1.0.

Molecular identification: 28S rRNA sequence was deposited in GenBank under accession number OR607987.

Holotype (examined, Fig. 9B**): Spain:** ♀, Alicante salines, 25.vi.1974, Z. Bouček (NHMUK 013457291).

New material examined (SMNHTAU)**: Israel:** 2♀, Mizpe Yeriho, 31°48'N 35°24'E, 7.iv.2013. G. Danon, ex Cecidomyiidae, ex *Suaeda asphaltica* leaves; 43♀, 221♂, 'Enot Qane Nature Reserve, 31°37'N 35°24'E, 1.vi. 2014, A. Freidberg, ex *Baldratia*, ex *Suaeda aegyptiaca* leaf galls (1♂ used for DNA analysis). **Jordan:** ♂, Wadi al-Karak, 31°13'N 35°39'E, 5.vii.2014, G. Danon, ex *Baldratia* ex *Suaeda aegyptiaca*.

Distribution: * Jordan, *Israel, Spain.

Host: Recorded for the first time from *Baldratia arida* Dorchin, 2019 (Cecidomyiidae), developing without gall formation in leaves of *Suaeda asphaltica* (Boiss.) Boiss. and *S. aegyptiaca* (Hasselq.) Zohary (Chenopodiaceae) (Dorchin et al. 2019).

Remark: The male of *K. salina* is described for the first time.

Kolopterna sugonjaevi Kostjukov, 2014

Kolopterna sugonjaevi Kostjukov, 2014: 87–88.

Diagnosis (after Kostjukov, 2014): ***Female.*** Body length 1.85 mm. POL 2.0× as long as OOL; F1 2.15×, F2 1.60×, clava 2.3× as long as wide. Pronotum 0.7× as long as mesoscutum, mesoscutum with two rows of adnotaular setae; scutellum with submedian lines; forewing with apical margin. Forewing between PMV and apex of wing, ciliate, speculum closed below, MV l 1.2× shorter than costal cell, SMV with 4 setae. Gaster 2.8× as long as wide. Body mostly yellow, axillae and propodeum brown, brown pattern on middle of pronotum and mesoscutum, on vertex around ocellus. Gaster yellow with transverse brown bands. ***Male.*** Unknown.

Holotype (not examined, presumably lost): **Turkmenistan:** ♀, Mary Region, Garagum District [Karakum], Moskva, 37°20'N 62°22'E, 23.viii.1983, V. Kostjukov, sweeping. (ZISP).

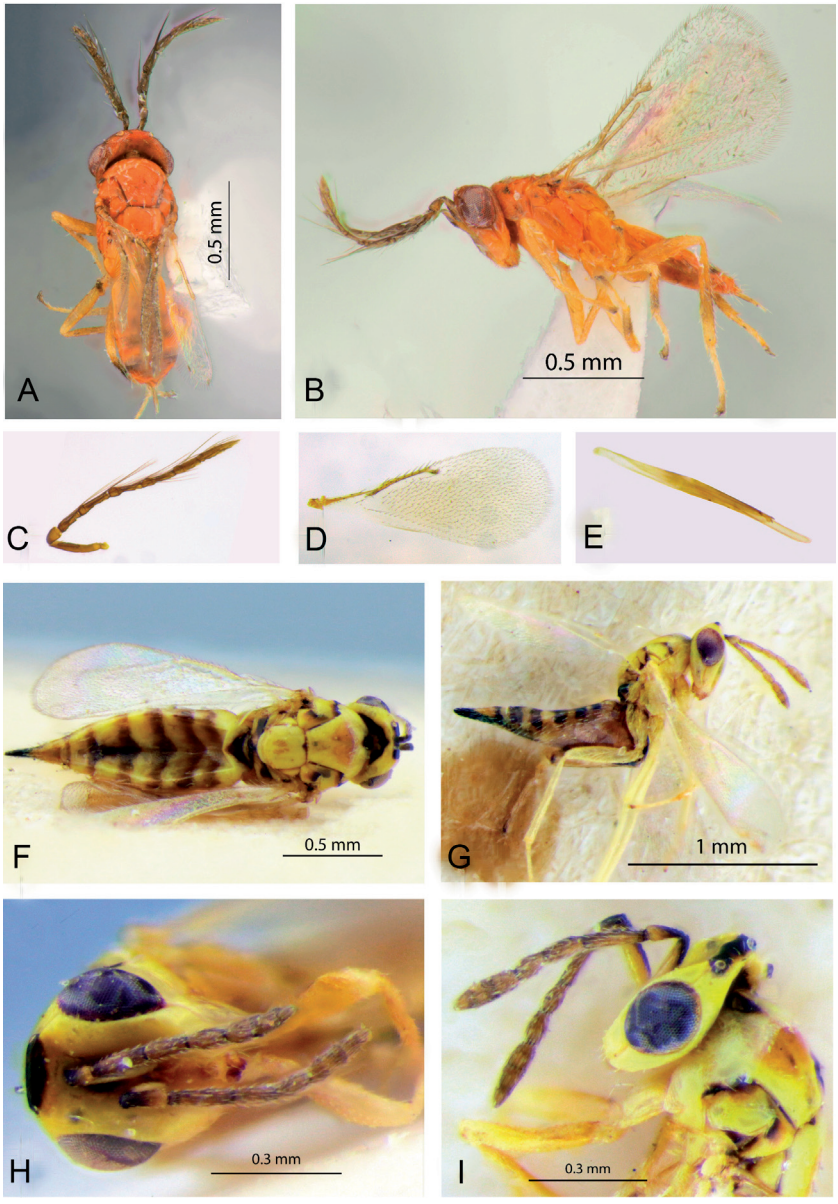

Fig. 10: (A–E) *Kolopterna salina* Graham: (A) male, body, dorsal view, (B) male, body, lateral view, (C) male, antenna, (D) male, forewing, (E) female, ovipositor; (F–H) *Kolopterna turkmenicus* n. sp.: (F) holotype, female body, dorsal view, (G) holotype, female body, lateral view, (H) paratype, female, head, frontal view, (I) paratype, female, head, antenna and mesoscutum, lateral view.

Distribution: Turkmenistan.

Host: Unknown.

Kolopterna turkmenica n. sp.

(Fig. 10F–I)

LSID: urn:lsid:zoobank.org:pub:D0226141-A53C-4B54-80FC-4547C9300C87.

Etymology: The species is named after the country of its origin.

Diagnosis: ***Female***. POL 2.0× as long as OOL; F1 3.8×, F2 2.3×, clava 3.0× as long as wide (Fig. 10H–I). Pronotum 0.8–0.9× as long as mesoscutum (Fig. 10F), mesoscutum with numerous pale yellow setae, scutellum without submedian lines. Forewing with apical margin, between PMV and apex of wing, ciliate, speculum closed below, SMV with 3 setae, MV as long as costal cell. Gaster 2.0–2.3× as long as wide. Body yellow (Fig. 10F, G). ***Male***. Unknown.

Description: ***Female***. Body length 1.5–1.9 mm. Forewing 1.3–1.5 mm. Color. Body yellow. Head yellow, occiput and vertex brown, antenna brownish, eye red; ocelli yellow. Mandibles brown. Propodeum upper part and margin brown. Legs yellow; gaster yellow with brownish transverse bands. *Head*. 2.8× as long as wide; eye 1.4× as long as malar space with sublinear fovea below eye extending 0.6 length of gena. Mandibles with two big brown teeth. POL 2.0× as OOL. Antenna inserted above lower level of eyes. Antenna with pedicel plus funicle more 1.6–1.7× as long as wide of mesoscutum. Scape 4.8× as long as wide, 0.85 length of eye, pedicel 1.6× as long as wide and 1.3× as long as F1**,** flagellum with 2 anelli, flagellomeres F1–F3. F1 3.8× as long as wide (Fig.10H, I), F1 1.3× as long as pedicel and 1.5× as long as F2, F2 2.3× as long as wide, and F3 1.7× as long as wide, clava 3–segmented, 3.0× as long as wide and 2.4× as long as F3. *Mesosoma*. Pronotum 3.2× as wide as long. Mesoscutum 1.2× as wide as long, finely reticulate, with numerous pale-yellow setae. Scutellum 1.4× as wide as long, finely reticulate, without submedian lines. Dorsellum 2.7× as wide as long. Propodeum 8.0× as wide as long; spiracle with postspiracal rim; callus with four yellow setae in one row. Forewing 2.3× as long as wide, with apical margin, between PMV and apex of wing, ciliate, SMV with 3 setae, MV as long as costal cell, MV 1.7× as long as SMV, MV 4.8× as long as STV, PMV as stub, speculum large and along MV, closed. Hindwing apically rounded. Legs: hind tarsi T2 1.7× as long as T1. Tibial spur 1.1× as long as T1. *Metasoma*. Petiole small, smooth. Gaster 2.3× as long as wide.

Male. Unknown.

Holotype: Turkmenistan: ♀, Mary Velayat, Garagum [Karakum] District, Moskva, 37°20'N 62°22'E, 23.viii.1979, V. Kostjukov (ZISP).

Paratypes: Turkmenistan: 8♀, same data as holotype (ZISP).

Distribution: Turkmenistan.

Host: Unknown.

Species excluded from *Kolopterna*

Kolopterna trjapitzini Kostjukov & Kosheleva, 2018 is hereby excluded from *Kolopterna* Graham, 1987 and transferred to the genus *Aprostocetus (Aprostocetus)* Westwood, 1833, according to the following combination of characters: mid T1 1.25× longer than T2, hind T1 1.25× shorter than T2, and fovea on malar sulcus absent (Fig. 11C). The species *Aprostocetus trjapitzini* (Kostjukov, 1976) already exists, as Graham (1987: 326) transferred *Tetrastichus trjapitzini* Kostjukov (1976: 169) to *Aprostocetus*. Thus, a replacement name is needed for *Aprostocetus trjapitzini* (Kostjukov & Kosheleva, 2018) **n. comb.**, which has become a junior secondary homonym of *Aprostocetus trjapitzini* (Kostjukov, 1976).

Aprostocetus mashuk Yefremova & Yegorenkova, **nom. nov.**

Fig. 11A–D

Aprostocetus trjapitzini (Kostjukov & Kosheleva, 2018) **n. comb.**, nec *Aprostocetus trjapitzini* (Kostjukov, 1976*b*).
Kolopterna trjapitzini Kostjukov & Kosheleva, 2018: 916.

LCID: urn:lsid:zoobank.org:act:6537C1E1-9E99-4761-ACFC-9E054B2B2FED.

Etymology: The species name is after the collecting location, Mt Mashuk (North Caucasus, Russia).

Diagnosis: ***Female.*** Body length 1.5 mm. POL 2.8× as long as OOL. Antenna. F1 as long as F2. Gaster 1.5× as long as wide (Fig. 11A). Eyes sporadically setose. Malar sulcus present and not widened. Mid T1 1.25× longer than T2, hind T1 1.25× shorter than T2. Distance between sublateral and submedian lines 1.3× as long as distance between both submedian lines on scutellum. Mesoscutum with row of several adnotaular setae; forewing with SMV with 5 setae. MV 1.1× longer than costal cell. Gaster 1.6× as long as wide (Fig. 11A). Sheaths of ovipositor strong exerted from gaster, with numerous trichoid setae. Body yellow with dark pattern, gaster yellow with black transverse stripes. ***Male***. Body length 1.4 mm. Antenna. Scape with ventral plaque 0.20 as long as scape, F1 1.0× as long as pedicel.

Holotype (antenna and forewing on slide no 3014, examined): **Russia:** ♀, Stavropol Territory, Pyatigorsk, Mashuk, 44°03'N 43°05'E, 18.viii.2005, O. Kosheleva, sweeping (ZISP).

Paratype: Russia (antenna and forewing on slide no 3015, examined, Fig. 11D): ♂, data same as holotype (ZISP).

Distribution: Russia (North Caucasus).

Host: Unknown.

DISCUSSION

In the light of our revision of *Kolopterna* several diagnostical characters of this genus should be updated comparatively to the original diagnosis by Graham (1987): (1). “First segment of mid and hind tarsi much shorter than second“. This character varies for mid T1 1.6–2.4× shorter than T2 and for hind T1 1.7–2.7× shorter than

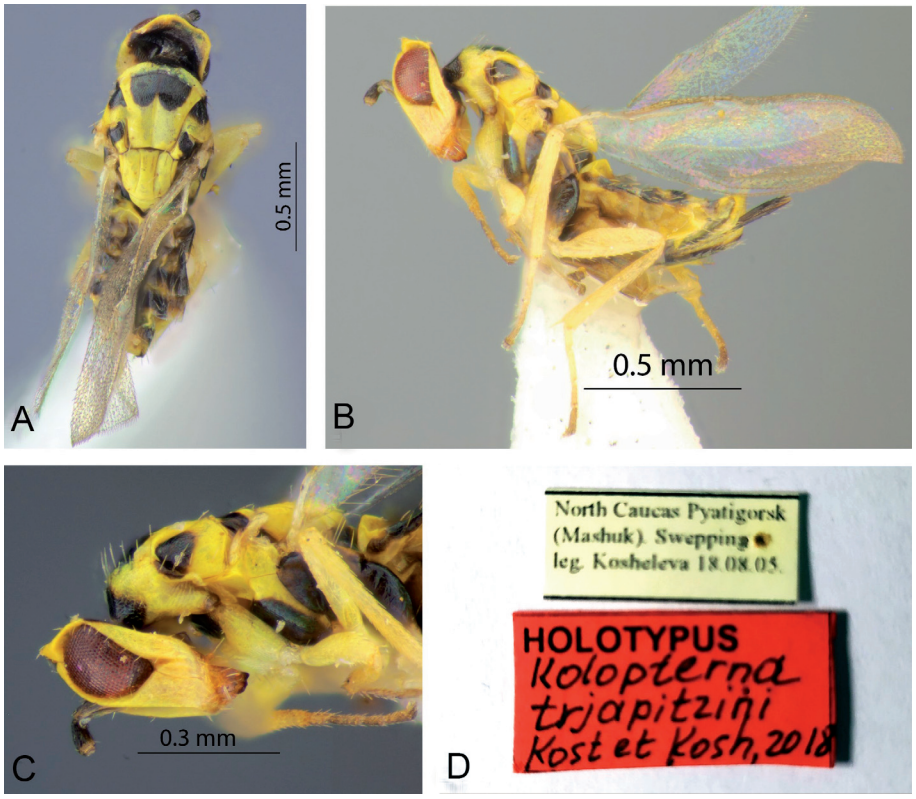

Fig. 11: (A–D) *Aprostocetus mashuk* Yefremova & Yegorenkova, holotype, female: (A) dorsal view, (B) body, lateral view (antennae broken), (C) holotype, female, head and antenna (broken) and mesosoma, lateral view, (D) labels of holotype.

T2); (2) "Forewing with marginal vein shorter than or at most as long as costal cell". Marginal vein varies from shorter 1.1–1.7× (most of species of *Kolopterna*) to as long as costal cell (*K. salina* and *K. turkmenica* n. sp.) or longer 1.1–1.3× (*K. quartensis*, *K. kurdjumovi*, *K. nartshukae* and *K. nikolskaya*); (3) "Antenna of ♀ with 3 anelli … Antenna of ♂ with ventral plaque of scape placed in upper half". Female antenna with 3 anelli or, rarely, with 2 anelli (*K. nartshukae* and *K. turkmenica* n. sp.). Size of ♂ ventral plaque varies from 0.23 to 0.75; (4) Length of fovea on malar sulcus varies from 0.50 to 0.75 length of gena; (5) "Genitalia of ♂ very elongate, as in *Sigmophora*" (Graham 1987). Length of phallobase of male genitalia vary from 5.7 to 14.5× as long as broad.

This raises doubts about the separation between *Kolopterna* and the closely related genus *Sigmophora* Rondani, 1867. Part of the diagnostic characters are presented in the Table 1. However, in part of the species the combination of part of the characters

Table 1. Part of diagnostic characters separating between *Sigmophora* Rondani and *Kolopterna* Graham.

Character	*Sigmophora* Rondani, 1867	*Kolopterna* Graham, 1987
Vertex	with sharp transverse carina separating vertex from occiput, often with second carina crossing ocellar triangle	without transverse carina or with carina weak, nearly indistinct
Mid T1	1.2× shorter than T2	1.6–2.4× shorter than T2
Hind T1	1.4–1.5× shorter than T2	1.7–2.7× shorter than T2
MV	always longer than costal cell	from 1.1–1.7× shorter to 1.1–1.3× longer than costal cell
Male antennal scape	with ventral plaque 0.2–0.5× length of scape	with ventral plaque 0.20–0.75× length of scape
Male genitalia	with phallobase 8.0–14.0× as long as wide	with phallobase 5.7–14.5× as long as broad
Distribution	Cosmopolitan	Palearctic and Oriental regions

is different; characters considered as important are strongly variable, for example, the malar sulcus vary from triangular fovea to elongate in *Sigmophora* and from sublinear to oblong in *Kolopterna.* In the phylogenetic analysis by Rasplus *et al.* (2020) *Kolopterna blascoi* forms one cluster with *Sigmophora brevicornis* (Panzer, 1804). Meanwhile, we leave the decision on the synonymy in these genera to the further research.

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