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RESEARCH ARTICLE

Taxonomic notes on the genera *Hedyphanes* Fischer von Waldheim, 1820 and *Entomogonus* Solier, 1848 (Coleoptera: Tenebrionidae) of Turkey

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Abstract: Four species of *Hedyphanes* F.-W. are distributed in Anatolia: *H. cordicollis* Seidlitz, 1896 (Diyarbakır), *H. khachikovi* **sp. nov.** (southern part of Tunceli Province), *H. lutosus* Allard, 1877 **sp. resurr.** (type locality: "Asia min.") and *H. roznerorum* (Nabozhenko, 2008) **comb. nov.** (from *Pseudoprobaticus*) (type locality: Pamukkale, Denizli Province). A new subgenus *Granulophanes* **subgen. nov.** is erected for *H. lutosus* (type species) and *H. roznerorum*. The new subgenus differs from other subgenera by granulated and setose elytra on disk, and granulated epipleura. Original combination is resurrected and lectotype is designated for *Entomogonus elongatus* Allard, 1876 **comb. resurr.** (from *Hedyphanes*). Key to species of *Hedyphanes* of Turkey is given.

Key words: Tenebrionidae, *Hedyphanes*, *Entomogonus*, taxonomy, new taxa, Turkey.

Introduction

The genus *Hedyphanes* Fischer von Waldheim, 1820 is widespread in the Caucasus, Iran, Anatolia, Middle Asia, Iraq, Israel, Egypt (Sinai) and Kazakhstan (Nabozhenko 2002; Nabozhenko 2005; Nabozhenko & Löbl 2008; Nabozhenko & Lillig 2013). Two species from Crete (Lucas 1854) which probably belong to the genus *Raiboscelis* Allard, 1876 are discussed in Nabozhenko & Lillig (2013). Synonymy and taxonomy of the genus are discussed in many papers. For the review of these works see Nabozhenko & Lillig (2013). Three species of *Hedyphanes* were recorded for Turkey (Nabozhenko & Löbl 2008): *H. upioides* Faldermann, 1837, *H. elongatus* (Allard, 1876) and *H. cordicollis* Seidlitz, 1896.

The first species is a synonym of *H. tagenioides* Faldermann in Ménétriés, 1832 and it is not distributed in Turkey (Abdurakhmanov & Nabozhenko 2011). *Hedyphanes elongatus* must be included in the genus *Entomogonus* Solier, 1848 (see below). *Hedyphanes cordicollis* was the only species of this genus that occurred in Anatolia.

Other species of *Hedyphanes* are added to Anatolian fauna after study of the type and new material. *Hedyphanes lutosus* which was described from Asia Minor and unreasonably synonymized with *H. tagenioides* (Seidlitz 1896) is a good species and must be reinstated. *Pseudoprobaticus roznerorum* from Denizli Province was erroneously described in the genus *Pseudoprobaticus* Nabozhenko, 2001 and must be included in the genus *Hedyphanes*. A new subgenus *Granulophanes* **subgen. nov.** is erected for these two species. A new species *H.* (s. str.) *khachikovi* **sp. nov.** is found in Tunceli Province (Turkey). As a result, four species of the genus *Hedyphanes* are now known from Anatolia.

Material and methods

The study is based on the material from the following institutes and museums:
ZIN – Zoological Institute of Russian Academy of Sciences, St. Petersburg (Russia);
NHM – Natural History Museum, London (United Kingdom);
MNHP – Muséum National d'Histoire Naturelle, Paris (France);
HNHM – Hungarian Natural History Museum, Budapest (Hungary);
CP – Collection of Luboš Purchart, Brno (Czech Republic).

Results

Taxonomy

Genus *Hedyphanes* Fischer von Waldheim, 1820

Granulophanes subgen. nov.

Type species *Hedyphanes lutosus* Allard, 1877

Description

Body moderately large, strongly sclerotized, black. Anterior margin of clypeus straight or weakly rounded. Eyes convex and strongly transverse (but weakly transverse in dorsal view). Punctation of head very dense and coarse. Each puncture has light seta. Pronotum weakly convex, with very dense and coarse punctation and setation. Base of pronotum narrowly bordered, other margins not bordered. Punctation of prohypomera consists of large, round, not rasp punctures with setae. Elytra convex, humeral angles very weakly developed. Elytral intervals covered with small granules and short strong setae. Epipleura covered with very small and sparse granules and reach sutural angle of elytra. Ventral side of body covered with short setae.

Body length: 10-11 mm.

Note. Body often with grey soil incrustation dorsally.

Diagnosis. See in the key to subgenera of *Hedyphanes*.

Composition. Two species: *H. lutosus* and *H. roznerorum*, both from Turkey

Key to the subgenera of the genus *Hedyphanes*

1(2). Elytral intervals covered with small granules. Each granule has short seta. Epipleura have very small and sparse granules …..……...…….. *Granulophanes* **subgen. nov.**

2(1). Elytral intervals punctured. Epipleura with very sparse punctation.

2(4). Body large, length 9-20 mm. Cuticle black, sometimes bluish, very rarely with metallic shine. Anterior margin of clypeus straight ……..……. *Hedyphanes* s. str.

4(3). Body small, length 6–7 mm. Cuticle yellow rufous or light rufous, often semitransparent. Anterior margin of clypeus distinctly sinuate, its angles strongly projecting ……..…..….. *Microhedyphanes* Nabozhenko et Lillig, 2013

***Hedyphanes* (*Granulophanes*) *lutosus* Allard, 1877 sp. resurr.** (Fig. 1A)

Hedyphanes lutosus Allard, 1877a: 97; Allard 1877b: 229 (redescription);
Hedyphanes lutosus (as synonym of *H. upioides*): Seidlitz 1896: 797; Gebien 1911: 558; Reitter 1914: 187; Reitter 1922: 20; Gebien 1943: 413 (792); Nabozhenko & Löbl 2008: 251.

Redescription

Body black, dull, slender, elongated, pubescent with recumbent setae. Anterior margin of clypeus straight, genae shortly rounded in middle, its anterior margin straight. Outer margin of head between genae and clypeus without sinuation. Depression of fronto-clypeal suture very weak. Eyes strongly transverse (lateral view), strongly convex. Ocular index – 1.5. Head dorsally and ventrally very coarsely and densely punctuated, punctures contiguous. Surface of head pubescent with recumbent light hairs. Antennae short and narrow, reaching base of pronotum. Three apical antennomeres wider than others, 11th antennomer rhomboid.

Pronotum very weakly transverse (1.1 times as wide as long), widest at middle, 1.3 times as wide as head. Lateral margins of pronotum weakly rounded, sinuated in middle, anterior margin widely weakly emarginated, base weakly rounded. Angles of pronotum widely rounded, obtuse. Lateral sides completely narrowly bordered, base not bordered in middle, anterior margin bordered only near angles. Disc regularly moderately convex, with very dense and coarse punctation (diameter of punctures visibly longer than distance between punctures, but punctures not contigous) and short recumbent setae (see laterally). Prohypomera with dense and coarse punctation, which transversally elongate in outer third, pubescent with short setae. Prosternum with coarse punctation and pubescence, prosternal process weakly convex apically.

Elytra visibly convex and elongate (1.8 times as long as wide), widest at middle, 1.83 times as wide as head, 1.4 times as wide and 2.65 times as long as pronotum. Elytral striae narrow and shallow, sometimes interrupted. Intervals with small granules and recumbent setae. Humeral angles not expressed, base of pronotum sloping, not vertical. Epipleura (including inner edge) reaching sutural angle, where transformed in epipleural mucro. Flattened dorsal part of epipleura expressed only apically. Surface of epipleura with small granules. Meso- and metaventrite, mesepimera, metepisterna with coarse punctation and recumbent hairs. Abdominal ventrites with coarse punctation, 5th ventrite narrowly bordered on apex.

Tibiae straight, pubescent with strong recumbent hairs on inner side. Trochanters with dense pubescence of short light hairs and single long seta.

Body length 10 mm, width 3-3.8 mm.

Type material. Holotype (MNHP), ♀ with labels: "Asia min." (rectangular, handwritten), "Type *lutosus* As. Min." (round, yellow), "Ex. Musæ E. Allard 1899", "SYNTYPE".

***Hedyphanes* (*Granulophanes*) *roznerorum* (Nabozhenko, 2008) comb. nov.** (Fig. 1B)

Pseudoprobaticus roznerorum Nabozhenko, 2008: 721

Type material. Holotype (♀) with labels: Turkiye, prov. Denizli, Pamukkale, 2001.05.16-17. Leg. G. & V. Rozner (HNHM).

Other studied material. 1 ♀: Turkey SW, prov. Denizli, Pamukkale – Hierapolis, 22-25.04.2003 (lat. V. Hula) (CP).

Notes. This species was erroneously included in the genus *Pseudoprobaticus* based on the presence of granules with setae on elytra. In fact, *H. roznerorum* is very close to *H. lutosus* and has all characters including structure of epipleura and elytral base as in the genus *Hedyphanes*.

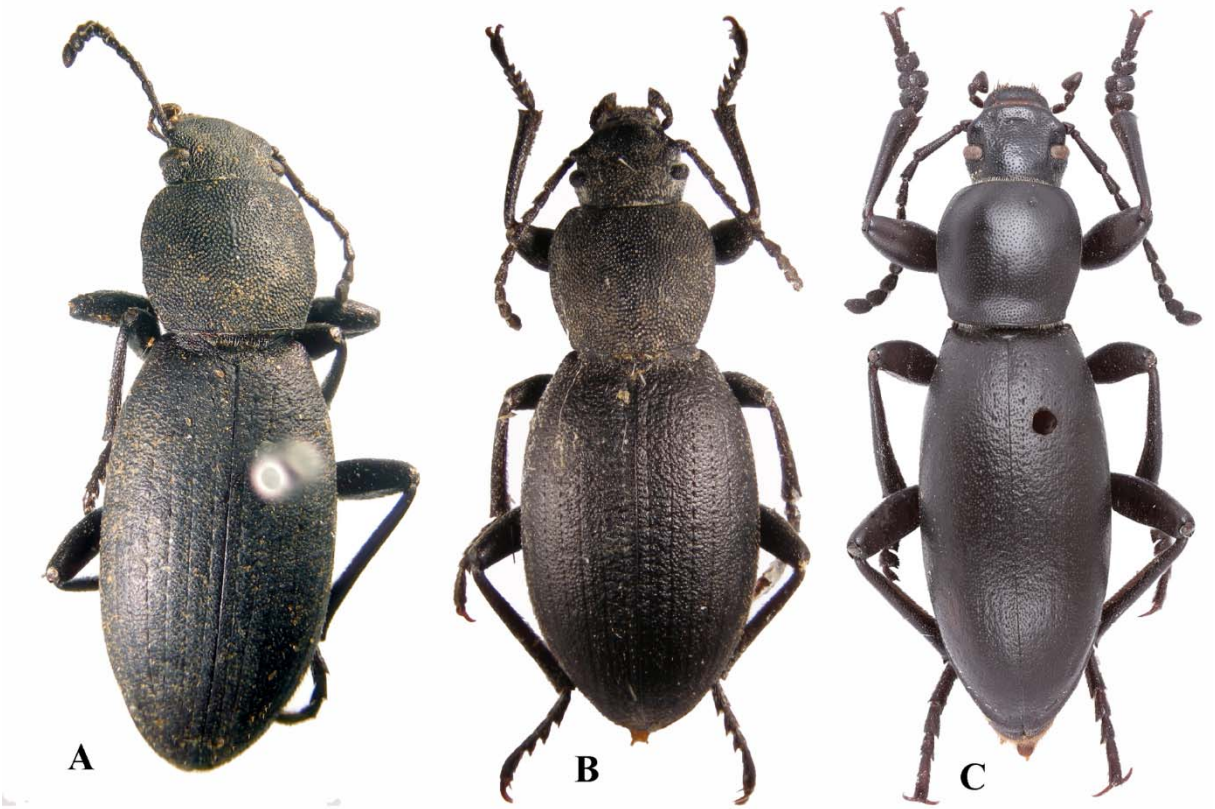

Figure 1. The genus *Hedyphanes*, habitus. **A,** holotype of *H. lutosus* Allard, 1877; **B,** holotype of *H. roznerorum* (Nabozhenko, 2008); **C,** *H. cordicollis* Seidlitz, 1896, male.

***Hedyphanes* (s. str.) *cordicollis* Seidlitz, 1896** (Fig. 1C)

Hedyphanes cordicollis Seidlitz, 1896: 795, 797; Gebien 1911: 557; Reitter 1914: 184; Reitter 1922: 16; Gebien 1943: 412 (791); Nabozhenko & Löbl 2008: 250.

This species belongs to the species group *mannerheimii* with rasp-shaped or granulated prohypomera.

Type locality. "Kurdistan: Diarbekir" (originall spelling by Seidlitz (1896)). Type material is not studied.

Other studied material. 1♂ with label (in cyrillic): Mamakhatun [now Turkey, Erzincan Province, Tercan, N39°46′46″/ E40°23′03″], west valley of Euphrates, 7-13.IV.917, leg. Kuchinsky", "*cordicollis*, S. Medvedev det." (ZIN); 1♂ without geographic label, with grey square and small label "35." (ZIN).

***Hedyphanes* (s. str.) *khachikovi* sp. nov.** (Fig. 2)

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Description

Body small, slender, black, almost dull, dorsally hairless. Head widest at level of eyes. Eyes strongly convex, elongated (lateral view). Ratio of head width at eyes to distance between eyes – 1.6. Genae weakly rounded. Outer margin of head very weakly sinuated. Apical margin of clypeus straight. Transverse depression along frontoclypeal suture absent. Frons with fine and sparse punctation. Punctation of other surface of head moderately coarse (diameter of punctures 1.5 as long as distance between them). Gular surface with coarse transverse wrinkles. Antennae long, visibly widened apically, their three apical segments extending beyond base of pronotum. Second antennomere transverse (1.4 times as wide as long), other antennomeres longitudinal. Length to width ratio of 3rd–11th segments: 2.87; 1.75; 1.75; 1.75; 1.55; 1.5; 1.08; 1; 1.36. Third antennomere 4.6 times as long as 2nd and 1.54 times as long 4th; 11th antennomere widely oval, 1.36 times as long as 10th.

Pronotum weakly transverse, widest at middle (1.1 times as wide as long), 1.45 times as wide as head. Outer margins and base of pronotum weakly moderately rounded, anterior margin straight. Angles of pronotum widely rounded, obtuse. Margins of pronotum not rimmed, only base with narrow rim on lateral sides. Disc of pronotum weakly convex, with not deep, but long depression in basal part. Punctation of pronotum the same as on head: more sparse in middle (diameter of punctures subequal to distance between them), more dense on sides (diameter of punctures 1.5-2 times as long as distance between them). Prohypomera with dense and coarse not rasp punctation. Prosternal process weakly convex in base.

Scutellum not punctured. Elytra elongated (1.87 times as long as wide), 2.55 times as long and 1.24 times as wide as pronotum, 1.8 as wide as head. Humeral angles are absent. Elytral intervals flattened, with coarse and dense punctation of round punctures. Epipleural carina expressed only in apical part. Strial punctures not merged, large, elongated. Intervals of elytra flattened, with coarse and dense punctation of round punctures. Epipleura not depressed, with coarse transverse wrinkles.

Ventral part of body. Meso- and metaventrite and all abdominal ventrites covered with dense recumbent hairs. Punctation of metaventrite moderately coarse and dense (puncture diameter subaequal to distance between them). Abdominal ventrite 5 not rimmed.

Femora thickened, punctated and pubescent with recumbent hairs on inner side. Pro- and metatibiae straight, mesotibiae arcuate; all tibiae covered with strong reddish hairs. Pro- and mesotarsi strongly widened. Width to length ratio of 1–3th segments of protarsi – 1.16/ 1.3/ 1.4, of mesotarsi – 1/ 1.2/ 1.25.

Body length 8 mm, width 2.5 mm.

Etymology: The species is named in honor of my colleague and collector of the holotype Eduard Khachikov (Rostov-on-Don).

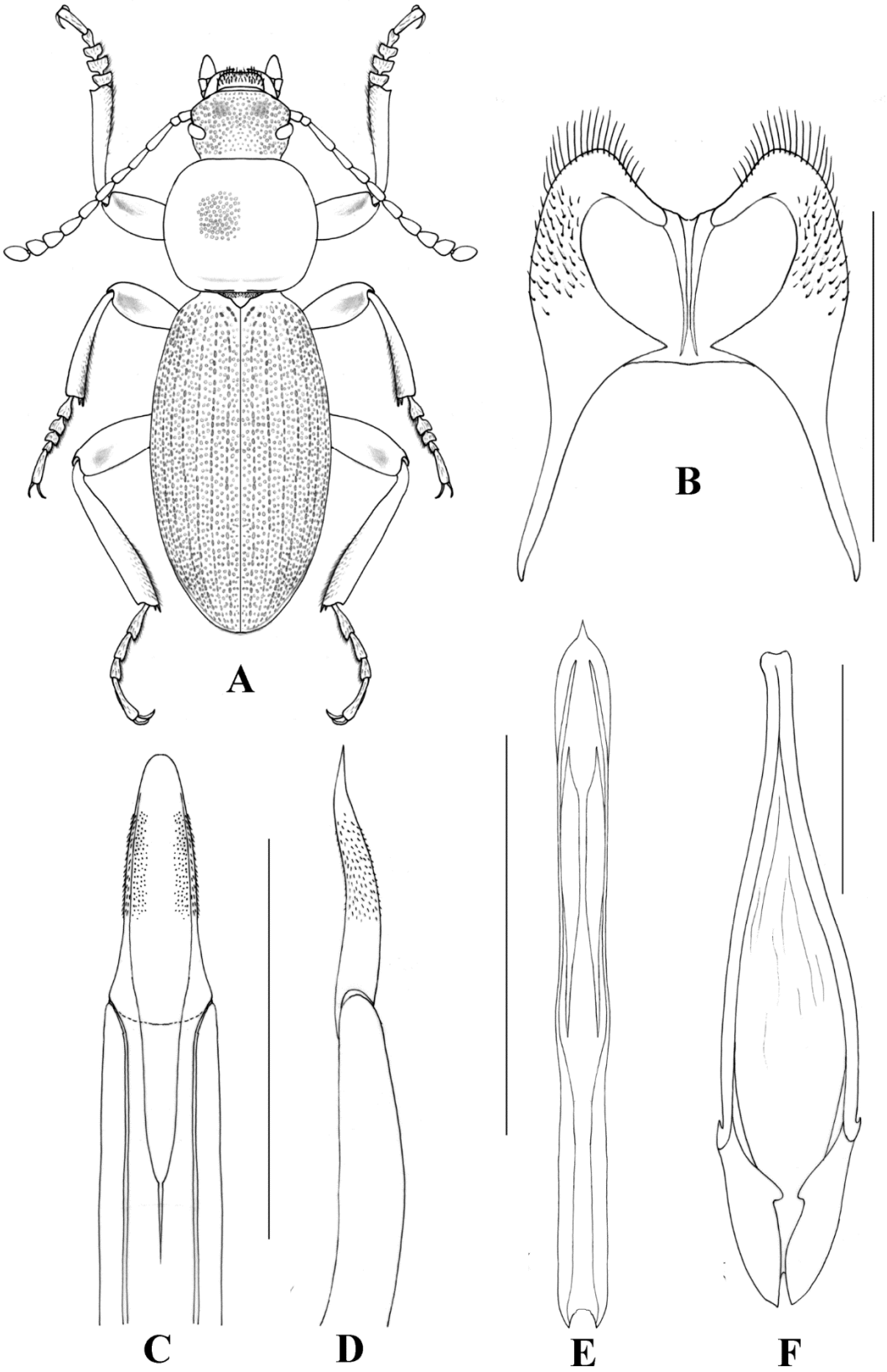

Figure 2. *Hedyphanes khachikovi* **sp. nov.**, male, holotype. **A,** habitus; **B,** VIII inner sternite; **C,** parameres, ventral view; **D,** parameres, lateral view; **E,** penis; **F,** gastral spicula. Scale bars – 1 mm.

Type material: Holotype, ♂ (ZIN): Turkey, Tunceli Prov., dist. Pertek, Çakırbahçe, 38º54'N/ 39º16'E, 19.05.2011 (leg. E.A. Khachikov).

Differential diagnosis: The new species is close to *Hedyphanes tagenioides* from Transcaucasia. For comparison of both species see Table 1.

Table 1. Differences of *Hedyphanes tagenioides* and *Hedyphanes khachikovi* **sp. nov.**

Hedyphanes tagenioides	*Hedyphanes khachikovi* **sp. nov.**
Pronotum rectangular, outer sides weakly rounded, rimmed near posterior angles.	Pronotum longitudinally oval, outer sides visibly rounded, not rimmed.
Elytral intervals with sparse and fine punctation.	Elytral intervals with coarse and moderately dense punctuation.
Profemora smooth on inner side, without punctation and pubescence.	Profemora with punctation and recumbent short hairs on inner side.
Lobes of gastral spicula without deep sinuation on inner side.	Lobes of gastral spicula with deep sinuation on each inner side.

Key to species of the genus *Hedyphanes* of Turkey

1(4). Elytral intervals covered with small granules and short strong setae.

2(3). Pronotum with subequal length and width (1.1 times as wide as long), not cordiform. Lateral margins of pronotum weakly rounded, sinuated in middle. Body slender ..... *H. lutosus*

3(2). Pronotum transverse (1.2 times as wide as long), weakly cordiform, widest before middle. Lateral margins of pronotum visibly rounded, not sinuated. Body robust ..... *H. roznerorum*

4(1). Elytral intervals punctured.

5(6). Body large (12–15 mm). Prohypomera, metaventrite and 1-3 abdominal ventrites covered with dense granules, epipleura with sparse small granules. Pronotum weakly cordiform with sinuate near base lateral side. Elytra with very small humeral angles..... *H. cordicollis*

6(5). Body small (8 mm). Punctation of prohypomera consists of simple round punctures. Pronotum not cordiform, widest at middle. Humeral angles are absent ..... *H. khachikovi* **sp. nov.**

***Hedyphanes upioides* Faldermann, 1837**

Faldermann (1837) described *H. upioides* from a single female from Transcaucasia. Allard (1876) cited *H. upioides* as a junior synonym of *H. dejeani* Faldermann, 1837. Later Allard (1877b) cited both taxa as junior synonyms of *H. tagenioides*. Seidlitz (1896) reinstated the validity of *H. upioides*. Reitter (1914, 1922) also cited *H. upioides* as a valid taxon and compared it with *H. dejeanii*. Seidlitz and Reitter erroneously considered that *H. upioides* inhabits only Asia Minor. It is not known, which species was cited by Ferrer and Soldati (1999) under the name "*Hediphanes upioides*" (original spelling) from Troy (Aegean region of Turkey).

Now the name is a junior synonym of *H. tagenioides* (Abdurakhmanov & Nabozhenko 2011).

Entomogonus elongatus* Allard, 1876, comb. resurr. from *Hedyphanes

Allard (1876) described this species in the genus *Entomogonus* Solier, 1848. Seidlitz (1896) synonymized it with *Hedyphanes laticollis* F.-W. sensu Allard. *Entomogonus*

elongatus was cited as a synonym of *Hedyphanes laticollis* in the works of Gebien (1911, 1943). Reitter (1914) reinstated the validity of this species and included it in the genus *Hedyphanes*. Nabozhenko & Löbl (2008) cited this species as a valid taxon in combination *Hedyphanes elongatus*.

The original combination *Entomogonus elongatus* is resurrected after the studying of the type material: Lectotype (♂), designated here, with labels: "*elongatus*: X coll. Donè, Turkey", "*Entomogonus elongatus* Type All.", "F. Bates Coll. 81–19". Paralectotype (♀) with labels: "Type H. T." (round), "*Hedypanes elongatus* Amasia (v. Schaufuss)", "*Entomogonus elongatus*" (yellow), "*Entomogonus elongatus* type All.", "F. Bates Coll. 81-19". Type material is deposited in NHM.

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