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A revision of the *Anthaxia* (*Haplanthaxia*) mashuna species-group

(Coleoptera: Buprestidae: Buprestinae)

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Abstract. The Anthaxia (Haplanthaxia) mashuna Obenberger, 1931 species-group is defined, revised, keyed, and important diagnostic characters are illustrated. Additionally, four new species are described: Anthaxia (Haplanthaxia) convexiptera sp. nov. (Ethiopia, Tanzania, Zimbabwe), A. (H.) jendeki sp. nov. (Kenya), A. (H.) nigroaenea sp. nov. (Kenya, Tanzania, Uganda), and A. (H.) puchneri sp. nov. (Angola). The lectotype of Anthaxia (H.) mashuna Obenberger, 1931 is designated. New country records and new host plants are given for Anthaxia (H.) ennediana Descarpentries & Mateu, 1965, A. (H.) mashuna, and A. (H.) patrizii Théry, 1938.

Key words. Coleoptera, Buprestidae, Anthaxiini, new species-group, new species, lectotype designation, taxonomy, Afrotropical Region, Palaearctic Region

Introduction

The Sahelian fauna of the genus *Anthaxia* was rather poorly known and only a few species of the Sahelian distribution were recorded in the Obenberger's Catalogue (OBENBERGER 1930). The number of species significantly increased when Descarpentries & Bruneau de Miré (1963) and Descarpentries & Mateu (1965) published the results of the French expeditions to Tibesti and Ennedi, respectively. Further species were added after the revisions of the *Anthaxia* (*H.*) *zanzibarica* Kerremans, 1898 (Bílý 2010), *A.* (*H.*) *thunbergi* Gory & Laporte, 1839, and *A.* (*H.*) *melancholica* Gory, 1841 (Bílý & Kubáň 2010) species groups. Many bionomical data concerning the Sahelian xylophagous insects (not only Buprestidae) were published by Mateu (1972).

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During the last two decades we have gathered rather extensive material of the genus *Anthaxia* Eschscholtz, 1829 from the Sahel, part of which was reared from various species of the diverse genus *Acacia* (Mill.) (Fabaceae: Mimosoideae). The great part of specimens seemed to be *Anthaxia* (*Haplanthaxia*) *ennediana* Descarpentries & Mateu, 1965, conspicuous by quite extraordinary form of the male genitalia (Fig. 14) which was described from the Ennedi Mts. in Chad (Descarpentries & Mateu 1965). The other, very similar species, *A.* (*H.*) *patrizii* Théry, 1938, was described from Egypt, and for a long time we assumed both species to be a separate species-group of the Sahelian *Anthaxia*. Due to new numerous material we found that *A.* (*H.*) *ennediana* is distributed nearly in the whole Sahelian belt and belongs, together with *A.* (*H.*) *patrizii*, to the *A.* (*H.*) *mashuna* Obenberger, 1931 species-group defined in this contribution. In addition, four other new species were discovered and *A. patrizii* had to be transferred from the subgenus *Anthaxia* s. str. to the subgenus *Haplanthaxia*.

Material and methods

Photographs were taken using Canon D-550 digital camera with the Canon MP-E65 mm $f/2.8~1-5\times$ macro lens.

Data from locality labels of the type specimens are cited verbatim with additional comments in square brackets, individual labels are separated by a double slash ('//'), the abbreviation 'h' stands for handwritten and 'p' for printed.

The pronotal length was measured in the middle, the width across the widest part (usually the anterior fifth); the elytral length was measured along the suture (incl. scutellum) to the tip of elytra, elytral width was measured across humeri (incl. humeral swellings which in some cases project beyond the elytral outline).

The following codens are used throughout the text:

Alfred Puchner collection Vienna Austria:

7 11 VV C	Attrica i definer correction, viernia, rustria,
BMHN	The Natural History Museum, London, England;
DBRI	Daniele Baiocchi collection, Rome, Italy;
DGCI	Domenico Gianasso collection, Castelnuovo Don Bosco, Italy;
GCCI	Gianfranco Curletti collection, Carmagnola, Italy;
GMCI	Gianluca Magnani collection, Cesena, Italy;
IBER	Institute of Biodiversity and Ecosystem Research Collection - Bulgarian Academy of Sciences, Sofia,
	Bulgaria;
MKNC	Marek Kafka collection, Neratovice, Czech Republic;
MNHN	Muséum national d'Histoire Naturelle, Paris, France;
MRAC	Muséum Royal de l'Afrique Centrale, Tervuren, Belgium;
NMPC	National Museum, Prague, Czech Republic;
WBCW	Wolfgang Barries collection, Vienna, Austria.

Taxonomy

Anthaxia (Haplanthaxia) mashuna Obenberger, 1931 species-group

Description. Medium to large-sized (6.8–11.2 mm), bronze to nearly black, more or less wedge-shaped species, dorsal surface usually with silky lustre, asetose except for short, white or cream-white, semi-erect pubescence of frons and few white setae at anterior pronotal angles.

Head large, usually as wide as anterior pronotal margin, frontoclypeus widely emarginate anteriorly; frons usually slightly convex, rarely nearly flat, inner margins of eyes deeply S-shaped in both sexes; vertex much narrower than width of eye (0.6–0.8 times); distal antennomeres of male enlarged, in some species bicolorous.

Pronotum convex, 1.7–1.8 times as wide as long with shallow but sometimes wide laterobasal depressions; lateral margins usually regularly rounded, basally subparallel, posterior angles always obtuse; pronotal sculpture consisting of fine, transverse rugae on disc and small, polygonal cells with tiny central grains along lateral margins and in lateroposterior depressions; transverse rugae often laterally bent anteriorly, directed at anterior angles (Fig. 8).

Elytra weakly or strongly wedge-shaped, 1.8–2.0 times as long as wide, regularly convex or uneven (with one oblique, posthumeral depression and one longitudinal depression in posterior half); apical part of lateral margins roughly serrate; elytral sculpture usually very fine, elytral epipleura narrow, parallel-sided, nearly reaching elytral apex.

Prosternal process flat, strongly enlarged posteriorly to procoxae; anal ventrite of female deeply notched (Figs 17–19). Male metatibiae with inner tooth in posterior half (Figs 20–26), tarsal claws conspicuously small, only slightly enlarged at base.

Aedeagus usually long, flattened or very long and slender, nearly tubular, parameres tapering posteriorly, fused together, separated only at ultimate tip of the apex, sometimes with typical sculpture on ventral surface (Fig. 14 here and Fig. 14 in Descarpentries & Mateu (1965)). **Bionomy.** All species seem to be associated with the genus *Acacia* (Fabaceae, Mimosoideae), like the majority of the Sahelian *Anthaxia*.

Differential diagnosis. The *Anthaxia* (*H*.) *mashuna* species-group is very similar, and probably related, to the so far undefined group of species related to *A*. (*H*.) *dispar* Kerremans, 1898 from the central part of Africa. The *A*. (*H*.) *mashuna* species-group differs in the widened antennomeres in male, asetose dorsal surface, form of the male metatibiae (simply, widely emarginate male metatibiae in *A*. (*H*.) *dispar* species-group) and in the form of male genitalia (short, spindle-shaped aedeagus in *A*. (*H*.) *dispar* species-group).

Species included. *Anthaxia* (*Haplanthaxia*) *convexiptera* sp. nov., *A.* (*H.*) *ennediana* Descarpentries & Mateu, 1965, *A.* (*H.*) *jendeki* sp. nov., *A.* (*H.*) *mashuna* Obenberger, 1931, *A.* (*H.*) *nigroaenea* sp. nov., *A.* (*H.*) *patrizii* Théry, 1938, and *A.* (*H.*) *puchneri* sp. nov.

Key to Anthaxia (Haplanthaxia) mashuna species-group

- 1(4) Elytra uneven, posterior half of elytra with rather deep, lateral, longitudinal depression with silky lustre and slightly different sculpture than rest of elytral surface, and with posthumeral, oblique depression (Figs 3, 5).
- 3(2) Large (8.0–11.2 mm), black species with slight bronze lustre (Fig. 5); inner margins of eyes strongly S-shaped; terminal antennomeres (5–11) twice as wide as long, bicolorous in male, 1.5 times as wide as long and bronze in female; cells on lateral parts

- 4(1) Elytra regularly convex, with almost homogeneous sculpture; sometimes elytra with very weak lateral, longitudinal depression but with the same sculpture as rest of elytra (Figs 1, 2, 4, 6, 7).
- 5(10) Frons slightly convex; elytra 1.8–1.9 times as long as wide, less wedge-shaped; scutellum flat; pronotal disc with long, regular, transverse rugae; aedeagus shorter, sometimes with blister-like tubercles on ventral surface (Fig. 14).
- 7(6) Lustrous, bronze to black-bronze species; elytra 1.9 times as long as wide, slightly uneven with very weak lateral, longitudinal depression having the same sculpture like the rest of elytra; aedeagus without blister-like tubercles or with one pair of very weak elevations on ventral surface (Fig. 11).

- 10(5) Frons flat; elytra twice as long as wide, strongly wedge-shaped; scutellum concave; pronotal disc with short, transverse rugae which are bent posteriorly on prescutellar part; aedeagus very long, slender, without blister-like tubercles on ventral surface (Figs 12–13).

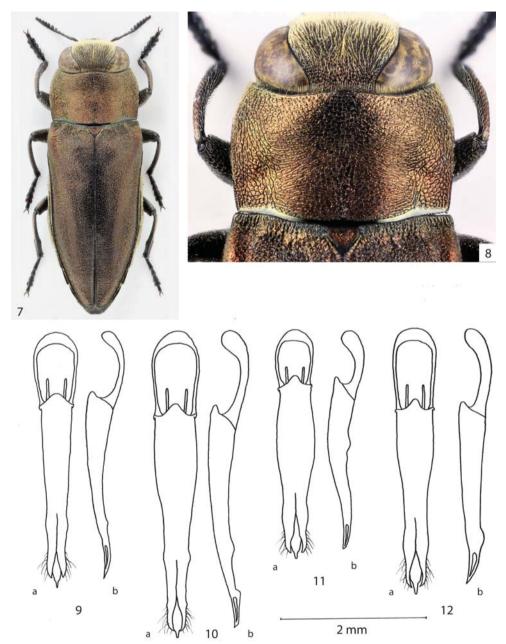
Anthaxia (Haplanthaxia) convexiptera sp. nov.

(Figs 1, 11, 19, 22)

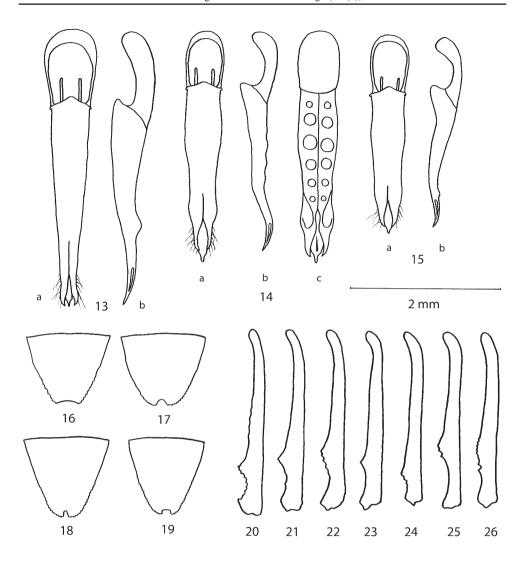
Type locality. Tanzania, Baobab valley, road Morogora – Iringa, 7°29′S 36°33′E, 506 m a.s.l. Type material. Holotype: \$\(\cap-\), 'Tanzania, Baobab valley, 4.i.1992, G. Curletti leg.' (NMPC). Allotype: \$\(\cap-\), 'Zimbabwe NW, Chimanimani, 28.xi.[19]92, leg. K. & F. Adlbauer' (NMPC). Paratypes: 1 \$\(\cap-\) 1 \$\(\cap-\), 'Tanzania (Iringa), Mtandika, 1000 m, leg. A. Dutto // ex larva *Acacia* sp., xii.1992' (NMPC); 1 \$\(\cap-\), 'Tanzania (Mbeya), Ujewa, 10.i.1994, leg. G. Curletti' (DGCI); 1 \$\(\cap-\), 'Abyss[inia] [= Ethiopia], Raffray' (DGCI).



Figs 1–6. Anthaxia (Haplanthaxia) mashuna Obenberger, 1931 species-group, dorsal aspects. 1-A. (H.) convexiptera sp. nov., holotype, male, 7.8 mm; 2-A. (H.) ennediana Descarpentries & Mateu, 1965, male (Kenya: Nguni), 8.2 mm; 3-A. (H.) jendeki sp. nov., holotype, male, 9.2 mm; 4-A. (H.) mashuna Obenberger, 1931, male (Zambia: Abercorn), 9.4 mm; 5-A. (H.) nigroaenea sp. nov., holotype, male, 11.2 mm; 6-A. (H.) puchneri sp. nov., holotype, male, 8.0 mm.



Figs 7–12. 7–8 – *Anthaxia* (*Haplanthaxia*) *mashuna* Obenberger, 1931 species-group, dorsal aspects. 7 – *A.* (*H.*) *patrizii* Théry, 1938, male (Egypt: Wadi Jimal), 9.1 mm; 8 – the same, pronotum. 9–12 – male genitalia (a – dorsal, b – lateral). 9 – *A.* (*Haplanthaxia*) *jendeki* sp. nov., holotype; 10 – *A.* (*H.*) *nigroaenea* sp. nov., holotype; 11 – *A.* (*H.*) *convexiptera* sp. nov., holotype; 12 – *A.* (*H.*) *puchneri* sp. nov., holotype. Figs 7–8 – photo by D. Baiocchi.



Figs 13-26. 13-15 – male genitalia (a – dorsal, b – lateral, c – ventral). 13 – *Anthaxia* (*Haplanthaxia*) *mashuna* Obenberger, 1931, lectotype; 14-A. (*H*.) *ennediana* Descarpentries & Mateu, 1965 (Kenya: Nguni); 15-A. (*H*.) *patrizii* Théry, 1938 (Egypt: Wadi Jimal). 16-19 – anal ventrites (not to scale). 16-A. (*H*.) *jendeki* sp. nov., holotype, male; 17-A. (*H*.) *jendeki* sp. nov., allotype, female; 18-A. (*H*.) *nigroaenea* sp. nov., allotype, female; 19-A. (*H*.) *convexiptera* sp. nov., allotype, female. 20-26 – male metatibiae. 20-A. (*H*.) *jendeki* sp. nov., holotype; 21-A. (*H*.) *nigroaenea* sp. nov., holotype; 21-A. (*H*.) *nigroaenea* sp. nov., holotype; 25-A. (*H*.) *convexiptera* sp. nov., holotype; 25-A. (*H*.) *mashuna* Obenberger, 1931, lectotype; 25-A. (*H*.) *ennediana* Descarpentries & Mateu, 1965 (Kenya: Nguni); 26-A. (*H*.) *patrizii* Théry, 1938 (Egypt: Wadi Jimal).

Diagnosis. Medium-sized to large (6.8–8.9 mm), wedge-shaped, rather convex (Fig. 1); dorsal surface dark bronze, frontoclypeus dark golden green (male), antennae black; elytra with slight mirror effect along suture; ventral surface and legs black with bronze lustre; dorsal surface asetose, frons with short, white, rather dense semi-erect pubescence; ventral surface with short, sparse, recumbent, white pubescence.

Description. *Male* (holotype). Head large, slightly wider than anterior pronotal margin; frontoclypeus wide, flat, with widely, shallowly emarginate anterior margin; frons very slightly convex, vertex flat, 0.8 times as wide as width of eye; eyes large, reniform, very slightly projecting beyond outline of head; sculpture of frons consisting of very dense, small, polygonal cells with nearly indistinct central grains; antennae short, reaching anterior third of pronotal length when laid alongside; scape pyriform, slightly curved, 4 times as long as wide, pedicel suboval, 1.3 times as long as wide; third antennomere obtusely triangular, 1.6 times as long as wide, fourth antennomere sharply triangular, slightly wider than long; antennomeres 5–10 trapezoidal, 1.8 times as wide as long; terminal antennomere axe-shaped, 1.5 times as wide as long.

Pronotum flattened in middle, 1.7 times as wide as long; anterior margin slightly biarcuate, posterior margin nearly straight; lateral margins subparallel at midlength, weakly rounded both anteriorly and posteriorly; posterior angles obtuse, lateroposterior depressions shallow but large; pronotal sculpture consisting of regular, long, transverse rugae on disc, and small, dense, polygonal cells with small central grains along lateral margins. Scutellum obtusely pentagonal, slightly wider than long, with small, central, oval depression.

Elytra convex, wedge-shaped, twice as long as wide; lateral margins sharply serrate in posterior third, each elytron narrowly, separately rounded; humeral swellings large but not projecting beyond elytral outline, basal, transverse depressions large, deep, reaching scutellum; elytral epipleura very narrow, parallel-sided, nearly reaching elytral apex; elytral sculpture almost homogeneous, consisting of fine, transversely widened punctures and fine rugae which are sparser along suture and denser along lateral margins and at elytral base.

Ventral surface rather lustrous, sparsely punctate; prosternal process flat; anal ventrite widely truncate apically, preapical part of lateral margins roughly serrate. Legs slender, relatively long; anterior tibiae curved, widened apically; mesotibiae slightly curved with somewhat widened apex; metatibiae (Fig. 22) straight, somewhat flattened, with large, inner spine in posterior third; tarsal claws simply hook-shaped, only weakly enlarged at base.

Aedeagus (Fig. 11) rather long, robust, parameres widened in posterior third, ventral surface with two pairs of blister-like tubercles; median lobe obtusely pointed apically, without lateral serration.

Sexual dimorphism. The female differs from the male in stouter body, completely bronze frons, simple metatibiae and in the deeply, widely notched anal ventrite (Fig. 19); the female also possesses more distinct lateral, elytral depression.

Measurements. Length 6.8–8.9 mm (holotype 7.8 mm); width: 2.3–3.2 mm (holotype 2.7 mm).

Variability. No variability was observed except for the size.

Differential diagnosis. Anthaxia (H.) convexiptera sp. nov. is very similar to A. (H.) ennediana from which it differs, except for the characters given in the key, in the slightly darker

colouration, longer elytra (only 1.8 times as long as wide in *A.* (*H.*) ennediana), slightly in the shape of the male metatibiae (Figs 22 vs. 25) and in the different male genitalia (Figs 11 vs.14). **Etymology.** The specific epithet is a Latinized adjective, composed of the Latin adjective 'convexus' (= convex) and the Greek noun 'ptéron' (= wing), to stress the shape of the elytra. **Distribution.** Ethiopia, Tanzania, Zimbabwe.

Anthaxia (Haplanthaxia) ennediana Descarpentries & Mateu, 1965 (Figs 2, 14, 25)

Anthaxia (Haplanthaxia) ennediana Descarpentries & Mateu, 1965: 1042. Type locality: 'Tchad, mare d'Ortebi'. Anthaxia (Haplanthaxia) ennediana: Mateu (1972): 241 (bionomy); Bílý (1997): 21, 68 (catalogue); Bellamy (2008): 1384 (catalogue).

Type material examined. HOLOTYPE: ♂, 'Mare d'Ortebi, Tchad, Ennedi, 13.XI.59 [p] // éclos à Paris de bois d'*Acacia seyal* Del., le 13.xi.[19]59[p+h]' (MNHN). ALLOTYPE: ♀, 'Marmarigna, Ennedi // Tchad, Mateu [h, p] // éclos le 5.ix. [19]60' (MNHN). PARATYPES: 1 unsexed, 'Tchad, Ennedi, Wadi Kaoura, 22.viii.[19]49[h]' (MNHN); 1 unsexed, '100 kms Nord Rosso s/*Acacia*, 14.vii.[19]51[h]' (MNHN).

Additional material examined. ETHIOPIA: Gamo Gofa Zone: Arba Minch, N of Omo, iv.-v.1992, 1 \circlearrowleft , Werner leg. (MKNC); KENYA: Coast Province: N of Garsen, 6.xii.2007, 1 \circlearrowleft , M. Snížek leg. (MKNC); Kiboko env., 21.xi.1999, 1 \circlearrowleft , M. Snížek leg. (MKNC); Rukanga-Kasigau Mts. env., 26.xi.1997, 1 \circlearrowleft , M. Snížek leg. (MKNC); Tsavo reg., Voi, 8.-18.xi.1996, 1 \circlearrowleft , M. Snížek leg. (NMPC); the same but: 11.-14.iv.1997, 1 \circlearrowleft , M. Halada leg. (NMPC); Voi, 10.xii.1999, 2 \circlearrowleft , M. Snížek leg. (MKNC). Eastern Province: Katulu-Kithioko, 27.xi.1999, 2 \circlearrowleft , 4 \circlearrowleft , M. Snížek leg. (MKNC); Meru-Gatunga, 5.iv.1987, 1 \circlearrowleft (ex larva x.1987 from *Acacia* sp.), R. Mourglia leg. (NMPC); Mwingi-Nguni env., 28.xi.199, 1 \circlearrowleft , M. Snížek leg. (MKNC); Sosoma, 202 km E of Thika, 20.xi.2007, 2 \circlearrowleft , M. Snížek leg. (MKNC). Rift Valley Province: Ilbisil, 50 km N of Namanga, 18.xi.1997, 2 \circlearrowleft , M. Snížek leg. (MKNC); Kimana, 25 km SE Amboseli NP, 2004 (ex larva), 3 \circlearrowleft , 3 \hookrightarrow , P. Zábranský leg. (NMPC). Unknown Province: Tana River, v.1915, 1 \hookrightarrow , G. Babault leg. (NMPC). SOMALIA: Lower Shebelle Region: Afgoi [= Afgooye], 4.-5.v.1984, 2 \circlearrowleft , R. Mourglia leg. (NMPC): same data but: Benadir, 2 \hookrightarrow (ex larva from *Acacia* sp.), R. Mourglia leg. (NMPC). Snaag Region: Eriavo [= Erigavo], 2.v.1952, 1 \hookrightarrow , E. J. van Ingen leg. (NMPC). Unknown Region: Muliu River, 18.iv.1905, 1 \hookrightarrow , Sedov leg. (NMPC). TANZANIA: Tanga Region: E of Mombo, 9.-11.i.1996, 1 \circlearrowleft , M. Snížek leg. (NMPC). ZIMBABWE: Mashonaland Central Province: Shamva 10 km E, Bindura env., 16.-17.xii.1998, 1 \circlearrowleft , A. Kudrna jr. leg. (MKNC).

Diagnosis. Matt, bronze, medium-sized species (7.0–9.2 mm); frons very slightly convex, vertex about 0.8 times as wide as width of eye; pronotal disc with fine, long, transverse rugae, lateral sides with regular, polygonal cells with central grains; elytra regularly convex, 1.8 times as long as wide; male metatibiae – Fig. 25; aedeagus somewhat flattened with 6–7 pairs of blister-like tubercles on ventral surface (Fig. 14 here and Fig. 14 in Descarpentries & Mateu 1965); this character is quite typical for this species and it is only very slightly indicated in other related species (see previous species).

Bionomy. All type specimens were reared from dead branches of *Acacia seyal* Forsk. (Fabaceae: Mimosoideae) (Descarpentries & Mateu 1965). Mateu (1972) reared this species also from *A. raddiana* Savi.

Distribution. Chad (Descarpentries & Mateu 1965), Ethiopia (new country record), Kenya (new country record), Mauritania (Descarpentries & Mateu 1965, Mateu 1972), ? Niger (Bellamy 2008), Somalia (new country record), Tanzania (new country record), Zimbabwe (new country record).

Remarks. Descarpentries & Mateu (1965) mentioned also Mauritania in the distribution of this species but specimens from Mauritania were not included among the type specimens

and we were unable to find them in MNHN. Bellamy (2008) recorded this species also from Niger without any citation, thus this record is considered doubtful.

MATEU (1972) confirmed the distribution in Mauritania and dealt briefly also with the bionomy. He also suggested (without any definition) the species-group of the Sahelian *Anthaxia* spp. developing in *Acacia* species and included in the group *A. (H.) ennediana, A. (H.) patrizii* and *A. (H.) sahelica* Descarpentries & Miré, 1963. After having studied all type specimens of *A. (H.) sahelica* (deposited in MNHN) we found that this species does not belong to this species-group having different pronotal sculpture, antennae, and significantly different male metatibiae and genitalia.

Anthaxia (Haplanthaxia) jendeki sp. nov.

(Figs 3, 9, 16, 17, 20)

Type locality. Kenya, Ngong Hills, 8 km S of Kiserian, 1°27′S, 36°38′E.

Type material. Holotype: \circlearrowleft , 'Kenya, Ngong Hills, 8 km S of Kiserian, 1°27′S 36°38′E, 10.–17.iv.2006, E. Jendek leg.' (NMPC). Allotype: \Lsh , same data as holotype (NMPC). Paratypes: $1 \circlearrowleft 3 \Lsh \Lsh ,$ same data as holotype (NMPC); $5 \circlearrowleft 3 \Lsh ,$ 'Kenya, Ngong Hills, Kiserian distr., (01°26′56″S-36°38′19″E), 1940 m, 17.iv.2006, leg. V. Sakalian' (IBER); $1 \circlearrowleft 1 \Lsh ,$ 'Kenya, road Kiserian–Oltepesi, 1770 m, 28.iv.2004, leg. V. Sakalian' (NMPC); $1 \backsim ,$ 'C Kenya, Road Kiserian–Oltepesi: 01°26′56 S 36°38′19 E, 1940 m, 11.–22.xi.2005, leg. Sakalian & Curletti' (IBER); $1 \backsim ,$ 'Kenya, Samburu Nat. P., 2.viii.1989, leg. D. Gianasso' (DGCI); $1 \backsim ,$ 'Kenya, 2000 m' (NMPC).

Diagnosis. Large (7.2–9.2 mm), wedge-shaped, convex (Fig. 3); dorsal surface bronze, frontoclypeus and tips of elytra with red lustre, lateral elytral depressions with silky lustre; dorsal surface asetose, frons with dense, erect, white pubescence; ventral surface lustrous, bright bronze with short, sparse, recumbent, white pubescence; prosternal process with dense (in male nearly lanuginose), erect pubescence; ventral pubescence distinctly denser on metacoxae, metepisterna, laterotergites and on posterior margin of metasternum.

Description. *Male* (holotype). Head large, as wide as anterior pronotal margin; frontoclypeus widely emarginate anteriorly, frons slightly convex; vertex very weakly convex, 0.8 times as wide as width of eye; eyes large, reniform, not projecting beyond outline of head; sculpture of frons consisting of very small, dense, polygonal cells with indistinct central grains; antennae short, scarcely reaching midlength of lateral pronotal margins when laid alongside; scape long, claviform, slightly curved, 4.5 times as long as wide, pedicel suboval, 1.2 times as long as wide; third antennomere subtriangular, 1.5 times as long as wide, fourth antennomere obtusely triangular, as long as wide; antennomeres 5–10 trapezoidal, slightly wider than long; terminal antennomere rhomboid, about as long as wide.

Pronotum rather convex, 1.7 times as wide as long, with very shallow lateroposterior depressions; anterior margin deeply, posterior margin very slightly biarcuate, lateral margins regularly rounded; maximum pronotal width in anterior third, posterior angles obtuse; pronotal sculpture consisting of fine, transverse rugae which are laterally bent, directed at anterior angles, and of small, polygonal cells with tiny central grains along lateral margins. Scutellum flat, obtusely pentagonal to cordiform, slightly wider than long.

Elytra convex, slightly uneven, strongly wedge-shaped, 1.9 times as long as wide; posterior half of each elytron with longitudinal depression near lateral margin; humeral swellings large but not projecting beyond elytral outline, basal, transverse depressions wide, shallow, not

reaching scutellum; each depression interrupted in middle by small tubercle; elytral epipleura narrow, nearly parallel-sided, not reaching elytral apex; elytral sculpture consisting of fine punctures which are somewhat transversely widened on basal part and along lateral margins.

Ventral surface lustrous, rather densely, finely punctate; prosternal process flat, enlarged posteriad procoxae, sharply pointed apically; anal ventrite widely truncate, finely but sharply serrate laterally (Fig. 16). Legs rather robust, short, protibiae rather strongly curved, mesotibiae slightly curved without inner serration, metatibiae straight with large tooth in posterior fourth of inner margin (Fig. 20). Tarsal claws small, regularly arched, only very slightly enlarged at base.

Aedeagus (Fig. 9) long and slender, only slightly bent dorsoventrally, parameres tapering posteriorly; median lobe sharply pointed apically, without lateral serration.

Sexual dimorphism. The female differs from the male in slightly stouter body, less trapezoidal terminal antennomeres, sparser and shorter pubescence of the prosternal process, unmodified metatibiae and widely notched anal ventrite (Fig. 17).

Measurements. Length: 7.2–9.2 mm (holotype 9.2 mm); width: 2.8–3.2 mm (holotype 3.2 mm).

Variability. Nearly no variability was observed except for the size; one male paratype (road Kiserian–Oltepesi) possesses green-bronze antennomeres 6–11 and narrow, green stripe along the inner margins of eyes.

Etymology. This species is named after the collector of the holotype, our friend and colleague Edo Jendek (Ottawa, Canada), a world specialist in the genus *Agrilus* Curtis, 1825.

Differential diagnosis. Anthaxia (H.) jendeki sp. nov. is somewhat similar to A. (A.) nigroaenea sp. nov.; except for the characters given in the key it differs from it in smaller body, bronze colouration, unicolour antennomeres of male, distinctly S-shaped inner margins of eyes, slightly different pronotal sculpture, form of the male metatibiae (Figs 20 vs. 21) and in the different male genitalia (Figs 9 vs. 10).

Distribution. Kenya (Rift Valley Province).

Anthaxia (Haplanthaxia) mashuna Obenberger, 1931

(Figs 4, 13, 24)

Anthaxia mashuna Obenberger, 1931: 108. Type locality: 'Mashonaland: Mazoë [Zimbabwe, Mashonaland Central Prov., Mazowe, approx. 17°31'S 30°58'E]'.

Anthaxia (Anthaxia) mashuna: Bílý (1996): 22 (synonymy).

Anthaxia (Haplanthaxia) mashuna: Bílý (1997): 28, 91 (catalogue); Bellamy (2008): 1424 (catalogue).

Anthaxia chalcogenioides Burgeon, 1941: 190. Type localities: 'Welgelegen [nowadays Lumata, 12°04′60″S, 27°31′08″E]; Lubombo [11°10′60″S, 27°55′00″E]'. Both localites are situated in the Katanga Province, Democratic Republic of Congo.

Anthaxia (Anthaxia) chalcogenioides: Bílý (1996): 22 (synonym of A. mashuna).

Anthaxia (Haplanthaxia) chalcogenioides: BíLý (1997): 28, 91 (catalogue, as synonym of A. mashuna); Bellamy (2008): 1424 (catalogue, as synonym of A. mashuna).

Type material examined. *Anthaxia mashuna*: Lectotype (here designated): ♂, 'Mashonaland [h] // TYPUS [red, p] // Mus. Nat. Pragae, Inv. 22763 [orange, p+h] // *Anthaxia mashuna* m. Type, Det. D^r. Obenberger [p+h]' (NMPC). Paralectotype: ♂, 'Mashonaland, Mazoë, Dez. 1905 (G. A. Marshall) // Syntype [blue, round, p] // Type [red, p] // 1906-182 // *Anthaxia mashuna* m. Type, Det. D^r. Obenberger [p+h]' (BMNH). *Anthaxia chalcogenioides*: Syntypes: 1 ♀, 'Musée du Congo, Welgelegen, Jan. 1912 [p] // Holotypus [red, p] // *Anthaxia pilifrons* Kerr. [h] // *Anthaxia*

chalcogenioides Type Burg. [h] // R. DÉT. A 57 [p]' (MRAC); 1 ♂, 'Musée du Congo, Katanga: Lubombo, xii.1928, Ch. Seydel, c. 1951 [p+h] // Paratype [red, p] // Lubombo, Décbre 1929, Ch. Seydel [p] // C. 1951 [h]' (MRAC); 1 ♂, 'Musée du Congo, Katanga: Lubombo, xii.1929, Ch. Seydel [p+h] // Paratype [red, p]' (MRAC).

Redescription. Size 7.3–10.5 mm; body conspicuously wedge-shaped, bronze with strong silky lustre (Fig. 4); frons flat, scutellum concave, usually also with 1–2 deep punctures; pronotal disc with short, transverse rugae which are bent posteriorly on the prescutellar region; maximum pronotal width at midlength; elytra regularly convex, twice as long as wide, nearly regularly tapering posteriorly from humeri to apex; elytral epipleura narrow, parallel-sided, nearly reaching elytral apex; elytral sculpture homogeneous, consisting of fine, dense, very short, transverse rugae; anal ventrite relatively finely serrate laterally, widely truncate apically; male metatibiae – Fig. 24; aedeagus long, strikingly narrowed posteriorly, parameres with one pair of blister-like, ventral knolls in posterior third (Fig. 13).

Distribution. ?Botswana (Bellamy 2008), Democratic Republic of the Congo (Obenberger 1931), Kenya (new country record), Malawi (new country record), Mozambique (new country record), Tanzania (new country record), Zambia (new country record), Zimbabwe (new country record). Bellamy (2008) recorded this species also from Botswana, however, without any citation.

Remarks. OBENBERGER (1931) did not mention how many specimens he used for description of *A. mashuna* therefore we designate the male specimen from NMPC (Inv. No. 22763) as the lectotype and the male from BMNH as the paralectotype to conserve identity of this species. The female from Zimbabwe bearing the same label as the lectotype (BMNH) is most probably also a syntype but it lacks any label indicating this fact.

OBENBERGER (1931) compared *A. mashuna* with *A. albovillosa* Kerremans, 1913 but the latter belongs to the *A. (H.) thunbergi* Gory & Laporte, 1839 species-group which was defined and revised recently by Bílý & Kubáň (2010).

Anthaxia (Haplanthaxia) nigroaenea sp. nov.

(Figs 5, 10, 18, 21)

Type locality. Kenya, Ngong Hills, 8 km S of Kiserian, 01°27′S – 36°38′E.

Type specimens studied. Holotype: \circlearrowleft , 'Kenya, Ngong Hills, 8 km S of Kiserian, 01°27′S – 36°38′E, 10.–17.iv.2006, E. Jendek leg.' (NMPC). Allotype: \circlearrowleft , 'Uganda occ., Kasese, 600 m, 18.–19.xi.1994, lgt. M. Snížek' (NMPC). Paratypes: 3 \circlearrowleft same data as allotype (NMPC); 'Kenya, Loitokitok [Coast Province], 6.xii.2004, leg. Hovorka' (1 \circlearrowleft , WBCW); 1 \circlearrowleft , 'Tanzania, Ujewa, x.[19]98, G. Curletti leg. // ex larva *Acacia* sp., G. Curletti leg.' (NMPC);

1 Å, 'Tanzania, Iringa, 27.x.2003 // ex larva *Acacia* sp. G. Curletti leg.' (GCCI); 1 Å, 'Tansania, Morogoro, Nguru Mountains // Str. zw. Masimba u. Kibati, Umg. Pemba, 950 m, 4.xii.2009, leg. A. Puchner' (APWC); 1 Å, '[Tanzania] Ukerewe, P. A. Conrads' (NMPC).

Diagnosis. Large (8.0–11.2 mm), convex, wedge-shaped, black with slight bronze lustre (Fig. 5); lateral, longitudinal depressions in posterior half of elytra with golden-red lustre; antennae red-bronze, outer half of antennomeres 5–11 yellow in male; ventral surface black with red-bronze lustre; dorsal surface asetose, frons with short, white, rather dense, semi-erect pubescence; ventral surface lustrous, with very short, sparse, white pubescence, prosternal plate asetose.

Description. *Male* (holotype). Head large, as wide as anterior pronotal margin; anterior margin of frontoclypeus widely, shallowly emarginate; frons slightly, regularly convex, inner margins of eyes strongly S-shaped; vertex weakly convex, 0.5 times as wide as width of eye; eyes large, reniform, slightly projecting beyond outline of head; sculpture of frons consisting of small, dense, polygonal or rounded cells with tiny central grains; antennae rather short, robust (Fig. 5), scarcely reaching midlength of lateral pronotal margins when laid alongside; scape claviform, slightly curved, 4 times as long as wide; pedicel subcylindrical, 1.5 times as long as wide; third antennomere slightly triangular, 1.8 times as long as wide, fourth antennomere obtusely triangular, slightly wider than long; antennomeres 5–10 widely trapezoidal to lobate, about 1.8 times wider than long, terminal antennomere pyriform, twice as wide as long.

Pronotum convex, 1.8 times as wide as long, slightly depressed in middle; anterior margin rather deeply, posterior margin very slightly biarcuate; lateral margins regularly rounded, maximum pronotal width in anterior third; lateroposterior depressions shallow, slightly longitudinal, posterior angles obtuse; sculpture consisting of fine, transverse rugae which are slightly bent posteriorly in prescutellar part; lateral parts of pronotum with small, dense, polygonal cells with small central grains. Scutellum micro-sculptured, obtusely pentagonal, slightly concave, somewhat wider than long.

Elytra convex, widely wedge-shaped, uneven, twice as long as wide; each elytron with shallow, oblique, posthumeral depression and with longitudinal depression in posterior half near lateral margin; humeral swellings small but well-defined; transverse, basal depression deep, not reaching scutellum, interrupted by small elevation near humeri; posterior third of elytral margins sharply serrate, each elytron rounded separately; elytral epipleura narrow, parallel-sided, not reaching elytral apex; sculpture consisting of small, irregular punctures fusing into short, transverse rugae in humeral part and along suture.

Ventral surface with small, dense, simple punctures; prosternal process flat, strongly enlarged posterior to procoxae, sharply pointed apically; anal ventrite widely truncate with sharp, dense, lateral serration. Legs rather robust, pro- and mesotibiae rather strongly curved; metatibiae (Fig. 21) almost straight with large tooth in the posterior fourth of inner margin. Tarsal claws small, slender, hook-shaped, only weakly enlarged at base.

Aedeagus (Fig. 10) long, tapering posteriorly, parameres with two weak, blister-like elevations on ventral surface; median lobe sharply pointed apically, without lateral serration.

Sexual dimorphism. The female differs from the male in the unicolorous, not enlarged antennae, straight mesotibiae, unmodified metatibiae and in the widely emarginate anal ventrite (Fig. 18).

Measurements. Length: 8.0–11.2 mm (holotype 11.2 mm); width: 2.8–4.0 mm (holotype 4.0 mm).

Variability. No variability was observed except for the size.

Differential diagnosis. Anthaxia (H.) nigroaenea sp. nov. is similar to A. (H.) jendeki sp. nov. from which it differs in larger size (the largest species of the group) and nearly black colouration, less acuminate body, wider pronotum (only 1.7 times as wide as long in A. (H.) jendeki sp. nov.), enlarged and bicolorous male antennae (Fig. 5), slightly in the shape of male metatibiae (Figs 20 vs. 21), and in the different male genitalia (Figs 9 vs. 10)

Etymology. The specific epithet is composed from the Latin nouns 'niger' (black) and 'aeneus' (coppery) because of the colouration of the new species.

Distribution. Kenya, Tanzania, Uganda.

Anthaxia (Haplanthaxia) patrizii Théry, 1938

(Figs 7, 8, 15, 26)

Anthaxia patrizii Théry, 1938: 268. Type locality: 'Sohna [nowadays Ain Sokhna in Suez Governorate, approximately 29°38'N 32°20'E]'.

Anthaxia patrizii: Alfieri (1976): 105 (monograph).

Anthaxia (Anthaxia) patrizii: Bílý (1997): 31, 102 (catalogue); Bílý (1999): 237 (catalogue); Bílý (2006): 372 (catalogue); Bellamy (2008): 1446 (catalogue).

Type material examined. PARATYPE: \lozenge , 'Egypte [p], Sohna [h] // Anthaxia patrizii Théry, Paratype [h]' (MNHN). Additional material examined. EGYPT: Red Sea Governorate: Marsa Alam, Abou Gimal, Wadi Massa, $2 \Leftrightarrow (ex larva 20.viii.2005$ from Acacia e[h]renbergiana), P. Rapuzzi leg. (MKNC, GMCI); Marsa Alam, Abou Goushum, $1 \Leftrightarrow (ex larva 20.viii.2005$ from Acacia sp. sfarf.), P. Rapuzzi leg. (NMPC); Wādi Abu Ghousun, 10-20.iii.2004, $1 \Leftrightarrow (ex larva x.2004$ from Acacia raddiana), Sama leg. (DBRI); NP Wādi Jimal, Wādi El Reada $24^{\circ}13'162''N 35^{\circ}11'18''E$, 250 m, 8.ii.2005, $2 \Leftrightarrow (ex larva 23.vi.2005$ from Acacia raddiana), D. Baiocchi leg. (DBRC); NP Wādi Jimal, Wādi Abū Ghūsun, 280 m, 7.ii.2005, $24^{\circ}24'00''N 35^{\circ}01'42''E$, $2 \Leftrightarrow (ex larva 31.v.-7.vii.2005$ from Acacia raddiana), D. Baiocchi leg. (DBRI); Red Sea, Wadi Gemal Protect., Wadi Abu Goushum, 15.ii.2004, $2 \Leftrightarrow (ex larva 24.vi.-ix.2004$ from Acacia tortilis/raddiana), G. Magnani leg. (GMCI); Red Sea, Wadi Gemal Prot., Wadi Abu Goushum, 15.ii.2004, $1 \Leftrightarrow (ex larva vii.2004$ from Acacia raddiana), G. Sama leg. (GMCI).

Diagnosis. Rather large (8.5–9.5 mm), lustrous, bright bronze, nearly subparallel species (Fig. 7); lateral pronotal margins rounded; transverse rugae on pronotum laterally bent, directed towards anterior angles (Fig. 8); elytra 1.9 times as long as wide, slightly uneven with very weak lateral, longitudinal depression bearing the same sculpture like rest of elytra; humeral swellings well-defined, slightly projecting beyond outline of elytra; elytral epipleura very narrow, parallel-sided, nearly reaching elytral apex; tooth on inner margin of male metatibiae only weakly defined (Fig. 26); aedeagus without blister-like tubercles on ventral surface (Fig. 15). **Bionomy.** Larva develops under the bark of dead branches of *Acacia ehrenbergiana* Hayne, *A. raddiana* Savi and *A. tortilis* (Forsskal) (Fabaceae: Mimosoideae). According to Baiocchi (pers. comm.) the larvae seem to be rather sparse in the wood and the twigs are infested only by a low number of larvae.

Distribution. Egypt (Théry 1938, present paper) and ? Israel (Bellamy 2008).

Remarks. This species strongly resembles small, cupreous species of the genus *Chalcogenia* Saunders, 1871. Bellamy (2008) recorded this species also from Israel but without any citation.

The type specimens were reared from dead branches of *Acacia tortilis* by A. Rabinovith and the holotype was deposited in the collection of A. Alfieri (Théry 1938). The Alfieri collection was purchased by Georg Frey and is nowadays housed in Naturhistorisches Museum in Basel, unfortunately we were unable to find the holotype there. Distribution of this species seems to be limited only to a small region near the Red Sea.

Anthaxia (H.) patrizii was so far treated in the subgenus Anthaxia s. str., e.g. Bílý (1997, 1999, 2006) and Bellamy (2008). Based on a study of the paratype specimen and recently collected material we found that this species possesses all principal characters of the subgenus Haplanthaxia Reitter, 1911 such as the form of the elytral epipleura, male metatibiae, female anal ventrite, and the aedeagus. Therefore we transfer A. patrizii to the subgenus Haplanthaxia.

Anthaxia (Haplanthaxia) puchneri sp. nov. (Figs 6, 12, 23)

Type locality. Angola, Prov. Huila, Caconda – Huambo road, near Nova Monçaõ, 1640 m, 13°262′S − 015°227′E. Type specimen studied. Holotype: ♂, 'Angola, Prov. Huila, Str. zw. Caconda u. Huambo, Umgb. Nova Monçaõ, 1640 m, S13°262′−015°227′, 8.−12.xi.2012, leg. A. Puchner' (NMPC).

Diagnosis. Medium-sized (8.0 mm), convex, strongly wedge-shaped, bronze with silky lustre (Fig. 6); frontoclypeus with green lustre, tarsi and distal antennomeres (5–11) black; ventral surface bronze, lustrous; dorsal surface asetose, frons with rather dense, white, semi-erect pubescence; ventral surface with sparse, white, recumbent pubescence; metepimera and lateral parts of ventrites with patches of condensed cream-white pubescence.

Description. *Male* (holotype). Head large, as wide as anterior pronotal margin; anterior margin of frontoclypeus rather deeply, triangularly emarginate; frons flat, inner margins of eyes strongly S-shaped; vertex flat, 0.7 times as wide as width of eye; eyes large, reniform, slightly projecting beyond outline of head; sculpture of frons consisting of dense, irregular, small cells without distinct central grains; antennae short, reaching midlength of lateral pronotal margins when laid alongside; scape claviform, curved, 4.5 times as long as wide, pedicel subcylindrical, 1.2 times as long as wide; third antennomere triangular, 1.5 times as long as wide, fourth antennomere obtusely triangular, as wide as long; antennomeres 5–10 obtusely trapezoidal, somewhat longer than wide; terminal antennomere rhomboid, 1.5 times as long as wide.

Pronotum rather convex, 1.7 times as wide as long with fine, transverse depression in middle; lateroposterior depressions wide, shallow; anterior margin rather strongly, posterior weakly biarcuate; lateral margins subparallel, regularly rounded both anteriorly and posteriorly, posterior angles obtuse; sculpture consisting of short, transverse rugae at disc, and small, regular, dense polygonal cells with small central grains along lateral margins and in lateroposterior depressions. Scutellum cordiform, concave, somewhat wider than long.

Elytra regularly convex, strongly wedge-shaped, twice as long as wide; humeral swellings small, transverse basal depressions shallow not reaching scutellum; apical quarter of elytral margins sparsely serrate, each elytron rounded separately; elytral epipleura narrow, parallel-sided, nearly reaching elytral apex; sculpture homogeneous consisting of fine punctures along suture and fine, very dense, transverse rugae on reminder of elytra.

Ventral surface lustrous, prosternal process flat, strongly enlarged posterior to procoxae; anal ventrite truncate apically, finely, densely serrate laterally. Legs slender, relatively long, protibiae strongly, mesotibiae slightly curved; apices of mesotibiae slightly enlarged; metatibiae (Fig. 23) straight, somewhat flattened with large tooth in apical fifth of inner margin. Tarsal claws fine, slightly hook-shaped, very slightly enlarged at base.

Aedeagus (Fig. 12) long, slender, parameres nearly parallel-sided with small, knoll-like elevation in posterior third of ventral surface; median lobe very slender, sharply pointed apically, without lateral serration.

Sexual dimorphism. Female unknown.

Measurements. Length: 8.0 mm; width: 2.8 mm.

Differential diagnosis. *Anthaxia* (*H*.) *puchneri* sp. nov. is very similar to *A*. (*H*.) *mashuna* from which it differs only in distinctly slender body, slightly in the form of male metatibiae (Figs 23 vs. 24) and first of all in the different male genitalia (Figs 12 vs. 13).

Etymology. This species is named in the honour of its collector, Alfred Puchner, Vienna, Austria.

Distribution. Angola (Huíla Province).

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References

ALFIERI A. 1976: The Coleoptera of Egypt. Mémoires de la Société Entomologique d'Egypte 5: 1-361.

BELLAMY C. L. 2008: A world catalogue and bibliography of the jewel beetles (Coleoptera: Buprestoidea). Volume 3. Buprestinae: Pterobothrini through Agrilinae: Rhaeboscelina. Series Faunistica No. 78, Pensoft, Sofia-Moscow, pp. (1–2) + 1261–1932.

BÍLÝ S. 1996: New species of Anthaxia and some nomenclatorical changes in Buprestidae (Coleoptera). Folia Heyrovskyana 4: 21–33.

BÍLÝ S. 1997: World catalogue of the genus Anthaxia Eschscholtz, 1829 (Coleoptera, Buprestidae). Folia Heyrovskyana, Supplementum 2: 3–190.

BÍLÝ S. 1999: Supplement to the "World catalogue of the genus Anthaxia (Coleoptera, Buprestidae)". Folia Heyrovskyana 7: 229–242.

BÍLÝ S. 2006: New nomenclatorial and taxonomic acts, and comments. Buprestidae: Anthaxiini. Pp. 58–60. Catalogue. Buprestinae: Anthaxiini. Pp. 369–381. In: LÖBL I. & SMETANA A. (eds): Catalogue of Palaearctic Coleoptera. Volume 3. Scarabaeoidea – Scirtoidea – Dascilloidea – Buprestoidea – Byrrhoidea. Apollo Books, Stenstrup, 690 pp.

BÍLÝ S. 2010: A revision of the Anthaxia (Haplanthaxia) zanzibarica species-group (Coleoptera: Buprestidae: Buprestinae: Anthaxiini). *Folia Heyrovskyana, Series A* 18: 1–24.

- BÍLÝ S. & KUBÁŇ V. 2010: A revision of the Anthaxia (Haplanthaxia) melancholica and A. (H.) thunbergi species-groups (Coleoptera: Buprestidae: Buprestinae: Anthaxiini). Folia Heyrovskyana, Series A 18: 25–58.
- BURGEON L. 1941: Catalogues Raisonnés de la Faune Entomologique du Congo Belge. Coléoptères. Buprestides. Annales du Musée du Congo Belge. C. Zoologie, Série III, Section II 5(3): 121–275.
- DESCARPENTRIES A. & BRUNEAU DE MIRÉ P. 1963: Coléoptères Buprestidae du Tibesti. *Bulletin de l'Institut Français d'Afrique Noire, Série A* **25(1)**: 163–209.
- DESCARPENTRIES A. & MATEU J. 1965: Coléoptères Buprestidae récoltés dans l'Ennedi par M. J. Mateu. *Bulletin de l'Institut Français d'Afrique Noire, Série A* 27(3): 1022–1056.
- MATEU J. 1972: Les Insectes xylophages des Acacia dans les régions sahariennes. Instituto de Zoologia 'Dr. Augusto Nobre', Faculdade de Ciências do Porto, 116. Imprensa Portuguesa, Porto, 714 pp.
- OBENBERGER J. 1930: Buprestidae II. In: SCHENKLING S. (ed): Coleopterorum Catalogus. Pars 111. W. Junk, Berlin, pp. 213–568.
- OBENBERGER J. 1931: Studien über die aethiopischen Buprestiden II. Folia Zoologica et Hydrobiologica 3(1): 84–127.
- THÉRY A. 1938: Nouvelle contribution l'étude des Buprestides d'Egypte. Bulletin de la Société Royale Entomologique d'Égypte 21 (1937): 266–270.