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CLICK-BEETLES SPECIES AND RECORDS NEW TO THE PALEARCTIC REGION

(Insecta Coleoptera Elateridae)

Abstract

Ten species of click-beetles new to the Palearctic Region are described. They belong to the genera *Athous*, *Agriotes*, *Prokraerus*, *Cardiophorus*, *Dicronychus*, *Paracardiophorus*. New records are given for eleven species of the genera *Adelocera*, *Limoniscus*, *Athous*, *Ampedus*, *Idotarmonides*, *Cardiophorus*, *Dicronychus*. The female of *Cardiophorus albofasciatus* Schwarz, unknown to date, is described.

Riassunto

[Nuove specie e nuovi reperti di elateridi della fauna paleartica]

Nel presente lavoro vengono descritte 10 nuove specie di elateridi appartenenti ai generi *Athous*, *Agriotes*, *Prokraerus*, *Cardiophorus*, *Dicronychus*, *Paracardiophorus* della fauna paleartica; inoltre vengono forniti nuovi dati geonemici o viene descritto uno dei sessi, per 11 specie dei generi *Adelocera*, *Athous*, *Limoniscus*, *Ampedus*, *Cardiophorus*, *Dicronychus*, *Idotarmonides*.

Key words: Coleoptera, Elateridae, click-beetles, *Athous*, *Agriotes*, *Prokraerus*, *Cardiophorus*, *Dicronychus*, *Paracardiophorus*, *Adelocera*, *Limoniscus*, *Ampedus*, *Idotarmonides*, new species, geonemy, distribution, Palearctic.

Material and methods

Body measurements. Body length is measured along the midline from the anterior margin of the frons to the apex of elytra; the width is measured across the broadest part of the body.

Pronotal measurements. The pronotal length is measured along the midline; the width at the broadest part, which is most usually at the hind angles.

Abbreviations. The names of institutions, museums and collections containing

the studied material are abbreviated as follows:

CAF	Angelini coll., Francavilla Fontana (Italy)
CCW	Cate coll., Wien (Austria)
CDZ	Dusanek coll., Zábřeh na Moravě, Kralove, (Czech Rep.)
CKB	Kubáň coll., Brno (Czech Rep.)
CMHK	Mertlik coll., Hradec Kralove (Czech Rep.)
CMM	Monguzzi coll., Milan
CMO	Malinka coll., Ostrava (Czech Rep.)
COI	Orbach coll., Kiryat Tivon (Israel)
CPG	Platia coll., Gatteo (Italy)
CPT	Preiss coll., Tellington (United Kingdom)
CRG	Riese coll., Genoa (Italy)
CSO	Sitek coll. Ostrava (Czech Rep.)
CSV	Schimmel coll., Vinningen (Germany)
CVO	Vávra coll., Ostrava (Czech Rep.)
CZP	Zbuzek coll., Prague (Czech Rep.)
MCSNG	Museo Civico di Storia Naturale, Genoa (Italy)
MCSNM	Museo Civico di Storia Naturale, Milan (Italy)
NMP	Pecirka coll., National Museum, Prague (Czech Rep.)
TM	Termesztudományi Múzeum, Budapest (Hungary)
TU	Tel Aviv University coll., Tel Aviv (Israel)

Introduction

This paper reports the results of a study of several click-beetles from different countries of the Palearctic Region, recently submitted by museums and colleagues. We have recognized ten undescribed species belonging to the genera *Athous* (material from Croatia, Hungary, Turkey), *Agriotes* (Bulgaria), *Pro-craerus* (material from Turkey, Syria, Jordan, Israel and Palestine) *Cardiophorus* (Syria), *Dicronychus* (Turkey, Turkmenistan), *Paracardiophorus* (Greece). New records of eleven species of the genera *Adelocera*, *Limoniscus*, *Athous*, *Ampedus*, *Idotarmonides*, *Cardiophorus* and *Dicronychus* report additional data to their known distribution. The female of *Cardiophorus albofasciatus* Schwarz, unknown to date, is described. The species are arranged in tribes, following SANCHEZ-RUIZ (1996).

Tribe **Agrypnini** Candèze, 1857

Adelocera yemenita Platia & Schimmel, 1997 (Figs 1, 13)

Material examined. 7 exs. (♂♀): **E Yemen:** Jabal al Fatk, Hawf NE al Ghaydah (16°40'N, 53°05'E), m 729, 12-13.X.2005, S. Kadlec. **W Yemen:** Jabal Bura NEEAl Hudaydah (14°52'N, 43°24'E), m 225-600, 30.X-1.XI.2005. S. Kadlec.

Oman: S Oman, Al Mughsayl env., m 0-50, 21-23.X.2005, R. Cervenka; Aln Garziz 8 km nordl., Salalah, 24.X.2006, G. Wagner (CMHK; CPG; CZH). Described on two female specimens from Yemen, the species is new to Oman. The male is morphologically undistinguishable from the female. Aedeagus as in fig. 1.

Tribe **Dendrometrini** Gistel, 1856

Limoniscus vittatus (Candèze, 1873)

Material examined. 1 ♀: **Russia:** Kurili Isl., Kunashir, Tretyakovo, 18.VI.1988, J. Louda (CRG).

Distribution: Japan; Korea.

New to Kurili Islands.

***Athous (Orthathous) kasovskyi* n. sp.** (Figs 2, 14)

Material examined. Holotype ♂: **Hungary:** Zalälövo, 10.V.2003, L. Kasovsky (CMHK).

Diagnosis. Among the Hungarian species of subgenus *Orthathous* Reitter (MERKEL & MERTLIK, 2005) the new species could be confused with *apfelbecki* Reitter, but it is easily separated for a combination of characters as smaller size, longer antennae, pronotum longer than wide with lighter punctures.

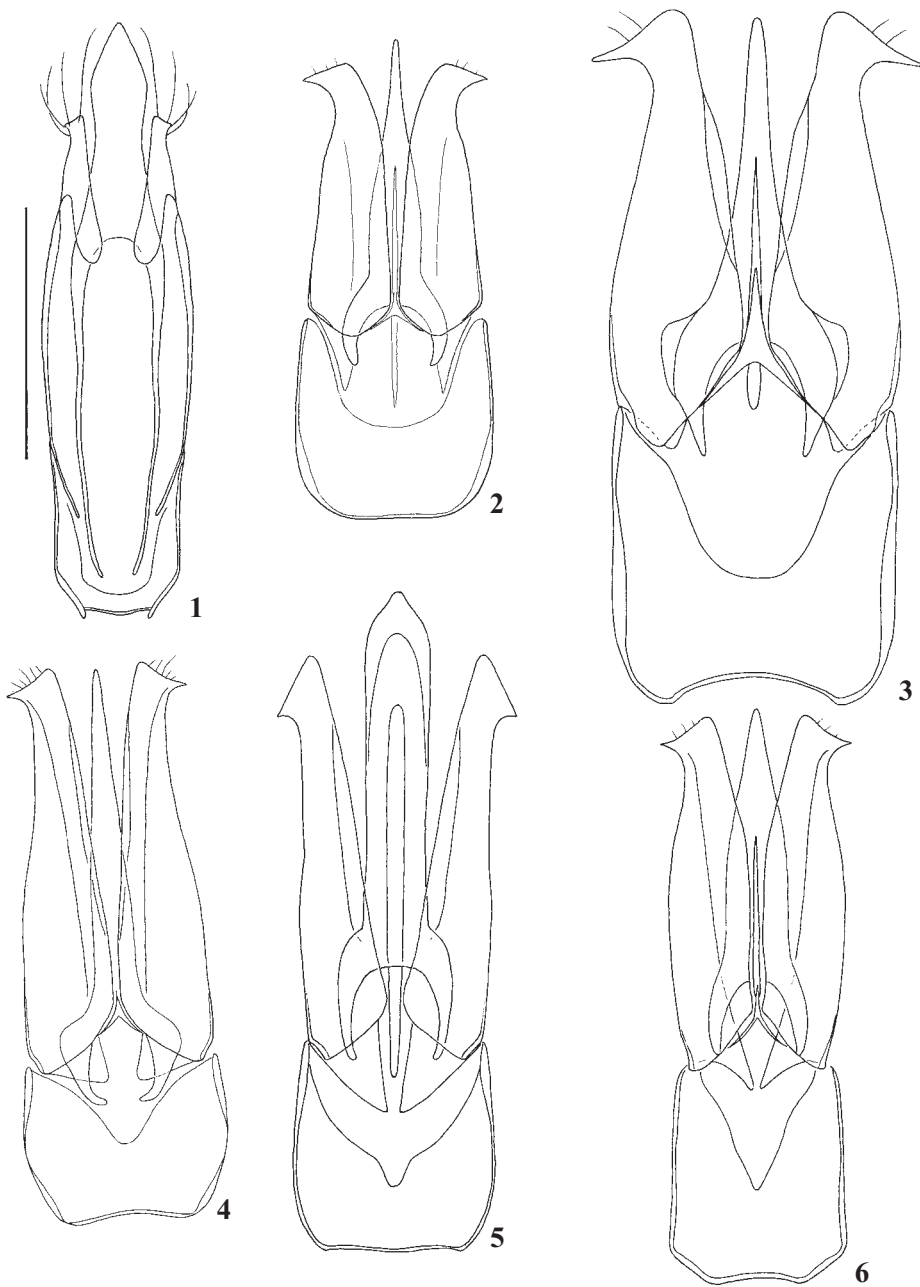
Description. Male. Moderately shiny; body entirely blackish with tarsi and articulations of legs brown-ferruginous; covered with dense, yellow-fulvous, recumbent, pubescence.

Head with eyes a little narrower than anterior margin of pronotum; frons deeply impressed from middle, anterior margin simple, nearly touching clypeus at middle; punctures coarse, simple, with very narrow intervals or contiguous.

Antennae exceeding by more than three articles the apexes of posterior angles of pronotum, subserrate from third article; second article cylindrical a little longer than wide; third conical, sculptured as the following ones, a little shorter than fourth; second and third articles taken together longer than fourth; fourth to tenth subtriangular, more than twice longer than wide, gradually tapering; last article longer than preceding ones, with subparallel sides, rounded at apex.

Pronotum 1.15 x longer than wide, widest behind the middle and at posterior angles, regularly convex, abruptly sloping at sides and base; sides gradually narrowing from behind the middle toward apexes, sinuate before posterior angles, the latter just divergent, shortly pointed and upturned; punctures uniformly distributed on the whole surface, deep, simple, with very narrow intervals also at sides.

Scutellum quadrangular, convex, narrower than inter-elytral space. Elytra a little wider than base of pronotum, 2.9 x longer than it; sides subparallel for about two third their length; striae well impressed; interstriae subconvex with rough surface.



Figs 1-6 (scale 0.5 mm). Male genitalia in dorsal view. 1. *Adelocera yemenita* Platia & Schimmel; 2. *Athous (Orthathous) kasovskyi* n. sp.; 3. *A. (Orthathous) zbuzeki* n. sp.; 4. *A. (Orthathous) ponticus* n. sp.; 5. *Agriotes bulgaricus* n. sp.; 6. *A. (Orthathous) monguzzii* n. sp.

Tarsal articles decreasing regularly in length; fourth article in dorsal view only a little narrower than third.

Aedeagus as in fig. 2.

Female unknown.

Size. Length 8.30 mm; width 2.18 mm.

Etymology. Dedicated to L. Kasovsky, Vrútky, Slovak Republik, collector of the species.

***Athous (Orthathous) zbuzeki* n. sp.** (Figs 3, 15)

Material examined. Holotype ♂: **Turkey:** vil. Kastamonu, 20 km S of Araç, Sümenler env., 3.VII.2006, J. Mertlik (CMHK). 64 Paratypes ♂♂: same data as Ht, J. Mertlik, V. Dusanek, B. Zbuzek (CMHK; CPG; CDZ; CZP).

Diagnosis. Among turkish species, the new taxon is allied to *acutangulus* Fairmaire, 1866 for the fourth tarsal article just shorter than the preceding ones, but it can be separated by quadrangular pronotum with simple punctures and less acute and diverging hind angles.

Description. Male. Moderately shiny; body colour entirely blackish with suture, lateral extremities of elytra and legs brown ferruginous; covered with yellow-fulvous, semi-erect at sides, vestiture.

Head with eyes just narrower than anterior margin of pronotum, frons moderately depressed from middle to anterior margin, the latter regularly curved, touching clypeus at middle; punctures coarse, deep, simple or slightly umbilicate, with very narrow interstices or contiguous.

Antennae exceeding by about three articles the apexes of posterior angles of pronotum; second article subcylindrical, a little longer than wide; third conical, sculptured as the following ones, more than twice longer than second and a little shorter than fourth; second and third articles, taken together, longer than fourth; fourth to tenth triangular, gradually slenderer, last article longer than previous, longely ellipsoidal.

Pronotum as long as wide, widest at middle and at posterior angles, regularly and moderately convex, sometimes with a shallow depression at sides of basal sloping; sides gently and regularly arcuate, shortly sinuate before posterior angles, the latter short, rather acute and diverging; puncturation rather uniformly distributed on the whole surface, punctures deep, simple or vaguely umbilicate, with narrow interstices, denser and contiguous only at sides.

Scutellum quadrangular, convex, punctured, smaller than inter-elytral space. Elytra a little wider than base of pronotum, 2.8-2.9 x longer than it, rather depressed on the disc; sides very slightly arcuate, widest at middle or gently dilated after middle, regularly curved at apexes; striae regularly marked and punctured; interstriae flat or subconvex, roughly punctured.

Tarsal articles nearly regularly decreasing in length; fourth just narrower than third in dorsal view.

Aedeagus as in fig. 3.

Female unknown.

Size. Length 8.30-10.50 mm; width 2.25-2.80 mm.

Etymology. The species is dedicated to B. Zbuzek, Praha, collector of a part of the material.

***Athous (Orthathous) ponticus* n. sp.** (Figs 4, 16)

Material examined. Holotype ♂: **Turkey:** vil. Trabzon, Soganli Geç., Köknar env., 25.VI.2006, V. Dusanek (CDZ). 2 Paratypes ♂♂: same data as Ht, J. Mertlik (CMHK; CPG).

Diagnosis. A species closely related to *kovancii* Platia (PLATIA 2003) from Western Anatolia for the stout antennae and shape of male genitalia; it can be separated by shorter antennae with third article a little narrower than fourth and coarser, umbilicate punctures of pronotum.

Description. Male. Moderately shiny; body colour brownish and ferrugineous; first antennal article, anterior half of frons, sides of pronotum, suture, fifth-sixth interstriae from humera, lateral interstriae of elytra, legs, ferruginous; covered with yellow-fulvous, recumbent vestiture.

Frons weakly depressed from middle, anterior margin subarcuate, at middle briefly protruding and reaching clypeus; punctures coarse, umbilicate, contiguous.

Antennae robust, exceeding by one article the apexes of posterior angles of pronotum; second article subcylindrical, a little longer than wide; third conical, sculptured as the following, about twice longer than wide, just shorter than fourth; second and third articles, taken together, longer than fourth; fourth to tenth triangular, less than twice as long as wide, gradually slenderer; last article a little longer than penultimate, ellipsoidal.

Pronotum just longer than wide, convex, with shallow depressions at sides of basal sloping, sometimes with trace of a median longitudinal depression before basal declivity; sides moderately arcuate or subparallel, shortly sinuate before posterior angles, the latter short, just divergent; puncturation rather uniformly distributed; punctures umbilicate on all the surface, on the disc with shortest interstices, at sides contiguous or confluent.

Scutellum quadrangular, convex, smaller than interelytral space, roughly punctured. Elytra just wider than base of pronotum, 2.55-2.65 x longer than it; sides subparallel in the basal half, then gently dilated and gradually tapering to apexes; striae well marked and punctured; interstriae subconvex, roughly punctured.

Fourth tarsal segment much narrower than third in dorsal view.

Aedeagus as in fig. 4.

Size. Length 7.8-8.4 mm; width 2.25-2.37 mm.

Female unknown.

Etymology. The name is derived from the old name of the region where the species lives: Pontus.

Athous (Orthathous) svihlai Platia & Gudenzi, 1998

Athous (Orthathous) svihlai PLATIA & GUDENZI, 1998: 632.

Material examined. 6 exs. (5 ♂♂, 1 ♀). **Turkey:** 5 exs.: Zonguldak Prov., 20 km E of Karabük, 22-23.VI.1996, J. Vávra; 1 ex.: Zonguldak Prov., Safranbolu, m 1000, 4-5.VI.1996, Z. Malinka (CVO; CMO).

Described on male specimens.

Female. It differs from the male for the body more convex and stout; antennae shorter nearly reaching the apexes of posterior angles of pronotum; second and third articles, taken together, longer than fourth. Elytral sides widened after the middle.

Size. Length 11 mm; width 3.3 mm.

Athous (Orthathous) monguzzi n. sp. (Figs 6, 17)

Material examined. Holotype ♂: **Croatia:** Velebit, Zavizan, m 1500, 17.VII.1990, R. Monguzzi (CMM don. MCSNM). 1 Paratype ♂: Veliki Zavizan, 6.VIII.1994, M. Sarovec (CMHK).

Diagnosis. A small species very close to *A. szombathyi* Schenkling, 1927; it can be separated by the pronotum as long as wide, arcuate at sides, coarsely punctured, without median longitudinal depression.

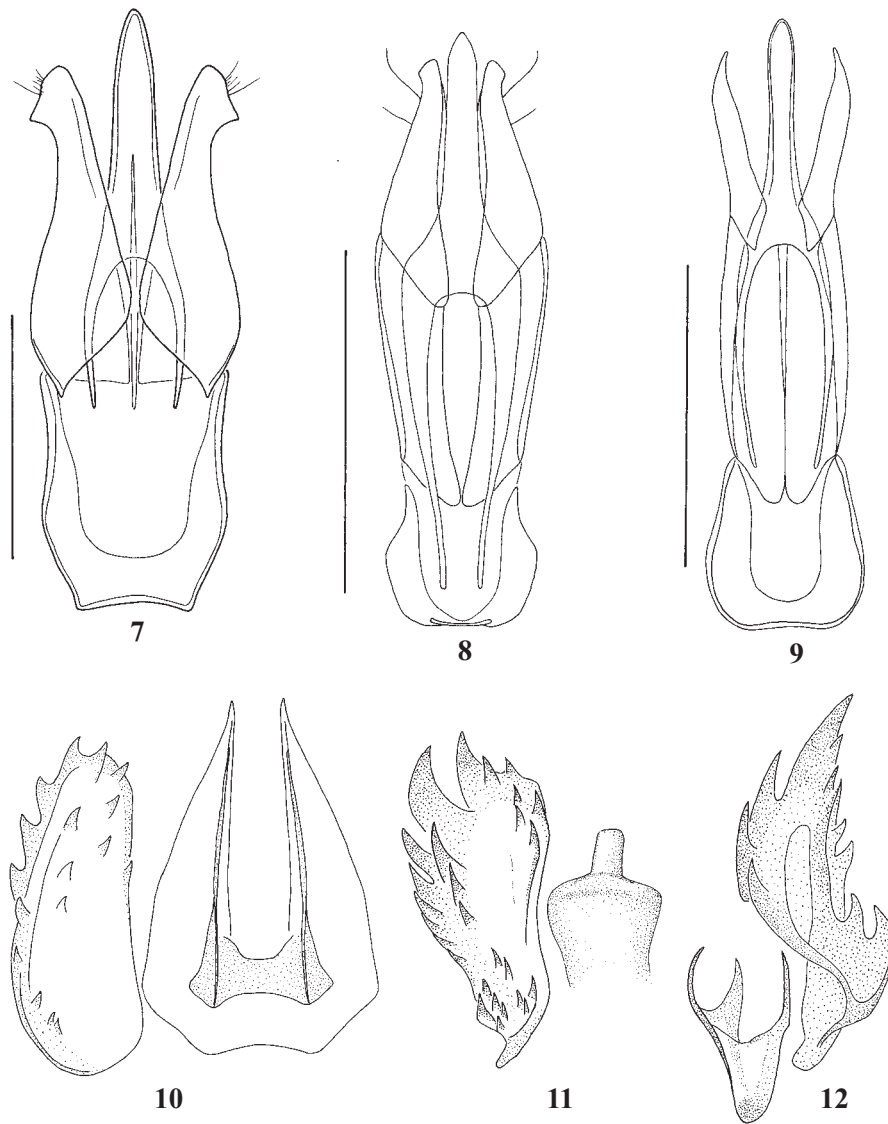
Description. Male. Moderately shiny. Head, pronotum, scutellum blackish; antennae, elytra and legs lighter, brown-ferruginous; covered with yellowish, recumbent vestiture.

Head with eyes a little narrower than anterior margin of pronotum; frons depressed from middle, anterior margin subarcuate, moderately thickened, nearly touching clypeus at middle; punctures coarse, umbilicate, contiguous.

Antennae exceeding by about 1.5 articles the apexes of posterior angles of pronotum, subserrate from third article; second article subcylindrical a little longer than wide; third conical, sculptured as the following ones, about twice longer than wide, longer than second and shorter than fourth; second and third, taken together, longer than fourth; fourth to tenth sub-triangular, less than twice longer than wide, gradually tapering; last article longer than penultimate, ellipsoidal.

Pronotum as long as wide, regularly convex, with two symmetrical, punctiform depressions at sides of basal sloping, widest at middle and posterior angles; sides moderately and regularly arcuate, gently sinuate before posterior angles, the latter short, just or not diverging. Shortly pointed and upturned at apex; puncturation coarse, uniformly distributed, punctures on the disc deep, simple to slightly umbilicate, towards sides denser, umbilicate and contiguous or laterally confluent.

Scutellum quadrangular, convex, coarsely punctured, smaller than inter-elytral space. Elytra a little wider than base of pronotum, 2.7-2.8 x longer than pronotum; moderately convex; sides subparallel, slightly dilated behind the middle and tapering at extremity; striae well marked and punctured; interstriae subconvex with rough surface.



Figs 7-12 (scale 0.5 mm). 7-9. Male genitalia in dorsal view. 7. *Procraerus levantinus* n. sp.; 8. *Cardiophorus gerhardi* n. sp.; 9. *Dicronychus turkmenicus* n. sp. 10-12. Sclerifications of copulatrix bursa. 10. *Cardiophorus albofasciatus* Schwarz; 11. *Dicronychus freudei* n. sp.; 12. *Paracardiophorus malinkai* n. sp.

Fourth tarsal article fairly smaller and shorter than third in dorsal view.

Aedeagus as in fig. 6.

Female unknown.

Size. Length 7.5-8 mm; with 2.25-2.28 mm.

Etymology. The species is dedicated to R. Monguzzi, Milan, a valid specialist of Col. Carabidae, collector of the Holotype.

The following four species are added to the check-list of the known *Athous* (*Orthathous*) from the former Yugoslavia, published by PLATIA (2005).

Athous (*Orthathous*) *lomnickii* Reitter, 1905. 1 ♂: **Bosnia- Herzegovina**: Duzi, 1.VII.1987, J. Jelinek (CMHK). 1 ♂: **Serbia-Montenegro**: (Flussufer bei) Danilovgrad, 16.VII.1978, M. Zeising (CZH).

Athous (*Orthathous*) *freudei* Platia, 1989. 1 ♂: **Macedonia**: Starj Dojran VI.1969, Z. & J. Novotny (CMHK).

Athous (*Orthathous*) *bicolor* (Goeze, 1777). Several specimens: **Slovenia**: Goricko, Kobilje, m 192, 29.VI-9.VII.2006, A. Kapla (CPG; CZP); **Croatia**: Velika Kapela Mts.

Athous (*Orthathous*) *vavrai* Platia, 2006. **Slovenia**: Sajevice env., Krakovski gozd forest, 28.VI.2003, J. Vavra; Sajevice env., Krakovski gozd forest, Kostanjevica na Kriki env., 1-3.VII.2004, T. Sitek, Z. Malinka (CPG; CVO; CTO; CMO).

Tribe **Agriotini** Champion, 1894

Agriotes bulgaricus n. sp. (Figs 5, 18)

Material examined. Holotype ♂: **Bulgaria**: 4 Km SE Harmanli, 19.VI.2006, J. Mertlik (CMHK). 2 Paratypes ♂♂: same data as Ht, 5.VII.2006, V. Dusanek, B. Zbuzek (CDZ; CZP).

Diagnosis. A species of the *nuceus* group (PLATIA, 2003a), allied to *sameki* Platia, 2003 of Western Anatolia; it can be distinguished by shorter antennae with second and third articles, taken together, clearly longer than fourth.

Description. Male. Moderately shiny; body entirely blackish with antennae, middle of scutellum and legs ferruginous; covered with dense, recumbent, yellow-fulvous pubescence.

Frons flat, anterior margin straight, suprantennal carinae reaching anterior part, punctures umbilicate, contiguous.

Antennae just reaching the apexes of posterior angles of pronotum, serrate from fourth article; second and third articles subcylindrical, subequal in length; second with a fairly larger diameter; second and third, taken together, clearly longer than fourth; fourth to tenth triangular, just longer than wide, gradually tapering; last article a little longer than penultimate, sub-ellipsoidal, constricted before apex.

Pronotum as long as wide or a little wider, widest at posterior angles, strongly convex, abruptly sloping at sides, more gradually at base with a short and shallow median longitudinal depression on basal declivity; sides subparallel to arcuate in the first half, slightly and longely sinuate to apexes of posterior angles, the latter rather acute, diverging, with a moderate, little apparent, inwards oriented carina; lateral suture curved, directed to upperside of eyes, briefly obsolete near middle; puncturation rather uniformly distributed, punctures on disc deep, simple to slightly umbilicate, with intervals shorter than their own diameters, gradually denser towards sides, laterally contiguous to confluent.

Scutellum tongue-shaped, flat, densely punctured. Elytra as wide as base of pronotum, 2.9-3.0 x longer than it; sides subparallel in the first half than gradually tapering to apex; striae well marked and punctured; interstriae flat, with rough surface. Prosternal sutures briefly furrowed in front.

Aedeagus as in fig. 5.

Female unknown.

Size. Length 9.35-10.9 mm; width 2.62-2.81 mm.

Etymology. The name is derived from the country of origin: Bulgaria.

Tribe **Ampedini** Gistel, 1856

Ampedus phoenicium Platia, 2001

Ampedus phoenicium PLATIA, 2001: 68.

Material examined. 1 ♂: **Syria**: Slinfah env., Jabal an Nusayrlyah, 30.V-6.VI.1998, J. Vorisek (CPG).

Described on female specimens. Male extremely similar to the female, distinguishable by its longer antennae reaching the apexes of posterior angles of pronotum.

Known from Lebanon. New to Syria.

Tribe **Megapenthini** Gurjeva, 1973

Procraerus levantinus n. sp. (Figs 7, 19)

Material examined. Holotype ♂: **Israel**: Upper Galilee, N Granot, Ha Galil m 500, 16.VIII.2000, E. Orbach (COI). 13 Paratypes ♂♂ - Nitsanim, 24.VII.1959, Hebr. Univ., Ginzburg (TU); Nahal Oren, Mt Carmel, 24.VI.1997, T. Pavlicek & V. Chikatunov; Nahal Oren, 19.VI.1988, V. Chikatunov & T. Pavlicek, at light; Upper Galilee, Nahal Kziv, 1 km SE Avdon, 27.VII.2000, E. Orbach, at light (TU; CPG; CPT). **Palestine**: Gelatha, 18.VII.1927. **Jordan**: W. Jordan, Vallée du Zarqa, prés Romana, 12.V.1963, J. Klapperich; E. Jordan, Amman, 11.VIII.1967, J. Klapperich. **Syria**: ?Messina, leg.? [not legible]; Oschebel-Kala (NMP, Pecirka coll.; CPG; CSV). **Turkey**: vil. Içel, Gulnar env., Dunya, VIII.1999, leg. K. Werner (CMHK; CPG).

Diagnosis. Close to *P. cretensis* Platia & Gudenzi, 1996 (see literature) for the general shape and colour, it can be easily separated by the larger body and longer antennae.

Description. Male. Entirely fuscous- ferruginous covered with dense, partially erect, yellow golden pubescence.

Frons convex with anterior margin regularly arcuate, directed downwards, not protruding above clypeus; punctures broad, contiguous and umbilicate. Antennae exceeding by 2.5-3 articles the apexes of posterior angles of pronotum, serrate from fourth article; second and third articles small, subequal, taken together, shorter than fourth; fourth to tenth subtriangular, fairly longer than wide; eleventh with subparallel sides, strongly narrowing before apex.

Pronotum just wider than long, regularly and moderately convex on the disk; sides subparallel or just narrowing from base to apex; posterior angles acuminate, unicarinate, not diverging at apex; punctures on disc broad, umbilicate, with narrow interstices, at sides coarser and contiguous, on the basal declivity smaller and sparser, simple to slightly umbilicate.

Scutellum tongue-shaped, flat, densely punctured. Elytra 2.9 x longer than pronotum and 2.5 x longer than wide; sides subparallel for about the two third of the length, then gradually narrowing towards apex, the latter regularly rounded; striae well marked and punctured, interstriae flat, densely punctured with rough surface.

Tarsal segments regularly decreasing in length; claws simple.

Aedeagus as in fig. 7.

Female unknown.

Size: Leng. mm 8.3-8.5; width mm 2.2-2.35.

Etymology. The name is derived from "Levant", the oriental regions of Mediterranean, where the species occurs.

Tribe **Pomachiliini** Candèze, 1859

Idotarmonides bicolor Platia & Gudenzi, 1999

Idotarmonides bicolor PLATIA & GUDENZI, 1999: 118.

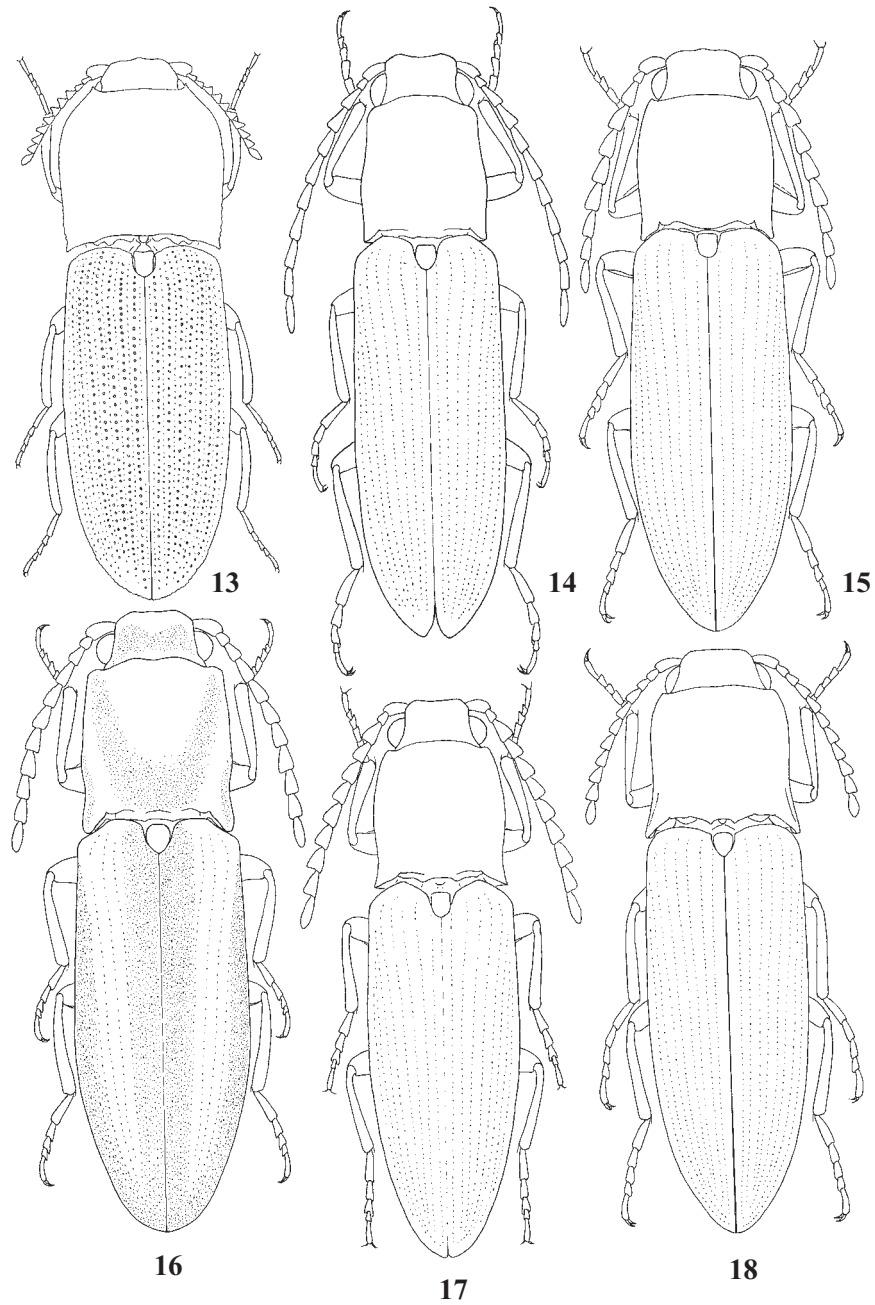
Material examined. 1 ♂: **Syria:** Aleppo Prov., Talhadia Yakti, 19.VI.2002, leg. Sprick (CZH).

The single specimen differs from the Holotype from Iraq because of the nearly uniform ferruginous colour and the intervals of pronotal punctures apparently shagreened also on disc.

Distribution. Iraq; new to Syria.

Tribe **Cardiophorini** Candèze, 1860

Cardiophorus albofasciatus Schwarz, 1893 (Figs 10, 21)



Figs 13-18. Dorsal habitus. 13. *Adelocera yemenita* Platia & Schimmel; 14. *Athous* (*Orthathous*) *kasovskiyi* n. sp.; 15. *A. (Orthathous) zbuzeki* n. sp.; 16. *A. (Orthathous) ponticus* n. sp.; 17. *A. (Orthathous) monguzzii* n. sp.; 18. *Agriotes bulgaricus* n. sp.

Cardiophorus albofasciatus PLATIA, 1994: 360.

Material examined. 1 ♀: **Italy:** Sicilia, Bosco della Ficuzza, loc. Torretta Torre, m 940, Area di Conservazione Ecologica Forestale Sic 1, A. Gatto leg., Malaise trap (CPG).

The female of this species, very rare in collections, was still undescribed. It is extremely similar to male, with antennae just shorter.

Copulatrix bursa sclerified as in fig. 10.

***Cardiophorus gerhardi* n. sp.** (Figs 8, 20)

Material examined. Holotype ♂: **Syria:** al Qunaltira env., m 400, 21.IV.1996, T. Sommer (CZH). 1 Paratype ♀: same data as Ht (CPG).

Diagnosis. A small species of the *C. nigratissimus* Buysson group, as for the general shape, length and features of first antennal articles, scutellum, copulatrix bursa. It can be separated by its dark brown colour, moderately shiny body, denser puncturation of pronotum and elytra, aedeagus.

Description. Male. Moderately shiny; entirely dark brown except for tibiae and tarsi yellowish; covered with dense, recumbent yellowish vestiture.

Frons flat, just impressed near anterior margin, the latter subarcuate, at middle not protruding above clypeus; punctures deep, simple, with very narrow intervals or contiguous. Antennae exceeding by about two articles the apexes of posterior angles of pronotum; second article subconical, longer than wide; third subtriangular, longer than second and shorter than the following; second and third, taken together, just longer than fourth; fourth to tenth about twice longer than wide.

Pronotum just wider than long, widest at middle, regularly convex; sides tapering from middle towards apexes, gently sinuate towards base; posterior angles truncate, not diverging; lateral suture moderately curved, obsolete at anterior third; puncturation rather uniformly distributed; punctures approximately of the same size, deep, simple or vaguely umbilicate, with very narrow intervals or contiguous.

Scutellum heart-shaped, a little longer than wide, flat, deeply emarginated at middle of base, finely punctured. Elytra as wide as pronotum, 2.7 x longer than it; suboval, widest at middle; striae deeply and coarsely punctured; interstriae subconvex with rough surface.

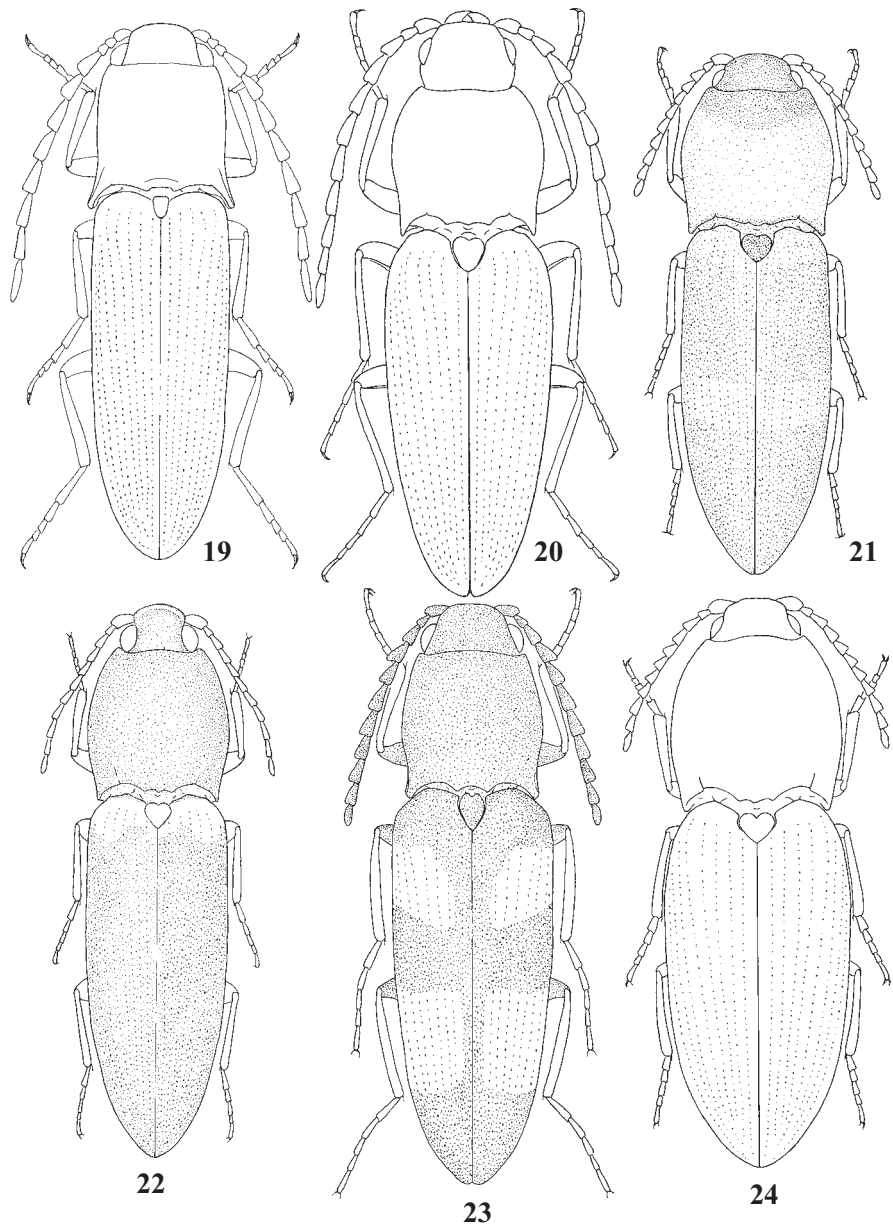
Claws simple.

Aedeagus as in fig. 8.

Female. Very similar to male, a little larger, shorter antennae just reaching the apexes of posterior angles of pronotum. Copulatrix bursa very similar to *C. nigratissimus* Buysson.

Size. Length 4.6-5.3 mm; width 1.37-1.62 mm.

Etymology. The species is dedicated to Gerhard Brunne of Hamburg, author of papers on Elaterids, together with M. Zeising.



Figs 19-24. Dorsal habitus. 19. *Procræus levantinus* n. sp.; 20. *Cardiophorus gerhardi* n. sp.; 21. *Cardiophorus albofasciatus* Schwarz; 22. *Dicronychus freudei* n. sp.; 23. *Dicronychus turkmenicus* n. sp.; 24. *Paracardiophorus malinkai* n. sp.

***Dicronychus freudei* n. sp.** (Figs 11, 22)

Material examined. Holotype ♀: **Turkey**: near Kozan, VII.2000, Werner & Lizer (CRG don. MCSNG).

Diagnosis. A species completely different from all known species from Turkey (PLATIA & GUDENZI, 2004) and nearest countries for the anterior margin of frons thickened and protruding above clypeus, and the shape of sclerified plates of copulatrix bursa.

Description. Female. Shiny; entirely black with anterior margin of frons, base and humera of elytra, antennae and legs ferruginous; covered with dense, yellow-fulvous vestiture.

Head with eyes as wide as the anterior margin of pronotum; frons convex, anterior margin subarcuate, rather thickened at angles, well projecting sub-horizontally above clypeus; puncturation dense; punctures deep, simple or slightly umbilicate, contiguous.

Antennae fairly short, not reaching for about two articles the apexes of posterior angles of pronotum, moderately serrate from third article; second article sub-cylindrical, longer than wide; third to tenth subtriangular, longer than wide.

Pronotum as long as wide, widest behind the middle; very convex, abruptly sloping at sides and base; sides arcuate, from behind the middle forwards moderately and regularly tapering, subsinuate before posterior angles, the latter short, not diverging; lateral suture regularly curved, obsolete at anterior third; punctures rather uniformly distributed, deep, simple, approximately of the same size, with very narrow intervals or contiguous.

Scutellum heart-shaped, as long as wide, concave at middle, with smooth surface. Elytra as wide as base of pronotum and 2.4 x longer than it; moderately convex on disc, sides suboval, widest at middle; striae well apparent for all their length and punctured; interstriae flat, densely and finely punctured.

Wings regularly developed.

Claws moderately dilated in the basal half.

Copulatrix bursa sclerified as in fig. 11.

Male unknown.

Size. Length 6.2 mm; width 1.8 mm.

Etymology. The species is dedicated to the memory of our Colleague and Friend, renowned Entomologist, Dr Heinz Freude, recently deceased.

***Dicronychus turkmenicus* n. sp.** (Figs 9, 23)

Material examined. Holotype ♂: **Turkmenistan**: E Turkmenistan, Hardzhov Reg-Soka, N Nephtezavdosk, 15.IV.1998, J. Louda (CRG don. MCSNG).

Diagnosis. A species identical to *D. quadrinaevus* (Reitter, 1891) as for the colour patterns; it can be separated essentially by several characters as smaller size, longer antennae, pronotum as long as wide, scutellum longer than wide.

Description. Male. Moderately shiny; bicoloured; entirely black with four yellowish spots on elytra forming a cross-shaped pattern; antennae black, femora

blackish, tibiae and tarsi yellowish; covered with fine, dense, yellowish, vestiture. Head with eyes as wide as anterior margin of pronotum; frons flat, just impressed at anterior margin, the latter moderately ridged, subarcuate, just protruding above clypeus; punctures fine, deep, simple, with narrow shining interstices.

Antennae exceeding by one article the apexes of posterior angles of pronotum, serrated from third; second article subconical, longer than wide; third-tenth subtriangular, more than twice longer than wide.

Pronotum as long as wide, widest behind the middle and at posterior angles; regularly convex; sides moderately arcuate, gradually tapering from behind the middle towards apex, sinuate before posterior angles, the latter short, truncate, diverging; lateral suture sub-straight reaching the anterior margin of pronotum; puncturation rather uniformly distributed; punctures of two sizes: few, sparse and large punctures are more or less regularly mixed with numerous finer ones.

Scutellum heart-shaped, clearly longer than wide, concave at center and pointed at apex. Elytra wider than base of pronotum, 2.95 x longer than it; sides subparallel in the first half then gradually tapering to apex; striae well marked and deeply punctured; interstriae subconvex with finer punctures.

Claws moderately dilated in the basal half.

Aedeagus as in fig. 9.

Female unknown.

Size. Length 4.6 mm; width 1.25 mm.

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

Dicronychus senaci (Desbrochers, 1870)

Material examined. 5 ♂♂: 4 exs.: **Russia:** Krasnodar reg., Tama env., 15.V.1998; 1 ex.: **Kazachstan:** Aktyubinsk reg., Chalkar, 9.VI.1995, J. Louda (CPG; CRG).

Previously known from Greece and Turkey (PLATIA & GUDENZI, 2002, 2004).

New to Russia and Kazachstan.

Paracardiophorus malinkai n. sp. (Figs 12, 24)

Material examined. Holotype ♀: **Greece:** Macedonia, Stavros, 30.VI.1993, Z. Malinka (CPG).

Diagnosis. The species is separated from *P. musculus* (Erichson, 1840), the only known European species of the genus, by the bicoloured body, the very convex sub-costiform elytral interstriae, the reduced wings, as long as elytra, and the shape of symmetrical sclerified plates of copulatrix bursa.

Description. Female. Body very convex; bicoloured; head, pronotum, scutellum, underside black; elytra and legs brown, antennae blackish; covered with yellowish, short vestiture.

Head with eyes as wide as anterior margin of pronotum, frons flat, just impressed at the anterior margin, the latter subarcuate, moderately thickened, directed downwards, just protruding above clypeus; punctures coarse, simple or vaguely

umbilicate, contiguous.

Antennae short, not reaching the apexes of posterior angles of pronotum, subseriate from third article; second article just longer than wide, third triangular, a little longer than the following, about twice longer than wide; fourth-tenth triangular, longer than wide; last ellipsoidal, a little longer than previous.

Pronotum as long as wide, widest behind the middle, strongly and regularly convex with a short and shallow median longitudinal depression at basal sloping; sides from behind the middle towards apexes and towards posterior angles regularly tapering; posterior angles short, converging; lateral suture substraight, obsolete at anterior third; puncturation rather uniformly distributed on all the surface; punctures approximately of the same size, deep, simple with shortest interstices.

Scutellum heart-shaped, flat, pointed at apex, deeply emarginate at middle of base, finely punctured. Elytra convex, wider than pronotum and 2.08 x longer than it; sides suboval, widest at middle; striae coarsely and deeply punctured; interstriae subcostiform, very finely punctured.

Wing reduced, as long as elytra.

Claws simple.

Copulatrix bursa sclerified as in fig. 12.

Male unknown.

Size. Length mm 6.85 mm; width 2.4 mm.

Etymology. The species is dedicated to the collector, Z. Malinka.

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