

Description of two new *Ceratophyus* (Coleoptera: Geotrupidae) species from the Mediterranean region along with annotated checklist of the genus

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Abstract. *Ceratophyus schaffrathi* sp. nov. from the Island of Kós, Greece and *C. maghrebinicus* sp. nov. from Libya and Algeria are described and their diagnostic characters are illustrated. Identification key to the Mediterranean *Ceratophyus* Fischer von Waldheim, 1824 species is provided and annotated checklist of the genus *Ceratophyus* is compiled. First country records of *C. sinicus* Zunino, 1973 for Mongolia (Dornogovi Aimag province) and *C. sulcicornis* (Fairmaire, 1887) for the Indian states of Arunachal Pradesh and West Bengal are given.

Key words. Taxonomy, new species, key, annotated checklist, distribution, Coleoptera, Scarabaeoidea, Geotrupidae, Palearctic region.

INTRODUCTION

Ceratophyus Fischer von Waldheim, 1824 is a Holarctic geotrupide genus exhibiting a disjunctive amphipacific distribution pattern (Zunino 1973). *Ceratophyus gopherinus* Cartwright, 1966 is considered to be a Nearctic faunal element so far known only from California (Cartwright 1966, Zunino 1973) and 12 species (including two species described below) are distributed throughout the Palearctic region from Iberian peninsula and Morocco to central China, Mongolia and the Himalaya (e. g., Baraud 1985, Löbl et al. 2006, Martín-Piera & López-Colón 2000, Nikolajev 2007, Zunino 1973). In the last taxonomical revision of this genus published by Zunino (1973) *C. sinicus* from China is described and the type species *Scarabaeus dispar* Fabricius, 1781 is designated. Ziani et al. (2006) conserved the junior primary homonym *Geotrupes rossii* Jekel, 1866 of *Geotrupes rossii* Rosenhauer, 1856. In the last recent study contributed the genus Nikolajev (2007) described *Ceratophyus kabaki*, also a species from China. In the Mediterranean region the genus was previously known only from isolated spots in western parts (Iberian Peninsula, central Italy and Morocco) (Baraud 1985, Löbl et al. 2006, Martín-Piera & López-Colón 2000) and doubtfully recorded also from Libya (Schatzmayer 1937). Discovery of *C. schaffrathi* sp. nov. from the Kós Island situated near the Turkey mainland represents first evidence of distribution of this genus in the eastern Mediterranean as similarly in the case of the description of *C. maghrebinicus* sp. nov. based on old material from Algeria and Libya. Descriptions of two new species are one of the results of collecting trips to Greece in 2011 and 2012 carried out by the authors and of further material of museums and our colleagues.

MATERIAL AND METHODS

The following codes identify the collections housing the material examined (curators are given in parenthesis):

AKBC – Andreas Kleeberg collection, Berlin, Germany;
DKCP – David Král collection (deposited in NMPC);
EKCS – Emil Kučera collection, Soběslav, Czech Republic;
HFCB – Hans Fery collection, Berlin, Germany;
JRCP – Jan Růžička collection, Praha, Czech Republic;
JSCP – Jan Schneider collection, Praha, Czech Republic;
NMPC – National Museum, Praha, Czech Republic (Jiří Hájek);
OHCB – Oliver Hillert collection, Schöneiche bei Berlin, Germany;
SJCP – Stanley Jakl collection, Praha, Czech Republic;
USCK – Ulrich Schaffrath collection, Kassel, Germany;
ZMHB – Museum für Naturkunde der Humboldt Universität, Germany, Berlin (Johannes Frisch, Manfred Uhlig).

Altogether 230 specimens (see material below) were studied. Specimens were examined with an Olympus SZ61 stereomicroscope; measurements were taken with an ocular grid. The habitus photographs were taken using a Canon MP-E 65mm/2.8 1-5× Macro on bellows attached to a Canon EOS 550D camera. Partially focused images of each specimen were combined using Helicon Focus 3.20.2 Pro software. Specimens of the presently described species are provided with one red printed label: “[name of the taxon] HOLOTYPUS [or] ALLOTYPUS [or] PARATYPUS No. [x], ♂ [or] ♀, Oliver Hillert & David Král 2012”. The exact label data are cited for the type material only; individual labels are indicated (only for primary types) by double slash “//”, individual lines within every label by a single slash “/”, [p] – preceding data within quotation marks are printed, [hw] – preceding data within quotation marks are hand-written. Information in quotation marks indicates the original spelling. Our remarks and additional comments are found in brackets. Coordinates and altitude are assigned for each locality mentioned in the text (material examined in each Mediterranean species) (see Appendix 1). These data were used in the construction of distribution maps (see Fig. 36).

TAXONOMY

Ceratophyus maghrebinicus sp. nov. (Figs 2, 7, 12, 17, 22, 27, 28, 31–33, 36)

Ceratophyus hoffmannseggi (Fairmaire, 1856): Schatzmayr 1937: 392.

TYPE LOCALITY. Libya, Tripolis [32°52'N 13°12'E, ca. 90 m a. s. l.].

TYPE MATERIAL (6 specimens). **Libya: Tripolitania.** Holotype ♂, allotype ♀ and paratype Nos 1 and 2 ♀♀ (NMPC), “Tripolis / Quedenfeld S. [p, blue label]”; paratype No. 3 ♀ (OHCB), “Tripolis [p, white label]”; paratype No. 4 ♀ (JSCP), “Libye, Tadjura / III. 1[9]85. – lgt. Houška [hw, black ink]. – **Algeria: Naâma.** paratype No 5 ♂ (JSCP), “Algerien – 2000m / Ain Sefra – 3.[19]71 / Djebel Ksour [hw, black ink]”.

DESCRIPTION OF HOLOTYPE (♂). Weakly convex, surface blackish coloured, without metallic reflex. Total body length: 21 mm.

Head (Figs 7, 12, 31, 32). Mandibles considerably protruding anteriorly, with broadly round bifurcate external outline, smooth. Labrum transverse, broader than long, anterior margin weakly emarginate, surface distinctly punctate. Clypeus triangularly elongated anteriorly and slightly upward in long, acute triangular process apically. Clypeal horn and area of base of horn finely, roughly sculptured with elongate punctures. Oblique keels above eyes weakly developed to half of eyes, genae elongated in weak tooth anterolaterally (Fig. 12). Clypeus shallowly, sparsely but distinctly punctate, each punctate very small (like made with pin), punctures separated by about ten their diameters. Frons, vertex and occiput except area of clypeal horn impunctate.

Pronotum (Figs 2, 7, 31, 32) distinctly transverse, broadest just at middle, entirely bordered; lateral fovea broadly widened; anterior angles very weakly truncate, angular and broadly round; lateral fovea deeply and remarkably coarsely and densely punctate; longitudinal midline extremely

shallow to missing. Punctuation of pronotum coarse and dense, especially medially, near frons. Disc and lateral parts sparser and more shallowly double punctate. Medial pronotal apophysis well developed, straight, narrowly and weakly upturned in lateral aspect. Ventral surface with two weakly developed subapical tooth.

Scutellar plate cordate, transverse, impunctate.

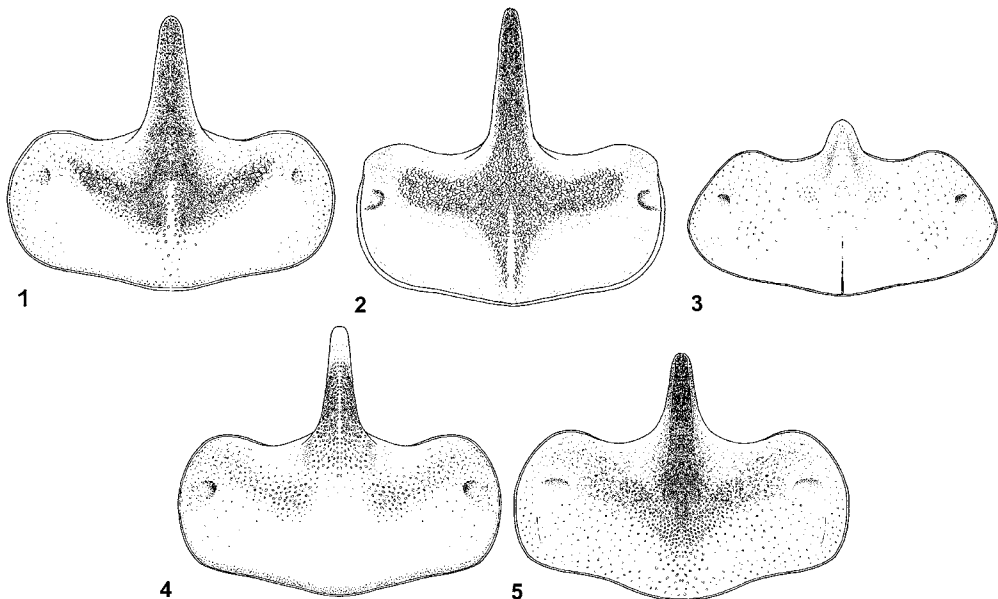
Elytra (Fig. 22) distinctly longer than wide, maximal width about at middle; surface moderately shiny; between suture and humerus with seven striae, all of them well impressed along entire length of elytron; intervals convex, impunctate; humeral umbone distinct; base of epipleura in area of humeral umbone distinctly narrowed to apex of elytron.

Macropterous.

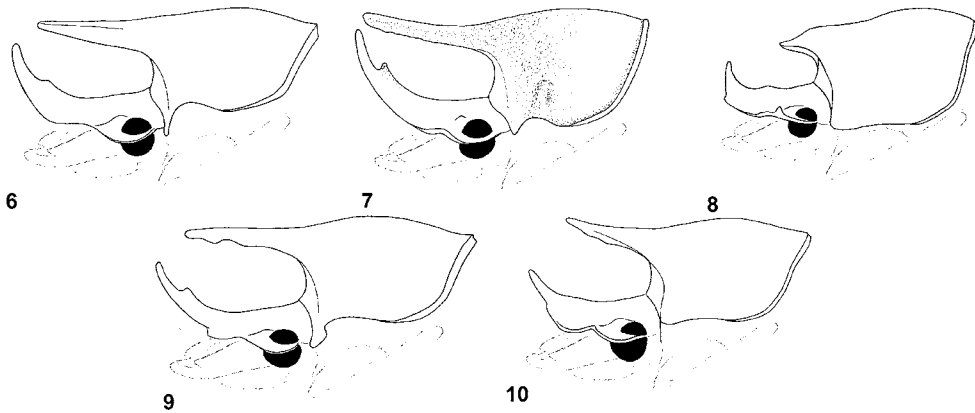
Aedeagus as in Figs 27–28.

VARIABILITY IN MALES. Considerably variable in body length 21 mm (holotype) and 30 mm (the only male paratype).

FEMALE (Fig. 32). Body length 18–29 mm (allotype 29 mm); differs from male in the following characters: clypeus sides s-shaped, apex weakly round but not distinctly elongated, densely and coarsely punctate, frons as well as clypeus; vertex and occiput almost impunctate; tubercle simple, prominent; oblique keels above eyes distinct, prolonged to half of eyes; eye moderately developed, genae well extending. Pronotum transverse, lateral margin widened, broadest just at middle of its length, anterior angles broadly round, extend, dorsal surface distinctly deeply punctate, except disc; disc more sparse, entirely punctate. Elytra distinctly longer than wide, surface moderately shiny; between suture and humerus seven well impressed striae becoming gradually finer to mis-



Figs 1–5. Pronotum of male in dorsal aspect. 1 – *Ceratophyus hoffmanseggi* (Fairmaire) (Spain: Andalucía, Algeciras, OHCB), 2 – *C. maghrebicus* sp. nov. (paratype No. 5), 3 – *C. martinezi* Lauffer [small male] (Spain: Madrid, El Tiemblo, OHCB), 4 – *C. rossii* (Jekel) (Italy: Toscana, Li Calabornone, OHCB), 5 – *C. schaffrathi* sp. nov. (holotype); not to scale.



Figs 6–10. Head and pronotum of male in lateral aspect. 6 – *Ceratophyus hoffmanseggi* (Fairmaire) (Spain: Andalucía, Algeciras, OHCB), 7 – *C. maghrebinicus* sp. nov. (paratype No. 5), 8 – *C. martinezi* Lauffer [small male] (Spain: Madrid, El Tiemblo, OHCB), 9 – *C. rossii* (Jekel) (Italy: Toscana, Li Calabornne, OHCB), 10 – *C. schaffrathi* sp. nov. (holotype); not to scale.

sing apicad; intervals convex, impunctate; humeral umbone distinct. Base of epipleura in area of humeral umbone distinctly narrowed to apex of elytra, maximum width of elytra at middle.

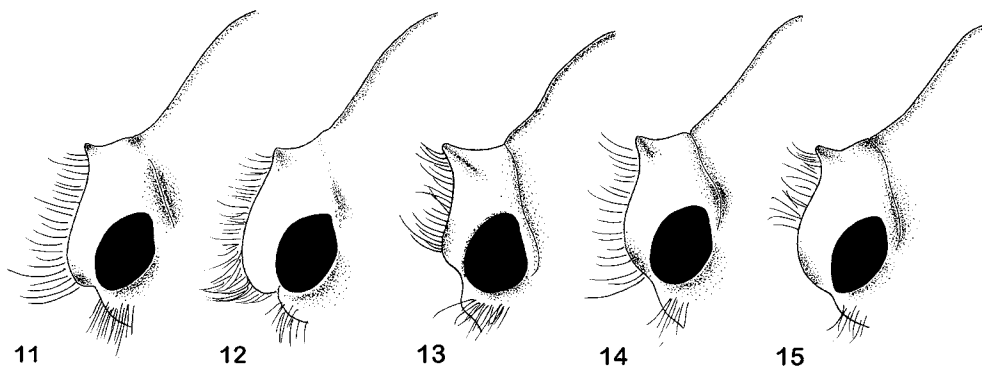
DIFFERENTIAL DIAGNOSIS. Refer to the species key below.

GEOGRAPHIC DISTRIBUTION. Algeria (Naâma), Libya (Tripolitania).

COLLECTING CIRCUMSTANCES. Unknown.

ETYMOLOGY. Named after its origin, the Maghreb region (defined as much or most of the area of Northwest Africa west of Egypt).

NOTE. Record of *C. hoffmanseggi* by Schatzmayr (1937) from “Tripoli, Porta Gargaesc” very likely refers to the new species described above.



Figs 11–15. Left gena and eye of male. 11 – *Ceratophyus hoffmanseggi* (Fairmaire) (Spain: Andalucía, Algeciras, OHCB), 12 – *C. maghrebinicus* sp. nov. (paratype No. 5), 13 – *C. martinezi* Lauffer [small male] (Spain: Madrid, El Tiemblo, OHCB), 14 – *C. rossii* (Jekel) (Italy: Toscana, Li Calabornne, OHCB), 15 – *C. schaffrathi* sp. nov. (holotype); not to scale.

Ceratophyus schaffrathi sp. nov.

(Figs 5, 10, 15, 20, 25, 34–37)

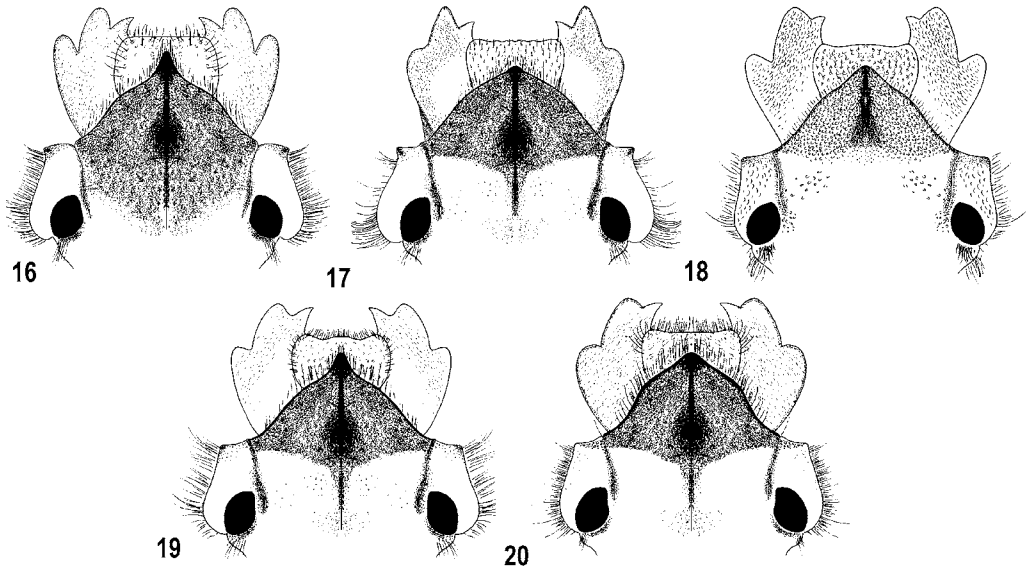
TYPE LOCALITY. Greece, Kós Island, Mastichari [36°50'46"N 27°04'34"E, at about sea level] (Figs 36, 37).

TYPE MATERIAL (5 specimens). Greece: Kós Island. Holotype ♂ (OHCB), "Greece, Kos Island, / Mastichari, /20.–27.X.2011, / O. Hillert lgt. [p]". Allotype ♀ (DKCP), paratypes Nos 1, 2 ♀♀ (USCK) and No. 3 ♀ (OHCB), "Ceratophyus / Griechenland / Insel Kos, 10.IV.[hw]19[p]87[hw] / leg.[p] Dr. Schenk [hw]".

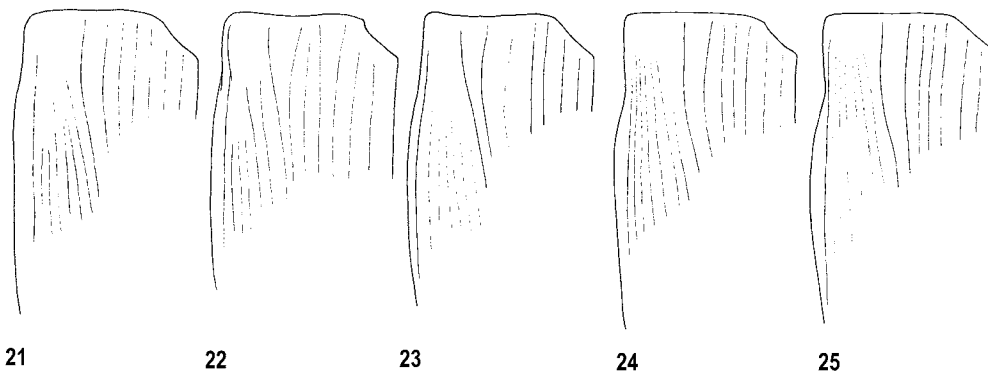
DESCRIPTION OF HOLOTYPE (partially damaged ♂, aedeagus missing). Weakly convex, surface black with distinct greenish tinge, pronotum laterally and epipleura with noticeable purple reflex. Total body length: 22 mm.

Head (Figs 10, 15, 34). Mandibles considerably protruding anteriorly, with broadly round bifurcate external outline, smooth. Labrum transverse, broader than long, anterior margin weakly emarginate, surface distinctly punctate. Clypeus triangularly elongated anteriorly and slightly upward in long, acute triangular process apically. Clypeal horn and area of base of horn finely, roughly sculptured with elongate punctures. Oblique keels above eyes distinctly developed to half of eyes, genae elongated in distinct tooth anterolaterally (Fig. 15). Clypeus shallowly, sparsely but distinctly punctate, each punctate very small (like made with pin), punctures separated by about ten their diameters. Frons, vertex and occiput except area of clypeal horn impunctate.

Pronotum (Figs 5, 10, 34) distinctly transverse, broadest just at middle, entirely bordered; lateral margins broadly widened; anterior angles very weakly truncate, angular and broadly round; lateral fovea deeply and remarkably coarsely and densely punctate; longitudinal midline extremely



Figs 16–20. Head of female in dorsal aspect. 16 – *Ceratophyus hoffmanseggi* (Fairmaire) (Spain: Andalucía, Algeciras, OHCB), 17 – *C. maghrebinicus* sp. nov. (allotype), 18 – *C. martinezi* Lauffer (Spain: Madrid, El Tiemblo, OHCB), 19 – *C. rossii* (Jekel) (Italy: Toscana, Li Calabornese, OHCB), 20 – *C. schaffrathi* sp. nov. (allotype); not to scale.



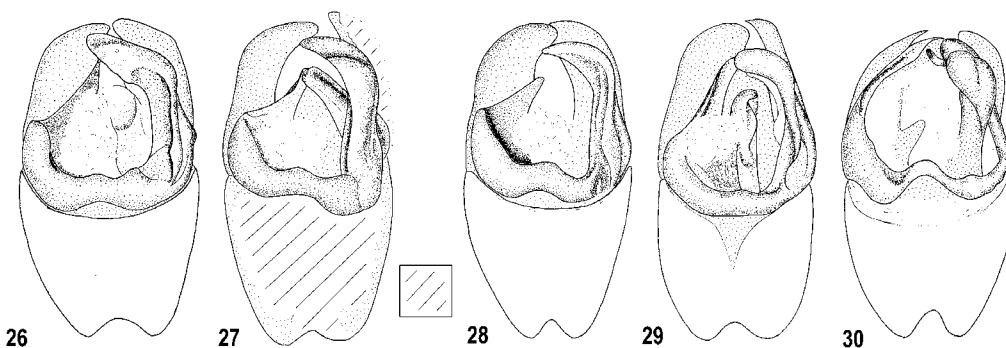
Figs 21–25. Basal part of left elytron of male. 21 – *Ceratophyus hoffmanseggi* (Fairmaire) (Spain: Andalucía, Algeciras, OHCB), 22 – *C. maghrebinicus* sp. nov. (paratype No. 5), 23 – *C. martinezi* Lauffer [small male] (Spain: Madrid, El Tiemblo, OHCB), 24 – *C. rossii* (Jekel) (Italy: Toscana, Li Calamborne, OHCB), 25 – *C. schaffrathi* sp. nov. (holotype); not to scale.

shallow to missing. Punctuation of pronotum coarse and dense, especially medially, near frons. Disc and lateral parts sparser and more shallowly double punctate. Medial pronotal apophysis well developed, straight, narrowly and weakly upturned in lateral aspect. Ventral surface with two weakly developed subapical tooth.

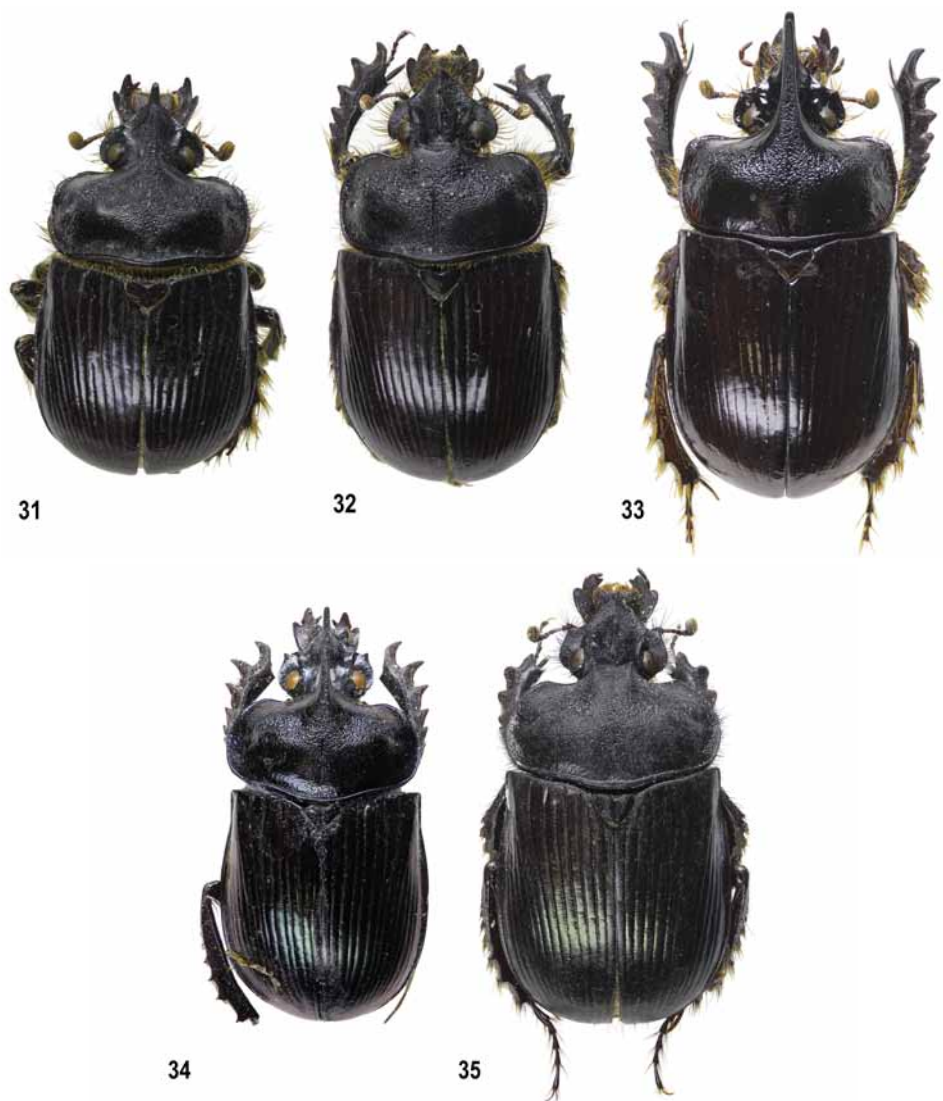
Scutellar plate cordate, transverse, impunctate.

Elytra (Fig. 25) distinctly longer than wide, maximal width about at middle; surface moderately shiny; between suture and humerus with seven striae, all of them well impressed along entire length of elytron; intervals convex, impunctate; humeral umbone distinct; base of epipleura in area of humeral umbone distinctly narrowed to apex of elytron.

Macropterous.



Figs 26–30. Aedeagus, dorsal view. 26 – *Ceratophyus hoffmannseggi* (Fairmaire) (Spain: Andalucía, Algeciras, OHCB); 27 – *C. maghrebinicus* sp. nov. (holotype, partially damaged, see shaded parts), 28 – *C. maghrebinicus* sp. nov. (paratype No. 5), 29 – *C. martinezi* Lauffer (Spain: Madrid, El Tiemblo, OHCB), 30 – *C. rossii* (Jekel) (Italy: Toscana, Li Calamborne (OHCB); not to scale.



Figs 31–35. Habitus, dorsal aspect. *Ceratophyus maghrebinicus* sp. nov. (31–33); 31 – holotype, male; 32 – paratype No. 5, male; 33 – allotype, female; *C. schaffrathi* sp. nov. (34–35); 34 – holotype, male; 35 – allotype, female.

FEMALE (Fig. 35). Total body length 24–26 mm (allotype 26 mm) mm. Head (Figs 20, 35). Clypeus sides s-shaped, apex weakly round but not distinctly elongated, densely and coarsely punctate, frons as well as clypeus; vertex and occiput almost impunctate; tubercle simple, prominent; oblique keels above eyes distinct, prolonged to half of eyes; eye moderately developed, genae well extending. Pronotum transverse, lateral margin widened, broadest just at middle of its length, anterior angles



Fig. 36. Map of the Mediterranean region with localities of *Ceratophyus hoffmannseggi* (Fairmaire) (●), *C. martinezi* Lauffer (■), *C. maghrebinicus* sp. nov. ▲, (type locality ▼), *C. rossii* (Jekel) (*) and *C. shaffrathi* sp. nov. (■ also type locality).

broadly round, extend, dorsal surface distinctly deeply punctate, except disc; disc more sparse, entirely punctate. Elytra distinctly longer than wide, surface moderately shiny; between suture and humerus seven well impressed striae becoming gradually finer to missing apicad; intervals convex, impunctate; humeral umbone distinct. Base of epipleura in area of humeral umbone distinctly narrowed to apex of elytra, maximum width of elytra at middle.

DIFFERENTIAL DIAGNOSIS. Refer to the species key below.

GEOGRAPHIC DISTRIBUTION. Greece, Kós (= Κως) Island.

COLLECTING CIRCUMSTANCES. Male holotype was found dead buried in sandy soil, at an uncultivated field; paratypes were collected at light.

ETYMOLOGY. Patronymic, named in honour of our longtime friend Ulrich Schaffrath (Kassel, Germany), an excellent expert of beetles and donor of a part of the type series.

Identification key for the Mediterranean species of the genus *Ceratophyus*

- a (b) Pronotum with more or less prominent hornlike apophysis at middle of pronotum (Figs 1–10, 31, 33–34). ... **males**
 b (a) Pronotum with transversal carina anteriorly (Figs 32, 35). **females**

Males

- 1 (2) Apical tooth of protibia bifid; elytral striae finely impressed, becoming finer to missing apicad, elytral intervals flat; anterior angles distinctly truncate (Fig. 3); aedeagus as in Fig. 29; Spain (Figs 8, 13, 23). *C. martinezi* Lauffer, 1909

- 2 (1) Apical tooth of protibia simple; elytral striae distinctly impressed, visible to apex, elytral intervals convex; anterior angles of pronotum broadly round (Figs 1, 2, 4, 5).
- 3 (4) Anterior angles of pronotum rectangular, weakly s-shaped in maximally developed specimens, widest in anterior third of its length (Figs 2, 31, 33); aedeagus as in Figs 27, 28; Algeria, Libya (Figs 7, 12, 22, 32). *C. maghrebinicus* sp. nov.
- 4 (3) Anterior angles of pronotum broadly evenly round, pronotum widest approximately at middle of its length (Figs 1, 4, 5).
- 5 (6) Pronotal disc shallowly punctate, area of midline more distinctly, basal margin of pronotum distinctly convex medially (Fig. 5), punctuation of basal third of pronotum coarse, punctures separated by twice their diameter; basis of epipleura in area of humeral umbone narrowed apicad (Figs 25, 34); Greece: Kós Island (Figs 10, 15). *C. schaffrathi* sp. nov.
- 6 (5) Pronotal disc impunctate except midline area (Figs 1, 4), basal margin of pronotum flat medially, punctuation of basal third of pronotum nearly impunctate only basal line with punctures separated by twice or more their diameters; basis of epipleura in area of humeral umbone parallel or weakly widened apicad (Figs 21, 24).
- 7 (8) Basis of epipleura in area of humeral umbone parallel, distinctly widened behind humerus, sides weakly narrowed to elytral apex; surface shiny with distinct red-purple tinge; aedeagus as in Fig. 30; Italy (Figs 4, 9, 14, 24). *C. rossii* (Jekel, 1866)
- 8 (7) Basis of epipleura in area of humeral umbone extended posteriad, weakly widened in middle of epipleura, sides of elytra more or less parallel along whole its length (Fig. 21); surface black and shiny; aedeagus as in Fig. 26; Morocco, Portugal, Spain (Figs 1, 6, 11). *C. hoffmannseggi* (Fairmaire, 1856)

Females

- 1 (2) Anterior angles of pronotum truncate, distinctly angular; elytral striae nearly missing apically, elytral intervals flat; dorsal surface shiny; Spain (Fig. 18). *C. martinezi* Lauffer, 1909
- 2 (1) Anterior angles of pronotum broadly round; elytral striae finely impressed apically, intervals flat; dorsal surface alutaceous.
- 3 (4) Clypeus not or only weakly projected anteriad, clypeus approximately as wide as long (Fig. 17); Algeria, Libya. *C. maghrebinicus* sp. nov.
- 4 (3) Clypeus more or less projected anteriad, clypeus longer as wide (Figs 16, 19, 20).



Fig. 37. Habitat of *Ceratophyus schaffrathi* sp. nov., Greece: Kós Island, Mastichari env., April 2012 (photo by Oliver Hillert).

- 5 (6) Clypeus weakly projected anteriad, not acuminate (Fig. 20); punctation of pronotal disc deeply impressed, becoming gradually shallower laterad; elytral striae distinctly impressed gradually completely vanishing apicad; dorsal surface shiny with distinct greenish tinge (Fig. 35); Greece: Kós Island. *C. schaffrathi* sp. nov.
- 6 (5) Clypeus distinctly projected anteriad, acuminate (Figs 16, 19); punctation of pronotal disc shallow, only with sparse, irregularly spaced punctures laterally; elytral striae distinctly impressed, gradually vanishing to single points apicad, dorsal surface shiny with red-purple, greenish or without tinge.
- 7 (8) Basis of epipleura in area of humeral umbone parallel or weakly narrowed to apex of elytra; elytral striae weakly impressed, becoming gradually weakly visible and vanishing to single points apicad; dorsal surface shiny with distinct red-purple or greenish tinge; Italy. *C. rossii* (Jekel, 1866)
- 8 (7) Basis of epipleura in area of humeral umbone elongated to apex of elytra; elytral striae weakly impressed to apex on whole its length; dorsal surface black and shiny; Morocco, Portugal, Spain. *C. hoffmannseggi* (Fairmaire, 1856)

Material for comparison

Ceratophyus dauricus Jekel, 1866

MATERIAL EXAMINED (4 specimens). **Mongolia:** Sükhbaatar. Ongon elis, 10 km S von Somon Chongor, 900 m, 3.–5.viii.1965, Nr. 355, Exp. Dr. Z. Kaszab 1965, 1/1 in DKCP. **Russia:** Zabaykalskiy Krai. Transbaikalia, 1/0 in DKCP, 1/0 in OHCB.

Ceratophyus hoffmannseggi (Fairmaire, 1856)

(Figs 1, 5, 9, 13, 17, 21)

TYPE MATERIAL EXAMINED. **Morocco.** Syntype (♂), labelled: “Geotrupes / Hoffmannseggi [black ink, probably Fairmaire’s hand] // Fairmaire / coll. Dohrn [black ink, hw] // Hoffmannseggi / Fairm. Morocco [handwritten, black ink, pink label with black margin]”; syntype (♀), labelled: „Maroc [black ink, hw] // Fairm. typ. [handwritten, black ink] // [Fairmaire / coll. Dohrn], both in NMPC (see Bezděk & Hájek (2009) for details).

ADDITIONAL MATERIAL EXAMINED (86 specimens). **Portugal.** Baixo Alentejo, Santiago de Cacem, Quinta da Ortiga, 11.xi.2005, A.M. & T. Branco lgt., 2/2 in OHCB; Estremadura, Forninho, 40 km E of Lisboa, 38°39'27.9"N 008°48'28.6"E, 22.ii.2009, O. Hillert lgt., 4/9 in OHCB; Portugal, Algarve, Carrapateira, W of Monchique, 24.02.2009, O. Hillert lgt., 0/1 in OHCB; Portugal, Rio Frio env., 40 km E of Lisboa, 05.03.2010, 1/0 in OHCB; Lusit, 1/0, in ZMHB; Hispan, Laferte, 1/0, in ZMHB; Lusitania, 1/0 in NMPC. – **Spain: Andalucía.** Chiclana, Andalusien, 1890, Korb., 2/1, in ZMHB; Hispan, Cadiz, San Roque, 3.ii.1973, lgt. de Ferrer, 2/5 in DKCP; Spanien La Linea, Cadiz, 28.11.1978, 0/2 in OHCB; E, Andalucía, Cadiz, San Roque u. Umg., 23.–28.1.1986, leg. L. Hendrich, 2/1 in DKCP, 2/3 in OHCB; Sanien, Andalucía, Tarifa bei Algeciras, 04.03.1998, O. Hillert lgt., 1/1 in OHCB; Spanien, Andalucía, Rota bei Cadiz, 08.03.1998, 2/1 in OHCB; Spain mer., Andalusia, El Rocio, 13.–14.2.2005, P. Kyllies lgt., 1/3 in DKCP; Spain, Andalucía, Castillo de Castillar, Algeciras env., 10 km N of San Roque, 02.III.2008, 1/0 in OHCB; Spain, Andalucía, Bonares, 20 km E od Huelva, 04.03.2008, O. Hillert lgt., 0/1 in OHCB; Spain, Andalucía, 10 km N of Barrios, Algeciras env., Sierra de Nina, 05.III.2008, O. Hillert lgt., 0/1 in OHCB; Spain, Andalucía, Almonte, 10 km E od Huelva, 25.02.2009, O. Hillert lgt., 1/0 in OHCB; Spain, Andalucía, N of Los Barrios, Algeciras env., Sierra de Nina, 26.02.2009, O. Hillert lgt., 0/1 in OHCB; Andalusia, Chiclana, 1/0 in NMPC; Andalus, Garnier, 1/0, in ZMHB; Malaga, 1/0, in ZMHB; Andal. 1/0, in ZMHB; Fuengirola, J. Ardois, 0/3, in ZMHB; – **Castilla y Leon.** Spain, Castilla y Leon, El Tiemblo, S of Avila, W of Madrid, 03.03.2010, O. Hillert lgt., 3/0 in OHCB; – **Galicia.** Spanien, Vigo, 28.11.1990, O. Hillert lgt., 1/2 in OHCB; – **Madrid.** El Pardo, 0/1 in OHCB; El Pardo, J. Ardois, 1/3 in NMPC; Madrid, 1/0 in OHCB; Madrid, J. Ardois, 1/1 in NMPC; El Pardo, J. Ardois, 0/3, in ZMHB; **Valencia:** Albufera, Valencia, F. Moroder, 0/2 in NMPC. – **Morocco:** Tanger, xi.1909, 1/0 in DKCP.

Ceratophyus kabaki Nikolajev, 2007

MATERIAL EXAMINED (11 specimens). **China: Sichuan.** Sichuan 24.–26.6.2006, Yading Nat. Res., N28°27' E100°20', 3800–4200 m, lgt. A. Mikyška, 1/0 in DKCP, 1/0 in JSJP; China, W Sichuan, 5.–11.vi., Yading mts., valley W of YADING vill., 3950–4650m, 28°27'N 100°20'–17'E, David Král lgt. 2012, 3/3 in DKCP, 1/0 in JSJP, 1/0 OHCB, 1/0 in SJCP.

Ceratophyus martinezi Lauffer, 1909

(Figs 3, 8, 13, 18, 23, 29)

MATERIAL EXAMINED (7 specimens). **Spain: Avila.** Avila, El Tiemblo, 20.III.1990, P. Velasco lgt., 1/1 in OHCB, 1/1 in HFBC; Spain, Avila, El Tiemblo, i.1996, 0/1 in DKCP, 1/1 in JSJP.

Ceratophyus mesasiaticus Medvedev et Nikolajev, 1974

MATERIAL EXAMINED (26 specimens). **China: Xinjiang.** China, Turfan, 0/1 in NMPC. – **Kazakhstan.** Tien-schan, westl. Taler d. Tekes Tales, 1902, Wache S. G., 2/2 in NMPC; Syr Darja Geb., Tal Tallas, 1.–20.iv.1907, Fischer u. Willberg, 1/0 in NMPC; Tian Shan, Wernoje-Almatinka, Bez., 4.V.1908, 0/1 in OHCB, 25.V.1908, 1/0 in OHCB; Tian Shan, Wernoje-Almatinka, Bez., VI.1909, 0/1 in OHCB; Tian Shan, 0/3 in OHCB; Syr-Darja, 1/0 in OHCB; Auli Ata, Syr Darja, 3/1 in OHCB; Kazakhstan. Yu. V. Kazakhstan, Ok. Nikolajevki, 27.4.1976, Nikolajev, 1/1 in DKCP; Turkestan, Aulie-Ata [= Taraz], C. Aris, 1/0 in NMPC; Wernyi [= Almaty], Turkest., 1/2 in NMPC; Dzhungaria, 17.5.1987, river Ili, Bastshi, at light, S. Murzin lgt., 0/1 in DKCP. – **Kyrgyzstan.** UdSSR, Kirgisien, Issik-Kul, Südufer, 27.5.1989, M. Hornburg lgt., 0/1 in OHCB; Przewalsk, Issyk-kul, 1/0 in NMPC.

Ceratophyus polyceros (Pallas, 1771)

MATERIAL EXAMINED (13 specimens). **Kazakhstan.** Tschel[jabinsk], Kaz[akhstan], 28.5.[19]07, 0/1 in OHCB. – **Kyrgyzstan.** Kirg[isische], Stepp[en]. 1/0 in NMPC, 1/0 in OHCB; Astrachan, Wukejenskoje Onda, 1/1 in OHKB. – **Russia: Rostovskaya Oblast'.** USSR, 22.6.1976, reg. Rostov, N. Krivskoj, lgt. Přivora, 1/0 in DKCP. – **Russia.** Russia, Staudg., 1902, 2/3 in NMPC; Russia merid., Reitter, Leder, 0/1 in NMPC; Russia, 1/0 in NMPC.

Ceratophyus rossii Jekel, 1866

(Figs 4, 9, 14, 19, 24, 30)

MATERIAL EXAMINED (27 specimens). **Italy: Toscana.** Italia, Toscana, 23.x.1988, Pisa, Tenuta J. Rossore, 3/0 in DKCP; Toskana, Tombola di Pisa, 11.II.1995, leg. A. Ballerio, 1/0 in OHCB; Toskana – PI, S. Rossore, 12.II.1995, leg. A. Ballerio, 0/1 in OHCB; Li Calambrone, 27.II.96, 1/0 in OHCB; Toskana, PI, S. Rossore, 08.II.99, 0/1 in OHCB; Italia, 1/1 in OHCB; Italien, 1/1 in ZMHB; Livorno, Weinzierl, 1/1 in NMPC; Toscana, Tombolo, Bacol 1/0, in ZMHB; Toscana 2/3, in ZMHB; 1/1 in NMPC; Toscana, 2/3 in NMPC; Tose[ana], 0/1 in NMPC.

Ceratophyus sinicus Zunino, 1973

MATERIAL EXAMINED (43 specimens). **China: Qinghai.** China, E Qinghai prov., Ertala env., 3800 m, 22.–23.7.1992, J. Kaláb lgt., 1/0 in DKCP; China, C Qinghai, Wulan, 3500–4000 m, 1.–6.vii.1995, leg. A. Wrzecionko, 1/1 in DKCP; China, Qinghai province, Haibu env. 3190–3270 m, 36° 48.4–49.8'N 100°45.4–49.7'E (GPS), 13.–15.VII.2005, J. Hájek, D. Král & J. Růžička lgt, 2/2 in OHCB; China: Qinghai province, 7 km NE of Ulan, 3020 m, 36°57.6'N 098°30.6'E (GPS), 7.VII.2005, J. Hájek, D. Král & J. Růžička leg. [Ch 13] // individually in sheep excr., sand dune, 1/1 in DKCP; China: Qinghai province, Haibu env., 3190–3270 m, 36°48.4–49.8'N 100°45.4–49.7'E (GPS), 13.–15.VII., 2005, J. Hájek, D. Král & J. Růžička leg. [Ch 18] // individually under excr. of Procprapa przewalskii; sand dune close to the bank of the Qinghai Hu lake, 9/11 in DKCP, 1/1 in JRCP, 1/1 in JSCP, 4/2 in NMPC, 1/1 in OHCB; – **Shanxi.** Shansi, iv.1934, Showchow, 1/0 in NMPC; – **Xinjiang.** Nordwestl. China, Chingkiang, Col. Reitter, 1/0 in NMPC. – **Mongolia: Dornogovi.** SE Mongolia, 5.8.1990, Dornogov's Aimak prov., Zaamyn Uud [railway station, at light], D. Král + V. Kubán lgt., 1/2 in DKCP, 1/0 in JSCP.

Ceratophyus sulcicornis (Fairmaire, 1887)

MATERIAL EXAMINED (11 specimens). **Nepal.** Ost Nepal, Arun Tal, 3000 m, Nebelwald, 14.04.1981, Dr. Schenk lgt., 0/1 in OHCB; W Nepal, Ghorapani, 6.vi.1992, 2800–3200 m, J. Moravec lgt., 1/0 in DKCP; Nepal, Annapurna, Telbrung Danda, 10.6.1997, ca. 3200 m, lgt. J. Schmidt, 1/0 in DKCP, 1/0 in JSCP; Nepal, Annapurna, Krapa Danda, 2900 m, 2.6.97, Schmidt lgt., 1/0 in OHCB; Ost Nepal, Rolwaling Himal, Rolwaling Ufer zw. Simigaon u. Nymare, 2700m, 17.05.2000, leg. A. Kleeberg, 1/0 in AKCB. Nepal, Kali Gandaki Tal, 6 km SO Narcheng, oberh. Rele Kohla, NO Hang, 2900 m, N28°29'06" E83°42'35", 24.V.2001, O. Jäger lgt., 1/1 in OHCB. – **India: Arunachal Pradesh.** India, Arunachal Pradesh (11), 0.7 km W of Tawang, 1–1.7 km N of monastery, 27.–30.iv.2008, 27°35'37"N 91°51'27"E, 2950m, Fikáček, Podskalská, Šípek lgt., in cow excrements, 1/0 in DKCP; – **West Bengal.** North India, West Bengal, Shingalila National Park, Shirikhola (2600 m), 18.–28.5.1999, lgt. E. Kučera, 1/0 in EKCS; – **Sikkim.** Sikkim, Staudinger, 1/0 in NMPC.

Annotated checklist

Ceratophyus Fischer von Waldheim, 1824: 143. Type species: *Scarabaeus dispar* Fabricius, 1781 (= *Scarabaeus polyceros* Pallas, 1771) (for details see also Branco 2007).

Ceratophyus dauricus (Jekel, 1866: 538) (*Geotrupes*). Type locality: “Dauria Sibiriae orientali [Dauriya, Russia]”.

DISTRIBUTION. China (Nei Mongol), Mongolia (Sükhbaatar, Dornod), Russia (Buryatia, Zabaykalskiy Krai) (Endrődi 1967, Medvedev & Nikolajev 1974, Puntsagdulam 1974, Nikolajev & Puntsagdulam 1984).

Ceratophyus gopherinus Cartwright, 1966: 3, Plate I, II. Type locality. “Vandenberg village, Santa Barbara, California, USA”.

DISTRIBUTION. USA (California).

Ceratophyus hoffmannseggii (Fairmaire, 1856: 530) (*Geotrupes*). Type locality: “Morocco”.

= *Geotrupes olivieri* Jekel, 1866: 539. Type locality: “Lusitania, Barbaria [Portugal, Morocco]”.

= *Geotrupes rossii* Rosenhauer, 1856: 126. Type locality: “Lucar, Xerez [Jerez de la Frontiera, Spain]” [homonym].

DISTRIBUTION. Morocco, Portugal, Spain (Báguena 1967, Baraud 1977, 1985, 1992, Martín-Piera & López-Colón 2000).

Ceratophyus kabaki Nikolajev, 2007: 55, figs 1–2. Type locality: “China, S. Sichuan, SSE Daocheng”.

DISTRIBUTION. China (Sichuan).

Ceratophyus maghrebinicus sp. nov. Type locality. Libya, Tripolis [32°52'N 13°12'E, ca. 90 m a. s. l.].

DISTRIBUTION. Algeria (Naâma), Libya (Tripolitania).

Ceratophyus martinezi Lauffer, 1909: 275. Type locality: “Sierra carpeto-betonica, Galicia [Spain]”.

DISTRIBUTION. Spain (Castilla y Leon [Avila, Segovia], Galicia [Pontevedra & Ourense], Madrid) (Báguena 1967; Baraud 1977, 1992; Carrera 2002; Gomez et al. 1997; Martín-Piera & López-Colón 2000).

Ceratophyus mesasiaticus Medvedev & Nikolajev, 1974: 119. Type locality: “Kazakhstan, nizov'ya reki [= lowland of river] Karatal [original in Cyrillic]”.

DISTRIBUTION. China (Xinjiang), Kazakhstan, Kyrgyzstan (Nikolajev 1987).

Ceratophyus polyceros (Pallas, 1771: 461) (*Scarabaeus*). Type locality: “Lectus in lacu salso Inderiensi [Inder lake, Kazakhstan]”.

= *Scarabaeus ammon* Pallas, 1776: 707. Type locality. “in arenis Naryn ineunte aestate abunde, vbicunque pascuntur equi, noctu conuolat [= Naryn region, Kyrgyzstan]”.

= *Scarabaeus dispar* Fabricius, 1781: 5. Type locality: “Sibiria [Siberia]”.

= *Ceratophyus fischeri* Fischer von Waldheim, 1824: 148. Type locality: “Rossia meridionali [= southern Russia]”.

= *Ceratophyus menetriesi* Mulsant & Rey, 1871: 422. Type locality: “Russie [Russia]”.

= *Geotrupes nigricans* Jekel, 1866: 537. Type locality: “Sibir. mer. [= southern Siberia]”.

= *Ceratophyus pallasi* Mulsant & Rey, 1871, 422. Type locality: “Russie [Russia]”.

DISTRIBUTION. Kazakhstan, Russia (south of the European part), Ukraine, Uzbekistan (Karakalpakstan) (Baraud 1992, Löbl et al. 2006, Nikolajev 1987).

Ceratophyus rossii (Jekel, 1866): 539 (*Geotrupes*). Type locality: “Italia media (Etruria) [Etruria, central Italy]”.

= *Geotrupes monoceros* Jekel, 1866: 539. Type locality: “Italia media (Etruria) [Etruria, central Italy]”.

= *Ceratophyus perroudi* Mulsant & Rey, 1871: 423. Type locality: “provenant de l'Italie” [Italy].

DISTRIBUTION. Italy (Toscana) (Baraud 1992, Löbl et al. 2006, Balerio et al. 2010).

Ceratophyus schaffrathi sp. nov. Type locality. Greece, Kós Island, Mastichari [36°50'46"N 27°04'34"E, at about sea level].

DISTRIBUTION. Greece (Kós).

Ceratophyus sinicus Zunino, 1973: 17, Figs 4, 5, 6B. Type locality. “Péchino [Beijing, China]”.

DISTRIBUTION. China (Beijing, Gansu, Nei Mongol, Qinghai) (Medvedev & Nikolajev 1974), first records from Shanxi and Xinjiang. First country record for Mongolia (Dornogovi province).

Ceratophyus sulcicornis (Fairmaire, 1887: cxcii). Type locality. “Sikkim, Inde sept. [Sikkim, northern India]”.

DISTRIBUTION. Nepal; India: Sikkim (Löbl et al. 2006), first records for Arunachal Pradesh and West Bengal states.

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APPENDIX 1. GAZETTEER

locality	coordinates	altitude (ca. m a. s. l.)
Algeria		
Djebel Ksour [mts.]	35°48'N 01°18'E	890
Libya		
Tajiura	32°51'N 13°21'E	7
Tripolis	32°52'N 13°12'E	90
Greece		
Mastichari	36°51'N 27°03'E	0
Italy		
Li Calamborne	43°35'N 10°17'E	0
Livorno	43°32'N 10°19'E	0
Pisa	43°42'N 10°24'E	0
Rossore	43°42'N 10°20'E	0
Tombolo	43°44'N 10°12'E	0
Morocco		
Tanger	35°45'N 5°47'E	0
Portugal		
Carrapateira	37°11'N 8°53'E	55
Forninho	38°39'N 8°48'E	35
Quinta da Ortiga	38°00'N 8°41'E	221
Rio Frio	38°40'N 8°51'E	17
Spain		
Albufera	39°18'N 0°19'E	0
Almonte	37°15'N 6°31'E	73
Barrios	36°11'N 5°29'E	26
Bonares	37°17'N 6°40'E	124
Castillo de Castillar	36°19'N 5°27'E	197
Chiclana	36°25'N 6°08'E	32
El Pardo	40°31'N 3°46'E	620
El Rocio	40°24'N 3°41'E	657
El Tiemblo	40°23'N 4°29'E	837
Fuengirola	36°32'N 4°37'E	0
La Linea	36°09'N 5°20'E	0
Los Barrios	36°11'N 5°29'E	24
Madrid	40°24'N 3°42'E	656
Malaga	36°43'N 4°25'E	0
Rota	36°57'N 6°37'E	0
San Roque	36°12'N 5°23'E	102
Tarifa	36°01'N 5°36'E	0
Vigo	42°13'N 8°43'E	87