

# THE FIRST RECORD OF THE GENUS *DORYCTINUS* ROMAN, 1910 (HYMENOPTERA, BRACONIDAE, DORYCTINAE) IN THE OLD WORLD, WITH DESCRIPTION OF A NEW SPECIES FROM AFRICA

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**Abstract.**— The genus *Doryctinus* Roman is recorded for the first time in the fauna of the Old World and African continent. A new species *D. africanus* **sp. nov.** from Congo reared from the beetle larvae of the families Lyctidae and Scolytidae is described and illustrated. The discussion about composition of this genus and its synonyms is presented. A key to the World *Doryctinus* species is provided.



**Key words.**— Hymenoptera, Braconidae, Doryctinae, *Doryctinus*, *Acrophasmus*, first record, new species, Old World, Africa.

## INTRODUCTION

The braconid fauna of subfamily Doryctinae of the Afrotropical Region is very diverse. However, the information about these parasitoids is insufficiently complete even at the generic level (Belokobylskij and Quicke 2000, Belokobylskij *et al.* 2004, Belokobylskij 2005). Only a single revision of this group (as well as all Braconidae) has been provided for the fauna of Madagascar (Granger 1949), but in spite of this numerous additional new taxa from Madagascar (as well as from all Africa) remain undescribed. At present, more than 40 doryctine genera are recorded in the Afrotropical region (Shenefelt and Marsh 1976, Belokobylskij 1992, 2005, Yu *et al.* 2012), but many of them have not yet been described.

New World braconid genera are rarely recorded in the Old World fauna. In this regard the discovery in the collection of the Royal Museum for Central Africa in Tervuren of the numerous specimens from Republic of Congo with ambiguous position between Old World genera was undoubtedly interesting. The belonging of these specimens to the genus *Doryctinus* Roman,

1910 (= *Acrophasmus* Enderlein, 1912) was clarified with help of keys to the New World genera of Doryctinae (Marsh 1993, 1997, 2002) and modern interpretation of this genus and related taxa (Kula and Marsh 2011). Author also used redescrptions of examined type species of the world Doryctinae genera for understanding the placement of the Congolese specimens. Thus, genus *Doryctinus* Roman is recorded for the fauna of the Old World and for African continent for the first time. A new species, *D. africanus* sp. nov., is described and illustrated based on specimens from the Republic of Congo.

Information about the hosts of *Doryctinus* species is limited. Up to this time only the members of the beetle families Bostrichidae (*Scobicia* Lesne, 1901) and Lyctidae (*Lyctus* Fabricius, 1792) were recorded as the hosts of this genus in the New World (Yu *et al.* 2012). The members of the Lyctidae genera *Lyctus* and *Minthea* Pascoe, 1866 as well as family Scolytidae (*Hypothenemus* Westwood, 1836) were discovered as hosts for the new African species. It is the first time that Scolytidae members are reported as a host of the genus *Doryctinus*.

## MATERIAL AND METHODS

The studied material was selected from the collection of the Royal Museum for Central Africa (Tervuren, Belgium). The information about hosts of the new species described below was exclusively received from the label data and basically corresponds to the host range of *Doryctinus* and related doryctine genera. For the descriptive part specimens were examined and figured using a MC-2 stereomicroscope. The images of the braconids were captured using Leica Application Suite imaging system that consists of the digital camera Leica IC 3D mounted on a Leica MZ16 microscope. The photograph images were enhanced and plate was composed using Adobe Photoshop. Determination of the *Doryctinus* specimens and preparation of a new key to species were realized on the base of published descriptions, revisions and keys (Marsh 1993, 1997, 2002, Kula and Marsh, 2011) as well as with help of the material of some *Doryctinus* species determined by Dr P. Marsh.

Terminology employed for morphological features and measurements follows Belokobylskij and Maetô (2009) and for sculpture as defined by Harris (1979) and Marsh (2002). Wing venation nomenclature follows Belokobylskij and Tobias (1998) and Belokobylskij and Maetô (2009). In the key, additional features useful for recognizing species are listed after the dash (–). The following abbreviations of the collections are used:

MIZW – Museum and Institute of Zoology, Polish Academy of Sciences (Warsaw, Poland);  
 MRAC – Royal Museum for Central Africa/ Musée royal de l’Afrique centrale (Tervuren, Belgium);  
 ZISP – Zoological Institute, Russian Academy of Sciences (St. Petersburg, Russia).

## TAXONOMY

### Genus *Doryctinus* Roman 1910

*Doryctinus* Roman, 1910: 122. – Marsh 1968: 112, 1971: 844, Shenefelt and Marsh 1976: 1295, Marsh 1993: 40 (as synonym of *Glyptocolastes* Ashmead), Kula and Marsh 2011: 467 (as valid genus), Yu *et al.* 2012 (as synonym of *Glyptocolastes* Ashmead).

*Acrophasmus* Enderlein 1912: 16. – Marsh 1971: 844, Shenefelt and Marsh, 1976: 1372, Marsh 2002: 26, Kula and Marsh 2011: 467 (as synonym of *Doryctinus* Roman).

**Type species.** *Exothecus rugulosus* Cresson, 1872.

**Redescription of the genus.** Head (Figs 4, 6, 7, 14, 15, 17) not depressed, transverse. Ocelli arranged in obtuse triangle. Frons more or less distinctly concave, without median keel and furrow. Eyes shortly and rather sparsely setose. Occipital carina dorsally complete, often fused below with hypostomal carina. Malar suture absent. Clypeus with short lower flange. Clypeal

suture distinct laterally, rather shallow dorsally. Hypoclypeal depression medium size and rounded. Postgenal bridge narrow. Maxillary palpi rather long, 6-segmented, its sixth (apical) segment about as long as fifth segment; labial palpi 4-segmented, its third segment not shortened. Scape of antenna wide and short, without apical lobe or basal constriction, its ventral margin (lateral view) shorter than dorsal margin. First flagellomere simple, subcylindrical, weakly curved (in lateral view), usually weakly longer than second flagellomere.

Mesosoma (Figs 3, 8, 18, 19) not or sometimes weakly depressed, medium-sized or weakly elongate. Neck of prothorax short, without pronope. Pronotum dorsally weakly convex; anterior flange distinctly curved up; pronotal carina rather distinct, situated in posterior third of pronotum. Propleural lobe long and wide. Mesonotum highly and perpendicularly or roundly elevated above pronotum. Median lobe of mesonotum usually without median longitudinal furrow, often with more or less distinct and rounded or sometimes pointed anterolateral corners. Notauli deep anteriorly and shallow posteriorly, complete, wide. Tegula weakly widened distally, convex along posterior margin. Prescutellar depression (scutellar sulcus) long, with several carinae. Scuto-scutellar (transscutal) suture distinct. Lateral longitudinal winglike flanges (on the level of prescutellar depression) usually low and rather fine. Scutellum (scutellar disc) weakly convex, with fine lateral carinae. Subalar depression rather deep and wide. Mesopleural pit (episternal scrobe) deep and elongate, fused with mesopleural suture. Metanotum with short and obtuse median tooth. Sternaulus (precoxal sulcus) rather deep, more or less narrow, long, weakly curved or almost straight. Prepectal carina distinct and complete, laterally continued up till sternaulus. Postpectal carina absent. Metapleural flange long, wide basally and rather narrow apically, almost rounded apically. Propodeum usually with areas delineated by carinae, areola present and more or less large; lateral propodeal tubercles wide and low; propodeal bridge absent. Propodeal spiracles rather small and round. Metapleural suture distinct. Metapleuron weakly convex.

Wings (Figs 10–12, 23, 24). Pterostigma of fore wing wide. Radial vein arising almost from or before middle of pterostigma. Radial cell usually not shortened. Both radiomedial veins always present. Second radiomedial cell medium-sized or rather long. Recurrent vein ante-furcal or sometimes almost interstitial. Nervulus distinctly postfurcal. Discoidal cell petiolate anteriorly, petiole rather long. First medial abscissa curved or sinuate. Parallel vein distinctly curved basally. Brachial cell widely open postero-apically; brachial vein absent. Mediocubital vein weakly curved to anal vein. Transverse anal veins absent. Hind wing with 3 hamuli. Radial vein arising from costal vein rather far from

basal vein. Radial vein strongly desclerotised, spectral. Radial cell subparallel-sided, without additional transverse vein. Medial cell narrow, weakly widened towards apex, 0.30–0.35 times as long as hind wing. Nervellus present. Submedial cell short. First abscissa of mediocubital vein 0.2–0.4 times as long as second abscissa. Recurrent vein long, distinctly oblique toward base of wing, nebulous. Hind wing of male usually (except *D. atriventris*) with stigmalike enlargement of the hecaboline type.

Legs (Figs 5, 16). All tibiae rather slender; all femora with low anterodorsal protuberances. Fore tibia with several short and thick spines arranged in almost single vertical row. Middle tibia with several short and thick spines. Middle tarsal segments long. Hind coxa medium size, with distinct basoventral corner and tooth. Hind femur rather narrow, elongate-oval. Hind tibia with row of very dense white setae on inner distal edge. Hind tibial spurs rather short and slender, mainly glabrous, inner spur 0.25 times as long as hind basitarsus. Basitarsus of hind tarsus weakly thickened, rather short.

Metasoma (Figs 1, 2, 9, 13, 20–22). First tergite not petiolate, varied in length and width. Acrosternite of first segment usually short, but sometimes (two species) elongate, 0.2–0.4 times as long as first tergite. Dorsople of first tergite medium-sized, basolateral lobes absent; spiracular tubercles usually small or indistinct, situated in basal 0.3 of tergite; dorsal carinae distinct and complete. Second tergite with shallow or very shallow, wide subparallel or more or less divergent posteriorly longitudinal sublateral grooves separated subrectangular or trapezoid median area, but grooves often hardly developed. Suture between second and third tergites distinct, narrow, distinctly concave, without or with weak sublateral breaks. Third tergite with distinct or fine transverse furrow in basal 0.3–0.4. Second-fifth tergites with separate laterotergites. Hypopygium rather small, with distinct and pointed process medioposteriorly. Ovipositor apically with two obtuse and small dorsal nodes. Ovipositor sheath longer than metasoma.

**Hosts.** Species of Bostrichidae, Lyctidae and Scolytidae (Coleoptera).

**Distribution.** Afrotropical (first record), Nearctic, Neotropical and Pacific Regions.

*Doryctinus africanus* sp. nov.

(Figs 1–12)

**Type material.** Holotype: female, Republic of Congo, “Coll. Mus. Congo, Eala, I – 1936, J. Ghesquiere, 96 – G” (MRAC).

Paratypes. 2 females, Republic of Congo, “Coll. Mus. Congo, Eala, II – 1936, J. Ghesquiere, 81 – G” (MRAC,

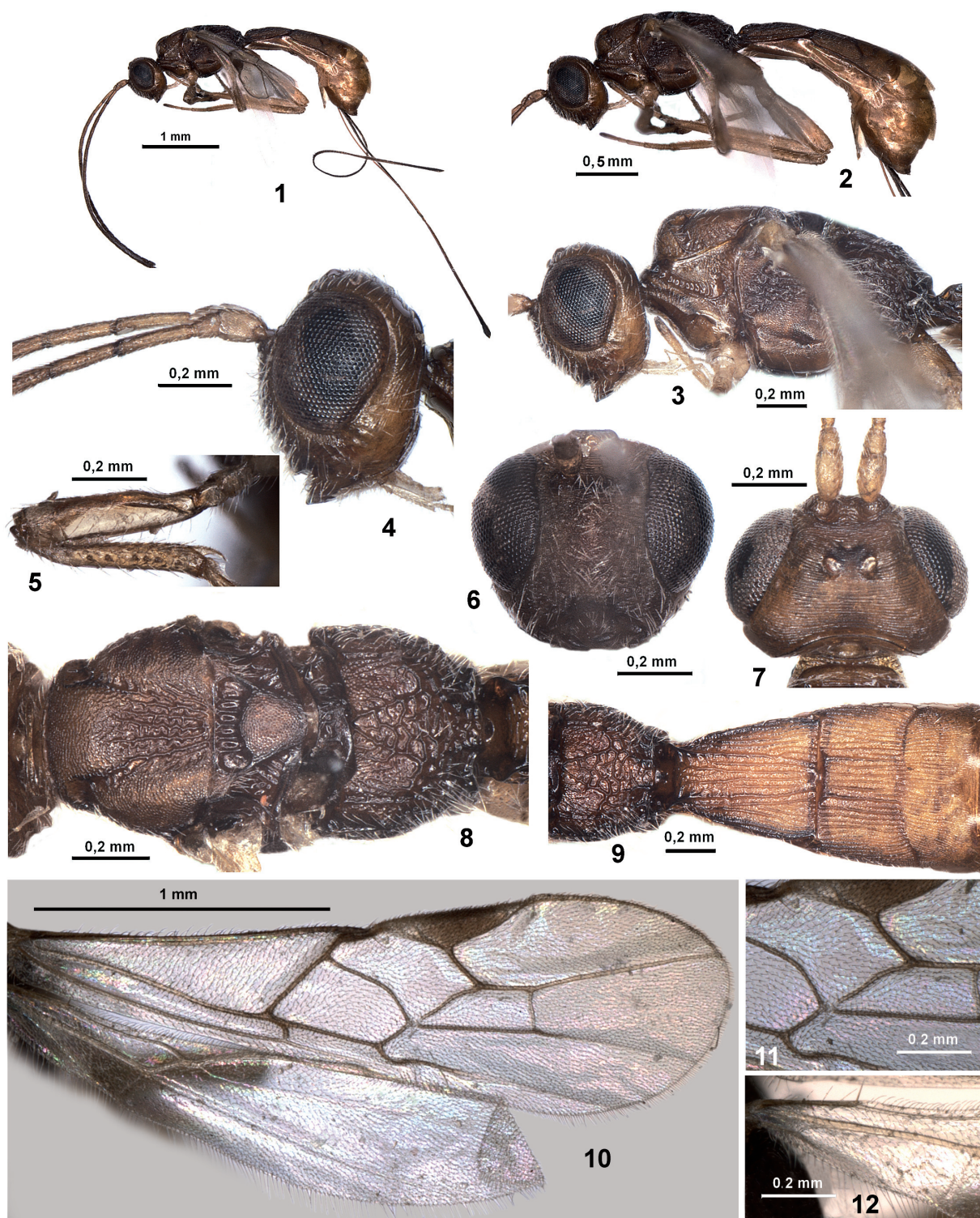
ZISP); 1 male, same label, but “69 – G” (MRAC); 2 females, same label, but “I – 1936; 86 – G” (MRAC); 2 males, same label, but “68 – G” (MRAC, ZISP); 1 male, same label, but “96 – G” (MRAC); 2 females, same label, but “125 – G” (MRAC, ZISP); 1 female, same label, but “19 – G” (MRAC); 1 female, same label, but “68 – G” (MRAC); 1 female, same label, but “68 – G”, “Citranco (pres des Oranges +) du 8. I. 36” (MRAC); 1 female, “Coll. Mus. Congo, Eala, V – 1936, J. Ghesquiere, 26 35 44 45 46” (MRAC); 1 female, “Coll. Mus. Congo, Eala, XI – 1936, J. Ghesquiere”, “Parasite de *Lyctus brunneus* (forem de bois)” (MRAC); 1 male, “Musée du Congo, Eala, IX – 1935, J. Ghesquiere”, “Parasite de *Lyctus brunneus*, forem de bois” (MRAC); 1 female, “Parasite de *Stephanoderes hampei*”, “Musée du Congo, Uelé: Dembia, 15 – VI – 1934, H. I. Bredo” (MRAC); 1 female, “? Parasite de *Stephanoderes Hampei* (des bois cafe)”, “Musée du Congo, Uelé: Dembia, 10 – VI – 1934, H. I. Bredo” (MRAC); 1 female, “Coll. Mus. Congo, Haut-Uele: Ter. Paulis, Mboli, IV – 1947, P. L. G. Benoit” (MRAC); 1 female, 1 male (without head), “Parasite de *Minthea*”, “Coll. Mus. Congo, BasCongo: Tshela, XII – 1945, J. Vrydagh” (MRAC); 2 females, “Musée du Congo, Murlambongo, (Idiofa) – 1930 (Soeurs de la Mission)” (MRAC); 2 females, “Coll. Mus. Congo, Bolima, 17/28 – II – 1939, Rev. P. Hulstaert” (MRAC, ZISP); 1 female, “Coll. Mus. Congo, Basoko, IX – 1948, P. L. G. Benoit” (MRAC); 1 female, “Musée du Congo, Stanleyville, IX – 1928, A. Collart” (MRAC); 1 female, “Mus. Congo, Kasenyi, X – 1937, H. J. Brédo” (MRAC);

**Description.** Female. Body length 2.1–4.4 mm; fore wing length 1.7–2.6 mm.

Head width 1.5–1.6 times median length, 1.1–1.2 times width of mesoscutum. Head behind eyes (dorsal view) narrowed strongly roundly in anterior half and almost linearly in posterior half. Transverse diameter of eye 2.8–3.5 (rarely (5%) in small specimens 2.5) times longer than temple (dorsal view). Ocelli medium-sized, in triangle with base 1.15–1.30 times its sides. POL 0.8–1.0 times Od, about 0.5 times OOL. Eyes with fine emargination opposite antennal sockets, 1.15–1.20 times as high as broad. Malar space about 0.3 times height of eye, 0.6–0.8 times basal width of mandible. Face convex, its minimum width 0.70–0.75 times height of eye and 0.80–0.85 times height of face and clypeus combined. Hypoclypeal depression small and round, its width 0.5–0.6 times distance from edge of depression to eye, 0.30–0.35 times width of face. Head below eyes (front view) distinctly and more or less roundly narrowed. Hypostomal flange fine and narrow.

Antennae slender, filiform or very weakly setiform, with 16–22 flagellomeres, 0.8–0.9 times longer than body. Scape medium-sized, 1.4–1.6 times longer than its maximum width. First flagellomere slender, almost straight, subcylindrical, 5.0–5.3 (rarely (5%) 4.5) times longer than its apical width, 1.1 times longer than





Figures 1–12. Morphological features of *Doryctinus africanus* sp. nov., holotype. (1) Habitus, lateral view; (2) Body, lateral view; (3) Head and mesosoma, lateral view; (4) Head and basal flagellomeres, lateral view; (5) Fore leg; (6) Head, front view; (7) Head, dorsal view; (8) Mesosoma, dorsal view; (9) Propodeum and first-third metasomal tergites, dorsal view; (10) Fore and hind wings; (11) Medial part of fore wing; (12) Basal part of hind wing.

second flagellomere. Penultimate flagellomere 2.2–2.6 (rarely 2.8) times longer than wide, 0.50–0.55 times as long as first flagellomere, 0.9–1.0 times as long as apical flagellomere; the latter weakly pointed apically and without spine.

Mesosoma not depressed, its length 1.7–1.8 times maximum height. Pronotum with distinct pronotal carina in anterior 0.3. Maximum width of mesoscutum 1.15–1.20 times its length. Median lobe of mesoscutum weakly protruding forwards, with weak anterolateral corners, weakly convex anteriorly (dorsal view). Notauli wide, deep and sparsely crenulate on vertical part of mesoscutum, rather narrow, shallow and densely crenulate on horizontal part. Prescutellar depression (scutellar sulcus) deep, long, with three-five carinae, smooth between carinae, 0.30–0.35 times as long as scutellum. Scutellum weakly convex, with fine lateral carinae, its width almost equal to median length. Subalar depression rather shallow, wide, coarsely rugose-striate. Sternaulus shallow anteriorly and deep posteriorly, finely striate with dense granulation, running along anterior 0.6 of lower part of mesopleuron. Metanotal tooth absent. Propodeum (lateral view) weakly and roundly inclined from base to apex.

Wings. Fore wing 3.0–3.6 times longer than its maximum width. Pterostigma 3.7–4.0 times longer than wide. Metacarp 1.2–1.4 times longer than pterostigma. First radial abscissa 0.9–1.1 times as long as maximum width of pterostigma. Second radial abscissa 1.3–1.5 times longer than first abscissa, 0.30–0.35 times as long as the straight third abscissa, 0.8–1.0 times as long as first radiomedial vein. Second radiomedial cell short, 2.5–3.0 times longer than wide. First medial abscissa distinctly curved and additionally slightly sinuate. Recurrent vein 3.5–4.7 times longer than second abscissa of medial vein. Discoidal cell 1.7–2.0 times longer than wide. Basal and recurrent veins subparallel. Distance from nervulus to basal vein 0.9–1.1 times nervulus length; nervulus weakly curved and perpendicular to anal vein. Mediocubital vein weakly sinuate. Hind wing 4.3–4.6 times longer than wide. First abscissa of costal vein 0.6–0.7 times as long as second abscissa. Length of medial cell 8.0–9.0 times longer than maximum width. First abscissa of mediocubital vein 0.45–0.55 times as long as second abscissa. Recurrent vein unpigmented, straight, almost perpendicular to mediocubital vein, interstitial or weakly antefurcal.

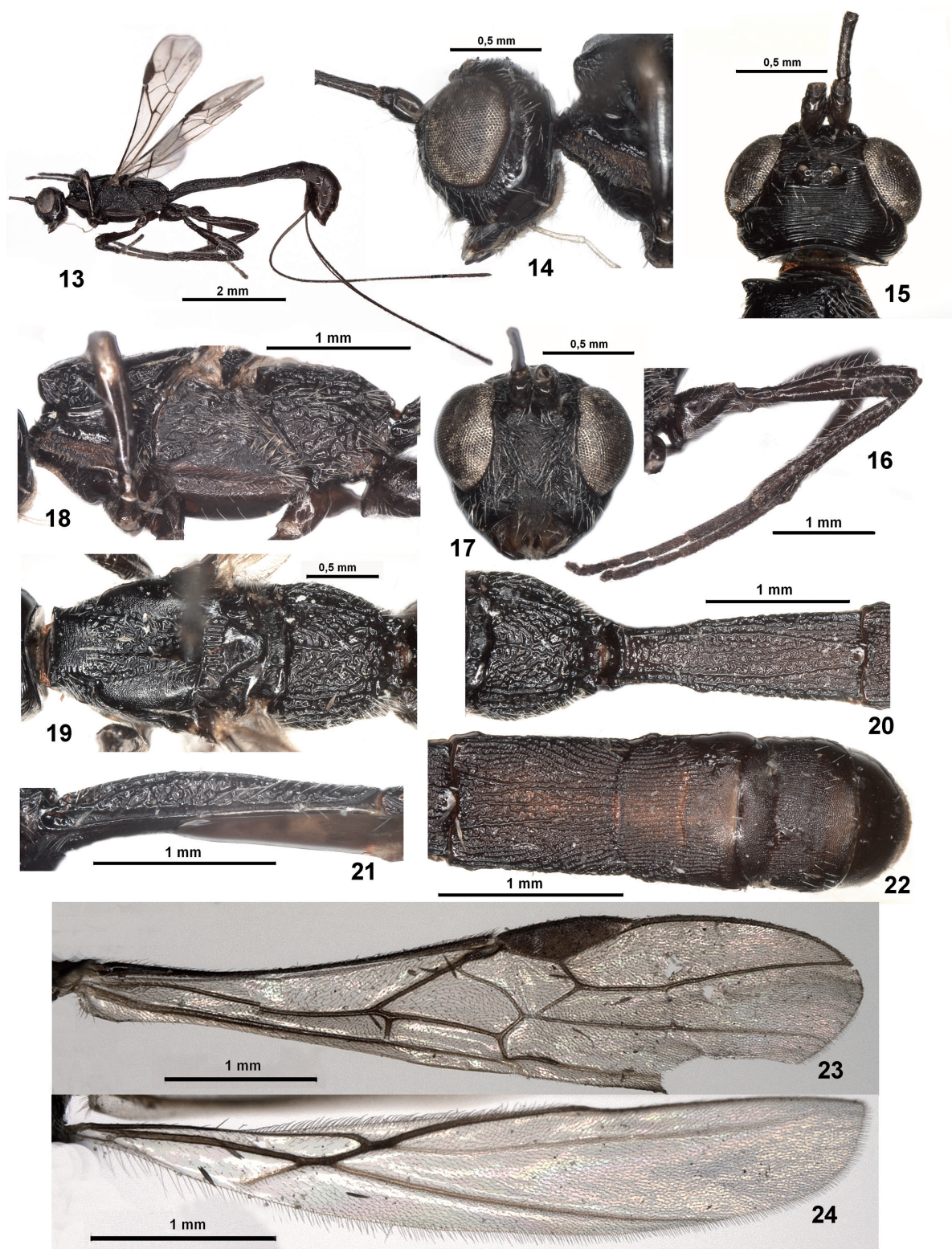
Legs. Fore tarsus about 1.7 times longer than fore tibia. Fore tibia with several rather slender spines arranged in single line on inner surface. Hind coxa 1.5–1.7 times longer than maximum width. Hind femur slender, with shallow dorsal protuberance, 3.6–4.0 times longer than wide. Hind tarsus weakly narrowed towards apex, about 1.1 times as long as hind tibia. Hind basitarsus weakly thickened, without distinct ventral keel, with dense setosity on lower margin,

0.6–0.7 times as long as second-fifth segments combined. Second tarsal segment 0.5–0.6 times as long as basitarsus, 1.7–2.0 times as long as fifth segment (without pretarsus).

Metasoma 1.1–1.5 times longer than head and mesosoma combined. First tergite distinctly and almost linearly widened from base to subapex, weakly narrowed apically, with short acrosternite, without convex median area, with small dorsope, with complete and weakly convergent dorsal carinae, without spiracular tubercles. Maximum width of first tergite 1.9–2.2 times its minimum width; length of tergite 1.2–1.3 (rarely 1.1) times its maximum width, 1.6–1.8 times length of propodeum. Second tergite with shallow or very shallow and parallel lateromedial furrows delineating narrow rectangular median area. Second suture distinct, narrow, roundly concave, weakly sinuate medially. Median length of second tergite 0.6 times its basal width, 0.8–0.9 times length of third tergite. Third tergite with shallow transverse furrow delineating posteriorly wide area in basal 0.35–0.40. Ovipositor sheaths 1.1–1.7 (sometimes (5%) 1.9) times longer than metasoma, 2.6–2.8 (sometimes (5%) 3.0) times longer than mesosoma, 0.7–1.1 times as long as body, 1.3–1.4 times as long as fore wing.

Sculpture and pubescence. Vertex entirely, densely and distinctly transverse and weakly sinuately striate, with very fine reticulation between striae; frons almost evenly with transverse dense striae; face entirely densely transversely striate with dense granulate-reticulate sculpture; temple distinctly curvedly striate in upper 0.3, finely and subvertically striate in lower 0.7. Mesoscutum very densely and distinctly granulate, with coarse longitudinal striation and rugosity between striae in wide medio-posterior area. Scutellum entirely densely granulate. Mesopleuron densely granulate, with coarse striation in subalar depression. Propodeum with delineated areas, areola large, pentagonal or subrhomboid, fused with anterior margin of propodeum (without basal carina), 2.0–2.2 times longer than wide, coarsely rugose-striate; basolateral areas rather small, distinctly delineated, rugose-granulate, only granulate basally; petiolate area absent; rest propodeum reticulate-areolate with granulation. Hind coxae densely granulate, additionally dorsally finely and transversely striate. Hind femur densely granulate-reticulate in upper 0.7, reticulate-coriaceous to almost smooth in lower 0.3. First and second tergites distinctly and not densely longitudinally striate with dense and fine or very fine reticulation. Third tergite distinctly and densely striate with fine reticulation in basal 0.5–0.8, rest of tergite smooth. Remaining tergites mainly smooth, partly with fine reticulation basally. Vertex glabrous sublaterally or medially, sometimes with sparse and semi-erect setae medially, with densely and narrowly spaced semi-erect or erect short setae





Figures 13–24. Morphological features of *Doryctinus exilis* (Enderlein), holotype. (13) Habitus, lateral view; (14) Head and anterior part of mesosoma, lateral view; (15) Head, dorsal view; (16) Hind leg; (17) Head, front view; (18) Mesosoma, lateral view; (19) Mesosoma, dorsal view; (20) Propodeum and first metasomal tergites, dorsal view; (21) First metasomal tergite and acrosternite, latero-ventral view; (22) Metasoma without first tergite, dorsal view; (23) Fore wing; (24) Hind wing.

laterally and posteriorly. Mesoscutum with rather dense, semi-erect and short setae widely spaced on lobes, almost glabrous on narrow median areas on median and lateral lobes. Metapleuron glabrous on wide space and almost glabrous medially. Hind tibia dorsally with short, sparse and semi-erect setae; length of these setae 0.3–0.5 times maximum width of hind tibia.

Colour. Head and mesosoma reddish brown in upper half and light reddish brown in lower half; metasoma light reddish brown to brownish yellow, three basal tergites darkened. Sometimes mesosoma and metasoma reddish brown, head brownish yellow, but darkened dorsally. Antenna reddish brown to dark reddish brown, faintly paler basally, two basal segments yellowish brown. Palpi brownish yellow. Legs brownish yellow. Ovipositor sheaths entirely black. Fore wing hyaline. Pterostigma brown, yellow in basal 0.3 and apically.

Male. Body length 1.8–3.3 mm; fore wing length 1.3–2.0 mm. Antennae with 12–18 flagellomeres. First flagellomere 4.6–4.8 times longer than its apical width, 1.00–1.05 times as long as second flagellomere. Penultimate flagellomere 3.5 times longer than wide. Hind wing with small stigmalike enlargement, this enlargement 0.7–0.8 times as long as distance from base of wing to base of enlargement. Hind femur 3.0–3.4 times longer than wide. Length of first metasomal tergite 1.3–1.4 times its maximum width. Median length of second tergite 0.55–0.65 times its basal width. Third tergite with deep transverse furrow. Fourth tergite densely and finely granulate-reticulate in basal 0.2–0.3. Sometimes (in small specimens) third tergite finely sculptured in basal 0.2 only. Otherwise similar to female.

**Hosts.** *Lyctus brunneus* (Stephens), *Minthea* sp. (Lyctidae); *Hypothenemus hampei* (Ferrari) (Scolytidae).

**Distribution.** Congo.

**Etymology.** This species is named after the continent where the genus *Doryctinus* is recorded for the first time.

**Comparative diagnosis.** This new species is similar to the Nearctic *D. marshi* Greenbaum, 1975 and *D. zolnerowichi* Kula and Marsh, 2011 (Greenbaum 1975; Kula and Marsh 2011), both known from the Nearctic Region, but differs in having the pair grooves on the second tergite parallel (divergent in *D. marshi* and *D. zolnerowichi*), temple short (longer in *D. marshi* and *D. zolnerowichi*), number of antennal flagellomeres small (number larger in *D. marshi* and *D. zolnerowichi*), propodeum with large areola delineated by distinct carinae and fused anteriorly with base of propodeum (without basal carina) (with distinct basal carinae and small areola if present in *D. marshi* and *D. zolnerowichi*), and pterostigma pale basally and apically (only basally in *D. marshi* and *D. zolnerowichi*).

## Key to the World species of the genus *Doryctinus* Roman

1. Vertex entirely smooth. Body length 5.0–7.0 mm. Costa Rica . . . . . *D. erugatus* (Marsh, 2002)
- Vertex transverse striate (Figs 7, 15), striate-rugose or costate-rugose . . . . . 2
2. First metasomal tergite 2.8–3.4 times longer than apical width (Fig. 20). Acrosternite of first segment distinctly elongate, 0.33–0.40 times as long as tergite (Fig. 21) . . . . . 3
- First metasomal tergite 1.1–2.0 times longer than apical width (Fig. 9), sometimes almost as long as apical width. Acrosternite of first segment not or weakly elongate (except *D. amazonicus*), about 0.25 times as long as tergite . . . . . 4
3. Anterolateral corners of median lobe of mesoscutum sharply pointed (Figs 15, 18, 19). Median lobe of mesoscutum granulate on wide area (Fig. 19). Hind femur 4.5 times longer than its maximum width (Fig. 16). Ovipositor sheath shorter than body (Fig. 13). Body length 6.5–11.5 mm. Colombia, Panama, Costa Rica, Honduras, Mexico (Figs 13–24) . . . . . *D. exilis* (Enderlein, 1912)
- Anterolateral corners of median lobe of mesoscutum rounded. Median lobe of mesoscutum almost entirely coarsely rugose. Hind femur 5.0 times longer than its maximum width. Ovipositor sheath as long as body. Body length 6.5–13.7 mm. Colombia, Brazil, Costa Rica . . . . . *D. maeandrius* (Enderlein, 1920)
4. Body partly black, mesonotum, mesopleuron, propodeum, first tergite entirely and second tergite widely medially red. Legs black. Body length 5.0–8.0 mm. Costa Rica . . . . . *D. rubronotum* (Marsh, 2002)
- Body (including legs) mainly or entirely brown, reddish brown or light brown, without red colouration . . . . . 5
5. Vertex coarsely costate-rugose or rugose-punctate . . . . . 6
- Vertex more or less finely, but distinctly and densely transverse striate (Fig. 7) . . . . . 7
6. Mesoscutum with long golden setae obscuring sculpture. Ovipositor sheath shorter than body. Body length 3.5–5.0 mm. Costa Rica . . . . . *D. gauldi* (Marsh, 2002)
- Mesoscutum with short pale setae not obscuring sculpture. Ovipositor sheath 1.5 times longer than body. Body length 3.5–6.0 mm. USA . . . . . *D. secundus* (Muesebeck and Walkley, 1951)
7. Second tergite with pair of distinct and usually oblique grooves (Fig. 9) . . . . . 8
- Second tergite without oblique grooves . . . . . 13



8. First metasomal tergite 2.0 times longer than apical width. Median lobe of mesoscutum with pointed anterolateral corner. – Temple short, width of eye about 3.0 times length of temple. Body length 8.5 mm. Brazil . . . . . *D. amazonicus* (Roman, 1924)
- First metasomal tergite 1.1–1.6 times longer than apical width (Fig. 9). Median lobe of mesoscutum with rounded anterolateral corner (Fig. 8) . . . . . **9**
9. Pair of grooves on second tergite not divergent posteriorly, parallel-sided (Fig. 9). Temple short, transverse diameter of eye 2.8–3.5 (rarely in small specimens only 2.5) times longer than temple (dorsal view) (Fig. 7). Body length 1.8–4.4 mm. – Congo . . . . . *D. africanus* Belokobylskij, sp. nov.
- Pair of grooves on second tergite more or less distinctly divergent posteriorly at least in basal half. Temple longer, transverse diameter of eye 1.5–2.0 times longer than temple (dorsal view) . . . . . **10**
10. Eyes small; malar space 0.75–0.90 times as long as eye height. Pair of grooves on second tergite divergent in basal half and gradually convergent posteriorly. – Third tergite without distinct transverse furrow. Hind wing of male without stigmalike enlargement. Body length 4.0–6.0 mm. – USA . . . . . *D. atriventris* (Cresson, 1872)
- Eyes large; malar space 0.3–0.6 (0.7) times as long as eye height. Pair of grooves on second tergite divergent from anterior to posterior margins . . . . . **11**
11. Vertex narrow, rather sharply declivous posteriorly (lateral view). Body length 6.0 mm. – USA . . . . . *D. rugulosus* (Cresson, 1872)
- Vertex wide, rounded posteriorly (lateral view) . . . . . **12**
12. Antennae with 37 flagellomere. Propodeum, metapleuron and first-third tergites of metasoma black. Hind leg dark brown. Grooves on second tergite weakly defined. Propodeum without areola delineated by carinae. Body length 6.5 mm. – USA . . . . . *D. marshi* Greenbaum, 1975
- Antennae with 31 flagellomeres. Propodeum, metapleuron and first-third tergites of metasoma orangish brown. Hind leg brownish yellow. Grooves on second tergite distinctly defined. Propodeum with basal carina and areola delineated by carinae. Body length 4.7 mm. – USA . . . . . *D. zolnerowichi* Kula and Marsh, 2011
- 13(7). Vertex strongly declivous posteriorly, sublinear (lateral view) (cf. Fig. 19 in Kula and Marsh, 2011). Malar space about 0.25 times as long as eye height . . . . . **14**
- Vertex not strongly declivous posteriorly, rounded (lateral view) (cf. Fig. 20 in Kula and Marsh, 2011). Malar space 0.3–0.7 times as long as eye height . . . . . **15**
14. Mesonotal lobes and scutellum punctate. First metasomal tergite 1.7–1.8 times longer than its apical width. Body length 2.4–7.0 mm. USA, Brazil, Guatemala, British West Indies . . . . . *D. ferrugineus* (Marsh, 1968)
- Mesonotal lobes and scutellum coriaceous. First metasomal tergite 1.4 times longer than its apical width. Body length 2.0–6.0 mm. Costa Rica, Panama . . . . . *D. costaricensis* (Marsh, 2002)
15. Vertex partially and interruptedly striate, with smooth areas. Malar space 0.5–0.7 times as long as eye height. Body length 3.5 mm. USA . . . . . *D. scobiciae* (Marsh, 1966)
- Vertex entirely striate, without smooth areas. Malar space 0.25–0.30 times as long as eye height . . . . . **16**
16. Radial cell short, radial vein ending before apex of fore wing. Fore wing infusate. Metasomal tergites posterior to third punctate. Body length 4.0 mm. USA . . . . . *D. butleri* (Marsh, 1968)
- Radial cell long, radial vein ending on apex of fore wing. Fore wing hyaline. Metasomal tergites posterior to third smooth or punctate only in basal half . . . . . **17**
17. Areola of propodeum present and delineated by carinae. Antennae with 16–24 flagellomeres. Pterostigma brown, pale basally and apically. Second radiomedial cell short. First metasomal tergite 1.3 times longer than its maximum width. Fourth–sixth metasomal tergites entirely smooth. Body length 2.0–4.0 mm. USA . . . . . *D. immigrans* (Beardsley, 1961)
- Areola of propodeum absent, only basolateral areas present. Antennae 28 flagellomeres. Pterostigma entirely dark brown. Second radiomedial cell long. First metasomal tergite 1.5 times longer than its maximum width. Fourth–sixth metasomal tergites punctate in basal half and smooth in apical half. Body length 5.0–5.5 mm. USA . . . . . *D. arizonensis* (Marsh, 1968)

## DISCUSSION

The tribe Hecabolini (sensu: Belokobylskij 1992) of the subfamily Doryctinae is one of the largest and most diverse taxonomic group. A recent molecular phylogenetic study of Doryctinae (Zaldivar *et al.* 2008) showed the polyphyletic contents of this tribe as well as the position of hecaboline genera from the Old and New World faunas in the different clades. On the other hand, the morphological features used for diagnosis of hecaboline genera did not show such separation of



genera from different continents on two phylogenetic groups, and undoubtedly only new simultaneous molecular (with several sequenced genes) and morphological analysis can provide more accurate estimates of phylogenetic relations for this complicated group. Indirectly, the presence of the members of the same genera on both sides of Atlantic ocean [*Hecabolus* Curtis, 1834, *Rinamba* Cameron, 1912 (*Rhoptrocentroides* Marsh, 1993), *Monolexis* Foerster, 1862, *Leluthia* Cameron, 1887, *Hemidoryctes* Belokobylskij, 1993 (*Atopodoryctes* Marsh, 1993), etc.] testifies for dubiousness of such territorial separation of Hecabolini taxa. The discovery of members of the former New World genus *Doryctinus* Roman, 1910 in Africa additionally supports this opinion.

The New World genus *Doryctinus* Roman was described in the beginning of 20th century for only the type species, *Exotheucus rugulosus* Cresson, 1872, from Texas, USA (Roman 1910). The genus was a monotypic until the description of a second species, *D. marshi* Greenbaum, 1975, from Florida (Greenbaum 1975). Marsh (1993) synonymized this genus with *Glyptocolastes* Ashmead, 1900 and the type species of *Glyptocolastes*, *Heterospilus caryae* Ashmead, 1896, with *E. rugulosus*.

The genus *Acrophasmus* Enderlein, 1912 (with type species *A. exilis* Enderlein, 1912; MIZW: Figs 13–24) was described from South America (Colombia). Another two species of this genus, *A. meandrius* Enderlein, 1920 from Colombia and *A. amazonicus* Roman, 1924 from Brazil, were additionally described from this continent (Enderlein 1920; Roman 1924). The first revision of *Acrophasmus* was provided by Marsh (1968) who already recognized eight species in the Nearctic Region (mainly from USA). An additional species, *A. marshi* (Greenbaum), was transferred to *Acrophasmus* from *Doryctinus* in Marsh (1993). Six species of *Acrophasmus* were described or recorded in the fauna of Costa Rica and Central America (Marsh 2002). Members of this genus were mainly restricted in distribution by territories of the North and South America except a single species, *A. immigrans* (Beardsley, 1961), which was recorded (and originally described) from Hawaii.

Recently Kula and Marsh (2011) showed that synonymisation of *Doryctinus* and *Glyptocolastes* Ashmead, 1900 was erroneous, and that *Glyptocolastes* is valid genus now [with type species *Heterospilus caryae* Ashmead, 1896 and second species *G. texanus* (Ashmead, 1900)]. On the other hand, *Doryctinus* was removed from synonymy with *Glyptocolastes*, and the genus *Acrophasmus* Enderlein was proposed as a new junior synonym of *Doryctinus*. Thus, *Doryctinus* now includes 16 species mainly from the New World but also with a single species from Hawaii and another one from Africa (Congo).

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