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Taxonomic revision of the genus *Oodera* Westwood, 1874 (Hymenoptera, Chalcidoidea, Pteromalidae, Cleonyminae), with description of ten new species

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Abstract

The world species of *Oodera* Westwood, 1874 (Chalcidoidea: Pteromalidae: Cleonyminae: Ooderini) are revised. We examined 115 specimens of this rarely collected genus and based on morphological characters assign 110 specimens to 20 recognised species, of which the following ten are described as new: *Oodera circularicollis* **sp. n.** (Morocco), *O. felix* **sp. n.** (Central African Republic), *O. fidelis* **sp. n.** (Vietnam), *O. florea* **sp. n.** (Thailand), *O. heikewernerae* **sp. n.** (Botswana and South Africa), *O. leibnizi* **sp. n.** (Papua New Guinea, Malaysia and Phillippines), *O. mkomaziensis* **sp. n.** (Tanzania), *O. namibiensis* **sp. n.** (Namibia), *O. niehuisorum* **sp. n.** (Egypt and Israel), and *O. srilankiensis* **sp. n.** (Sri Lanka). *Oodera monstrum* Nikol'skaya, 1952, syn. n., is synonymised under *O. formosa* (Giraud, 1863). Five specimens could not be assigned to species and are treated as *Oodera* sp. Redescriptions are provided for all previously described valid species. *Oodera albopilosa* Crosby, 1909 is excluded from *Oodera* and transferred to *Eupelmus* Dalman, 1820 (Eupelmidae) as *E. albopilosa* (Crosby, 1909) n. comb. *Oodera rufimana* Westwood, 1874 and *O. obscura* Westwood, 1874 are treated as *nomina dubia* because we were unable to locate type specimens and the original descriptions are not sufficiently informative to clarify the taxonomic status of these names. Several specimens from North America are identified as introduced specimens of the European species *O. formosa*. We provide images and diagnostic characters for all 20 included species and an identification key to species.

Keywords

Taxonomy, parasitoid wasps, identification key, new species

Introduction

Oodera Westwood, 1874 is a morphologically extraordinary and conspicuous genus in Chalcidoidea. The group is currently classified as the monotypic tribe Ooderini in the Cleonyminae, a subfamily of the polyphyletic Pteromalidae (Heraty et al. 2013).

It included 14 species prior to this revision. Gibson (2003) provides a detailed generic description and a key to differentiate *Oodera* from other Cleonyminae. Individuals of *Oodera* have modified front legs with enlarged profemora and modified tibiae, and a long pronotum. The mesothorax of *Oodera* has a membranous area ventrally anterior to each mesocoxa (Gibson 1989, fig. 105) similar to that of individuals of Calosotine and females of Eupelminae (Eupelmidae) (Gibson 1989, figs 99–103). Individuals also have a unique mesonotal structure in which the mesoscutum and the mesoscutellar-axillar complex are fused and the axillae are strongly advanced such that a flexible, transverse transscutal articulation is lacking, and V-like, sulcate notauli extend to the base of the mesoscutellum (Fig. 5). Individuals are generally comparatively large-bodied (>5 mm).

The phylogenetic position and proper classification of *Oodera* remain unclear. When Bouček (1958) transferred *Oodera* from Eupelmidae to Pteromalidae he established the tribe Ooderini for it and suggested that it formed a 'bridge' to Eupelmidae, though he also stated that some species of *Heydenia* suggest a close relationship with *Oodera*. Graham (1969) suggested that *Oodera* formed a 'link' with Eupelmidae, whereas Gibson (1989) suggested that based on the structure of its middle legs *Oodera* might be the sister group of Eupelmidae or some part of it. Current molecular-data-only studies were unable to robustly place the genus in the phylogenetic Chalcidoidea tree (Munro et al. 2011), or placed it as sister group of Leucospidae, yet with a very limited taxon sampling (Peters et al. 2018). Using morphological evidence only, Heraty et al. (2013) retrieved *Oodera* as part of a polytomy along with Eupelmidae, Encyrtidae and Tanaostigmatidae (Heraty et al. 2013, fig. 8), but using combined morphological and molecular data either as nested within Calosotinae (Heraty et al. 2013, fig. 9) or as the sister group of Neanastatinae + Calosotinae (Heraty et al. 2013, fig. 10). Future molecular analyses will likely provide more reliable relationships.

All *Oodera* species are thought to be parasitoids of woodboring beetles (mainly Buprestidae and Scolytinae) but only very few host-parasitoid records are actually verified or even vouchered (Noyes 2017). Other details on their biology are unknown. They are only rarely collected, especially with the usual collecting methods of Chalcidoidea specialists, i.e., Malaise trap, sweep net, and pan trap. Accordingly, the function of such conspicuous morphological characteristics as front legs resembling raptorial legs and prolonged pronotum, that give *Oodera* specimens a praying-mantis-like habitus, remains unknown. Gibson (2003) hypothesised that these features and the ability to rotate the mesocoxae forward so that the middle legs can extend straight forward all formed a functional complex for grasping and manipulating whatever was caught. However, Gates (2004) offered small insects to a female *Oodera* in a Petri dish and observed no such actions. The conspicuous crest-like parascrobal areas of the head,

each of which we call the 'corona', are most probably used to clear the tunnels of their woodboring host larva from frass and debris after emergence, analogous to other hymenopterans with similar structures that are wood borers (e.g., Stephanidae, Orussidae, some Calosotinae).

The genus has never been taxonomically revised. Of the 14 valid species described prior to this revision, all were described in isolation or with just another species. The only taxonomic actions so far, apart from new combinations to transfer species to *Oodera*, were by Fusu et al. (2015) who excluded *Oodera dakarensis* Risbec, 1957 from *Oodera* and transferred it to *Eupelmus*, and by Bouček (1958) and Bouček et al. (1978), who synonymised *Oodera bestia* Nikol'skaya, 1952 with *O. formosa* (Giraud, 1863) and *Oodera ornata* Gahan, 1925 with *O. longicollis* (Cameron, 1903). In fact, *O. formosa* and *O. longicollis* are both extraordinary, with *O. formosa* being the first described species and the only species from central Europe, and *O. longicollis* from East Asia being rather unusual in body length, ovipositor length, and colouration. In addition to these two species, there is one species described from the European part of Russia, four species described from Africa, and seven additional species described from Asia. No species are found in Australia or the New World except for one presumably introduced species in North America (Bouček and Heydon 1997). The latter was suspected to be *O. formosa* (Gibson 2003) but the identity of this species was not previously confirmed. Generally, *Oodera* species are recorded from warm to temperate areas.

Oodera are rarely collected and are, accordingly, also rare in scientific collections. The taxonomic revision presented here is based on 115 specimens. Most specimens are old (>10 years), dry-pinned material that does not allow routine DNA extraction and molecular sequencing. Our revision is based solely on morphological characters. We made high-resolution images of all relevant available type and non-type material and used a variety of qualitative features as well as morphometric ratios that describe body proportions as diagnostic characters to differentiate between species. Based on this, we describe new species, clarify the status of previously described species and redescribe them, and provide an identification key to all species considered valid after the taxonomic revision.

Methods

This study is based on material borrowed from the following museums (with abbreviations used in the text):

BMNH Natural History Museum, London, UK;
CNC Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Ontario, Canada;
DECU Department of Entomology, Cornell University, Ithaca, New York, USA;
MFNB Museum für Naturkunde Berlin, Berlin, Germany;
MHNG Naturkunde Museum Genf, Geneva, Switzerland;

MNHN Muséum national d'Historie naturelle, Paris, France;
NHMW Naturhistorisches Museum Wien, Vienna, Austria;
NMBE Naturhistorisches Museum Bern, Bern, Switzerland;
NMP Národní Muzeum, Prague, Czech Republic;
SAMC Iziko Museums of Cape Town, Cape Town, South Africa;
USNM Smithsonian National Museum of Natural History, Washington D.C., USA;
ZFMK Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany;
ZIRAS Zoological Institute of Russian Acedemy of Science, St. Petersburg, Russia.

The terminology in this study follows Gibson (1997, 2003) and Bouček (1988). Terms for surface sculpture follow Harris (1979). The term 'corona' is newly used for the crest-like parascrobal area on the frons dorsally between each inner orbit and scrobal depression. The following four types of corona are characterised (in dorso-frontal view): 'interrupted': all horizontal crests either connected by one, occasionally two vertical crests or interrupted by vertical crevices (Fig. 1a); 'continuous': none or only some horizontal crests connected by vertical crests or interrupted by vertical crevices, median areas between horizontal crests distinctly rectangular (Fig. 1b); 'square': horizontal crests neither interrupted by vertical crevices nor connected by vertical crests, median areas between horizontal crests almost square (Fig. 1c); and 'three- to four-part': all horizontal crests connected by two or three vertical crests (Fig. 1d).

Both sexes were used for description of all characters, except for shape and size of the metasoma and the size of the ovipositor. Detailed character definitions are given in Table 1.

Table 1. List of characters used in this study, with character definition and abbreviation as also used in Suppl. material 1 (character definitions follow Graham (1969), Baur (2015) and Janšta et al. (2016)).

Abbreviation	Character	Definition
bdy.l	Body length	Length of body, excluding the ovipositor in females, dorsal view
hea.h	Head height	Distance between lower edge of clypeus and lower edge of anterior ocellus, frontal view
hea.l	Head length	Maximum length of head, lateral view
hea.w	Head width	Maximum width of head, frontal view
eye.h	Eye height	Height of eye, lateral view
eye.l	Eye length	Length of eye, lateral view
msp.l	Malar space	Distance between the points where malar sulcus touches mouth margin and lower edge of eye, lateral view
lof.h	Lower face height	Distance between lower margin of torulus and margin of clypeus
eya.d	Eye to antennal toruli	Distance between the lower margin of eye and lateral margin of antennal toruli, frontal view
tor.d	Distance antennal toruli	Distance between the inner margins of the toruli, frontal view
eye.d	Eye distance	Shortest distance between eyes, dorsal view
pol.l	POL	Shortest distance between posterior ocelli, dorsal view

Abbreviation	Character	Definition
ool.l	OOL	Shortest distance between posterior ocellus and eye margin, dorsal view
cor.l	Corona length	Maximum length of corona, frontal view
cor.w	Corona width	Maximum width of corona, frontal view
scp.l	Scape length	Length of scape exclusive of radicle, outer aspect
pdl.l	Pedicel length	Length of pedicel, outer aspect
flg.l	Flagellum length	Length of all flagellomers
fun.l	Funicule length	Length of flagellum excluding clava
clv.l	Clava length	Length of clava, outer aspect
no.l	Pronotum length	Length of pronotum along median line, dorsal view
no.w	Pronotum width	Maximum width of pronotum, dorsal view
msn.l	Mesonotum length	Length of mesonotum along median line from anterior edge of mesoscutum to posterior edge of mesoscutellum, dorsal view
msc.w	Mesoscutum width	Maximum width of mesoscutum just anterior to tegulae, equals mesonotum width, dorsal view
msc.l	Mesoscutum length	Length of mesoscutum along median line from posterior edge of pronotum to posterior edge of mesoscutum, dorsal view
sct.l	Mesoscutellum length	Length of mesoscutellum along median line from posterior edge of mesoscutum to posterior edge of scutellum, dorsal view
sct.w	Mesoscutellum width	Maximum width of mesoscutellum, dorsal view
sam.l	Mesoscutellum anterior margin	Length of part of mesoscutellum from anterior margin of mesoscutellum to imaginary transverse line connecting posterior margins of axillae, measured along median line, dorsal view
ppd.l	Propodeum length	Length of propodeum measured along median line from anterior edge of propodeum to posterior edge of nucha, dorsal view
ppd.w	Propodeum width	Maximum width of propodeum, dorsal view
tb1.l	Protibia length	Length of protibia along median line, outer aspect
fm1.l	Profemur length	Length of profemur, from distal end of trochanter to tip of profemur, measured along median line, outer aspect
fm1.w	Profemur width	Maximum width of profemur, outer aspect
fwi.l	Fore wing length	Maximum length of fore wing, measured from end of humeral plate to tip of wing
fwi.w	Fore wing width	Maximum width of fore wing
cc.l	Costal cell length	Length of the costal cell, measured from the basal constriction that delimits the apex of the humeral plate of the wing to the point at which the submarginal vein touches the leading edge of the wing
mav.l	Marginal vein length	Length of marginal vein, distance between the point at which the submarginal vein touches the leading edge of the wing and the point at which stigmal vein and postmarginal vein unite
pmv.l	Postmarginal vein length	Length of postmarginal vein, distance between the point at which stigmal vein and postmarginal vein unite, apically to where the vein appears to end
stv.l	Stigmal vein length	Length of stigmal vein, distance between the point at which stigmal vein and postmarginal vein unite apically, and the distal end of the stigma
mts.l	Metasoma length	Length of metasoma along median line, from end of nucha to tip of metasoma, excluding ovipositor, dorsal view
mts.w	Metasoma width	Maximum width of metasoma, dorsal view
ovp.l	Ovipositor length	Length of the visible part of ovipositor, dorsal view

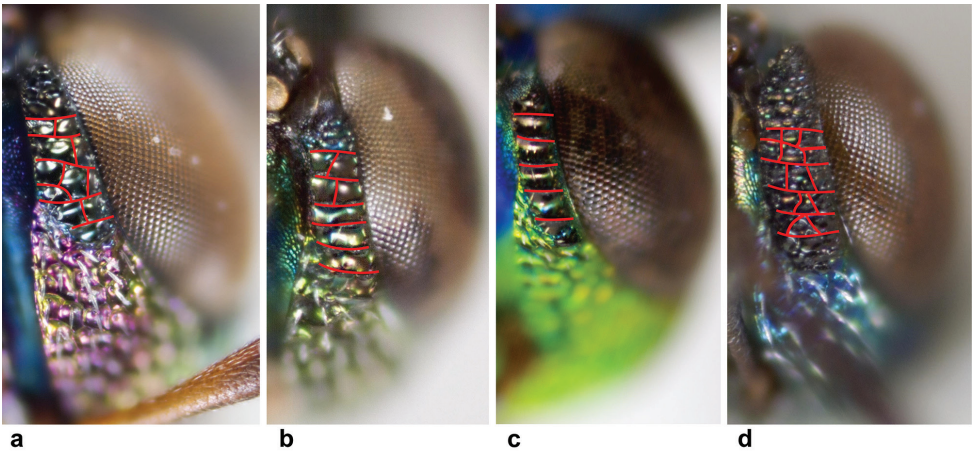

Figure 1. Four different types of corona structure in *Oodera*, in dorso-frontal view. Antennal scrobes are left of corona, eye is right of corona; **a** interrupted (exemplar species imaged: *O. namibiensis* sp. n.) **b** continuous (exemplar species imaged: *O. formosa*) **c** square (exemplar species imaged: *O. longicollis*) **d** three- to four-part (exemplar species imaged: *O. leibnizi* sp. n.). For additional definitions of corona types see main text.

We calculated a number of ratio characters to describe shape and dimensions of body parts, and assigned ratios to categories to allow easier diagnosis and use in the identification key. These ratios and categories – used throughout the text – are given in Table 2.

For morphological examination and measurements we used an Olympus SZX12-ILLK stereomicroscope with an eyepiece micrometer (1 mm divided in 100 units). Magnification ranged from 11.2× (16× eyepiece, 0.7× objective) to 144× (16× eyepiece, 9× objective). For photographs, we used a BK Lab Imaging system (Dun, Inc. 2016).

Photos were taken with a Canon EOS 7D, serially in 30 to 40 different focal distances. The camera was equipped with a Tamron Tele-Converter SP AF 1.4X, a Canon AC Adapter Kit ACK E6-(CBCB) and with different objectives (CF1B, CF2, CF3, CF4 or micro/macro-objective) that were selected depending on specimen or character size. For the lighting, the camera's own flash light and three movable light sources were used. A dull Plexiglas tube was placed over the specimen to avoid reflection from direct light.

Adobe Lightroom 5 was used for initial evaluation and for storing the photos. Then, the photos were stacked with Zerene Stacker and Helicon Focus and modified with GIMP 2.8.14 and Adobe Photoshop CS6. For scaling, photos of a 1 mm scale were made with all used objectives.

The image plates were made with PowerPoint 2010.

We examined a total of 115 specimens (24 males, 85 females, four of undetermined sex due to missing metasoma (= 113) plus two females examined from images). All 113 examined and measured specimens were given a unique code number referring to this study, composed of a species name abbreviation (e.g., OFo for *O. formosa*) and a consecutive number that was added to the specimen on a separate label. All measurements and calculated ratios for each specimen are given in Suppl. material 1.

Table 2. Characters and categories used in the text, with respecitive ranges of measured ratios.

Character	Categories and Ranges		
Body shape (mesonotum length/mesonotum width = mesoscutum width)	**robust**	**medium**	**slender**
	<1.4	1.4–1.44	>1.44
Head shape in lateral view (head height/head length)	**round**	**oval**	**elongated**
	<1.45	1.45–1.6	>1.6
Eye size (eye height/head height)	**small**		**large**
	<0.6		≥0.6
Corona shape (corona length/corona width)	**thick**	**medium**	**slim**
	<4.1	4.1–7.0	>7.0
Mesoscutellum shape (mesoscutellum length/mesoscutellum width)	**normal**		**slender**
	<0.75		≥0.75
Mesoscutellum anterior margin (part anterior to virtual transverse line between posterior margins of axillae/mesoscutellum length)	**hardly convex**		**convex**
	≤0.33		>0.33
Propodeum size (propodeum length/mesoscutum length)	**small**	**medium**	**large**
	<0.08	0.08–0.15	>0.15
Profemur shape (profemur length/profemur width)	**robust**	**medium**	**elongated**
	<1.99	2.0–2.2	>2.2
Marginal vein length (marginal vein length/postmarginal vein length)	**short**	**medium**	**long**
	<0.9	0.9–1.10	>1.10
Metasoma length (metasoma length/body length)	**short**	**medium**	**long**
	<0.46	0.46–0.5	>0.5
Ovipositor length (ovipositor length/metasoma length)	**short**		**rather long**
	<0.16		≥0.16
Body length (in mm)	**small**	**medium**	**large**
	<7.0	7.0–9.0	>9.0

Results

Oodera Westwood, 1874

Diagnosis. BOTH SEXES. Comparatively large-bodied (3.6–17 mm). Parascrobal area of head raised and with crest-like structure (= corona) (Fig. 1). Pronotum long and in dorsal view separated from mesothorax by distinct constriction, semicircularly strigulate (Figs 11–13). Mesonotum with mesoscutum and mesoscutellar-axillar complex fused, without flexible, transverse transscutal articulation; mesoscutum with notauli V-like sulcate and extending to base of mesoscutellum; axillae strongly advanced laterally (Figs 11–13). Mesothorax ventrally with membranous region anterior to each mesocoxa, enabling mesocoxae to rotate anteriorly. Profemur enlarged (Figs 2–4) and ventrally with comb of small teeth and strong black bristles.

FEMALE. Always with exserted part of ovipositor visible in dorsal view (Figs 2–4).

Description. For a detailed description of the genus see Gibson (2003). Only few characters given there need to be redescribed based on the material examined in this study:

Mesosoma. Pronotum in dorsal view appearing somewhat pentagonal or almost circular. Mesoscutellum sculpture variable dorsally, always with longitudinally strigose parts, with smoother, coriaceous apical rim distinguished by furrow or carina.

Wings. Postmarginal vein slightly shorter to slightly longer than marginal vein.

Metasoma. Length of ovipositor sheaths varying from less than 10% of metasoma length to 110% of metasoma length.

Note that some of the characters given by Gibson (2003) were not studied for all species because they were not visible in some specimens, including types, specifically ventral views of mesosoma.

Key to *Oodera* species

Note: If combinations of characters are given, connected with **and** and separated by comma (not semicolon), then **all** characters have to be present; in the alternative path at least one of the characters has to be different.

1 Ovipositor longer than 0.25× metasoma length; with bright blue or green colour on mesosoma (Fig. 3a, e) **2**

– Ovipositor distinctly shorter than 0.25× metasoma length; mesosoma not brightly coloured **3**

2(1) Ovipositor longer than metasoma; corona structure three- to four-part; body length >15 mm (Fig. 3a) ..... ***O. gracilis* Westwood** (Indonesia)

– Ovipositor shorter than metasoma; corona structure square; body length <15 mm (Fig. 3e) ..... ***O. longicollis* (Cameron)** (China, Indonesia, Malaysia, Myanmar, Philippines, Vietnam)

3(1) Head width about 7× eye distance (Fig. 3d); large-sized (>9.0 mm) .... ***O. madegassa* Bouček** (Madagascar)

– Head width at most 4.38× eye distance; usually small- to medium-sized (≤9.0 mm) **4**

4(3) Eyes small (eye height <0.6× head height), **and** head oval (head height 1.45–1.6× head length), **and** small-sized (<7.0 mm) **5**

– Different combination of characters **6**

5(4) Pronotum virtually round; profemur robust (profemur length <1.99× width) (Fig. 2b) ..... ***O. circularicollis* sp. n.** (Morocco)

– Pronotum pentagonal, with broadest part before midlength; profemur medium (profemur length 2.15× width) (Fig. 4f) ..... ***O. pumilae* Yang** (China)

6(4) Head round (height <1.45× length), **and** marginal vein long (marginal vein length >1.10× postmarginal vein length), **and** small-sized (<7.0 mm) **7**

– Different combination of characters **10**

7(6) Profemur elongated (profemur length >2.2× width); fore wing at least weakly infumate in part **8**

– Profemur medium (profemur length 2.0–2.2× width); fore wing hyaline (Fig. 2e) ..... ***O. florea* sp. n.** (Thailand)

8(7) Anterior margin of mesoscutellum convex (part anterior to imaginary transverse line connecting posterior margins of axillae more than 1/3 mesoscutellum length, 0.37–0.39); mesoscutellum completely lineate; pronotum pentagonal with posterior part hardly narrowing towards mesoscutum (Figs 2d, 14d) ..... ***O. fidelis* sp. n.** (Vietnam)

– Anterior margin of mesoscutellum hardly convex (part anterior to imaginary transverse line connecting posterior margins of axillae at most 1/3 mesoscutellum length, 0.17–0.33); mesoscutellum lineate only in anterior two thirds; pronotum oval or pentagonal, if pentagonal then with posterior part distinctly narrowing towards mesoscutum **9**

9(8) Pronotum oval (Fig. 4i); corona structure continuous (Figs 1b, 7i) .... ***O. tenuicollis* (Walker)** (Indonesia)

– Pronotum pentagonal with posterior part distinctly narrowing towards mesoscutum (Fig. 3d); corona structure three- to four-part (Fig. 1d) .... ***O. leibnizi* sp. n.** (Malaysia, Papua New Guinea, Philippines)

10(6) Body slender (mesonotum length 1.45× mesonotum width), **and** eyes large (eye height 0.64× head height), **and** marginal vein long (marginal vein length 1.17× postmarginal vein length) (Figs 2c, 8c)..... ..... ***O. felix* sp. n.** (Central African Republic)

– Different combination of characters..... **11**

11(10) Medium- to large-sized (≥7.0 mm), **and** either uniformly dark-coloured, or if not uniformly dark-coloured then fore wing hyaline..... **12**

– Small-sized (<7.0 mm) or if medium-sized (7.0–9.0 mm) then in part with distinct dark green or coppery colour and fore wing partly infumate..... **14**

12(11) Body robust or medium (mesonotum length ≤1.44× width) (Figs 4d, 13d); fore wing partly infumate (Fig. 4d) .... ***O. namibiensis* sp. n.** (Namibia)

– Body slender (mesonotum length >1.44× width) (Figs 4b, 13b); fore wing hyaline (Fig. 4b) **13**

13(12) Head and mesosoma uniformly black with tinges of dark green and purple (Figs 4b, 7b, 10b, 13b); head oval (head height 1.56× length); eyes large (eye height 0.63× head height) (Fig. 10b)..... ..... ***O. mkomaziensis* sp. n.** (Tanzania)

– Head and mesosoma dark blue and green-blue (Figs 2a, 5a, 8a, 11a); head round (head height 1.41× length); eyes small (eye height 0.57× head height) (Fig. 8a) ..... ***O. ahoma* (Mani & Kaul)** (India)

14(11) Head round (head height <1.45× length) or if oval (head height 1.45–1.6× length) then either mesoscutellum only partially lineate **and** fore wing partly infumate (some *O. formosa*) or mesoscutellum only partially lineate **and** with distinct blue on head and mesosoma (*O. srilankiensis* males)..... **15**

– Head oval or elongated (head height ≥1.45× length) and without other character combination..... **16**

15(14) Propodeum large (propodeum length >0.15× mesoscutum length) (Fig. 16h); fore wing hyaline (Fig. 4h); head and mesosoma blue or blue-green (Figs 7h, 10h, 13h) ..... ***O. srilankiensis* sp. n.** (Sri Lanka)

– Propodeum usually medium (propodeum length 0.08–0.15× mesoscutum length) (Fig. 14f); fore wing partly infumate (Fig. 2f); head and mesosoma dark green and coppery, without significant blue or blueish colour (Figs 5f, 8f, 11f) ..... ***O. formosa* (Giraud)** (Southern and Central Europe, Russia, eastern USA (introduced))

16(14) Marginal vein short (marginal vein length <0.9× postmarginal vein length), **and** propodeum medium to large (propodeum length ≥0.08× mesoscutum length), **and** fore wing hyaline, **and** mesoscutellum at least partly areolate or rugolose **17**

– Different combination of characters **18**

17(16) Mesoscutellum densely lineate in anterior half to two-thirds and areolate in posterior one-third to half (Fig. 16e); pronotum with broadest part before midlength (Fig. 13e) ..... ***O. niehuisorum* sp. n.** (Egypt, Israel)

– Mesoscutellum lineate in anterior two-thirds and rugulose in posterior one-third (Fig. 15c); pronotum broadest at midlength (Fig. 12c) .... ***O. hoggarensis* Hedqvist** (Algeria)

18(16) Marginal vein long (marginal vein length 1.19× postmarginal vein length); corona short (corona length 0.45× eye height) (Fig. 7g).. ***O. regiae* Yang** (China)

– Marginal vein short to medium (marginal vein length <1.07× postmarginal vein length); corona longer (corona length always >0.52× eye height) **19**

19(18) Fore wing hyaline (Fig. 3b); mesoscutellum completely densely lineate (Fig. 15b) ..... ***O. heikewernerae* sp. n.** (Botswana, South Africa)

– Fore wing partly infumate (Fig. 4a); mesoscutellum completely rippledly lineate (Fig. 16a) ..... ***O. magnifica* (Risbec)** (Senegal)

Oodera ahoma (Mani & Kaul, 1973)

Figs 2a, 5a, 8a, 11a, 14a

Lycisca ahoma Mani & Kaul, 1973: 53–55.
Oodera ahoma; Bouček et al. 1978: 448.

Diagnosis. FEMALE (N = 1). Medium-sized (8.40 mm). Head and mesosoma dark blue to green-blue. Fore wing hyaline. Body slender (mesonotum 1.51× as long as wide). Head round (1.41× as high as long). Eyes small (0.57× as high as head) (Fig. 8a). Corona medium (5.20× as long as wide), structure continuous (Fig. 5a). Pronotum pentagonal with posterior part distinctly narrowing towards mesoscutum, with broadest part before midlength (Fig. 11a). Mesoscutellum normal (0.70× as long as wide), anterior margin convex (part anterior to imaginary transverse line connecting posterior margins of axillae more than 1/3 of mesoscutellum length; 0.42), mesoscutellum line-

ate in anterior third to half, rugulose in posterior half or two thirds (Fig. 14a). Propodeum medium (0.13× as long as mesoscutum) (Fig. 14a). Profemur medium (2.04× as long as wide). Marginal vein long (1.13× as long as postmarginal vein). Metasoma medium (0.47× as long as body). Ovipositor short (0.11× as long as metasoma) (Fig. 2a).

Redescription. FEMALE. *Colour* (Figs 2a, 5a, 8a, 11a, 14a). Scape brown, darkening apically, rest of antenna dark brown. Procoxa dark brown, profemur dark green and blue, meso- and metafemur dark brown, tibiae light brown, tarsi yellow, except for brown last tarsal segments. Metasoma dark brown.

Head (Figs 5a, 8a). Face completely reticulate. Head 1.39× as wide as long. Head width 3.57× eye distance. Malar space 0.43× head height. Corona 0.71× as long as eye height. POL 0.75× OOL. Scape 2.31× as long as pedicel. Clava length to funicule length not available. Flagellum length to head width not available.

Mesosoma (Figs 11a, 14a). Pronotum 1.03× as long as wide. Pronotum 0.51× as long as mesonotum. Mesonotum 1.35× as long as mesoscutum. Mesoscutum 1.12× as long as wide. Mesoscutellum 0.35× as long as mesoscutum. Profemur 1.34× as long as protibia.

Wings (Fig. 2a). Fore wing 3.00× as long as wide. Costal cell 0.38× as long as fore wing. Marginal vein 0.20× as long as fore wing. Marginal vein 3.10× as long as stigmal vein. Postmarginal vein 2.76× as long as stigmal vein.

MALE. Unknown.

Material examined. ASIA. **India:** female holotype, Lumding, Assam, leg. R.O., 25.05.1942, det. Mani and Kaul as *Lycisca ahoma* (USNM) (OAh01).

Biology. Hosts may be *Agrilus* sp. (Buprestidae) (Noyes 2017) (unverified host record).

Distribution. India.

Oodera circularicollis **sp. n.**

http://zoobank.org/37D7A5DC-D3ED-430F-8A99-9CEA23091F7C

Figs 2b, 5b, 8b, 11b, 14b

Diagnosis. FEMALE (N = 3). Small-sized (5.88–6.48 mm). Head and mesosoma blackish with dark green, purple and yellow parts. Fore wing partly infumate. Body robust to medium (mesonotum 1.22–1.43× as long as wide). Head oval (1.45–1.51× as high as long). Eyes small (0.54–0.56× as high as head) (Fig. 8b). Corona thick (3.64–4.0× as long as wide), structure interrupted (Fig. 5b). Pronotum virtually round (Fig. 11b). Mesoscutellum normal to slender (0.64–0.76× as long as wide), anterior margin hardly convex or convex (part anterior to imaginary transverse line connecting posterior margins of axillae slightly less or more than 1/3 of mesoscutellum length; 0.32–0.35), mesoscutellum lineate in anterior two thirds, rugulose in posterior third (Fig. 14b). Propodeum medium (0.13–0.14× as long as mesoscutum) (Fig. 14b). Profemur robust (1.78–1.91× as long as wide). Marginal vein short to medium (0.88–0.94× as long as postmarginal vein). Metasoma medium (0.45–0.48× as long as body). Ovipositor short (0.12–0.15× as long as metasoma) (Fig. 2b).

Figure 2. Habitus (dorsal) I **a** *O. ahoma* (Mani & Kaul) (imaged specimen: OAh01, holotype) **b** *O. circularicollis* sp. n. (OCi01, holotype), **c** *O. felix* sp. n. (OFe01, holotype) **d** *O. fidelis* sp. n. (OFi01, holotype) **e** *O. florea* sp. n. (OFl01, holotype) **f** *O. formosa* (Giraud) (OFo13). Scale bars: 1 mm.

Figure 3. Habitus (dorsal) II **a** *O. gracilis* Westwood (imaged specimen: OGr01; ovipositor not visible in full length) **b** *O. heikewernerae* sp. n. (OHe01, holotype) **c** *O. hoggarensis* Hedqvist (OHo02, paratype) **d** *O. leibnizi* sp. n. (OLe01, holotype) **e** *O. longicollis* (Cameron) (OLo01) **f** *O. madegassa* Bouček (OMad01, holotype). Scale bars: 1 mm.

Description. FEMALE. *Colour* (Figs 2b, 5b, 8b, 11b, 14b). Scape yellow, darkening apically, rest of antenna dark brown. Procoxa and profemur light to dark green, all other parts of legs yellow to light brown. Metasoma black.

Head (Figs 5b, 8b). Face completely reticulate. Head 1.46–1.51× as wide as long. Head width 3.4× eye distance. Malar space 0.44–0.47× head height. Corona 0.62–0.71× as long as eye height. POL equal to OOL. Scape 2.52–2.86× as long as pedicel. Clava length to funicle length not available. Flagellum length to head width not available.

Mesosoma (Figs 11b, 14b). Pronotum 0.91× as long as wide. Pronotum 0.49–0.55× as long as mesonotum. Mesonotum 1.42–1.45× as long as mesoscutum. Mesoscutum

Figure 4. Habitus (dorsal) III **a** *O. magnifica* (Risbec) (imaged specimen: OMag01, holotype) **b** *O. mkomaziensis* sp. n. (OMk01, holotype) **c** *O. monstrum* syn. n. (OFo12, paratype) **d** *O. namibiensis* sp. n. (ONa01, holotype) **e** *O. niehuisorum* sp. n. (ONi01, holotype) **f** *O. pumilae* Yang (OPu01, paratype) **g** *O. regiae* Yang (ORe01, paratype) **h** *O. srilankiensis* sp. n. (OSr01, holotype) **i** *O. tenuicollis* (Walker) (OTe01, holotype). Scale bars: 1 mm.

0.86–0.98× as long as wide. Mesoscutellum 0.42–0.45× as long as mesoscutum. Profemur 1.21–1.29× as long as protibia.

Wings (Fig. 2b). Fore wing 2.67–2.89× as long as wide. Costal cell 0.35–0.38× as long as fore wing. Marginal vein 0.17–0.20× as long as fore wing. Marginal vein 2.5–3.53× as long as stigmal vein. Postmarginal vein 2.83–3.76× as long as stigmal vein.

MALE. Unknown.

Material examined. AFRICA. **Morocco**: female holotype, Granja del Muluya, Kebdana-Marruecos, leg. P. Alcaide VII. 1953, ex larva 'unreadable word' Punica, ex coll. V. Delucchi (NMBE) (OCi01); two female paratypes with same data (NMBE) (OCi02), (ZFMK) (OCi03).

Biology. Unknown. The label data point towards an association with *Punica* (pomegranate).

Distribution. Morocco.

Etymology. Named for its unusual, round pronotum.

***Oodera felix* sp. n.**
http://zoobank.org/2475099E-8892-4C89-8243-72FE741F76C9
Figs 2c, 5c, 8c, 11c, 14c

Diagnosis. FEMALE (N = 1). Medium-sized (7.20 mm). Head and mesosoma mostly blackish and dark greenish. Fore wing partly infumate. Body slender (mesonotum 1.45× as long as wide). Head oval (1.59× as high as long). Eyes large (0.64× as high as head) (Fig. 8c). Corona medium (4.80× as long as wide), structure continuous (Fig. 5c). Pronotum pentagonal with posterior part distinctly narrowing towards mesoscutum, roof-like, with broadest part behind midlength (Fig. 11c). Mesoscutellum slender (0.80× as long as wide), anterior margin convex (part anterior to imaginary transverse line connecting posterior margins of axillae more than 1/3 of mesoscutellum length; 0.38), mesoscutellum lineate in anterior two thirds, finely areolate in posterior third (Fig. 14c). Propodeum medium (0.14× as long as mesoscutum) (Fig. 14c). Profemur medium (2.08× as long as wide). Marginal vein long (1.17× as long as postmarginal vein). Metasoma short (0.43× as long as body). Ovipositor short (0.10× as long as metasoma) (Fig. 2c).

Description. FEMALE. *Colour* (Figs 2c, 5c, 8c, 11c, 14c). Scape, pedicel and first funicle segment yellow, darkening apically, rest of antenna dark brown. Procoxa and profemur black, all other parts of legs light brown with yellow joints, tarsi yellow, except for brown last tarsal segments. Metasoma brown.

Head (Figs 5c, 8c). Face completely reticulate. Head 1.54× as wide as long. Head width 3.72× eye distance. Malar space 0.36× head height. Corona 0.68× as long as eye height. POL 1.20× OOL. Scape 2.41× as long as pedicel. Clava 0.18× as long as funicle. Flagellum 1.47× as long as head width.

Mesosoma (Figs 11c, 14c). Pronotum as long as wide. Pronotum 0.55× as long as mesonotum. Mesonotum 1.80× as long as mesoscutum. Mesoscutum 1.05× as long as wide. Mesoscutellum 0.38× as long as mesoscutum. Profemur 1.28× as long as protibia.

Wings (Fig. 2c). Fore wing 3.20× as long as wide. Costal cell 0.34× as long as fore wing. Marginal vein 0.22× as long as fore wing. Marginal vein 3.50× as long as stigmal vein. Postmarginal vein 3.0× as long as stigmal vein.

MALE. Unknown.

Material examined. AFRICA. **Central African Republic**: female holotype, Prefecture Sangha-Mbaéré, Parc Ntional de Dzanga-Ndoki, 38.6 km 173 °S Lidjombo, leg. S. van Noort, 26–27.05.2001 (SAMC) (OFe01).

Biology. Unknown.

Distribution. Central African Republic.

Etymology. Named after the Latin adjective *felix*, meaning lucky.

Taxonomic remarks. Unfortunately, the holotype was damaged during examination for this study (metasoma detached from body). The images show the still undamaged specimen.

***Oodera fidelis* sp. n.**
http://zoobank.org/80A1EAF4-0C4C-4685-8A0A-399CA3CD9169
Figs 2d, 5d, 8d, 11d, 14d

Diagnosis. BOTH SEXES (N = 3). Small-sized (6.48–6.80 mm). Head and mesosoma dark green to blue. Fore wing partly infumate. Body robust to slender (mesonotum 1.29–1.47× as long as wide). Head round (1.33–1.41× as high as long). Eyes large (0.61–0.67× as high as head) (Fig. 8d). Corona medium to thick (4.00–6.00× as long as wide), structure continuous (Fig. 4d). Pronotum pentagonal with posterior part hardly narrowing towards mesoscutum, with broadest part before midlength (Fig. 11d). Mesoscutellum slender (0.75–0.87× as long as wide), anterior margin convex (part anterior to imaginary transverse line connecting posterior margins of axillae more than 1/3 of mesoscutellum length; 0.37–0.39), mesoscutellum completely lineate, with median lines converging (Fig. 14d). Propodeum large (0.19–0.20× as long as mesoscutum) (Fig. 14d). Profemur elongated (2.23–2.51× as long as wide). Marginal vein long (1.11–1.19× as long as postmarginal vein).

FEMALE. Metasoma medium (0.45–0.46× as long as body). Ovipositor short (0.13–0.13× as long as metasoma) (Fig. 2d).

Description. BOTH SEXES. *Colour* (Figs 2d, 5d, 8d, 11d, 14d). Scape yellow, darkening apically, rest of antenna dark brown. Procoxa and profemur dark green, all other parts of legs dark yellow, except for brown meso- and metafemur. Metasoma brown.

Head (Figs 5d, 8d). Face completely reticulate. Head 1.39–1.45× as wide as long. Head width 3.18–3.66× eye distance. Malar space 0.33–0.37× head height. Corona 0.57–0.76× as long as eye height. POL 0.6–1.00× OOL. Scape 2.18–2.86× as long as pedicel. Clava 0.14–0.18× as long as funicle. Flagellum 1.29–1.50× as long as head width.

Mesosoma (Figs 11d, 14d). Pronotum 0.83–1.10× as long as wide. Pronotum 0.44–0.64× as long as mesonotum. Mesonotum 1.44–1.47× as long as mesoscutum. Mesoscutum 0.89–1.02× as long as wide. Mesoscutellum 0.44–0.47× as long as mesoscutum. Profemur 1.27–1.43× as long as protibia.

Wings (Fig. 2d). Fore wing 2.80–2.97× as long as wide. Costal cell 0.35–0.40× as long as fore wing. Marginal vein 0.20–0.21× as long as fore wing. Marginal vein 2.95–3.64× as long as stigmal vein. Postmarginal vein 2.11–3.27× as long as stigmal vein.

Material examined. ASIA. **Vietnam**: female holotype, Ha Tinh Huong son, 900 m, 18°22'N/105°13'E, leg. L. Herman, MT, 05.05.1998 (CNC) (OFi01); two male paratypes, Ha Tinh Huong son, 900 m, 18°22'N/105°13'E, leg. L. Herman, MT, 18.–28.5.1998 (CNC) (OFi02), (ZFMK) (OFi03).

Biology. Unknown.

Distribution. Vietnam.

Etymology. Named after the latin adjective *fidelis*, meaning faithful, because of the distinct blueish colour of head and mesosoma and blue being the symbolic colour of trust.

Figure 5. Head (frontal) I **a** *O. ahoma* (Mani & Kaul) (imaged specimen: OAh01, holotype) **b** *O. circularicollis* sp. n. (OCi01, holotype) **c** *O. felix* sp. n. (OFe01, holotype) **d** *O. fidelis* sp. n. (OFi01, holotype) **e** *O. florea* sp. n. (OFl01, holotype) **f** *O. formosa* (Giraud) (OFo03). Scale bars: 1 mm.

Oodera florea sp. n.

http://zoobank.org/65A161CA-A576-4882-BE2F-E45327ED51A6

Figs 2e, 5e, 8e, 11e, 14e

Diagnosis. FEMALE (N = 1). Small-sized (4.80 mm). Head and mesosoma dark green and green-blue. Fore wing hyaline. Body robust (mesonotum 1.32× as long as wide). Head round (1.41× as high as long). Eyes large (0.66× as high as head) (Fig. 8e). Corona medium (5.83× as long as wide), structure continuous (Fig. 5e). Pronotum oval and wider than long, with broadest part at midlength (Fig. 11e). Mesoscutellum normal (0.72× as long as wide), anterior margin hardly convex (part anterior to imaginary transverse line connecting posterior margins of axillae less than 1/3 of mesoscutellum length; 0.28), mesoscutellum lineate in anterior third, areolate in posterior two thirds (Fig. 14e). Propodeum large (0.18× as long as mesoscutum) (Fig. 14e). Profemur medium (2.08× as long as wide). Marginal vein long (1.25× as long as postmarginal vein). Metasoma medium (0.49× as long as body). Ovipositor short (0.12× as long as metasoma) (Fig. 2e).

Description. FEMALE. *Colour* (Figs 2e, 5e, 8e, 11e, 14e). Scape yellow, darkening apically, rest of antenna dark brown. Procoxa and profemur light green, all other parts of legs dark brown with yellow joints and tarsi, except for brown last tarsal segments. Metasoma dark brown.

Figure 6. Head (frontal) II **a** *O. gracilis* Westwood (imaged specimen: OGr01) **b** *O. heikewernerae* sp. n. (OHe01, holotype) **c** *O. hoggarensis* Hedqvist (OHo02, paratype) **d** *O. leibnizi* sp. n. (OLe03, paratype) **e** *O. longicollis* (Cameron) (OLo01) **f** *O. madegassa* Bouček (OMad01, holotype). Scale bars: 1 mm.

Head (Figs 5e, 8e). Face completely reticulate. Head 1.41× as wide as long. Head width 3.76× eye distance. Malar space 0.34× head height. Corona 0.67× as long as eye height. POL 1.67× OOL. Scape 2.43× as long as pedicel. Clava length to funicle length not available. Flagellum length to head width not available.

Mesosoma (Figs 11e, 14e). Pronotum 0.92× as long as wide. Pronotum 0.52× as long as mesonotum. Mesonotum 1.45× as long as mesoscutum. Mesoscutum 0.91× as long as wide. Mesoscutellum 0.45× as long as mesoscutum. Profemur 1.37× as long as protibia.

Wings (Fig. 2e). Fore wing 3.33× as long as wide. Costal cell 0.36× as long as fore wing. Marginal vein 0.21× as long as fore wing. Marginal vein 3.16× as long as stigmal vein. Postmarginal vein 2.53× as long as stigmal vein.

MALE. Unknown.

Material examined. ASIA. **Thailand:** female holotype, Loei, Phu Kradueng NP, labelled "Deciduous", leg. S. Glong-lasae, 02–10.10.2006 (CNC) (OFl01).

Biology. Unknown.

Distribution. Thailand.

Etymology. Named after the latin adjective *florea*, meaning flowery. The species is, in our subjective view, particularly beautiful and flimsy, like a flower.

***Oodera formosa* (Giraud, 1863)**
Figs 2f, 5f, 8f, 11f, 14f

Heydenia formosa Giraud, 1863: 21–22.
Stellophora formosa; Hedqvist 1957: 44–46.
Oodera formosa; Bouček 1958: 375.
Oodera bestia Nikol'skaya, 1952: 487–488. Synonymy by Bouček 1958: 375–380.
Oodera monstrum Nikol'skaya, 1952: 487–488, **syn. n.** (Figs 4c, 7c, 10c, 13c, 16c)

Diagnosis. BOTH SEXES (N = 35). Usually small-sized (3.60–7.12 mm, with only 1 of 27 medium-sized). Head and mesosoma dark green and coppery. Fore wing partly infumate. Body robust to slender (mesonotum 1.19–1.47× as long as wide). Head usually round (1.30–1.48× as high as long, with only 3 of 32 with head oval). Eyes usually large (0.55–0.68× as high as head, with only 4 of 32 with eyes small) (Fig. 8f). Corona thick to medium (3.20–6.67× as long as wide), structure continuous (Fig. 5f). Pronotum pentagonal with posterior part distinctly narrowing towards mesoscutum, with broadest part at midlength (Fig. 11f). Mesoscutellum normal to slender (0.63–0.95× as long as wide), anterior margin usually convex (part anterior to imaginary transverse line connecting posterior margins of axillae more than 1/3 mesoscutellum length; 0.24–0.47, with only 8 of 32 with anterior margin of mesoscutellum hardly convex), mesoscutellum lineate in anterior half to anterior two-thirds, with median lines converging, rugulose in posterior half or third (Fig. 14f). Propodeum usually medium (0.08–0.18× as long as mesoscutum, with only 5 of 28 with propodeum large) (Fig. 14f). Profemur usually medium to elongated (1.94–2.33× as long as wide, with only 5 of 31 with profemur robust). Marginal vein short to medium (0.85–1.00× as long as postmarginal vein).

FEMALE. Metasoma short to long (0.43–0.55× as long as body). Ovipositor usually short (0.09–0.17× as long as metasoma, with only 2 of 26 with metasoma rather long) (Fig. 2f).

Redescription. BOTH SEXES. *Colour* (Figs 2f, 5f, 8f, 11f, 14f). Scape yellow, darkening apically, rest of antenna dark brown. Procoxa and profemur dark green, all other parts of legs dark brown, except for brown last tarsal segments. Metasoma brown to black.

Head (Figs 5f, 8f). Face completely reticulate. Head 1.29–1.73× as wide as long. Head width 3.00–3.78× eye distance. Malar space 0.33–0.45× head height. Corona 0.56–0.84× as long as eye height. POL 0.5–1.33× OOL. Scape 1.95–3.16× as long as pedicel. Clava 0.13–0.20× as long as funicle. Flagellum 1.12–1.66× as long as head width.

Mesosoma (Figs 11f, 14f). Pronotum 0.86–1.05× as long as wide. Pronotum 0.49–0.64× as long as mesonotum. Mesonotum 1.38–1.55× as long as mesoscutum. Mesoscutum 0.82–1.02× as long as wide. Mesoscutellum 0.38–0.55× as long as mesoscutum. Profemur 1.19–1.71× as long as protibia.

Wings (Fig. 2f). Fore wing 2.56–3.86× as long as wide. Costal cell 0.28–0.39× as long as fore wing. Marginal vein 0.17–0.21× as long as fore wing. Marginal vein

2.24–4.25× (2.24–3.29× if two outliers with very short stigmal vein are removed) as long as stigmal vein. Postmarginal vein 2.40–4.50× (2.40–3.29× if two outliers with very short stigmal vein are excluded) as long as stigmal vein.

Material examined. EUROPE. **Bulgaria**: male, Slencev Brjag, leg. Kocourek, 26.07.1968, det. Z. Bouček 1976 (BMNH) (OFo04). **France**: female, Landes, leg. Reinhard, det. Z. Bouček 1958 (MFNB) (OFo03). **Germany**: three females, MTB 6315 Flörsheim-Dalsheim, Rheinland-Pfalz, BRD RP 49°39'16"N–8°12'51"E, „Garten am Haus“, leg. G. Reder, 11.06, 19.06 and 04.07.2014 (ZFMK) (OFo33-35). **Romania**: female, Herculeana, leg. T.E. Leiler, 1921 (BMNH) (OFo07). **Russia**: male paratype *O. monstrum*, Taganrog, leg. K. Anger, 20.06.1929, det. N. Nikol'skaya (BMNH) (OFo12); female holotype *O. monstrum*, USSR, VI.1935 (ZIRAS, examined from photographs); female syntype *O. bestia*, Ul'yanovsk Aksinin, 19.04.1905 (ZIRAS, examined from photographs); female, USSR, Adigea, Soci, leg. K. Pospisil, 23.06.1957, det. Z. Bouček 1958 (BMNH) (OFo13). **Slovenia**: two males, one ? sex, Vipava, Carniolia, Wippach, leg. Handl, 16.07.1986, det. Z. Bouček 1958 (NHMW) (OFo09-11). **Spain**: female, Villaviciosa, 8.1969 (BMNH) (OFo08). **Switzerland**: female, Genève, Miolan, leg. C. Besuchet, 07.08.1991, det. H. Baur 1994 (NMBE) (OFo03). **Turkey**: female, G.antep, Gaziantep, leg. M Yasar Celik, 14.07.1971 (MNP) (OFo32). Former **Yugoslavia**: two females, leg. T.E. Leiler, 1955 (BMNH) (OFo05-06); **without location**: female holotype *O. formosa*, labelled "*Heydenia formosa* Gir." (plus unreadable addition) (MNHN) (OFo01). NORTH AMERICA. **Canada**: Ontario: female, Ottawa, Fletcher Garden, 45°23'11.58"N, 75°42'12.84"W, Boudreault, Goulet &Ferdandez, 28.VII–18.VIII.2016, MT (CNC) (collected subsequent to study, not included in diagnosis and description, no specimen ID assigned). **USA:** Kentucky: female, Owen County, Herndorn Farm, Hym Institute, 22.06–08.07.2009 (CNC) (OFo31). New Jersey: 11 females, one ? sex, Camden County, Merchantville, leg. H.A. Hespenheide, 1969 (CNC) (OFo19-30). Virginia: five females, Clarke County, Univ. Va. Blandy Exptl. Farm 2 miD Boyce, leg. D.R. Smith, 17.–30.06.1993, 01.–14.07.1993, 25.06–05.07.1994 and 25.07.–08.08.1995 (CNC) (OFo14-18).

Biology. Hosts: Buprestidae (*Agrilus* sp., *A. graminis*, *A. suvorovi*, *A. viridis*, *Capnodis* sp.), Cleridae (*Tillus unifaciatus*), Ptinidae (*Ptinus germanus*), Scolytinae (*Hylesinus* sp.); Plant associates: Fabaceae (*Robinia* sp.). The host and associates records are taken from Noyes (2017) (and references therein) and are not verified.

Distribution. Southern and Central Europe, northernmost location in Germany, Rhineland-Palatinate, representing first record from Germany; Russia. Introduced to the eastern United States (Kentucky, Virginia, New Jersey) and recently found in eastern Canada (Ontario).

Taxonomic remarks. Comparison of the female holotype (examined from images) and the male paratype of *O. monstrum* (Figs 4c, 7c, 10c, 13c, 16c) with the holotype of *O. formosa* indicates the specimens are conspecific, resulting in the new synonymy of *O. monstrum* under *O. formosa*. The characters used by Nikol'skaja (1952) to separate *O. monstrum* and *O. formosa* (as *O. bestia*) cannot be confirmed as valid. The first diagnostic character used to differentiate *O. monstrum* from *O.*

Figure 7. Head (frontal) III **a** *O. magnifica* (Risbec) (imaged specimen: OMag01, holotype) **b** *O. mkomaziensis* sp. n. (OMk01, holotype) **c** *O. monstrum* syn. n. (OFo12, paratype) **d** *O. namibiensis* sp. n. (ONa01, holotype) **e** *O. niehuisorum* sp. n. (ONi01, holotype) **f** *O. pumilae* Yang (OPu01, paratype) **g** *O. regiae* Yang (ORe01, paratype) **h** *O. srilankiensis* sp. n. (OSr01, holotype) **i** *O. tenuicollis* (Walker) (OTe01, holotype). Scale bars: 1 mm.

formosa was "pedicel length of first funicular segment" (interpreted as pedicel being as long as first funicular segment) versus "pedicel slightly longer than first funicular segment". This variation is characteristic of almost all *Oodera* species. The second character, "ovipositor shorter than first hind tarsal segment" versus "equal in length to first hind tarsal segment" is equally variable in *O. formosa*. Other differences between the two putative species included colour differences of the body, metasoma, antennae and legs. We found the rather slight differences in colouration to be within the variation of what we interpret as *O. formosa*. In general, differences in intensity or hue of colour, especially in the weaker sclerotised parts such as legs, antennae, and metasoma, are mostly unsuitable to differentiate between species in

Figure 8. Head (lateral) I **a** *O. ahoma* (Mani & Kaul) (imaged specimen: OAh01, holotype) **b** *O. circularicollis* sp. n. (OCi01, holotype) **c** *O. felix* sp. n. (OFe01, holotype) **d** *O. fidelis* sp. n. (OFi01, holotype) **e** *O. florea* sp. n. (OFl01, holotype) **f** *O. formosa* (Giraud) (OFo06). Scale bars: 1 mm.

Chalcidoidea (e.g., Peters and Baur 2011), though differences in colour pattern of different structures can be important. Bouček (1958) provided some more characters to differentiate *O. monstrum*, which he considered a valid species, and *O. formosa*. These differences, mainly of the surface sculpture of the head and mesoscutellum are accurate when examining the respective type specimens. However, we consider the differences to constitute intraspecific variation when taking into account all specimens we include in *O. formosa*. In all additional diagnostic characters we use in this revision, there is no difference between *O. monstrum* and *O. formosa*. The synonymy of *O. bestia* Nikol'skaja, 1952 under *O. formosa* by Bouček (1958) is confirmed after examination of one of the syntypes.

The specimens from North America were assumed to be *O. formosa* by Gibson (2003). Our examination of a number of specimens from North America and com-

parison with European *O. formosa*, including the holotype, revealed that the North American specimens are in fact introduced *O. formosa*.

In general, we found distinguishing *O. formosa* from many other species of *Oodera* to be rather difficult. This is mainly due to the fact that *O. formosa* is the only species of *Oodera* represented by a significant number of specimens from several series (except for *O. longicollis* (Cameron) which is, however, very easily distinguished from all other *Oodera* species). The specimens show intraspecific variation that can be quite staggering for some characters. Only examination of this larger series allowed us to recognise the variation as intraspecific. For many other species, only single or a few specimens were available or (small) uniform series that originate from the same host or region. The variation of *O. formosa* is reflected in several diagnostic characters for which we add the term "usually" if the vast majority of examined specimens exhibits this character but a minority does not. We made these additions (also in the diagnoses of few other species) to make diagnoses and key more easily applicable for the reader. With a combination of characters, *O. formosa* is well separated from all other species.

Oodera gracilis **Westwood, 1874**

Figs 3a, 6a, 9a, 12a, 15a

Oodera gracilis Westwood, 1874: 145.

Diagnosis. FEMALE (N = 1). Large-sized (17.00 mm). Head and mesosoma bright dark blue and green-blue with blackish parts. Fore wing partly infumate. Body slender (mesonotum 1.45× as long as wide). Head elongated (1.67× as high as long). Eyes large (0.60× as high as head) (Fig. 9a). Corona thick (3.32× as long as wide), structure three- to four-part (Fig. 6a). Pronotum oval and longer than wide, with broadest part at midlength (Fig. 12a). Mesoscutellum slender (0.82× as long as wide), anterior margin convex (part anterior to imaginary transverse line connecting posterior margins of axillae more than 1/3 of mesoscutellum length; 0.37), mesoscutellum completely rugose without clear structure, medial part shiny (Fig. 15a). Propodeum medium (0.08× as long as mesoscutum) (Fig. 15a). Profemur elongated (2.31× as long as wide). Marginal vein short (0.67× as long as postmarginal vein). Metasoma long (0.56× as long as body). Ovipositor very long (1.16× as long as metasoma) (Fig. 3a).

Redescription. FEMALE. *Colour* (Figs 3a, 6a, 9a, 12a, 15a). Scape with first half yellow and second half dark brown, rest of antenna dark brown. Procoxa and profemur blue, middle leg completely black, hind leg black with proximal 4/5 of femur orange. Metasoma black and blue.

Head (Figs 6a, 9a). Face transversely striate from parascrobal area at lower third of eye height to clypeus margin. Head width to length not available. Head width to eye distance not available. Malar space 0.40× head height. Corona 0.60× as long as eye height. POL 0.77× OOL. Scape 2.90× as long as pedicel. Clava length to funicle length not available. Flagellum length to head width not available.

Mesosoma (Figs 12a, 15a). Pronotum 0.86× as long as wide. Pronotum 0.42× as long as mesonotum. Mesonotum 1.43× as long as mesoscutum. Mesoscutum 1.02× as long as wide. Mesoscutellum 0.43× as long as mesoscutum. Profemur 1.30× as long as protibia.

Wings (Fig. 3a). Fore wing 3.27× as long as wide. Costal cell 0.39× as long as fore wing. Marginal vein 0.16× as long as fore wing. Marginal vein 3.50× as long as stigmal vein. Postmarginal vein 5.25× as long as stigmal vein.

MALE. Unknown.

Material examined. ASIA. **Indonesia** (North Sulawesi): female, Indonesia, Sulawesi Utara, Dumoga-Bone N.P., leg. G. Else, 09.06.1985, det. Z. Bouček (compared with holotype in Oxford Museum) (BMNH) (OGr01).

Biology. Unknown.

Distribution. Indonesia (Sulawesi), West Papua.

Taxonomic remarks. We did not examine the type (described from West Papua). However, the uniqueness of the species and the fact that we examined a specimen compared to the type by Bouček allow us to include this species in the taxonomic revision.

***Oodera heikewernerae* sp. n.**
http://zoobank.org/CB445D43-EB36-4A23-BF8B-88F7325FF125
Figs 3b, 6b, 9b, 12b, 15b

Diagnosis. BOTH SEXES (N = 12). Head and mesosoma mostly blackish with blue and coppery parts. Fore wing hyaline. Body robust to medium (mesonotum 1.22–1.40× as long as wide). Head usually oval (1.45–1.65× as high as long, with only 3 of 12 with head elongated). Eyes small to large (0.58–0.67× as high as head) (Fig. 9b). Corona thick to medium (3.80–5.33× as long as wide), structure continuous (Fig. 6b). Pronotum pentagonal with posterior part distinctly narrowing towards mesoscutum, with broadest part before midlength (Fig. 12b). Mesoscutellum normal to slender (0.58–0.77× as long as wide), anterior margin usually convex (part anterior to imaginary transverse line connecting posterior margins of axillae more than 1/3 of mesoscutellum length; 0.26–0.47, with only 2 of 12 with anterior margin hardly convex), mesoscutellum completely densely lineate (Fig. 15b). Propodeum small to medium (0.05–0.14× as long as mesoscutum) (Fig. 15b). Marginal vein usually medium (0.83–1.06× as long as postmarginal vein, with only 1 of 12 with short marginal vein).

FEMALE. Small-sized (5.31–6.64 mm). Profemur robust to medium (1.71–2.04× as long as wide). Metasoma short to medium (0.39–0.47× as long as body). Ovipositor short to rather long (0.12–0.18× as long as metasoma) (Fig. 3b).

MALE. Body length not available. Profemur elongated (2.29× as long as wide).

Description. BOTH SEXES. *Colour* (Figs 3b, 6b, 9b, 12b, 15b). Scape yellow, darkening apically, rest of antenna dark brown. Procoxa and profemur black with tinge of blue, all other parts of legs yellow to brown. Metasoma brown.

Figure 9. Head (lateral) II **a** *O. gracilis* Westwood (imaged specimen: OGr01) **b** *O. heikewernerae* sp. n. (OHe01, holotype) **c** *O. hoggarensis* Hedqvist (OHo02, paratype) **d** *O. leibnizi* sp. n. (OLe03, paratype) **e** *O. longicollis* (Cameron) (OLo01) **f** *O. madegassa* Bouček (OMad01, holotype). Scale bars: 1 mm.

Head (Figs 6b, 9b). Face completely reticulate. Head 1.45–1.75× as wide as long. Head width 3.13–4.00× eye distance. Malar space 0.34–0.42× head height. Corona 0.53–0.67× as long as eye height. POL 0.75–1.6× OOL. Scape 2.33–3.32× as long as pedicel. Clava 0.13–0.20× as long as funicle. Flagellum 1.3–1.51× as long as head width.

Mesosoma (Figs 12b, 15b). Pronotum 0.77–1.07× as long as wide. Pronotum 0.50–0.59× as long as mesonotum. Mesonotum 1.33–1.46× as long as mesoscutum. Mesoscutum 0.87–1.05× as long as wide. Mesoscutellum 0.33–0.46× as long as mesoscutum. Profemur 1.17–1.4× as long as protibia.

Wings (Fig. 3b). Fore wing 2.67–3.52× as long as wide. Costal cell 0.31–0.4× as long as fore wing. Marginal vein 0.15–0.20× as long as fore wing. Marginal vein 2.5–4.00× as long as stigmal vein. Postmarginal vein 2.67–4.21× as long as stigmal vein.

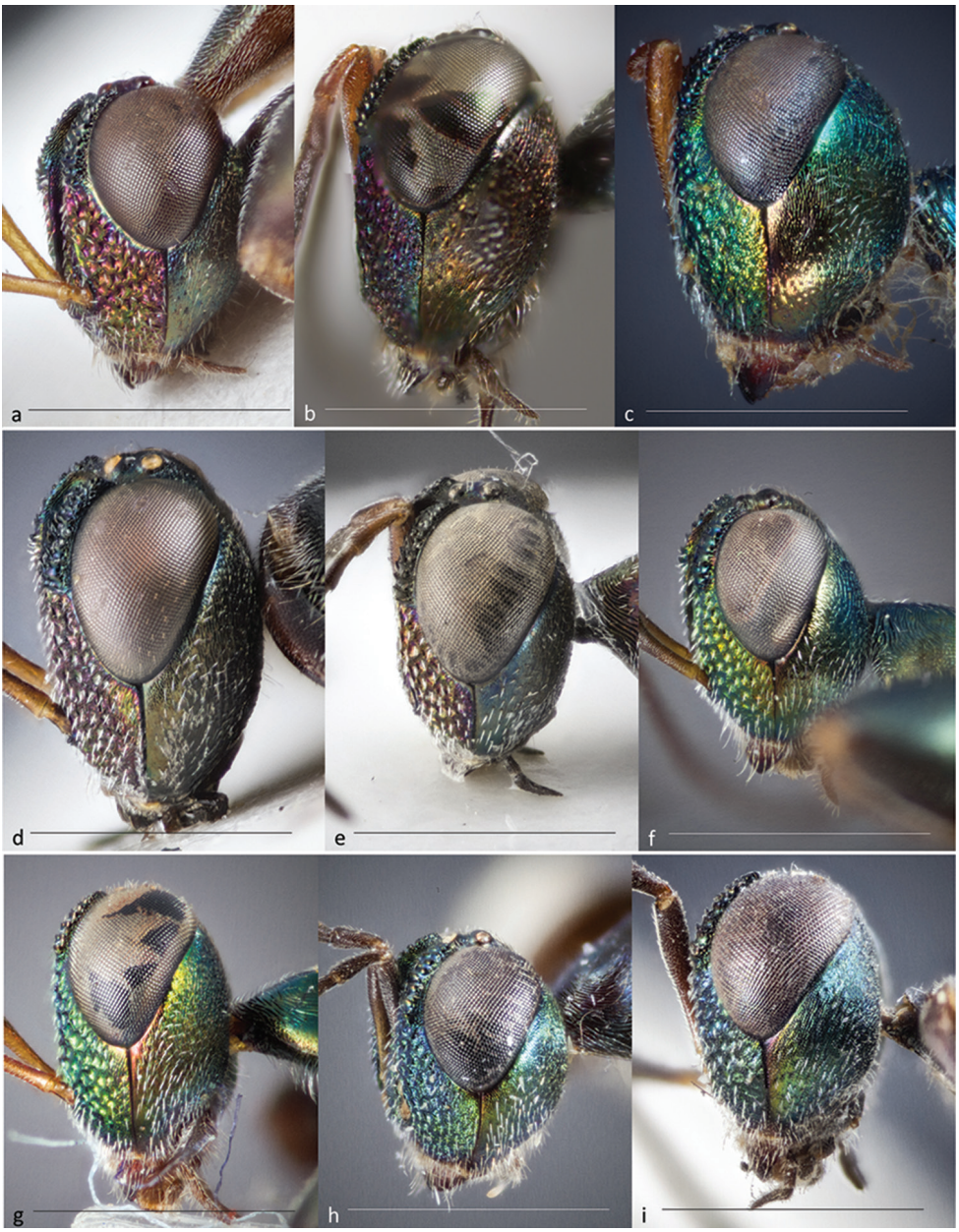

Figure 10. Head (lateral) III **a** *O. magnifica* (Risbec) (imaged specimen: OMag01, holotype) **b** *O. mkomaziensis* sp. n. (OMk01, holotype) **c** *O. monstrum* syn. n. (OFo12, paratype) **d** *O. namibiensis* sp. n. (ONa01, holotype) **e** *O. niehuisorum* sp. n. (ONi01, holotype) **f** *O. pumilae* Yang (OPu01, paratype) **g** *O. regiae* Yang (ORe01, paratype) **h** *O. srilankiensis* sp. n. (OSr01, holotype) **i** *O. tenuicollis* (Walker) (OTe01, holotype). Scale bars: 1 mm.

Material examined. AFRICA. **Botswana**: female holotype, Serowe, Farmer's Brigade, leg. P. Forchhammer, MT, XII. 1987 (CNC) (OHe01); three female paratypes, Serowe, Farmer's Brigade, leg. P. Forchhammer, MT, XII. 1992 (CNC) (OHe03-04), (ZFMK) (OHe09); female paratype, Serowe, Farmer's Brigade, leg. P. Forchhammer, MT, I. 1993 (CNC) (OHe08); female paratype, Serowe, Farmer's Brigade, leg. P. Forchhammer, MT, XII. 1987 (CNC) (OHe10); female paratype, Botswana (B9) Lake Ngami 2900 12 m. NE Sehitwa, 17.04.1972 (NMP) (OHe11); **Republic of South Africa**: male paratype, E. Transvaal 15km NW Klaserie Guernsey Farm M. FITs, Woodland, leg. S. & J. Peck, 19–31.07.1985 (CNC) (OHe02); female paratype, E. Transvaal, 15km NW Klaserie, Guernsey Farm, M. FITs, leg. W. Mason, 19–31.12.1985 (CNC) (OHe05); female paratype, Cape Prov. Roaring Sands Resort nr. Witsand, leg. J. Londt, 17–18.08.1982 (CNC) (OHe06); female paratype, E. Transvaal, 15km NW Klaserie, yellow, leg. M. Sandborne, 19–31.12.1985 (CNC) (OHe07); female paratype, Natal. Weenen., H.P. Thomasset, 11.1925–3.1929 (NMP) (OHe12).

Biology. Unknown.

Distribution. Botswana and South Africa.

Etymology. Named in memory of Heike Werner, the mother of the first author, who sadly passed away during completion of this revision.

Oodera hoggarensis Hedqvist, 1967

Figs 3c, 6c, 9c, 12c, 15c

Oodera hoggarensis Hedqvist, 1967: 186

Diagnosis. FEMALE (N = 2). Exact body length not available (both specimens are fragmented), roughly small-sized. Head and mesosoma blackish with light green, purple and yellow parts. Fore wing hyaline. Body robust (mesonotum 1.16–1.2× as long as wide). Head oval (1.52–1.54× as high as long). Eyes small to large (0.59–0.64× as high as head) (Fig. 9c). Corona thick (4.10–4.75× as long as wide), structure continuous (Fig. 6c). Pronotum pentagonal with posterior part distinctly narrowing towards mesoscutum, with broadest part at midlength (Fig. 12c). Mesoscutellum normal (0.55–0.57× as long as wide), anterior margin hardly convex (part anterior to imaginary transverse line connecting posterior margins of axillae less than 1/3 of mesoscutellum length; 0.28–0.29), lineate in anterior two thirds, rugulose in posterior third (Fig. 15c). Propodeum medium to large (0.14–0.18× as long as mesoscutum) (Fig. 15c). Profemur robust (1.79–1.97× as long as wide). Marginal vein short (0.86–0.88× as long as postmarginal vein). Metasoma length not available. Ovipositor short (0.14× as long as metasoma) (Fig. 3c).

Redescription. FEMALE. *Colour* (Figs 3c, 6c, 9c, 12c, 15c). Scape and pedicel yellow, rest of antenna dark brown. Procoxa dark green, profemur dark green and yellow, all other parts of legs yellow, except for tarsi brown. Metasoma dark brown, with lateral green regions on tergites 3 and 4.

Head (Figs 6c, 9c). Face completely reticulate. Head 1.46–1.52× as wide as long. Head width 3.52× eye distance. Malar space 0.35–0.41× head height. Corona 0.63–0.69× as long as eye height. POL 1.20× OOL. Scape 2.73–2.81× as long as pedicel. Clava length to funicle length not available. Flagellum length to head width not available.

Mesosoma (Figs 12c, 15c). Pronotum 0.88× as long as wide. Pronotum 0.59× as long as mesonotum. Mesonotum 1.40–1.46× as long as mesoscutum. Mesoscutum 0.80–0.86× as long as wide. Mesoscutellum 0.40–0.46× as long as mesoscutum. Profemur 1.23–1.33× as long as protibia.

Wings (Fig. 3c). Fore wing 2.83–3.13× as long as wide. Costal cell 0.34–0.36× as long as fore wing. Marginal vein 0.18–0.19× as long as fore wing. Marginal vein 2.82–3.29× as long as stigmal vein. Postmarginal vein 3.29–3.76× as long as stigmal vein.

MALE. Unknown.

Material examined. AFRICA. **Algeria:** female holotype, Timesdelssine, Hoggar, leg. J. Mateu, 23.05.1962, det. K-J. Hedqvist (1966) (MHNG) (OHo01); female paratype, Qued Teredjine, Hoggar Sahara, leg. J. Mateu, 15.05.1965, det. K-J Hedqvist (1966) (BMNH) (OHo02).

Biology. Noyes (2017) lists an association with *Acacia* sp. This association with *Acacia* trees is unverified and likely refers to *O. hoggarensis* hosts reared from *Acacia*.

Distribution. Algeria (Hoggar Mountains).

Taxonomic remarks. The species description of *O. hoggarensis* by Hedqvist (1967) includes a detailed characterisation of the colour of the different body parts, but only few measurements, shape or structure information. Accordingly, we provide a redescription and diagnosis with more character ratios that are necessary to differentiate all *Oodera* species.

***Oodera leibnizi* sp. n.**

http://zoobank.org/849CBD26-ACFF-428A-A0C4-AFE627C78F99

Figs 3d, 6d, 9d, 12d, 15d

Diagnosis. BOTH SEXES (N = 4). Small-sized (5.31–6.06 mm). Head and mesosoma dark green to blue-green. Fore wing partly weakly infumate. Body robust to medium (mesonotum 1.34–1.42× as long as wide). Head round (1.29–1.42× as high as long). Eyes large (0.60–0.66× as high as head) (Fig. 9d). Corona structure three- to four-part (Fig. 6d). Pronotum pentagonal with posterior part distinctly narrowing towards mesoscutum, with broadest part before midlength (Fig. 12d). Mesoscutellum normal to slender (0.69–0.83× as long as wide), anterior margin hardly convex (part anterior to imaginary transverse line connecting posterior margins of axillae less than or exactly 1/3 of mesoscutellum length; 0.26–0.33), mesoscutellum lineate in anterior two thirds, rugose in posterior third (Fig. 15d). Propodeum medium to large (0.14–0.24× as long as mesoscutum) (Fig. 15d). Profemur usually elongated (2.02–2.43× as long as wide, with only 1 of 4 with profemur medium). Marginal vein long (1.21–1.27× as long as postmarginal vein).

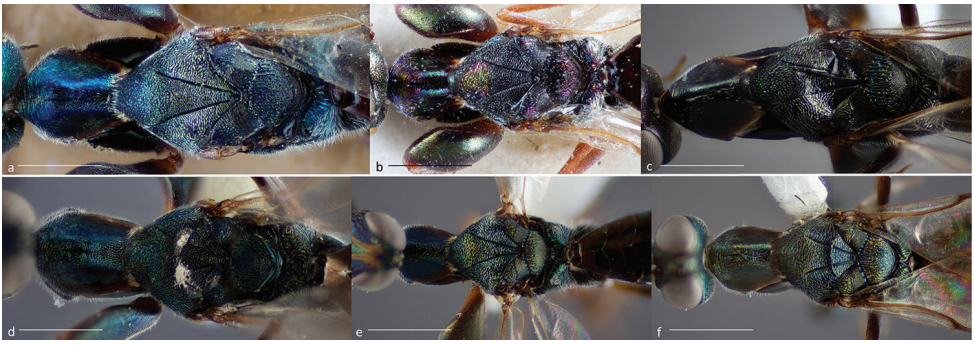

Figure 11. Mesosoma (dorsal) I **a** *O. ahoma* (Mani & Kaul) (imaged specimen: OAh01, holotype) **b** *O. circularicollis* sp. n. (OCi01, holotype), **c** *O. felix* sp. n. (OFe01, holotype) **d** *O. fidelis* sp. n. (OFi01, holotype) **e** *O. florea* sp. n. (OFl01, holotype) **f** *O. formosa* (Giraud) (OFo03). Scale bars: 1 mm.

Figure 12. Mesosoma (dorsal) II **a** *O. gracilis* Westwood (imaged specimen: OGr01) **b** *O. heikewernerae* sp. n. (OHe01, holotype) **c** *O. hoggarensis* Hedqvist (OHo02, paratype) **d** *O. leibnizi* sp. n. (OLe01, holotype) **e** *O. longicollis* (Cameron) (OLo01) **f** *O. madegassa* Bouček (OMad01, holotype). Scale bars: 1 mm.

FEMALE. Corona thick (3.64–4.00× as long as wide). Metasoma short (0.45–0.45× as long as body). Ovipositor short (0.08–0.10× as long as metasoma) (Fig. 3d).

MALE. Corona medium (4.36× as long as wide).

Description. BOTH SEXES. *Colour* (Figs 3d, 6d, 9d, 12d, 15d). Antenna dark brown. Procoxa and profemur light to dark green, all other parts of legs dark brown, except for yellow last tarsal segments. Metasoma dark brown.

Head (Figs 6d, 9d). Face completely reticulate. Head 1.24–1.42× as wide as long. Head width 3.28–3.63× eye distance. Malar space 0.34–0.41× head height. Corona 0.52–0.59× as long as eye height. POL 1.00–1.67× OOL. Scape 2.48–2.63× as long as pedicel. Clava 0.21× as long as funicle. Flagellum 1.34× as long as head width.

Mesosoma (Figs 12d, 15d). Pronotum 0.99–1.00× as long as wide. Pronotum 0.95–1.11× as long as mesonotum. Mesonotum 1.40–1.50× as long as mesoscutum. Mesoscutum 0.91–0.96× as long as wide. Mesoscutellum 0.40–0.50× as long as mesoscutum. Profemur 1.29–1.47× as long as protibia.

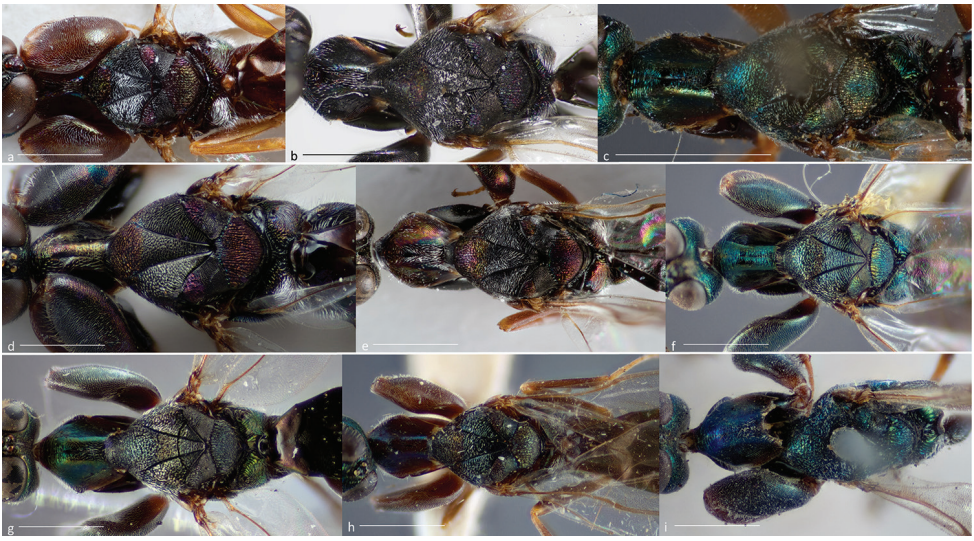

Figure 13. Mesosoma (dorsal) III **a** *O. magnifica* (Risbec) (imaged specimen: OMag01, holotype) **b** *O. mkomaziensis* sp. n. (OMk01, holotype) **c** *O. monstrum* syn. n. (OFo12, paratype) **d** *O. namibiensis* sp. n. (ONa01, holotype) **e** *O. niehuisorum* sp. n. (ONi01, holotype) **f** *O. pumilae* Yang (OPu01, paratype) **g** *O. regiae* Yang (ORe01, paratype) **h** *O. srilankiensis* sp. n. (OSr01, holotype) **i** *O. tenuicollis* (Walker) (OTe01, holotype). Scale bars: 1 mm.

Wings (Fig. 3d). Fore wing 2.99–3.78× as long as wide. Costal cell 0.37–0.39× as long as fore wing. Marginal vein 0.18–0.20× as long as fore wing. Marginal vein 2.72–3.17× as long as stigmal vein. Postmarginal vein 2.24–2.53× as long as stigmal vein.

Material examined. ASIA. **Philippines**: female holotype, S.O. Luzon, determined as *O. ornata* by anonymous (BMNH) (OLe01); **Malaysia**: female paratype, Perak, leg. K. Staudinger, identified as *Oodera* by Bouček, later as *O. ornata* by anonymous (BMNH) (OLe02); **Papua New Guinea**: male paratype, Bulolo, Manki, leg. H. Roberts, 30.07.1981, identified as *O. gracilis* by Bouček (1984), crossed out by anonymous (BMNH) (OLe03); male paratype, Bulolo, Manki, leg. H. Roberts, 30.07.1981 (BMNH) (OLe04).

Biology. Unknown.

Distribution. Malaysia, Philippines (both Oriental part of Asia), Papua New Guinea (Australasian part of Asia).

Etymology. Named in honour of Gottfried Wilhelm Leibniz (1646–1716) on the occasion of his 300th death day. The Zoologisches Forschungsmuseum Alexander Koenig in which this study was done is part of the Leibniz Association, named after Leibniz.

Taxonomic remarks. The two specimens from Malaysia and the Philippines were originally identified as *O. ornata* (valid species name *O. longicollis*), one of the specimens from Papua New Guinea was identified by Bouček as *O. gracilis* in 1984, later crossed out by an unknown person. The new species is rather easily distinguished from *O. longicollis* and *O. gracilis*, as *O. longicollis* and *O. gracilis* exhibit exceptionally long ovipositors and bright metallic colours on head and mesosoma while *O. leibnizi* sp. n. does not.

***Oodera longicollis* (Cameron, 1903)**
Figs 3e, 6e, 9e, 12e, 15e

Epistenia longicollis Cameron, 1903: 98.
Oodera longicollis; Hedqvist 1961: 97.
Oodera ornata Gahan, 1925: 97. Synonymy with *Oodera longicollis* and lectotype designation by Bouček et al. (1978: 448–449).

Diagnosis. BOTH SEXES (N = 14). Head and mesosoma bright green to blue and blackish. Fore wing partly infumate. Body robust to slender (mesonotum 1.28–1.45× as long as wide). Head oval to elongated (1.57–1.72× as high as long). Eyes large (0.60–0.65× as high as head) (Fig. 9e). Corona medium to slim (5.33–7.38× as long as wide), structure square (Fig. 6e). Pronotum pentagonal with posterior part distinctly narrowing towards mesoscutum, with broadest part at midlength (Fig. 12e). Mesoscutellum normal to slender (0.68–0.80× as long as wide), anterior margin usually convex (part anterior to imaginary transverse line connecting posterior margins of axillae more than 1/3 of mesoscutellum length; 0.29–0.45, with only 3 of 13 with anterior margin hardly convex), mesoscutellum completely lineate, with median lines converging (Fig. 15e). Profemur usually elongated (2.14–2.58× as long as wide, with only 1 of 14 with profemur medium). Marginal vein medium to long (1.05–1.18× as long as postmarginal vein).

FEMALE. Medium- to large-sized (8.80–12.60 mm). Propodeum medium to large (0.12–0.22× as long as mesoscutum) (Fig. 15e). Metasoma short to long (0.44–0.54× as long as body). Ovipositor long (0.26–035× as long as metasoma) (Fig. 3e).

MALE. Small- to medium-sized (5.38–9.6 mm). Propodeum very large (0.26 to 0.34× as long as mesoscutum).

Redescription. BOTH SEXES. *Colour* (Figs 3e, 6e, 9e, 12e, 15e). Scape green, rest of antenna dark brown. Procoxa yellow, profemur yellow and green, all other parts of legs irregularly dark brown and yellow. Metasoma dark brown.

Head (Figs 6e, 9e). Face transversely striate from parascrobal area at lower third of eye height to clypeus margin. Head 1.59–1.79× as wide as long. Head width 4.00–5.19× eye distance. Malar space 0.34–0.40× head height. Corona 0.52–0.59× as long as eye height. POL 1.0–1.67× OOL. Scape 1.69–2.78× as long as pedicel. Clava 0.10–0.25× as long as funicle. Flagellum 1.31–1.85× as long as head width.

Mesosoma (Figs 12e, 15e). Pronotum 0.95–1.11× as long as wide. Pronotum 0.52–0.69× as long as mesonotum. Mesonotum 1.36–1.47× as long as mesoscutum. Mesoscutum 0.92–1.05× as long as wide. Mesoscutellum 0.36–0.48× as long as mesoscutum. Profemur 1.25–1.50× as long as protibia.

Wings (Fig. 3e). Fore wing 2.85–3.78× as long as wide. Costal cell 0.33–0.38× as long as fore wing. Marginal vein 0.19–0.21× as long as fore wing. Marginal vein 2.98–4.19× as long as stigmal vein. Postmarginal vein 2.60–3.70× as long as stigmal vein.

Material examined. ASIA. **China**: female, Matang Rd, 18.05.1920, det. C. R. Vardy (1962) (BMNH) (OLo10); **Malaysia**: female, Sandakan, det. Z. Bouček (1980) (BMNH) (OLo01); female, Quop, Sarawak, leg. G.E. Bryant, 06.03.1914, det. Z. Bouček (1976) (BMNH) (OLo04); female, Perak, leg. K. Staudinger, det. Z. Bouček

(1976) (BMNH) (OLo05); female, Bettotan near Sandakan, 20.08.1927, det. Z. Bouček (1976) (BMNH) (OLo09); female, Perak, det. Z. Bouček (1960) as *Oodera* sp., later as *O. ornata* by anonymous (BMNH) (OLo13); male, Negeri, Sembilan Pasoh Forest, leg. E. Jendek & O. Sausa, 10–21.06.2013 (CNC) (OLo02); **Myanmar**: ? sex, Burma, Bilumyo Res., Mytikyina, leg. D.J. Atkinson, 31.05.1928, det. Z. Bouček (1976) (BMNH) (OLo06); male, Manymar, Yeni Res. Pyinmana, leg. D.H. Desai, 29.06.1934, det. Z. Bouček (1980) (BMNH) (OLo07); **Philippines**: female holotype *O. ornata*, Davao on Island Mindanao, leg. Baker (examined from images provided by the USNM, http://usnmhymtypes.com/default.asp?Action=Show_Types&Single_Type=True&TypeID=7233, accessed 20/01/2017); female, Davao in Island Mindanao, leg. Baker, det. Ch. Ferriere as *O. ornata* (BMNH) (OLo03); female, Surigao, Mindanao, det. as *O. ornata* by anonymous (BMNH) (OLo11); male, Island of Basilan, det. as *O. ornata* by anonymous (BMNH) (OLo12); **Vietnam**: male, Tonkin, Hoabinh, leg. R.V.de Salvaza, 8.1918, det. Ch. Ferriere as *Heydenia longicollis*, second location label says "Indo China" (BMNH) (OLo08).

Biology. Associated with teak (*Tectona grandis*) (Verbenaceae), presumably as habitat for the parasitoids' host (unverified record taken from Noyes (2017)).

Distribution. China (Oriental part), Malaysia, Myanmar, Philippines, Vietnam.

Taxonomic remarks. *Oodera ornata* was synonymised with *O. longicollis* by Bouček et al. (1978); this was confirmed by us after examining the images of *O. ornata* available online (for exact reference see examined material).

Gahan (1925) compared *O. ornata* and *O. gracilis* and declared them similar, except for the different ovipositor lengths and some colour differences (*O. ornata* "can be distinguished from that species [*Oodera gracilis*] at once by the much shorter ovipositor and the differently coloured legs"). After examining material of both species we found many more distinguishing characters (see diagnoses and key).

The species description of *O. ornata* by Gahan (1925: 97) points out that *O. ornata* (= *O. longicollis*) is a species of "rather variable size". He characterised a specimen from Borneo as the smallest (body length: 7 mm) and a specimen from Mindanao (Phillipines) as the largest specimen (body length: 12 mm). We confirm the large size differences after examining the available material from various countries (smallest: 5.38 mm, largest: 12.6 mm). We see these large intraspecific size differences in both *Oodera* species for which we were able to examine a considerable number of specimens not originating from the same series and with both sexes available (i.e., *O. formosa* and *O. longicollis*). Comparable differences might also be found for other species of *Oodera* if more specimens are examined. Because of this we use body length in the diagnoses and key but avoid using it as an exclusive character. This still holds a certain risk that users of the key will have difficulties to identify specimens of extreme body length. However, we think that body length is such an obvious character that it should be mentioned in identification keys. If the key might fail in rare cases, all specimens should be assignable to a certain species with the diagnoses provided.

Note that we located one additional specimen in the Australian National Insect Collection in Canberra (ANIC). It originated from the same series as specimens already included here (from Philippines, Davao/Mindanao). *O. longicollis* is a well-defined species and we did not borrow and include this additional specimen.

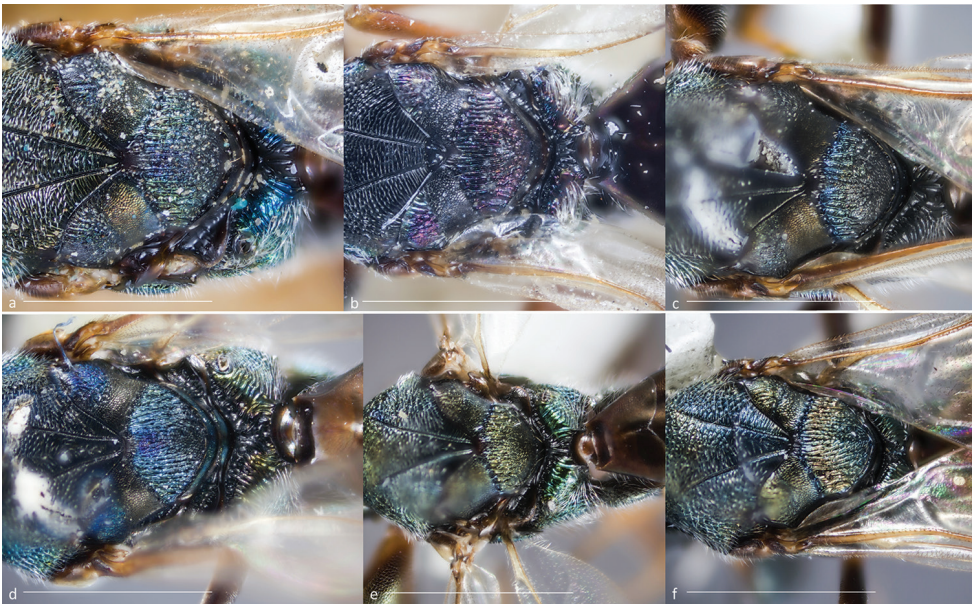

Figure 14. Mesoscutellum and propodeum (dorsal) I **a** *O. ahoma* (Mani & Kaul) (imaged specimen: OAh01, holotype) **b** *O. circularicollis* sp. n. (OCi01, holotype) **c** *O. felix* sp. n. (OFe01, holotype) **d** *O. fidelis* sp. n. (OFi01, holotype) **e** *O. florea* sp. n. (OFl01, holotype), **f** *O. formosa* (Giraud) (OFo14). Scale bars: 1 mm.

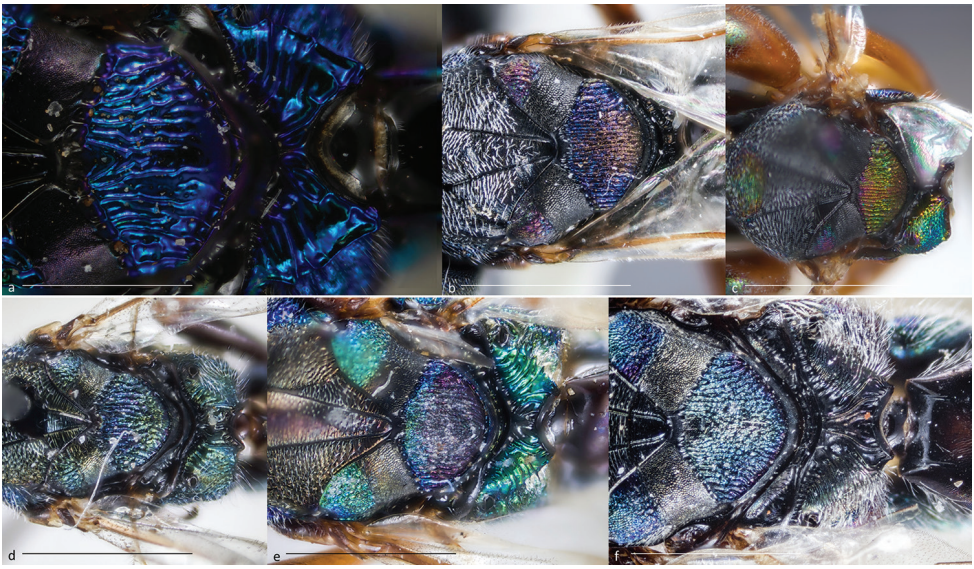

Figure 15. Mesoscutellum and propodeum (dorsal) II **a** *O. gracilis* Westwood (imaged specimen: OGr01) **b** *O. heikewernerae* sp. n. (OHe01, holotype) **c** *O. hoggarensis* Hedqvist (OHo02, paratype) **d** *O. leibnizi* sp. n. (OLe03, paratype) **e** *O. longicollis* (Cameron) (OLo01) **f** *O. madegassa* Bouček (OMad01, holotype). Scale bars: 1 mm.

***Oodera madegassa* Bouček, 1958**
Figs 3f, 6f, 9f, 12f, 15f

Oodera madegassa Bouček, 1958: 376.

Diagnosis. FEMALE (N = 1). Large-sized (10.30 mm). Head and mesosoma dark blue to blackish. Fore wing partly infumate. Body slender (mesonotum 1.52× as long as wide). Head elongated (1.77× as high as long). Eyes large (0.63× as high as head) (Fig. 9f). Eye distance very short, head width 7.09× eye distance. Corona slim (7.13× as long as wide), structure continuous (Fig. 6f). Pronotum oval and wider than long, with broadest part at midlength (Fig. 12f). Mesoscutellum slender (0.85× as long as wide), anterior margin convex (part anterior to imaginary transverse line connecting posterior margins of axillae more than 1/3 of mesoscutellum length; 0.44), mesoscutellum almost lineate in anterior third, longitudinally rugose in posterior two thirds (Fig. 15f). Propodeum large (0.20× as long as mesoscutum) (Fig. 15f). Profemur elongated (2.38× as long as wide). Marginal vein long (1.19× as long as postmarginal vein). Metasoma medium (0.48× as long as body). Ovipositor rather long (0.17× as long as metasoma) (Fig. 3f).

Redescription. FEMALE. *Colour* (Figs 3f, 6f, 9f, 12f, 15f). Scape brown, slightly brightening apically, rest of antenna dark brown. Procoxa dark blue to blackish, profemur dark brown, all other parts of legs brown. Metasoma black, with greenish spots laterally on tergites 2 to 5.

Head (Figs 6f, 9f). Face completely reticulate. Head 1.86× as wide as long. Head width 7.09× eye distance. Malar space 0.38× head height. Corona 0.61× as long as eye height. POL 2× OOL. Scape length not available. Clava 0.10× as long as funicle. Flagellum 1.53× as long as head width.

Mesosoma (Figs 12f, 15f). Pronotum 0.95× as long as wide. Pronotum 0.51× as long as mesonotum. Mesonotum 1.43× as long as mesoscutum. Mesoscutum 1.06× as long as wide. Mesoscutellum 0.43× as long as mesoscutum. Profemur 1.33× as long as protibia.

Wings (Fig. 3f). Fore wing 3.40× as long as wide. Costal cell 0.35× as long as fore wing. Marginal vein 0.22× as long as fore wing. Marginal vein 4.41× as long as stigmal vein. Postmarginal vein 3.70× as long as stigmal vein.

MALE. Unknown.

Material examined. AFRICA. **Madagascar**: female holotype, Haute-Vallée de Sambirano, det. Z. Bouček (1958) (NMP) (OMad01).

Biology. Unknown.

Distribution. Madagascar.

***Oodera magnifica* (Risbec, 1951)**
Figs 4a, 7a, 10a, 13a, 16a

Stellophora magnifica Risbec, 1951: 239–243.
Oodera magnifica; Bouček 1958: 375.

Diagnosis. FEMALE (N = 1). Small-sized (5.75 mm). Head and mesosoma blackish, coppery and reddish. Fore wing partly infumate. Body robust (mesonotum 1.25× as long as wide). Head oval (1.51× as high as long). Eyes large (0.65× as high as head) (Fig. 10a). Corona medium (5.50× as long as wide), structure continuous (Fig. 7a). Pronotum shape not available (pronotum is partly covered by the legs) (Fig. 13a). Mesoscutellum normal (0.66× as long as wide), anterior margin hardly convex (part anterior to imaginary transverse line connecting posterior margins of axillae less than 1/3 of mesoscutellum length; 0.29), mesoscutellum completely rippledly lineate (Fig. 16a). Propodeum medium (0.15× as long as mesoscutum) (Fig. 16a). Profemur robust (1.90× as long as wide). Marginal vein medium (1.0× as long as postmarginal vein). Metasoma medium (0.47× as long as body). Ovipositor short (0.14× as long as metasoma) (Fig. 4a).

Redescription. FEMALE. *Colour* (Figs 4a, 7a, 10a, 13a, 16a). Scape yellow, darkening apically, rest of antenna brown. Procoxa and profemur dark brown, all other parts of legs yellow. Metasoma brown.

Head (Figs 7a, 10a). Face completely reticulate. Head 1.54× as wide as long. Head width 3.89× eye distance. Malar space 0.36× head height. Corona 0.66× as long as eye height. POL 1.20× OOL. Scape 2.60× as long as pedicel. Clava 0.16× as long as funicle. Flagellum 1.30× as long as head width.

Mesosoma (Figs 13a, 16a). Pronotum length to width not available. Mesonotum 1.44× as long as mesoscutum. Mesoscutum 0.87× as long as wide. Mesoscutellum 0.44× as long as mesoscutum. Profemur 1.34× as long as protibia.

Wings (Fig. 4a). Fore wing 2.59× as long as wide. Costal cell 0.36× as long as fore wing. Marginal vein 0.20× as long as fore wing. Marginal vein 3.16× as long as stigmal vein. Postmarginal vein 3.16× as long as stigmal vein.

MALE. Unknown.

Material examined. AFRICA. **Senegal**: female holotype, M'Bambey, leg. A. Wane, 13.11.1945, det. J.Y. Rasplus (1990) (MNHN) (OMag01).

Biology. Unknown.

Distribution. Senegal.

Taxonomic remarks. The description of *O. magnifica* by Risbec (1951) is very detailed but misses some characters that we found to be of diagnostic value. Therefore, our redescription should be considered an addition to Risbec's work and not a replacement.

Oodera mkomaziensis **sp. n.**

http://zoobank.org/E054C035-9265-46ED-910F-F6C038DC06A3

Figs 4b, 7b, 10b, 13b, 16b

Diagnosis. FEMALE (N = 1). Medium-sized (7.20 mm). Head and mesosoma black, with tinges of dark green and purple. Fore wing hyaline. Body slender (mesonotum 1.50× as long as wide). Head oval (1.56× as high as long). Eyes large (0.63× as high as head) (Fig. 10b). Corona thick (3.92× as long as wide), structure interrupted (Fig. 7b).

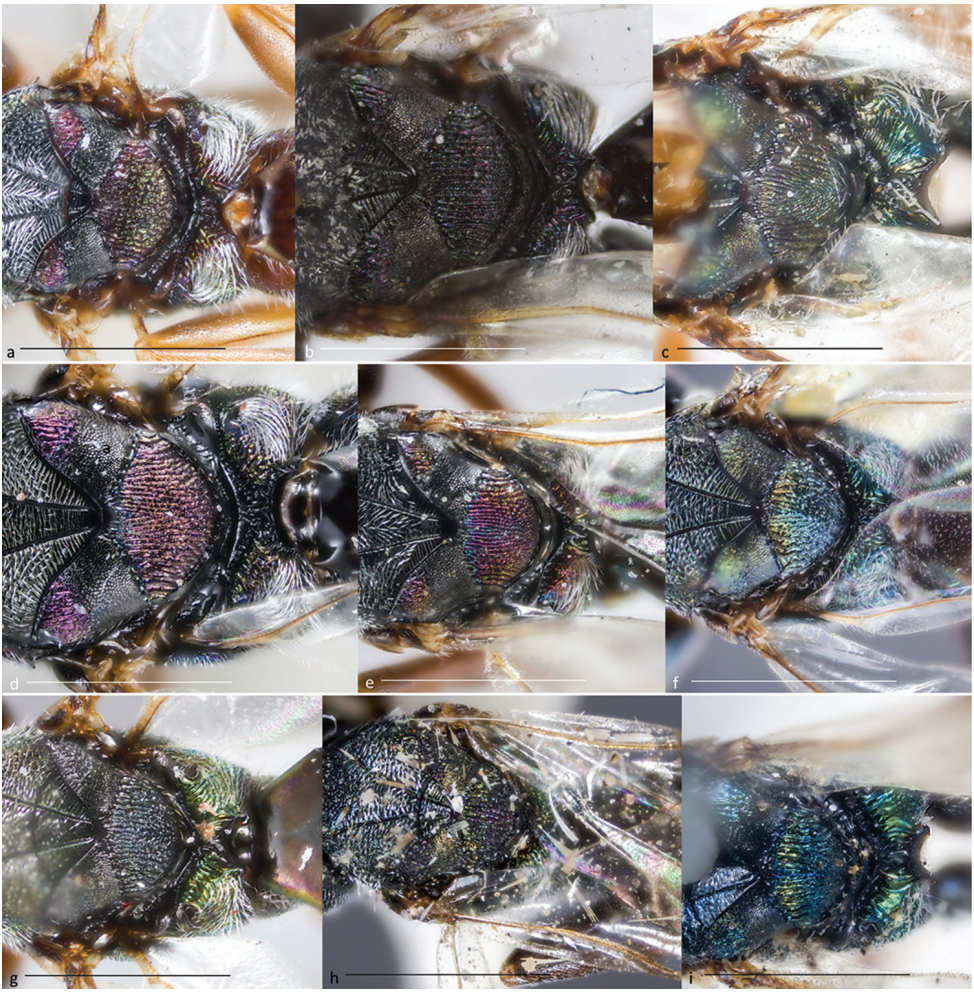

Figure 16. Mesoscutellum and propodeum (dorsal) III **a** *O. magnifica* (Risbec) (imaged specimen: OMag01, holotype) **b** *O. mkomaziensis* sp. n. (OMk01, holotype) **c** *O. monstrum* syn. n. (OFo12, paratype) **d** *O. namibiensis* sp. n. (ONa01, holotype) **e** *O. niehuisorum* sp. n. (ONi01, holotype) **f** *O. pumilae* Yang (OPu01, paratype) **g** *O. regiae* Yang (ORe01, paratype) **h** *O. srilankiensis* sp. n. (OSr01, holotype) **i** *O. tenuicollis* (Walker) (OTe01, holotype). Scale bars: 1 mm.

Pronotum oval, with broadest part at midlength (Fig. 13b). Mesoscutellum normal to slender (0.68× as long as wide), anterior margin convex (part anterior to imaginary transverse line connecting posterior margins of axillae 1/3 of mesoscutellum length; 0.33), mesoscutellum lineate in anterior two thirds, finely areolate in posterior third (Fig. 16b). Propodeum medium (0.09× as long as mesoscutum) (Fig. 16b). Profemur robust (1.31× as long as wide). Marginal vein short (0.85× as long as postmarginal vein). Metasoma long (0.52× as long as body). Ovipositor short (0.14× as long as metasoma) (Fig. 4b).

Redescription. FEMALE. *Colour* (Figs 4b, 7b, 10b, 13b, 16b). Scape and pedicel light brown, rest of antenna dark brown. Procoxa and profemur black, all other parts of legs yellow to brown. Metasoma black.

Head (Figs 7b, 10b). Face completely reticulate. Head 2.21× as wide as long. Head width 4.13× eye distance. Malar space 0.37× head height. Corona 0.73× as long as eye height. POL 1.33× OOL. Scape 3.19× as long as pedicel. Clava 0.11× as long as funicle. Flagellum 1.39× as long as head width.

Mesosoma (Figs 13b, 16b). Pronotum 0.80× as long as wide. Pronotum 0.41× as long as mesonotum. Mesonotum 1.50× as long as mesoscutum. Mesoscutum 1.11× as long as wide. Mesoscutellum 0.68× as long as mesoscutum. Profemur 1.21× as long as protibia.

Wings (Fig. 4b). Fore wing 2.78× as long as wide. Costal cell 0.36× as long as fore wing. Marginal vein 0.19× as long as fore wing. Marginal vein 3.40 as long as stigmal vein. Postmarginal vein 4.00× as long as stigmal vein.

MALE. Unknown.

Material examined. AFRICA. **Tanzania**: female, Mkomazi Game Reserve (now Mkomazi National Park), Ibaya Hill, 3°58.40'S 37°47.13'E, leg. S. van Noort, 15.–30.04.1996 (SAM) (OMk01)

Biology. Unknown.

Distribution. Tanzania.

Etymology. Named after the type locality, the Mkomazi National Park in north-eastern Tanzania.

Oodera namibiensis **sp. n.**

http://zoobank.org/409663D3-3FE9-4E0B-A020-A6DBBB72EF9E

Figs 4d, 7d, 10d, 13d, 16d

Diagnosis. FEMALE (N = 8). Medium- to large-sized (7.36–9.10 mm). Head and mesosoma dark, mostly blackish and reddish. Fore wing partly infumate. Body robust to medium (mesonotum 1.01–1.40× as long as wide). Head round to oval (1.42–1.59× as high as long). Eyes large (0.6–0.66× as high as head) (Fig. 10d). Corona thick to medium (4.0–6.38× as long as wide), structure interrupted (Fig. 7d). Pronotum pentagonal with posterior part distinctly narrowing towards mesoscutum, with broadest part at midlength (Fig. 13d). Mesoscutellum normal (0.60–0.75× as long as wide), anterior margin hardly convex to convex (part anterior to imaginary transverse line connecting posterior margins of axillae less than or more than 1/3 of mesoscutellum length; 0.28–0.35), mesoscutellum completely densely lineate (Fig. 16d). Propodeum small to medium (0.07–0.14× as long as mesoscutum) (Fig. 16d). Profemur medium (2.02–2.15× as long as wide). Marginal vein medium to long (0.9–1.13× as long as postmarginal vein). Metasoma medium to long (0.49–0.55× as long as body). Ovipositor rather long (0.16–0.2× as long as metasoma) (Fig. 4d).

Description. FEMALE. *Colour* (Figs 4d, 7d, 10d, 13d, 16d). Scape yellow, darkening apically, rest of antenna dark brown. Procoxa and profemur black, all other parts of legs light dark brown, except for yellow last tarsal segments. Metasoma black.

Head (Figs 7d, 10d). Face completely reticulate. Head 1.51–1.61× as wide as long. Head width 3.71–4.38× eye distance. Malar space 0.34–0.41× head height. Corona 0.57–0.70× as long as eye height. POL 0.75–1.6× OOL. Scape 2.33–3.17× as long as pedicel. Clava 0.18–0.21× as long as funicle. Flagellum 1.12–1.34× as long as head width.

Mesosoma (Figs 13d, 16d). Pronotum 0.87–0.90× as long as wide. Pronotum 0.47–0.64× as long as mesonotum. Mesonotum 1.0–1.49× as long as mesoscutum. Mesoscutum 0.69–1.40× as long as wide. Mesoscutellum 0.28–0.49× as long as mesoscutum. Profemur 1.23–1.34× as long as protibia.

Wings (Fig. 4d). Fore wing 2.88–3.21× as long as wide. Costal cell 0.32–0.40× as long as fore wing. Marginal vein 0.19–0.21× as long as fore wing. Marginal vein 2.93–3.40× as long as stigmal vein. Postmarginal vein 2.67–3.50× as long as stigmal vein.

MALE. Unknown.

Material examined. AFRICA. **Namibia**: female holotype, ca. 1500 m (above sea level), ca. 140 km N Okanhandja, 20°50.85'S/16°47.77'E, Holzeintrag (= from wood), leg. M. & O. Niehuis, 01.04.1997 (ZFMK) (ONa01); two female paratypes, same data (BNMH) (ONa04), (CNC) (ONa05); ? sex paratype, same data (NMBE) (ONa06); female paratype, 2000 m Khomas, highland, 22°42.26'S/16°31.24'E, Holzeintrag (= from wood), leg. M. & O. Niehuis, 4.4. e.l. M.5 1998 (ZFMK) (ONa02); female paratype, 1000 m NN e.l., 140 km N Okahandja, 20°50.85'S/16°47.77'E, Holzeintrag (= from wood), leg. M. & O. Niehuis, 01.04.1997 (ZFMK) (ONa03); female paratype, Waterberg ca. 1500 m (above sea level), 20°36.58'S/17°10.43'E, Holzeintrag (= from wood), ex larva, leg. M. & O. Niehuis, 01.04.1997 (USNM) (ONa07); female paratype, S. W. Africa, leg. R.E. Turner, 8–30.11.1929, labelled "*Oodera obscura cf.*" (NMP) (ONa08).

Biology. Reared from wood, exact tree species unknown.

Distribution. Namibia.

Etymology. Named after the type series' origin from Namibia.

***Oodera niehuisorum* sp. n.**

http://zoobank.org/81C69EDF-F739-46FE-88B0-5A04DA79D745

Figs 4e, 7e, 10e, 13e, 16e

Diagnosis. BOTH SEXES (N = 13). Small-sized (4.50–6.48 mm). Head and mesosoma blackish and coppery, with small dark green parts, never with blue. Fore wing hyaline. Head usually oval (1.42–1.59× as high as long, with only 2 of 13 with head round). Eyes large (0.60–0.74× as high as head) (Fig. 10e). Corona usually medium (3.8–6.0× as long as wide, with only 1 of 10 with corona thick), structure continuous (Fig. 7e). Pronotum pentagonal with posterior part distinctly narrowing towards mesoscutum, with broadest part before midlength (Fig. 13e). Mesoscutellum normal to slender (0.55–0.85× as long as wide), anterior margin hardly convex to convex (part anterior to imaginary transverse line connecting posterior margins of axillae less than or more than 1/3 of mesoscutellum length; 0.3–0.45), mesoscutellum densely lineate in anterior half to anterior two thirds, areolate in posterior half or third (Fig. 16e).

Propodeum medium to large (0.12–0.21× as long as mesoscutum) (Fig. 16e). Profemur robust to medium (1.82–2.15× as long as wide). Marginal vein short (0.78–0.89× as long as postmarginal vein).

FEMALE. Body robust to medium (mesonotum 1.29–1.41× as long as wide). Metasoma short (0.40–0.45× as long as body). Ovipositor short to rather long (0.14–0.18× as long as metasoma) (Fig. 4e).

MALE. Body robust to slender (mesonotum 1.27–1.47× as long as wide).

Description. BOTH SEXES. *Colour* (Figs 4e, 7e, 10e, 13e, 16e). Scape yellow, pedicel yellow, darkening apically, rest of antenna dark brown. Procoxa and profemur yellow to coppery, all other parts of legs mid brown with yellow joints, except for darker brown last tarsal segments. Metasoma black.

Head (Figs 7e, 10e). Face completely reticulate. Head 1.42–1.59× as wide as long. Head width 3.13–4.0× eye distance. Malar space 0.26–0.39× head height. Corona 0.53–0.67× as long as eye height. POL 1.0–1.20× OOL. Scape 2.29–2.83× as long as pedicel. Clava 0.14–0.21× as long as funicle. Flagellum 1.09–1.31× as long as head width.

Mesosoma (Figs 13e, 16e). Pronotum 0.88–1.0× as long as wide. Pronotum 0.50–0.59× as long as mesonotum. Mesonotum 1.28–1.53× as long as mesoscutum. Mesoscutum 0.84–1.10× as long as wide. Mesoscutellum 0.28–0.53× as long as mesoscutum. Profemur 1.19–1.37× as long as protibia.

Wings (Fig. 4e). Fore wing 2.68–3.11× as long as wide. Costal cell 0.28–0.37× as long as fore wing. Marginal vein 0.15–0.20× as long as fore wing. Marginal vein 1.90–2.91× as long as stigmal vein. Postmarginal vein 2.29–3.43× as long as stigmal vein.

Material examined. AFRICA. **Egypt**: female holotype, Sinai, Nuweiba, ex *Acacia* sp. tree, 29°01.17'N/34°40.52'E, leg. O. Niehuis, 11.03.2001, 10 m amsl (= above sea level) (ZFMK) (ONi01); seven female and four male paratypes, same data (ZFMK) (ONi02-05, ONi06-08, ONi10), (CNC) (ONi05), (BHMN) (ONi09), (NMBE) (ONi11), (USNM) (ONi12). ASIA, MIDDLE EAST. **Israel**: female paratype, Yeroham 329 m ü. NN (= above sea level), 30°57'9"N/35°4'51"E, e. l. ex *Acacia* Holzeintrag (= from wood), leg. M. & O. Niehuis, 24.04.2013 (ZFMK) (ONi13).

Biology. Reared from *Acacia* wood, which is likely the habitat of the *O. niehuisorum* host.

Distribution. Egypt and Israel.

Etymology. Named after Manfred and Oliver Niehuis, who collected the specimens of the type series.

Oodera pumilae **Yang, 1996**

Figs 4f, 7f, 10f, 13f, 16f

Oodera pumilae Yang, 1996: 100, 311.

Diagnosis. FEMALE (N = 1). Small-sized (5.81 mm). Head and mesosoma dark green to blue-green. Fore wing partly weakly infumate. Body robust (mesonotum 1.25× as long as wide). Head oval (1.46× as high as long). Eyes small (0.59× as high as head) (Fig.

10f). Corona medium (4.13× as long as wide), structure continuous (Fig. 7f). Pronotum pentagonal with posterior part distinctly narrowing towards mesoscutum, with broadest part before midlength (Fig. 13f). Mesoscutellum normal (0.71× as long as wide), anterior margin hardly convex (part anterior to imaginary transverse line connecting posterior margins of axillae less than 1/3 of mesoscutellum length; 0.30), mesoscutellum lineate in anterior third, rugulose in posterior two thirds (Fig. 16f). Propodeum large (0.16× as long as mesoscutum) (Fig. 16f). Profemur medium (2.15× as long as wide). Marginal vein medium (1.07× as long as postmarginal vein). Metasoma medium (0.46× as long as body). Ovipositor rather long (0.16× as long as metasoma) (Fig. 4f).

Redescription. FEMALE. *Colour* (Figs 4f, 7f, 10f, 13f, 16f). Scape yellow, darkening apically, rest of antenna dark brown. Procoxa and profemur dark green, all other parts of legs dark brown with yellow joints and tarsi. Metasoma dark brown.

Head (Figs 7f, 10f). Face completely reticulate. Head 1.51× as wide as long. Head width 3.28× eye distance. Malar space 0.41× head height. Corona 0.61× as long as eye height. POL equal to OOL. Scape 2.57× as long as pedicel. Clava 0.16× as long as funicle. Flagellum 1.25× as long as head width.

Mesosoma (Figs 13f, 16f). Pronotum 0.93× as long as wide. Pronotum 0.55× as long as mesonotum. Mesonotum 1.44× as long as mesoscutum. Mesoscutum 0.87× as long as wide. Mesoscutellum 0.44× as long as mesoscutum. Profemur 1.29× as long as protibia.

Wings (Fig. 4f). Fore wing 2.96× as long as wide. Costal cell 0.38× as long as fore wing. Marginal vein 0.20× as long as fore wing. Marginal vein 3.37× as long as stigmal vein. Postmarginal vein 3.16× as long as stigmal vein.

MALE. Unknown.

Material examined. ASIA. **China**: female paratype, leg. Z.Q. Yang, 02.07.1989, rest of label in Chinese, det. Z.Q. Yang 1995 (CNC) (OPu01).

Biology. Probably parasitic on *Scolytus* spp. on elm (*Ulmus*) trees (Yang 1996).

Distribution. China (Province: Heilongjiang; Palaearctic part of China) (Yang 1996).

Taxonomic remarks. We were unable to examine the holotype. Given that the paratype we examined is from the same series as the holotype and that it perfectly matches the (short) description, we decided to include the species in our revision, diagnoses and key without examination of the primary type. Yang (1996) gives some characters to differ between *O. pumilae* and *O. regiae* in the English summary. Yet, without full translation of the Chinese descriptions these characters cannot be understood and checked. They are not mandatory though as there are several other characters to differentiate the two species (see diagnoses and key).

Oodera regiae **Yang, 1996**

Figs 4g, 7g, 10g, 13g, 16g

Oodera regiae Yang, 1996: 98, 310.

Diagnosis. FEMALE (N = 1). Small-sized (6.25 mm). Head and mesosoma dark green to green. Fore wing hyaline. Body robust (mesonotum 1.25× as long as wide).

Head oval (1.58× as high as long). Eyes large (0.69× as high as head) (Fig. 10g). Corona very short (0.45× as long as eye height), thick (4.0× as long as wide), structure continuous (Fig. 7g). Pronotum pentagonal with posterior part distinctly narrowing towards mesoscutum, with broadest part at midlength (Fig. 13g). Mesoscutellum normal (0.63× as long as wide), anterior margin hardly convex (part anterior to imaginary transverse line connecting posterior margins of axillae less than 1/3 of mesoscutellum length; 0.26), mesoscutellum densely lineate in anterior half, rugulose in posterior half (Fig. 16g). Propodeum large (0.18× as long as mesoscutum) (Fig. 16g). Profemur elongated (2.25× as long as wide). Marginal vein long (1.19× as long as postmarginal vein). Metasoma medium (0.49× as long as body). Ovipositor rather long (0.16× as long as metasoma) (Fig. 4g).

Redescription. FEMALE. *Colour* (Figs 4g, 7g, 10g, 13g, 16g). Scape yellow, darkening apically, rest of antenna dark brown. Procoxa and profemur dark green, all other parts of legs dark brown with yellow joints and tarsi. Metasoma dark brown.

Head (Figs 7g, 10g). Face completely reticulate. Head 1.58× as wide as long. Head width 3.55× eye distance. Malar space 0.31× head height. Corona 0.45× as long as eye height. POL 1.20× OOL. Scape 2.41× as long as pedicel. Clava 0.16× as long as funicle. Flagellum 1.31× as long as head width.

Mesosoma (Figs 13g, 16g). Pronotum 0.95× as long as wide. Pronotum 0.54× as long as mesonotum. Mesonotum 1.38× as long as mesoscutum. Mesoscutum 0.91× as long as wide. Mesoscutellum 0.38× as long as mesoscutum. Profemur 1.31× as long as protibia.

Wings (Fig. 4g). Fore wing 2.65× as long as wide. Costal cell 0.37× as long as fore wing. Marginal vein 0.21× as long as fore wing. Marginal vein 3.17× as long as stigmal vein. Postmarginal vein 2.67× as long as stigmal vein.

MALE. Unknown.

Material examined. ASIA. **China**: female paratype *Oodera regiae*, 12.1994, det. Z.Q. Yang 1995, rest of labels in Chinese (CNC) (ORe01).

Biology. Parasitic on the larvae of *Xyeloborus* sp. (Curculionidae) and *Agrilus* sp. (Buprestidae) on a walnut (*Juglans regiae*) tree (Yang, 1996).

Distribution. China (Province: Shaanxi; Palaearctic part of China) (Yang 1996).

Taxonomic remarks. The species is characterised by a very short corona (measured as corona length to eye height). In all other species the corona is distinctly longer, with no diagnostically useful differences among them.

We were unable to examine the holotype. Given that the paratype we examined is from the same series as the holotype and that it perfectly matches the (short) description, we decided to include the species in our revision, diagnoses and key without examination of the primary type.

The description of *O. regiae* Yang, 1996 lists four characters to distinguish this species from *O. formosa*. First, *O. regiae* does not have dense hairs on the basal tergite (interpreted as the first gastral tergite), arranged circularly, while *O. formosa* does. This was not confirmed. The distribution of gastral hairs is identical between the examined *O. regiae* and specimens of *O. formosa*. Second, *O. regiae* is described to have "eyes

having sparse pubescence" (Yang 1996). However, this character is shared among all examined *Oodera* species. Third, *O. regiae* should have "not radiately striated crests on propodeum" (Yang 1996), implying that *O. formosa* has radiately striated crests on the propodeum. We found the propodeal structures to be rather variable intraspecifically and decided not to use them as diagnostic characters. Fourth, "notauli not touch each other posteriorly" in *O. regiae* (Yang, 1996), implying that they do in *O. formosa*. In fact, the notauli never touch in *Oodera* species. In summary, the diagnostic characters for *O. regiae* listed in the description by Yang (1996) are not useful. However, we found other characters to differentiate the two species (see diagnoses and key).

***Oodera srilankiensis* sp. n.**
http://zoobank.org/6ABF2E1E-F336-431C-AD68-1D9DC0E0D2B3
Figs 4h, 7h, 10h, 13h, 16h

Diagnosis. BOTH SEXES (N = 5). Small-sized (4.00–5.75 mm). Head and mesosoma dark blue to blue-green. Fore wing hyaline. Body robust (mesonotum 1.26–1.33× as long as wide). Eyes large (0.60–0.67× as high as head) (Fig. 10h). Corona thick to medium (3.70–4.75× as long as wide), structure continuous (Fig. 7h). Pronotum pentagonal with posterior part distinctly narrowing towards mesoscutum, with broadest part before midlength (Fig. 13h). Mesoscutellum normal to slender (0.64–0.80× as long as wide), anterior margin hardly convex to convex (part anterior to imaginary transverse line connecting posterior margins of axillae less than or more than 1/3 of mesoscutellum length; 0.28–0.39), meoscutellum lineate in anterior third to half, rugulose in posterior half or two thirds (Fig. 16h). Propodeum large (0.18–0.23× as long as mesoscutum) (Fig. 16h). Profemur usually medium to elongated (1.98–2.33× as long as wide, only only 1 of 5 with profemur robust). Marginal vein medium (0.93–1.07× as long as postmarginal vein).

FEMALE. Head round (1.30–1.41× as high as long). Metasoma medium (0.47× as long as body). Ovipositor short (0.13–0.14× as long as metasoma) (Fig. 4h).

MALE. Head oval (1.53–1.54× as high as long).

Description. BOTH SEXES. *Colour* (Figs 4h, 7h, 10h, 13h, 16h). Scape brown, darkening apically, rest of antenna dark brown. Procoxa and profemur dark brown, meso- and metafemur dark brown, tibiae light brown, joints and tarsi yellow, except for brown last tarsal segments. Metasoma dark brown.

Head (Figs 7h, 10h). Face completely reticulate. Head 1.28–1.48× as wide as long. Head width 3.44–3.83× eye distance. Malar space 0.33–0.40× head height. Corona 0.59–0.73× as long as eye height. POL 1.00–2.00× OOL. Scape 2.38–3.16× as long as pedicel. Clava 0.15–0.21× as long as funicle. Flagellum 1.23–1.29× as long as head width.

Mesosoma (Figs 13h, 16h). Pronotum 0.90–1.00× as long as wide. Pronotum 0.52–0.55× as long as mesonotum. Mesonotum 1.40–1.49× as long as mesoscutum. Mesoscutum 0.87–0.92× as long as wide. Mesoscutellum 0.40–0.49× as long as mesoscutum. Profemur 1.25–1.41× as long as protibia.

Wings (Fig. 4h). Fore wing 2.69–3.20× as long as wide. Costal cell 0.31–0.39× as long as fore wing. Marginal vein 0.18–0.20× as long as fore wing. Marginal vein 2.50–4.00× as long as stigmal vein. Postmarginal vein 2.33–4.25× as long as stigmal vein.

Material examined. ASIA. **Sri Lanka**: female holotype, Mate. Dist. Kibissa, 0,5 mi West of Sigiriya, Jungle, leg. K.V. Krombein, 28.06–04.07.1978 (USNM) (OSr01); male paratype, Anu. Dist. Hunuwilagama, near Wilpatta, 200 feet, leg. G.F. Hevel, 28.10–03.11.1976 (USNM) (OSr02); male paratype, Anu. Dist. Hunuwilagama, near Wilpatta, 200 feet, leg. G.F. Hevel, 28.10–03.11.1976 (USNM) (OSr04); female paratype, Tri. Dist. China Bay Ridge Bungalow, 0–50 feet, leg. K.V. Krombein, 24–25.07.1978 (ZFMK) (OSr03); female paratype, Gal. Dist. Udugama, Kanneliya, 400 feet, Jungle, leg. K.V. Krombein, 06–12.10.1973 (1978), det. Oodera ahoma by Z. Bouček 1978 (USNM) (OSr05).

Biology. Unknown.

Distribution. Sri Lanka.

Etymology. Named after the geographic origin of the type series from Sri Lanka.

Taxonomic remarks. Some (or maybe all) specimens described here as *O. srilankiensis* were probably those examined and mentioned by Bouček et al. (1978) and considered as *O. ahoma*. After careful examination they can be distinguished from the holotype of *O. ahoma* by several characters, for example, the very different body length (medium in *O. ahoma*, small in *O. srilankiensis*), the body shape (slender in *O. ahoma*, robust in *O. srilankiensis*), and the eye size (small in *O. ahoma*, large in *O. srilankiensis*). Bouček et al. (1978) also mentioned the close resemblance of some specimens (including one from Pakistan that we were unable to locate) with "a European species", i.e., *O. formosa*. In fact, the new species is rather similar to *O. formosa* but can be distinguished from this by some characters, for example, fore wing hyaline (*O. srilankiensis*) vs. partly infumate (*O. formosa*), and propodeum large (*O. srilankiensis*) vs. propodeum usually medium (*O. formosa*) (see also diagnoses and key).

Oodera tenuicollis **(Walker, 1872)**

Figs 4i, 7i, 10i, 13i, 16i

Eupelmus tenuicollis Walker, 1872: 86.
Oodera tenuicollis; Hedqvist 1961: 98.

Diagnosis. FEMALE (N = 1). Exact body length not available (the only specimen available is missing metasoma), if metasoma is not uniquely long, then small-sized. Head and mesosoma dark blue to green-blue. Fore wing partly infumate. Body slender (mesonotum 1.45× as long as wide). Head round (1.40× as high as long). Eyes large (0.67× as high as head) (Fig. 10i). Corona medium (4.40× as long as wide), structure continuous (Fig. 7i). Pronotum oval and longer than wide, with broadest part at midlength (Fig. 13i). Mesoscutellum slender (0.82× as long as wide), anterior margin hardly convex (part anterior to imaginary transverse line connecting posterior margins

of axillae less than 1/3 of mesoscutellum length; 0.17), mesoscutellum lineate in anterior two thirds, with median lines converging, rimose in posterior third (Fig. 16i). Propodeum large (0.18× as long as mesoscutum) (Fig. 16i). Profemur elongated (2.34× as long as wide). Marginal vein long (1.13× as long as postmarginal vein). Metasoma length not available. Ovipositor length not available (Fig. 4i).

Redescription. FEMALE. *Colour* (Figs 4i, 7i, 10i, 13i, 16i). Scape brown, darkening apically, rest of antenna dark brown. Procoxa dark brown, profemur dark green, all other parts of legs brown with yellow joints, tarsi yellow, except for brown last segments. Metasoma colour unknown.

Head (Figs 7i, 10i). Face completely reticulate. Head 1.37× as wide as long. Head width 4.00× eye distance. Malar space 0.32× head height. Corona 0.65× as long as eye height. POL 1.20× OOL. Scape 2.63× as long as pedicel. Clava length to funicle length not available. Flagellum length to head breadth not available.

Mesosoma (Figs 13i, 16i). Pronotum 1.05× as long as wide. Pronotum 0.52× as long as mesonotum. Mesonotum 1.40× as long as mesoscutum. Mesoscutum 1.04× as long as wide. Mesoscutellum 0.40× as long as mesoscutum. Profemur 1.30× as long as protibia.

Wings (Fig. 4i). Fore wing 3.04× as long as wide. Costal cell 0.35× as long as fore wing. Marginal vein 0.20× as long as fore wing. Marginal vein 2.72× as long as stigmal vein. Postmarginal vein 2.40× as long as stigmal vein.

MALE. Unknown.

Material examined. ASIA. **Indonesia**: female type (probably holotype), *Eupelmus tenuicollis* Walker Notes on Chalcidide 5:86.1872, Type female checked RDE 1955 (1955), det. *Oodera* sp. by R. D. Eady, BMNH(E) #1414764, labelled "Mysol" (?) (might be Misool, an Island in Indonesia, South Moluccas, see also Gibson (2003) who gives the same locality information) (BMNH) (OTe01).

Biology. Unknown.

Distribution. Indonesia.

Taxonomic remarks. This species is a bit problematic, because only the single type specimen without metasoma is available. However, the rest of the body provides some good diagnostic characters that allow differentiation from all other species of *Oodera*.

Nomina dubia and species removed from *Oodera*

Oodera obscura Westwood, 1874, nomen dubium

Oodera obscura Westwood, 1874: 146.

Distribution. Maybe Indonesia. This information is given by Gibson (2003) and Noyes (2017), yet the original description does not give information about the type locality.

Taxonomic remarks. Gibson (2003) states that the location of the holotype is uncertain. Based on the information in the original description we expected the holotype to be in Oxford as part of the W. W. Saunders collection. However, even after extensive

search at Oxford and London (where other parts of the Saunders collection are located) by the respective curators the type could not be located. The species description by Westwood includes only a short description of colouration pattern and body length, both unspecific. The description does not provide sufficient information to clarify the taxonomic status of this species. We therefore consider it as a nomen dubium.

Oodera rufimana Westwood, 1874, nomen dubium

Oodera rufimana Westwood, 1874: 146.

Distribution. Cambodia.

Taxonomic remarks. As for *O. obscura* (see above), we expected the holotype to be in Oxford as part of the W. W. Saunders collection (both species were described in the same publication). However, even after extensive search at Oxford and London (where other parts of the Saunders collection are located) by the respective curators the type could not be located. The species description is not conclusive and specific. We therefore considered it as a nomen dubium.

Eupelmus (Eupelmus) albopilosa (Crosby, 1909), comb. n.

Oodera albo-pilosa Crosby, 1909: 86.

Remarks. This new combination is by authority of G. Delvare (CSIRO, Montpellier), J. Werner and R. S. Peters.

Material examined. Female holotype, labelled "Eupelmidae?" by Bouček 1958 (examined from two images (head frontal, body lateral), kindly provided by J. Liebherr, DECU).

Biology. Parasite of an unknown gall-forming fly on branches of *Combretum olivaceum* (Crosby, 1909).

Distribution. The species is listed from South Africa and Zambia in Noyes (2017). The record from Zambia is taken from the description; the record from South Africa is assigned to Bouček (1958). However, Bouček (1958) actually names South-East-Africa ("Südostafrika" in the German orginal) as a geographic region, which includes Zambia, and he does not refer to a record that is different from the original description, i.e., the record from South Africa in Noyes (2017) is not correct.

Taxonomic remarks. We only examined images of the holotype. However, the female type is clearly a specimen belonging to the subfamily Eupelminae (Eupelmidae), not an *Oodera*. The species is therefore removed from *Oodera* and transferred to *Eupelmus*. The tentative assignment to Eupelmidae was already done by Bouček (1958) (see also the label of the holotype). The species belongs to the *Eupelmus orientalis* species group, and might be a senior synonym of *E. orientalis* (Crawford, 1913) or *E.*

vuilleti (Crawford, 1913) (Delvare pers. comm.) but the decision on the identity of this species should be left for a future *Eupelmus*-related work. This is the first record of *Eupelmus* from Zambia (Noyes 2017).

Oodera sp.

Note. Five specimens could not be assigned to any of the previously or newly described species (specimens OSp01 (ZFMK), OSp02 (BMNH) and OSp03-05 (SAMC)). All do not match the characters used in the key and diagnoses for the species included herein. All are single specimens and all are found in countries from which already one or more species have been described or are described in this study. We deliberately refrain from describing these five single specimens as five additional new species, because they are apparently close to but not identical with other species (for details see below), they show overlap in distribution with other species and we have no information about the variation of the potential new species. Most species of *Oodera* are fairly similar, and reliable diagnostic characters are hard to find and describe, especially because most type series are small in this rarely collected group. Describing the additional five specimens as five new species would potentially cause significant confusion. We decided to list these specimens in this revision so that they can easily be located for future studies, and include all measurements in Suppl. material 1. We hope for additional material collected in the future, ideally also including ethanol preserved material for an integrative study, to formulate robust species hypotheses. Note that we describe three species from single specimens (i.e., *O. felix* sp. n., *O. florea* sp. n., and *O. mkomaziensis* sp. n.), but these are much more easily separated morphologically and are also geographically isolated from all other species.

Oodera sp. 1

Material examined. AFRICA. **Namibia**: female, Waterberg ca. 1500 m (above sea level), 20°36.58'S/17°10.43'E, Holzeintrag (= from wood), ex larva, leg. M. & O. Niehuis, 01.04.1997 (ZFMK) (OSp01).

Remarks. This specimen has the same collecting data as one of the paratypes of *O. namibiensis* sp. n. and was at first included as paratype of this species. Yet, it does not belong to this species because it is, for example, not uniformly dark-coloured on head and mesosoma but has some distinct dark green parts, and the fore wing is not partly infumate but hyaline.

Oodera sp. 2

Material examined. ASIA. **Indonesia**: male, Sumatra: Tep. Tingi, standing over: *Oodera ornata* in Hedqvist coll. BMNH(E) 2011-27 (BMNH) (OSp02).

Remarks. It is a single male specimen. It was collected in Indonesia, yet very distant from the only other species from Indonesia *O. tenuicollis*. It was standing as *Oodera ornata* (now *O. longicollis*) in the Hedqvist collection at the BMNH but clearly differs from *O. longicollis* by, for example, the absence of bright colours on the head, a continuous corona (square in *O. longicollis*), and a different mesoscutellum sculpture (completely lineate in *O. longicollis*, lineate only in anterior half in this specimen). We first intuitively assigned it to *O. tenuicollis* but it is also different from this species, not only by geographic distribution, but also by, for example, an elongated head (round in *O. tenuicollis*), and a pentagonal pronotum (oval in *O. tenuicollis*).

Oodera sp. 3

Material examined. AFRICA. **Republic of South Africa**: female, Western Cape, Gamkaberg Nature Reserve, 33°39.941'S/21°53.505'E, 315 m, 21.03.–05.05.2009, leg. S. van Noort (SAMC) (OSp03).

Remarks. This specimen has very few conspicuous characteristics that might allow placing it close to any other species. It differs from the other South African species *O. heikewernerae* sp. n. by, for example, a distinctly larger body length (7.7 mm compared to maximum of 6.64 mm in *O. heikewernerae*), a slightly different corona (no horizontal crests connected by vertical crests vs. some horizontal crests connected by vertical crests in *O. heikewernerae*), and a different scutellum sculpture (only partially lineate vs. completely lineate in *O. heikewernerae*). It is tentatively close to *O. felix* (from Central African Republic), but differs also from this species by, for example, hyaline fore wings (partly infumate in *O. felix*), small eyes (large in *O. felix*), and a partly blueish mesosoma (dark green in *O. felix*).

Oodera sp. 4

Material examined. AFRICA. **Tanzania**: female. Mkomazi Game Reserve (now Mkomazi National Park), Kisima Plot, 4°06.06'S/38°05.58'E, Acacia/Commiphora bushland, 25.11.–08.12.1995, leg. S. van Noort (SAMC) (OSp04).

Remarks. The specimen was collected in the same National park in Tanzania as *O. mkomaziensis* sp. n. but is different from this species by, for example, distinct light green colour on the head (dark in *O. mkomaziensis*), partly infumate fore wings (hyaline in *O. mkomaziensis*), and being distinctly smaller (this specimen: 5.56 mm, *O. mkomaziensis*: 7.20 mm).

Oodera sp. 5

Material examined. AFRICA. **Republic of South Africa**: female, Merweville, Laingsburg Distr., leg. H. Zinn (SAMC) (OSp05).

Remarks. The specimen is not too different from the other South African species *O. heikewernerae* sp. n., yet cannot be assigned to this species because of a few rather subtle differences, for example, the colour of the head and mesosoma (light green on head and reddish parts on mesosoma, both not present in *O. heikewernerae*), and the head shape (round in this specimen, usually oval in *O. heikewernerae*).

Discussion

This taxonomic revision of *Oodera* is based on a comparatively small number of specimens (115) and on morphological data only. Several of the new and previously described species are known from only a single specimen. This is inevitable because of the rarity of specimens in scientific collections. The samples we used were borrowed from 13 different museums, but more museums in Germany and abroad (e.g., Bavarian State Collection for Zoology Munich, Senckenberg Museum Frankfurt, Senckenberg Deutsches Entomologisches Institut Müncheberg, University of Oxford Hope Collection, National Museum of Natural History Stuttgart, Zoological Museum of the University of Zurich, Zoologisches Museum Hamburg, Australian National Insect Collection) were investigated for specimens of *Oodera* but do not have any (except for one specimen of *O. longicollis* in Canberra, see part on *O. longicollis*). Apart from the specimens gathered for this revision that are deposited at the ZFMK (Bonn), only a single specimen of *Oodera* was found in all major German scientific collections (a specimen of *O. formosa* in MFNB). Furthermore, 15,000 unidentified Chalcidoidea specimens were examined at the Royal Museum of Central Africa in Tervuren, Belgium but none of them was identified as a species of *Oodera*. We were restrained from taking a more integrative approach and including nucleotide sequence data due to an overall lack of specimens and the considerable age of most of the available material.

Species of *Oodera* seemingly prefer warmer to temperate regions (Fig. 17). There are no records from north of 50. parallel north. The absence from more northern regions of Asia, however, might well be an artifact as the fauna of many areas is not well-studied. So far, there are no records from Australia. Given that there is at least one species in Papua New Guinea, we might assume that the absence from Australia is a sampling artifact. However, the genus is very conspicuous – yet rarely collected – and is not likely to be overlooked easily. Generally, we found that the rarity of this genus in Chalcidoidea collections might be related to the sampling habits of chalcidoid workers. They prefer to use sweep nets, Malaise or colour pan traps. However, some of the new species (and also the new record of *O. formosa* from Germany) are based on material from hand collecting on wood or from rearings from wood. The latter is done in large scale, for example, by beetle specialists. Accordingly, teaming up with beetle workers or collecting wood and rearing specimens could rapidly increase the number of *Oodera* specimens known and potentially also the number of species known, possibly allowing for an integrative taxonomic approach.

After comprehensive examination of all available material of this genus, we would like to add some speculation on the function of the modified front legs that are pre-

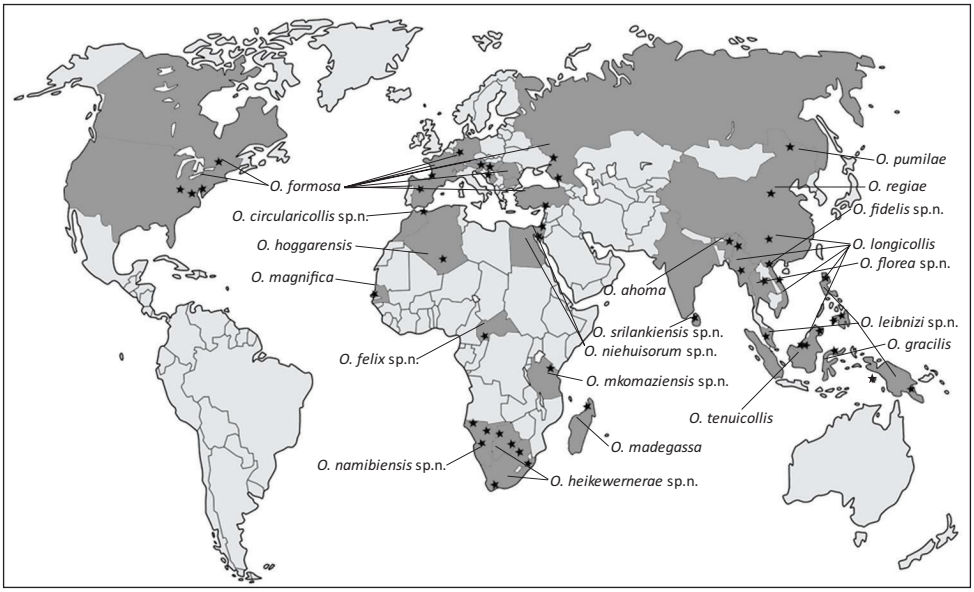

Figure 17. Geographic distribution of the genus *Oodera*. Countries from which *Oodera* was recorded are highlighted in dark grey. Stars indicate record localities. Record localities of *O. pumilae* Yang and *O. regiae* Yang are not exact but placed in the centre of the respective Chinese province from which the species was recorded.

sent in both sexes in striking conspiciousness. Raptorial function is highly unlikely. Although *Oodera* is an extraordinary chalcidoid in many ways, its mouth parts, head shape, etc. are typical for Chalcidoidea, and no other chalcidoid has been reported to be raptorial and carnivorous in the adult stage. Also, the anecdotal descriptions of Gates (2004) do not support raptorial function. A function in mating or courtship is unlikely, given that both sexes exhibit the character. This holds also for a function in catching host specimens, similar to Dryinidae females (in addition, host specimens are not free living but concealed in wood). Instead, we suspect a function in the clearing of wooden tunnels by the escaping newly emerged adult specimens. The legs are equipped with some strong bristles and pegs, but not with teeth or spines. Furthermore, the profemora are very massive and broad, much different from insects with raptorial front legs. They resemble shovels or rakes rather than a predator's instruments. Also, the long pronotum enables much greater moveability of the head, presumably allowing the specimens to use the coronated head to dig through narrow, frass- or debris-filled tunnels. Species of *Heydenia* (Cleonyminae: Heydeniini) have similar structures, and apparently also a comparable biology. However, verification of this function is still to be done by observations in the field or the lab.

We hope that this first revision of the group and the included identification key will foster studies on this beautiful and intriguing group of chalcids that will eventually lead to at least some basic knowledge about the species' biology and evolution.

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References

Baur H (2015) Pushing the limits – two new species of *Pteromalus* (Hymenoptera, Chalcidoidea, Pteromalidae) from Central Europe with remarkable morphology. ZooKeys 514: 43–72. https://doi.org/10.3897/zookeys.514.9910

Bouček Z (1958) Eine Cleonyminen-Studie; Bestimmungsstabelle der Gattungen mit Beschreibungen und Notizen, eingeschlossen einige Eupelmidae (Hym. Chalcidoidea). Sborník Entomologického Oddeleni Národního Musea v Praze 32: 353–386.

Bouček Z (1988) Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. Cab International, Wallingford, 1–832.

Bouček Z, Heydon S (1997) Pteromalidae. In: Gibson GAP, Huber JT, Woolley JB (Eds) Annotated keys to the genera of Nearctic Chalcidoidea (Hymenoptera). NRC Research Press, Ottawa, 541–692.

Bouček Z, Subba Rao BR, Farooqi SI (1978) A preliminary review of Pteromalidae (Hymenoptera) of India and adjacent countries. Oriental Insects 12: 433–468. https://doi.org/10.1080/00305316.1978.10432529

Cameron P (1903) Description of new genera and species of Hymenoptera taken by Mr Robert Shelford at Sarawak, Borneo. Journal of the Straits Branch of the Royal Asiatic Society 39: 89–181.

Crosby CR (1909) Chalcid-flies reared from galls from Zumbo East Africa. Brotéria: Serie Zoologica 8: 77–90.

Fusu L, Ebrahimi E, Siebold C, Villemant C (2015) Revision of the Eupelmidae Walker, 1833 described by Jean Risbec. Part 1: the slide mounted specimens housed at the Muséum national d'Histoire naturelle in Paris. Zoosystema 37: 457–480. https://doi.org/10.5252/z2015n3a3

Gahan AB (1925) A second lot of parasitic Hymenoptera from the Philippines. Philippine Journal of Science 27: 83–111.

Gates M (2004) Notes on *Henryana magnifica* Yoshimoto and *Oodera* sp. Chalcid Forum 26: 3.

Gibson GAP (1989) Phylogeny and classification of Eupelmidae, with a revision of the world genera of Calosotinae and Metapelmatinae (Hymenoptera: Chalcidoidea). Memoirs of the Entomological Society of Canada 149: 1–121. https://doi.org/10.4039/entm121149fv

Gibson GAP (1997) Morphology and terminology. In: Gibson GAP, Huber JT, Woolley JB (Eds) Annotated keys to the genera of Nearctic Chalcidoidea (Hymenoptera). NRC Research Press, Ottawa, 16–44.

Gibson GAP (2003) Phylogenetics and classification of Cleonyminae (Hymenoptera: Chalcidoidea: Pteromalidae). Memoirs on Entomology, International 16: 1–339.

Giraud J (1863) Hyménoptères recueillies aux environs de Suse, en Piémont, et dans le départment des Haut-Alpes en France et description de quinze espèces nouvelles. Verhandlungen der Kaiserlich Königlichen Zoologisch-Botanischen Gesellschaft in Wien (Abhandlungen) 13: 11–46.

Graham MWRDV (1969) The Pteromalidae of North-Western Europe (Hymenoptera: Chalcidoidea). Bulletin of the British museum (Natural history) Entomology, Supplement 16: 1–908.

Harris RA (1979) A Glossary of Surface Sculpturing. Occasional Papers in Entomology 28: 1–31.

Hedqvist K-J (1957) Über die Gattung *Heydenia* Först (Hym. Chalc.). Opuscula Entomologica 22: 39–48.

Hedqvist K-J (1961) Notes on Cleonymidae (Hym. Chalcidoidea). Entomologisk Tidskrift 82: 91–110.

Hedqvist K-J (1967) New genera and species of chalcid flies (Hym., Chalcidoidea) and a new species of Foenatopus Smith (Hym., Ichneumonoidea, Stephanidae) from Hoggar. Bulletin de la société entomologique Suisse 39: 180–190.

Heraty JM, Burks RA, Cruaud A, Gibson GAP, Liljeblad J, Munro J, Rasplus J-Y, Delvare G, Janšta P, Gumovsky JH, Woolley JB, Krogmann L, Heydon S, Polaszek A, Schmidt S, Darling DC, Gates MW, Mottern J, Murray E, Molin AD, Triapitsyn S, Baur H, Pinto JD, van Noort S, George J, Yoder M (2013) A phylogenetic analysis of the megadiverse Chalcidoidea (Hymenoptera). Cladistics 29: 466–542. https://doi.org/10.1111/cla.12006

Janšta P, Delvare G, Krogmann L, Schütte K, Peters RS (2016) Systematics, biology and distribution of *Microdontomerus iridis* (Picard, 1930), comb. n. (Hymenoptera, Torymidae, Toryminae, Microdontomerini), a parasitoid of Mantodea oothecae. Journal of Hymenoptera Research 48: 1–18. https://doi.org/10.3897/JHR.48.7470

Mani MS, Dubey OP, Kaul BK, Saraswat GG (1973) On some Chalcidoidea from India. Memoirs of the School of Entomology, St. John's College, Agra 2: 1–128.

Munro JB, Heraty JM, Burks RA, Hawks D, Mottern J, Cruaud A, Rasplus J-Y, Janšta P (2011) A Molecular Phylogeny of the Chalcidoidea (Hymenoptera). PLoS ONE 6: 11. https://doi.org/10.1371/journal.pone.0027023

Nikol'skaya M (1952) The Chalcid fauna of the USSR (Chalcidoidea). Opredeliteli po Faune SSSR Volume 44, 574 pp. [in Russian]

Noyes JS (2017) Universal Chalcidoidea Database. World Wide Web electronic publication. http://www.nhm.ac.uk/chalcidoids

Peters RS, Baur H (2011) A revision of the *Dibrachys cavus* species complex (Hymenoptera: Chalcioidea: Pteromalidae). Zootaxa 2937: 1–30.

Peters RS, Niehuis O, Gunkel S, Bläser M, Mayer C, Podsiadlowski L, Kozlov A, Donath A, van Noort S, Liu S, Zhou X, Misof B, Heraty J, Krogmann L (2018) Transcriptome sequence-based phylogeny of chalcidoid wasps (Hymenoptera: Chalcidoidea) reveals a history of rapid radiations, convergence, and evolutionary success. Molecular Phylogenetics and Evolution 120: 286–296. https://doi.org/10.1016/j.ympev.2017.12.005

Risbec J (1951) Les Chalcidoides de l'Afrique occidentale française. Mémoires de l'Institute Français d'Afrique Noire, Ifan-Dakar 13: 7–409.

Risbec J (1957) Chalcidoïdes et proctotrupoïdes de l'Afrique occidentale française (5e supplément). Bulletin de l'Institut Français d'Afrique Noire (A) 19: 228–267.

Walker F (1872) Part V. Encyrtidae, Myinidae, Eupelmidae, Cleonymidae, Spalangidae and Pirenidae. Notes on Chalcidiae E.W. Janson, London, 71–88.

Westwood JO (1874) Thesaurus Entomologicus Oxoniensis; or, Illustrations of New, Rare, and Interesting Insects, for the Most Part Contained in the Collection Presented to the University of Oxford by the Rev. F.W. Hope. Clarendon Press, Oxford, 227 pp.

Yang ZQ (1996) Parasitic Wasps on Bark Beetles in China. Science Press, Beijing, 363 pp.

Supplementary material 1

Table S1. Measurements (in mm) and ratios for all specimens examined

Authors: Jennifer Werner, Ralph S. Peters

Data type: measurement

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