

European species of the genus *Helorus* Latreille (Hymenoptera: Heloridae), with description of a new species from Sulawesi (Indonesia)

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The European species of the genus *Helorus* Latreille, 1802, are keyed and illustrated, with special reference to their distribution in The Netherlands. Three of the four European species are newly reported for The Netherlands. The description of a new species from Sulawesi (Indonesia) is added: *H. celebensis* spec. nov.

Introduction

The small and nearly worldwide family Heloridae Foerster, 1856 (Hymenoptera: Proctotrupoidea), contains one genus, *Helorus* Latreille, 1802, with twelve known valid species mostly in the Holarctic region (table 1). All species are very similar and possess a very characteristic venation of the fore wing (figs 1, 2, 12). Outside the Holarctic region the species have a limited distribution (table 1), most being only known from the type locality. In this paper the first species from Wallacea (Sulawesi) is described; the geographically nearest species are from Papua New Guinea and China. The genus remains unknown from the Indo-Pacific islands, but two species are known from the Australian region: *Helorus australiensis* New, 1975, from E. Australia and *H. niuginiae* Naumann, 1983, from Papua New Guinea. Heloridae are parasitoids of larvae of chrysopid lacewings (Neuroptera: Chrysopidae: Chrysopinae: *Chrysopa* species). The large genus *Chrysopa* Leach, 1815 (sensu lato), has representatives in all warm and temperate regions, with the exception of New Zealand (Tjeder, 1966).

The most important key to the genus *Helorus* is in the revision by Townes (1977), which is still complete for the European fauna. However, several European specimens are difficult to identify with this key, therefore a new identification key for the European species is included.

For terminology, see van Achterberg (1988), with exception of the syntergite which is medio-dorsal section of the metasoma formed by the fused second-fourth tergites. An asterisk indicates a new record for the fauna. Abbreviations: MZB stands for the Zoological Museum, Bogor-Cibinong, Indonesia; RMNH for the National Museum of Natural History, Leiden, The Netherlands and ZMA for Zoological Museum Amsterdam, The Netherlands.

The EFI photographs have been made with an Olympus motorized stereomicroscope SZX12 with AnalySIS Extended Focal Imaging Software.

Table 1. Distribution of the genus *Helorus* Latreille (excluding the fossil *H. festivus* Statz, 1938). Abbreviations of regions: W. Pal. = West Palaearctic (including Mediterranean region), E. Pal. = East Palaearctic (including Central Palaearctic), Nea = Nearctic, Neo = Neotropical, IA = Indo-Australian, Afro = Afrotropical.

Name of taxon \ region	W. Pal.	E. Pal.	Nea	Neo	IA	Afro
<i>Helorus anomalipes</i> (Panzer, 1798)	+	+	+	-	-	-
<i>Helorus australiensis</i> New, 1975	-	-	-	-	+	-
<i>Helorus brethesi</i> Oglobin, 1928	-	-	-	+	-	-
<i>Helorus celebensis</i> spec. nov.	-	-	-	-	+	-
<i>Helorus chinensis</i> He, 1992	-	+	-	-	-	-
<i>Helorus elgoni</i> Risbec, 1950	-	-	-	-	-	+
<i>Helorus nigripes</i> Foerster, 1856	+	-	-	-	-	-
<i>Helorus niuginiae</i> Naumann, 1983	-	-	-	-	+	-
<i>Helorus ruficornis</i> Foerster, 1956	+	+	+	-	-	+
<i>Helorus striolatus</i> Cameron, 1906	+	+	-	-	-	-
<i>Helorus suwai</i> Kusigemati, 1987	-	+	-	-	-	-
<i>Helorus yezoensis</i> Kusigemati, 1987	-	+	-	-	-	-

Key to European species of the genus *Helorus* Latreille

Note.— Males are very similar to females (both sexes have the number of antennal segments fixed at 15), but females have the hypopygium large and apically acute (figs 12, 13); in males the hypopygium is comparatively small and obtuse (fig. 1).

1. Temple, face, vertex, mesopleuron ventrally and mesoscutum medially coarsely reticulate-rugose; first metasomal tergite comparatively robust (fig. 3); hind tibia of ♂ dark brown *H. nigripes* Foerster, 1856
- Temple, face, vertex, mesopleuron ventrally and mesoscutum medially smooth to moderately punctate; first tergite variable, often more slender (figs 5, 6, 11, 12); hind tibia of ♂ blackish, dark brown or yellowish-brown 2
2. Pterostigma robust, 2.1-2.5 times as long as wide (fig. 4); mesopleuron largely smooth subanteriorly; syntergite basally (= directly after apex of first metasomal tergite) slender (fig. 5); first tergite hardly elevated subbasally and slender in lateral view (fig. 5); antenna yellowish-brown or brown; hypopygium of ♀ and area in front of it smooth; metasoma of ♂ smooth or superficially punctulate medio-ventrally *H. ruficornis* Foerster, 1856
- Note.— Usually middle trochanter yellowish-brown (in other European species dark brown), but colour of middle trochanter and femur varies from yellowish-brown to dark brown.
- Pterostigma slender, 2.9-3.6 times as long as wide (figs 1, 7, 9); mesopleuron distinctly crenulate-rugose subanteriorly (fig. 12); syntergite basally comparatively robust (figs 6, 11); first tergite distinctly elevated subbasally and usually robust in lateral view (figs 1, 6, 11, 12); antenna usually dark brown or black; hypopygium of ♀ and area in front of it distinctly punctate; metasoma of ♂ distinctly punctate medio-ventrally 3
3. Scutellum with distinctly transverse subposterior carina, at most narrowly interrupted (fig. 8); antennal flaps (= lobes over antennal sockets) with some coarse punctures; metanotum with distinct transverse carina subposteriorly (fig. 8), and

- rather acute dorsally (fig. 6); first metasomal tergite of both sexes swollen subbasally and 1.8-2.3 times as long as its maximum width, in lateral view comparatively wide (fig. 6) and moderately costate subventrally; face rather coarsely (rugose-) punctate medio-dorsally; axilla often narrow apically ("ax" in fig. 8); antenna of both sexes black; propodeum usually steep posteriorly (fig. 6) *H. anomalipes* (Panzer, 1798)
- Scutellum without distinctly transverse subposterior carina, absent or widely interrupted (fig. 10); antennal flaps smooth or punctulate (but punctate in Spanish specimens); metanotum without distinct transverse carina subposteriorly (fig. 10), and rounded dorsally (fig. 11); first tergite slender subbasally and of ♀ 2.7-3.0 (♂: 2.3-2.6) times as long as its maximum width, in lateral view comparatively slender (figs 11, 12) and strongly costate subventrally; face smooth or finely punctate medio-dorsally, similar to sublateral sculpture or weaker; axilla comparatively wide apically ("ax" in fig. 10); ventrally antenna of ♀ brown to dark brown and of ♂ black to dark brown; propodeum gradually rounded posteriorly (fig. 11) *H. striolatus* Cameron, 1906

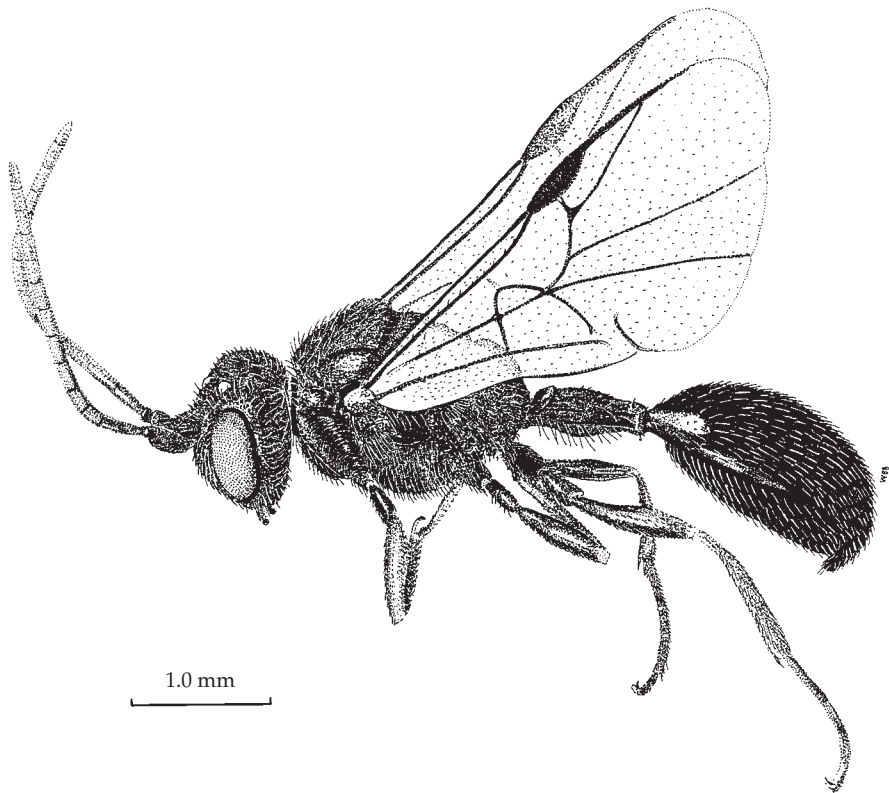


Fig. 1, *Helorus anomalipes* (Panzer), ♂, habitus, lateral aspect. Drawing by A. Watsham.

Helorus anomalipes (Panzer, 1798)
(figs 1, 6-8)

Notes.— Most common species in *The Netherlands and adults occur from end of June till end of September. Localities in The Netherlands (RMNH, ZMA, coll. Peeters, with acronyms for the provinces): Almelo (OV), Amsterdam (NH), Anloo (DR), Arkel (ZH), Arnhem (GE), Baarn (UT), Bergen (NH), de Bilt (UT), Bovenkerk (NH), Bussum (NH), Callantsoog (NH), Castelle (LI), Clinge (ZE), Drunen (NB), Elsloo (LI), Emmen (DR), Epen (LI), Exloo (DR), Gerendal (LI), 's Gravenpolder (ZE), 's Gravenzande (ZH: Staelduinen), 't Harde (GE), Heteren (GE), Hilversum (NH), Hoek van Holland (ZH), Hulshorst (GE), Katwijk (ZH), Koedijk (NH), Kotten (GE), Leiden (ZH), Lelystad (FL), Loosduinen (ZH), Mantinge (DR), Mook (GE), Mosbeek (DR), Neercanne (LI), Noordwijk (ZH), Nunspeet (GE), Ootmarsum (OV), Ovezande (ZE), Papenvoort (DR), Putten (GE), Rhenen (UT), Rijswijk (ZH), Rottemeroog (GR), Schoorl (NH), St. Pietersberg (LI), Terschelling (FR), Tongeren (GE; Epe), Texel (NH), Tienraij (LI), Vrouwenpolder (ZE), Waarder (ZH), Wageningen (GE), Westerbork (DR), Wijster (DR), Winterswijk (GE), Ypenburg (ZH). Additional specimens seen from *Austria (Flirsch; Schlins, Vorarlberg), *Belgium (St. Pietersberg; Doel), Bulgaria (Bojno, Rodopi, 14.v.1975), France (Grimaud, Var; Col Falchet, Drôme), Germany (Smückwitz near Berlin), *Lebanon (Becharré), and U.S.A. (Durham, New Hampshire). At lower altitudes in South Europe this species seems to be largely replaced by *H. striolatus* Cameron (e.g. in Bulgaria).

Helorus nigripes Foerster, 1856
(figs 2-3)

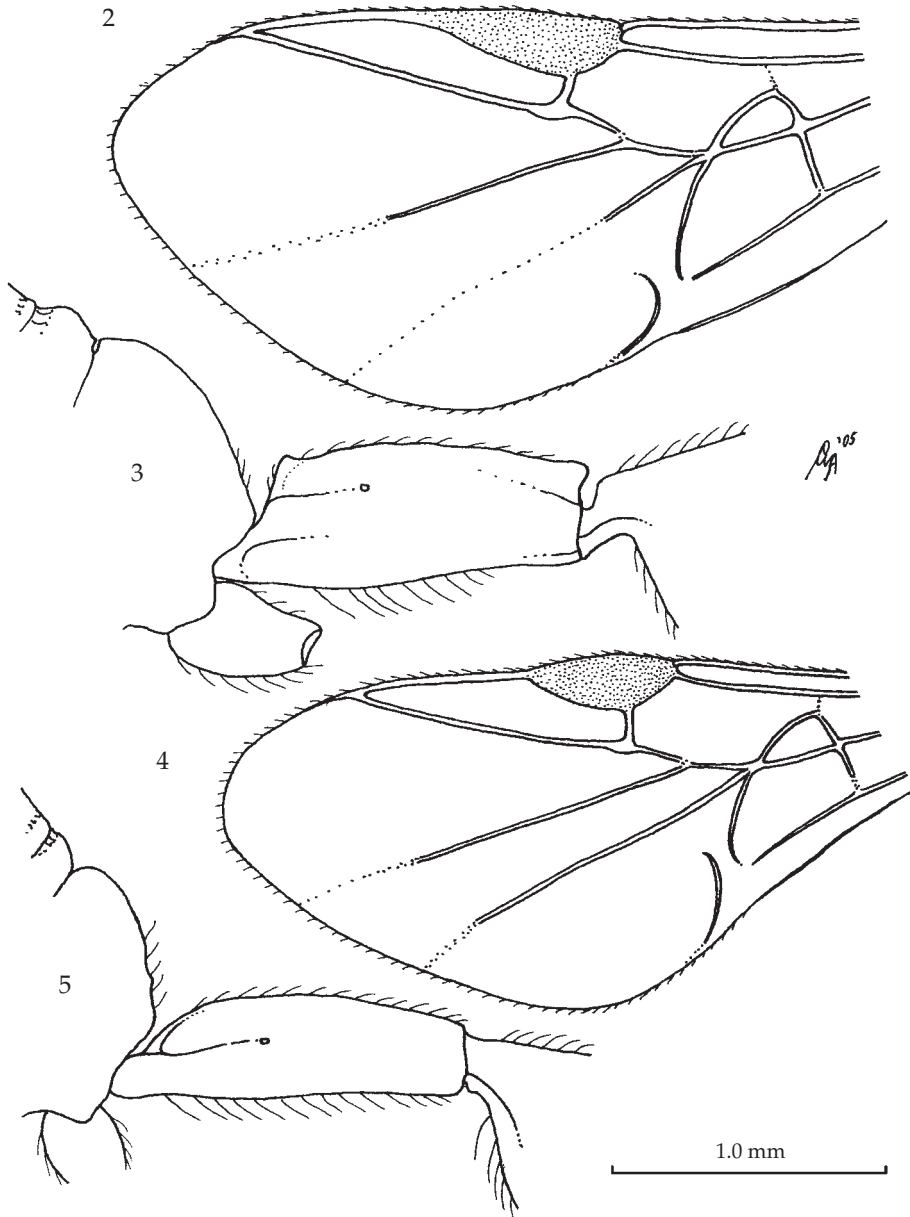
Material.— 1 ♂ (RMNH), “[Netherlands: ZH], Leyd[en], viii.[ca. 1875], [Snellen] v[an] Voll[enhoven]”; 1 ♀ (ZMA), “Nederland: Gld., Nunspeet, D, 1.ix.1977, R.T. Simon Thomas”; 1 ♀ (RMNH), “[Netherlands: OV], Deventer, venster [= on window], vii.[19]47, [J.G.] Betrem”; 1 ♀ (RMNH), id., but in house, 1956; 1 ♀ (RMNH), “[Netherlands: LI], Museum Leiden, Exc. St. Pietersberg, Oosthelling bij grens [= eastern slope near border], 17.viii.1950”; 1 ♂ (RMNH), id., but 16.viii.1950, wijngaard langs [= vineyard along] Kleine Pruisweg”; 1 ♂ (RMNH), “Belgium-L[imburg], 14.viii.1979, B.V. Lefeber”.

Distribution.— Austria, *Belgium, Bulgaria, Czech Republic, Denmark, England, France, Germany, Hungary, Moldova, *Netherlands, Sweden, Switzerland, Ukraine.

Notes.— The most rarely collected species of *Helorus*, but also the most easily recognisable one because of its coarsely sculptured body.

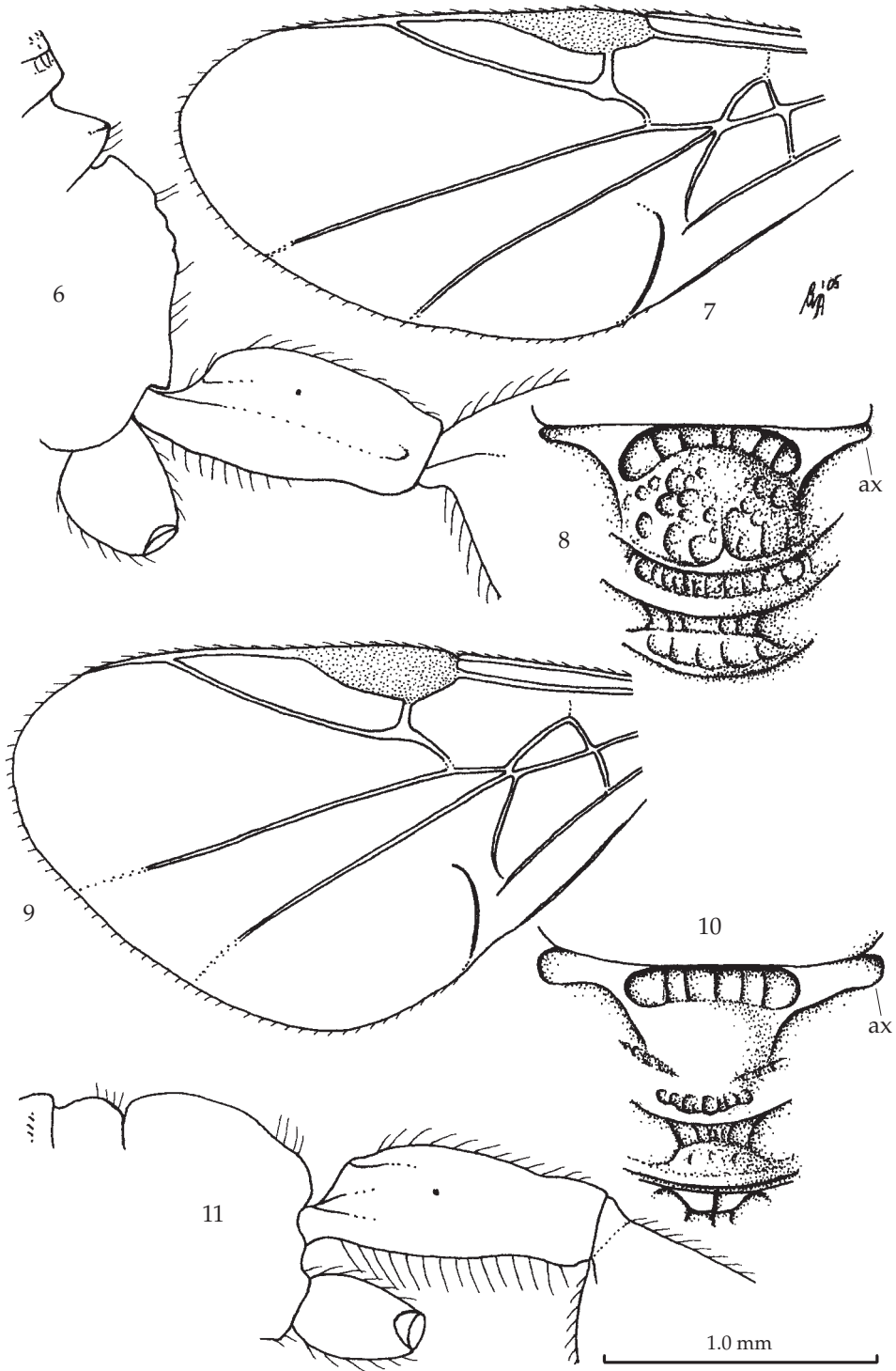
Helorus ruficornis Foerster, 1956
(figs 4-5)

Notes.— Second commonest species in The Netherlands and adults occur from early July till early September. It is the only species previously reported from The Netherlands (Peeters, 1996). Localities in The Netherlands (RMNH, ZMA and coll. Peeters): Arkel (ZH), Asperen (ZH), Borger (DR), Botshol (NH), Colmont (LI; Wrakelberg), Ede (GE), Emmen (DR), 't Harde (GE), Hilversum (NH), Kortenhoef (NH), Kwadijk (NH), Leiden (ZH), Lelystad (FL), Margraten (LI), Neerijnen (GE), Norg (DR), Nunspeet (GE),



Figs 2-3, *Helorus nigripes* Foerster, ♀, Netherlands, Deventer; figs 4-5, *H. ruficornis* Foerster, ♀, Netherlands, Oostkapelle. 2, 4, fore wing; 3, 5, propodeum and first metasomal tergite, lateral aspect. 2, 4: scale-line (= 1.0 ×); 3, 5: 1.4 ×.

Oostkapelle (ZE; Oranjezon), Papenvoort (DR), St. Pietersberg (LI), Putten (GE), Texel (NH), Udenhout (NB; de Brand), Urk (FL), Valkenburg (LI), Waarder (ZH), Wijster (DR; common). Additional specimens seen from Andorra (St. Julia, 16.x.1977), Austria (Flirsch, Tirol), Bulgaria, (Zdraves, Rodopi; Beklemet, Stara Planina), England (Silwood Park,



Berkshire, v.1994; Pamber, Hampshire), Finland (Turunja Porin Lääni), France (Col. Flachet, Drôme, 24-25.ix.1987), Germany (Aachen, Wurmatal, 18.vi.1981), Spain (Benidorm, 24.iv.1982; Vall Romnes, near Barcelona, 20.ix.1996), Switzerland (no locality), and U.S.A. (Greenville, South Carolina).

The middle trochanter and femur are brownish-yellow, yellowish-brown or dark brown, the latter condition especially in South European specimens, e.g. from Spain.

Helorus striolatus Cameron, 1906
(figs 9-12)

Material.— 1 ♂ (ZMA), “[Netherlands: NH], Blaricum, 26.viii.1923, [W.H.J. v. d. Beek]”; 1 ♀ (RMNH), “Nederland (Gld), Putten, Schovenh[orst], 6.viii.1975, J. v.d. Vecht, Malaise trap”; 1 ♂ (RMNH), Nederland-Gld, ‘t Harde, 1.viii.1990, B. v. Aartsen”; 1 ♀ (ZMA), “[Netherlands: UT], Zeist, 5.ix.1909, [W.H.J. v. d. Beek]”; 1 ♀ (coll. Peeters), “Netherlands: N.B., Udenhout, “De Brand”, 17-24.viii.1991, UTM FT 488222, Mal. trap, Ins. W. G. KNNV-Tilburg”; 2 ♂♂ (RMNH), “Nederland (LI), Meijnsweg, KB 9974, gem. Melick en Herkenbosch, 27.vii.1989, Ph. Pronk (89.076), Museum Leiden”; 1 ♀ (ZMA), “Nederland: Limburg, Lottum, 16.viii.1977, R.L. Veenendaal”; 1 ♀ (RMNH), “[France:] Indre et Loire, La Roche Clt., 23.viii.1991, Cocquempot”; 1 ♀ (RMNH), “France: Loiret, Lorris forest, 12.viii.1979, on *Pinus sylvestris*, F. Herard, G. Mercadier”; 1 ♀ (RMNH), “France: Vaucluse, Sault, 3.ix.1986, M.J. Gijswijt, RMNH’86”; 1 ♀ (RMNH), “France: Drôme, Aubres, 16-27.ix.1985, on *Hedera*, M.J. Gijswijt”; 1 ♂ (RMNH), “Esp. [= Spain],



Fig. 12, *Helorus striolatus* Cameron, ♀, Bulgaria, Sveti Vlas, habitus, lateral aspect.

◀ Figs 6-8, *Helorus anomalipes* (Panzer), ♀, Netherlands, ‘t Harde; figs 9-11, *H. striolatus* Cameron, ♀, Bulgaria, Sveti Vlas. 6, 11, propodeum and first metasomal tergite, lateral aspect; 7, 9, fore wing; 8, 10, scutellum and metanotum, dorsal aspect, ax = axilla. 6, 8, 10: 1.2 × scale-line; 7, 9: 1.0 ×; 11: 1.4 ×.

Alicante, Moraira, 90 m, 30.iv-6.v.1989, garrigue, R. Wahis, Mal. trap"; 1 ♂ (RMNH), "Espana: Mál[aga], Ronda, 22.v.1995, M.J. Gijswijt"; 1 ♂ (RMNH), "NW Bulgaria, Opletnja, near Mazdra, c 300 m, 11.viii-11.ix.1998, Mal. trap 5, C. van Achterberg, R. de Vries, & P.V. Atanassova, RMNH'98"; 1 ♀, id., but 11.vii-11.viii.1998; 7 ♀ ♀ (RMNH), "E. Bulgaria, Sv. Vlas, near Nesebar, c 20 m, 1-31.vii.1998, Mal. trap 3, C. van Achterberg, R. de Vries, & P.V. Atanassova, RMNH'99"; 26 ♀ ♀ + 15 ♂ ♂, id., but 1-30.vi.1998; 2 ♀ ♀ + 2 ♂ ♂, id., but 8-31.v.1998; 2 ♂ ♂ (RMNH), "SE Bulgaria, Brodilovo, 80 km S Burgas, c 30 m, 29.vii-2.viii.1997, Mal. trap, C. van Achterberg & P.V. Atanassova, RMNH'97"; 1 ♀ (RMNH), "[Bulgaria], Rhodopi, Markovo, 13.viii.1977, A. Zaykov; 1 ♂, id., but Sitovo, 16.viii.1977; 2 ♂ ♂ (RMNH), SW Bulgaria, Melnik, near Petric, c 450 m, 12.vi-14.vii.1998, Mal. trap 6, C. van Achterberg, R. de Vries, & P.V. Atanassova, RMNH'98"; 1 ♀ (RMNH), Turkey: Bingöl, 15 km S Genç, 1400 m, 13.viii.1985, R. Hensen".

Distribution.— Austria, *Bulgaria, Czech Republic, Finland, *France, Germany, Greece, Hungary, Italy, Lithuania, *Netherlands, Russia (south), Spain, Sweden, Switzerland, *Turkey and Ukraine.

Notes.— The specimens from Spain have the vertex strongly punctate and the pterostigma slightly more robust than other specimens.

Helorus celebensis spec. nov.
(figs 13-18)

Material.— 1 ♀ (RMNH), "Indonesia: Sulawesi, n[ea]r Mamasa, Penannang, 1620 m, Mal. trap 20, 9-22.iv.1991, C. v. Achterberg, RMNH'91". Paratypes: 1 ♀ + 15 ♂ ♂ (ZMB, RMNH), topotypic, but 1700 m, trap 23, 10-22.iv.1991 and 1 ♂ trap 22, 1590 m, 10-22.iv.1991.

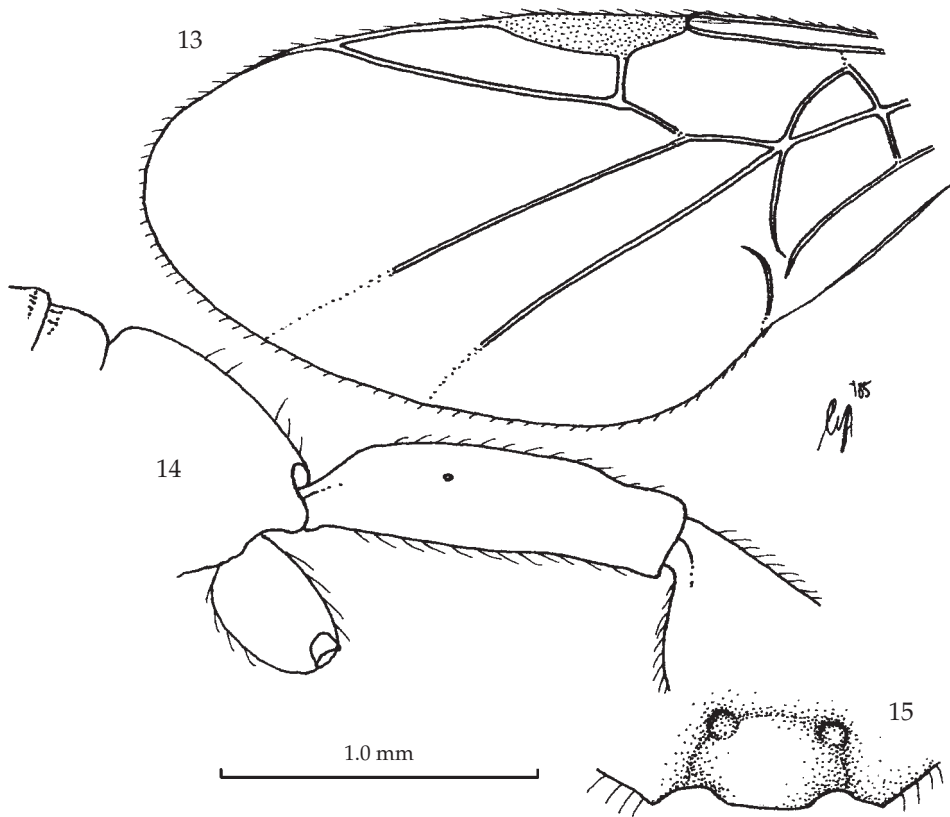
Holotype, ♀, length of body 4.7 mm, and of fore wing 3.3 mm.

Head.— Third antennal segment 1.2 times as long as fourth segment, third, fourth, and penultimate segments 6.4, 5.0 and 2.0 times as long as wide (fig. 16); apical (= fifth) segment of maxillary palp 1.5 times as long as fourth segment; face and clypeus smooth, densely and long setose; clypeus broadly semicircular (fig. 15) with ventral truncation; length of eye in dorsal view 1.4 times temple; temple long, densely and pale yellowish setose; OOL:diameter of ocellus:POL = 9:5:10; malar space distinctly impressed and with narrow malar suture, its length 1.3 times basal width of mandible and 0.4 times height of eye.

Mesosoma.— Length of mesosoma 1.5 times as long as high; side of pronotum largely smooth except for an oblique carina and some crenulae posteriorly; mesopleuron largely smooth (except for some crenulae below tegulae; fig. 16) and nearly completely setose; metapleuron coarsely reticulate (but anteriorly sculpture obsolescent), long and densely setose; prepectal and postpectal carinae coarsely developed; mesoscutum smooth and densely long setose; notauli deep and finely crenulate; scutellar sulcus deep and coarsely crenulate, but medially narrowed; scutellum smooth, weakly convex and without subposterior crest or carina, but with narrow transverse crenulate groove; metanotum coarsely crenulate anteriorly, smooth and rounded posteriorly; propodeum comparatively flat (figs 14, 16) and coarsely reticulate.

Wings.— Fore wing: pterostigma slender (fig. 13), 3.8 times longer than its maximum width; vein 1-R1 of fore wing about as long as pterostigma; vein cu-a antefurcal (fig. 18); basal and subbasal cells nearly completely glabrous.

Legs.— Length of femur, tibia and basitarsus of hind leg 5.0, 8.4 and 9.8 times their



Figs 13-15, *Helorus celebensis* spec. nov., ♀, holotype. 13, fore wing; 14, propodeum and first metasomal tergite, lateral aspect; 15, clypeus, anterior aspect. 13: 1.0 × scale-line; 14, 15: 1.4 ×.

width, respectively; hind tibial spurs 0.13 and 0.10 times hind basitarsus; hind femur (except basally) distinctly swollen (fig. 16).

Metasoma.— First tergite slender, in lateral view 3.5 times as long as its maximum width, antero-dorsally gradually widened (figs 16, 18), rather coarsely punctate-costate (fig. 18), tergite in dorsal view subparallel-sided, only subapically distinctly narrowed, rather superficially punctate-costate and long setose laterally and 3.5 times as long as its maximum width (fig. 17); syntergite strongly narrowed basally (figs 14, 16, 18); hypopygium remotely punctulate.

Colour (fig. 16).— Black; scapus, pedicellus partly ventrally, tegulae, palpi and legs (but hind tibia (except basally) and hind tarsus dark brown), brownish-yellow; pterostigma and veins brown; wing membrane hyaline; remainder of antenna, metasoma apically and narrowly laterally dark brown.

Male.— Very similar to female, including shape of third and fourth antennal segments.

Variation.— Length of body of ♀ 4.1-4.7 mm (of ♂ 3.2-3.6 mm) and of fore wing of ♀ 3.1-3.3 mm (and of ♂ 2.4-2.8 mm); vein cu-a of fore wing antefurcal, very rarely



Fig. 16, *Helorus celebensis* spec. nov., ♀, holotype, habitus, lateral aspect.

subinterstitial; length of first metasomal tergite 3.4-3.7 times (in dorsal view) or 3.5-3.6 times (in lateral view) its maximum width, sometimes tergite largely smooth and strongly shiny.



Fig. 17, *Helorus celebensis* spec. nov., ♀, holotype, propodeum and first metasomal tergite, dorsal aspect.



Fig. 18, *Helorus celebensis* spec. nov., ♀, holotype, propodeum and first metasomal tergite, lateral aspect.

Notes.— Very similar to *H. ruficornis* Foerster because of its slender habitus, smooth face and frons, elongate first tergite in lateral view, and yellowish middle trochanter. It differs by having a slender and brown pterostigma, scapus and pedicellus brownish-yellow (paler than the third antennal segment; fig. 16), clypeus truncate ventrally (fig. 15), all femora brownish-yellow (fig. 16), the head and the mesosoma conspicuously long and densely setose (fig. 16), the propodeum less steep posteriorly (fig. 14 versus fig. 5) and the first metasomal tergite comparatively slender (fig. 14 versus fig. 5).

The other Indo-Australian species are not closely related: *H. niuginiae* Naumann from Papua New Guinea has the third antennal segment of the male modified, much shorter than the fourth segment, and the fourth segment sinuate (the female is unknown); the scapus, pedicellus and most of the coxae black; the third and fourth antennal segments pale brown, much paler than the scapus; the pedicellus and most of the femora dark brown. *H. australiensis* New from East Australia has a similar yellowish-brown scapus and pedicellus, trochanters, fore and middle femora, but its first metasomal tergite is moderately robust (similar to that of *H. anomalipes* (Panzer), about 2.3 times as long as its maximum width in dorsal view), vein cu-a of the fore wing interstitial, the coxae largely black and the third and fourth antennal segments about of equal length and 3.2 and 3.4 times as long as wide. The only known Oriental species, *H. chinensis* He from China (Zhejiang, Hunan) is strongly dissimilar; it is very near *H. nigripes* Foerster because of its heavily sculptured head and mesosoma, and the dark brown femora.

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