

On the ants (Hymenoptera: Formicidae) of the Philippine Islands: II. The genus *Forelophilus* KUTTER, 1931

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Zusammenfassung. Zwei neue Spezies von den Philippinen, *Forelophilus stefanschoedli* sp. nov. und *Forelophilus philippinensis* sp. nov., werden beschrieben und abgebildet. Sie werden mit der Typusart, *F. overbecki* Kutter, 1931 von Java, der bisher einzigen in der Gattung beschriebenen Art, verglichen. Minor- und Major-Arbeiterinnen von *F. stefanschoedli* sp. nov. werden beschrieben. Letztere Morphe war bisher für *Forelophilus* Kutter, 1931 unbekannt und ermöglicht einen besseren Vergleich von *Forelophilus*, *Camponotus* Mayr, 1861 und *Overbeckia* Viehmeyer, 1916. Eine Minor-Arbeiterin von *F. overbecki* wird als Lectotypus designiert. Nachweise von *F. stefanschoedli* sp. nov. stammen von den Inseln Luzon, Leyte und Mindanao, jene von *F. philippinensis* sp. nov. von Luzon, Bayagnan und Mindanao.

Abstract. Two new ant species from the Philippines, *Forelophilus stefanschoedli* sp. nov. and *Forelophilus philippinensis* sp. nov., are described, illustrated and compared with the type species, *Forelophilus overbecki* Kutter, 1931 from Java, Indonesia, hitherto the only species described in the genus. *Forelophilus stefanschoedli* sp. nov. is known from minor and major workers. The latter morph was previously unknown in *Forelophilus* Kutter, 1931 and allows a better comparison of *Forelophilus*, *Camponotus* Mayr, 1861, and *Overbeckia* Viehmeyer, 1916. A minor worker of *F. overbecki* is designated as lectotype. Records of *F. stefanschoedli* sp. nov. are from the islands of Luzon, Leyte, and Mindanao, those of *F. philippinensis* sp. nov. from Luzon, Bayagnan, and Mindanao.

Keywords: ants, Formicidae, *Forelophilus*, *Camponotus*, Philippines, new species, first record, minor worker, major worker, lectotype designation

INTRODUCTION

Forelophilus Kutter, 1931 is definitely one of the least known formicine genera. Kutter (1931) described it as closely related to *Overbeckia* Viehmeyer, 1916 and *Camponotus* Mayr, 1861. Donisthorpe (1943) and most subsequent authors until Bolton (2003) placed *Forelophilus* in the Camponotini; only Agosti (1991) discussed *Forelophilus* as a genus of his "Formica-group". *Forelophilus overbecki* Kutter, 1931 was described from Java, Indonesia, and is so far the only formally described species of the genus (see

e.g. Bolton 1995). However, photographs of further undescribed species from Borneo are available on the World Wide Web (Antbase.net 2006 [sub *Camponotus* sp. 18], Antweb 2006). Hitherto no records of the genus are known from the Philippines (see species list in Alpert *et al.* 2006).

Forelophilus is certainly very close to *Camponotus*, if not to be treated as a junior synonym. In a phylogenetic system, it might be hard to find characters which prove both the monophyly of the over 1,400 described species of *Camponotus* (listed in Bolton 1995) on the one

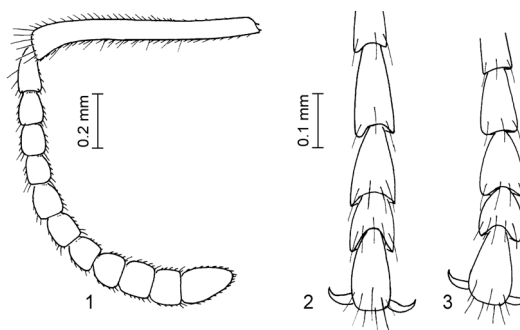
hand, and *Forelophilus* (or *Forelophilus* + *Overbeckia*?) being the adelphotaxon of *Camponotus* on the other. Only if these demands are met should *Forelophilus* be kept as a valid genus. The characteristics used by Kutter (1931) and Bolton (1994) to distinguish these three genera are treated in the discussion. It should be noted here that major workers of *Forelophilus stefanschoedli* sp. nov. would be identified as *Camponotus*, if using the key by Bolton (1994).

Within the Philippine ant fauna, workers of *Forelophilus* can be distinguished from Philippine species of *Camponotus* by the following combination of characteristics: body blackish, comparatively small (length ca. 3.0 - 5.5 mm), with erect setae on head, mesosoma, petiole, and gaster and with the appressed pilosity dense only on gaster. Eyes in full face view slightly behind mid-length of head, not entirely behind end of frontal carinae. Antenna (Fig. 1) relatively short, flagellum distally widened, segments 9 - 11 slightly shorter than wide. Metanotal furrow deep. Propodeum with transverse ridge separating dorsal and caudal surface; this ridge with some long setae. Fore femur not incrassate.

In the course of this study, three syntype specimens of *F. overbecki* were examined. A description and illustrations of this poorly known species are added, and a lectotype is designated.

MATERIAL AND METHODS

All specimens are dry mounted on card squares or card triangles. In the paragraphs "Type material," #-numbers are sample (locality) numbers and do not refer to nest series. Types of *F. overbecki* are referred by citing the original labels. Each single label is marked with ""; the backslash sign \ indicates the break of a line.



Figs. 1 - 3: (1) Antenna of *Forelophilus stefanschoedli* sp. nov.; (2) hind tarsal segments 2 - 5 of *F. stefanschoedli* sp. nov.; (3) hind tarsal segments 2 - 5 of *F. philippinensis* sp. nov.

Acronyms of repositories:

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|------|---|
| CZW | Coll. H. & S.V. Zettel, Vienna, Austria |
| MZL | Musée de Zoologie, Lausanne, Switzerland |
| NHWM | Natural History Museum, Vienna, Austria |
| MTKD | Museum für Tierkunde, Dresden, Germany |
| UPLB | University of the Philippines, Los Baños, Philippines |

Examination of structural characters were done mainly by a Leica Wild M10 binocular microscope. Measurements were taken with an Olympus SZH10 binocular microscope at magnifications of 20×, 70×, and 140×. Drawings (Figs. 1 - 3) were prepared with a drawing apparatus attached to a Nikon SMZ1500 binocular microscope at magnifications of 144× and 270×. Digital photographs (Figs. 4 - 20) were taken with a Leica DFC camera attached to a Leica MZ16 binocular microscope with the help of Image Manager IM50 and processed with Auto-Montage Pro and Adobe Photoshop 7.0 programmes.

The term "major worker" is used for a distinct morph with very large, squared head (Fig. 7) and with Scape Index 72 - 80; within *Forelophilus* it is only known in *F. stefanschoedli* sp. nov. "Minor workers" are distinctly smaller workers which show

however a relatively wide size range. They have roundish heads (Figs. 4, 10, 16) and a Scape Index of 101 - 105. A single "intermediate worker" of *F. philippinensis* sp. nov. has some intermediate characteristics but is overall more similar to the minor worker (head: Fig. 13; Scape Index 97).

Descriptions of species do not repeat characteristics of the genus description or the species diagnosis.

Acronyms and definitions of measurements and indices:

| | |
|-----|--|
| TL | Total Length: Approximate length of a totally outstretched individual, from apex of closed mandibles to gastral apex. |
| HW | Head Width. Maximum width of head, in full-face view including eyes. |
| HL | Head Length, in full-face view, excluding mandibles, measured along midline. |
| CI | Cephalic Index. $HW / HL \times 100$. |
| EL | Eye Length, measured in full face (frontal) view. |
| OMD | Oculomandibular Distance: minimum length of malar area in lateral view, from anterior eye margin to nearest point of malar area. |
| SL | Scape Length. Length of antennal scape, excluding basal condyle. |
| SI | Scape Index. $SL / HW \times 100$. |
| PW | Pronotal Width. Maximum width of pronotum in dorsal view. |
| HFL | Hind Femur Length, along dorsal margin, from articulation with trochanter to posterior-most extremity. |
| HFI | Hind Femur Index: $HFL / HW \times 100$. |

All measurements (except indices) are given in millimetres; for paratypes the minimum and maximum values are presented.

RESULTS

Forelophilus Kutter, 1931

DIAGNOSIS (females): Group of closely-related Camponotini with the following set of characteristics: Size small (body length of worker ca. 3.0 - 5.5 mm). Head approximately as long as wide (Cephalic Index 97 - 102), roundish in minor worker (Figs. 4, 10, 16), squared in major worker and gyne (Figs. 7, 19). Clypeus (sub-)truncate in minor worker, with short medial lobe in major worker and gyne. Antenna (Fig. 1) short, Scape Index 72 - 105; flagellum distally widened, with middle segments sub-quadrate, segments 9 - 11 shorter than wide. Pronotum, propodeum, and petiole without teeth or spines. Fore femur not incrassate. Worker (but not gyne) with deep metanotal furrow, prominent metathoracic spiracular tubercles (protruding dorsad in minor worker), and transverse setiferous ridge on propodeum (Figs. 5, 8, 17). Legs short (Figs. 5, 8, 20); Hind Femur Index 76 - 110. Petiole nodiform (Figs. 5, 11, 17, 20). Posterior margins of gastral tergites more or less whitish translucent (Figs. 6, 9). First tergite much shorter than lengths of following tergites combined.

DESCRIPTION OF MINOR WORKER: Head (Figs. 4, 10, 16) roundish, greatest width at eyes. Vertex slightly to distinctly convex. Dorsal surface with more or less developed fine rugosity. Eye relatively small, situated behind middle of head, not or slightly surpassing head sides in frontal view. No ocelli. Clypeus truncate, distinctly convex in lateral view, set with short, erect setae, with median ridge or tubercle. Gena with few short setae close to mandible base. Antennal sockets distant from clypeus. Frontal carinae with margin elevated dorsad, yellowish translucent, subparallel in front of antennal sockets, widened behind them. Antenna (Fig. 1) short, scape circa as long as head width, apically slightly widened and curved, flagellum distally distinctly widened, with middle segments subquadrate, segments 9 - 11 shorter than wide, apical segment sub-ovate. Mandible short and stout, masticatory margin with five teeth, outer surface smooth, with punctures, at most very delicately striate. Palp formula 6, 4.

Mesosoma (Figs. 5, 8, 11) relatively small and low (especially on prothorax), dorsal surface set with variable number of erect setae. Pronotum dorsally flattened, shoulders rounded, anterior margin yellowish translucent. Pro-mesonotal suture distinct. Mesonotum posteriorly declivitous, set with transverse row of long setae. Meso- and metanotum fused. Metanotum (or meso-metanotal suture?) deeply impressed, furrow-like. Metathoracic spiracles located on dorsad-projecting tubercle, surpassing dorsal face of propodeum. Propodeum with distinct dorsal and caudal (declivitous) face of approximately same lengths, separated by transverse, dorsad directed ridge well visible in lateral view and set with few long setae; posterior face concave in lateral view. Propodeal spiracle at mid-length between propodeal ridge and insertion of hind coxa. Legs relatively short. Tarsi longer than tibiae, widened, fourth tarsomere (and less distinct second and third tarsomeres) dorsoapically concave, enclosing base of following tarsomere (Figs. 2, 3). Claws wide at base, suddenly narrowed at mid-length, terminating in slender hook.

Petiole (Figs. 5, 8, 11) nodiform, much higher than long in profile, dorsally evenly rounded and with some long setae; node, if seen from front or rear, subovate.

Gaster (Figs. 6, 9, 12) with relatively dense appressed pilosity, tergites and sternites with scattered erect setae. First tergite much shorter than lengths of following tergites combined. Posterior margins of tergites whitish translucent (not very apparent in some specimens).

Description of major worker: see *F. stefanschoedli* sp. nov.

Description of intermediate worker: see *F. philippinensis* sp. nov.

Description of gyne: see *F. overbecki*.

Male: unknown.

DISTRIBUTION: Java, Borneo, Mindanao and nearby islands, Luzon.

***Forelophilus stefanschoedli* sp. nov.**

(Figs. 1, 2, 4 - 9)

TYPE MATERIAL: Holotype (minor worker): Mindanao, Surigao del Norte, SW of Bacuag, Payapag, Little Baguio Waterfall, 6.II.2000, leg. S. Schödl, # 9 (NHMW). Paratypes: 1 major worker, same locality as holotype (NHMW); Mindanao, Surigao del Norte, 40 km S of Surigao City, Songkoy Spring, 8.II.2000, leg. H. Zettel, # 231, 1 minor worker (CZW); Leyte, E of Ormoc, Lake Danao, 11.III.1998, leg. H. Zettel, # 158, 1 major worker (CZW); Luzon, Camarines Sur, Lupi, Sooc, 9.-10.III.2004, leg. C. Pangantihon, # P57, 1 major worker (CZW).

DIAGNOSIS (minor worker; Figs. 2, 4 - 6): Scape blackish brown, tibiae yellowish or brown. Clypeus yellow or light brown, with pronounced median ridge. Vertex with numerous long setae restricted to medial part. Pronotum with few, moderately long setae. Tibiae without erect setae. Tarsi relatively elongate and slender. Petiolar node narrowly rounded in lateral view.

DESCRIPTION

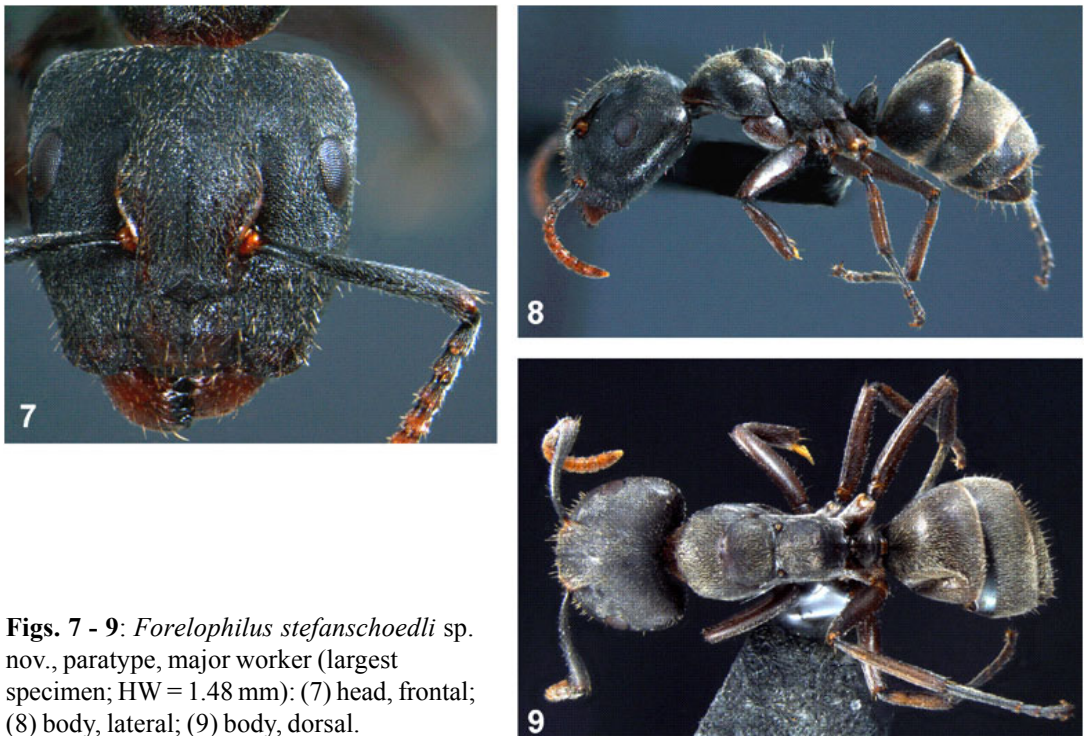
Measurement: Holotype (minor worker): TL = 3.5 mm; HW = 0.92 mm; HL = 0.91 mm; CI = 101; EL = 0.25 mm; OMD = 0.37 mm; SL = 0.95 mm; SI = 103; PW = 0.62 mm; HFL = 0.97 mm; HFI = 106. Paratype (minor worker; n = 1): TL = 3.1 mm; HW = 0.81 mm; HL = 0.81 mm; CI = 100; EL = 0.24 mm; OMD = 0.32 mm; SL = 0.85 mm; SI = 105; PW = 0.54 mm; HFL = 0.89 mm; HFI = 110. Paratypes (major workers; n = 3) TL = 4.4 - 5.4 mm; HW = 1.23 - 1.48 mm; HL = 1.25 - 1.48 mm; CI = 98 - 100; EL = 0.29 - 0.34 mm; OMD = 0.55 - 0.66 mm; SL = 0.97 - 1.07 mm; SI = 72 - 80; PW = 0.80 - 0.93 mm; HFL = 1.01 - 1.24 mm; HFI = 76 - 85.

Colour of minor worker (Figs. 4 - 6): Black. Frons brownish. Mandibles yellowish. Flagellum orange (basal 3 - 4 segments variably infuscated). Legs middle-brown, tibiae slightly lighter than femora, tarsi black. Whitish margins on tergites very narrow, indistinct.

Colour of major worker (Figs. 7 - 9): Similar to minor worker. Clypeus orange or brown. Frons brown or black. Whitish margins on tergites relatively wide, distinct.



Figs. 4 - 6: *Forelophilus stefanschoedli* sp. nov., holotype, minor worker: (4) head, frontal; (5) body, lateral; (6) body, dorsal.



Figs. 7 - 9: *Forelophilus stefanschoedli* sp. nov., paratype, major worker (largest specimen; HW = 1.48 mm): (7) head, frontal; (8) body, lateral; (9) body, dorsal.

Structural characteristics of minor worker (Figs. 1, 2, 4 - 6): Moderately shiny. Vertex medially, frons and clypeus entirely with reduced sculpture. Clypeus strongly convex, anterior margin straight, without lobe, medially slightly shorter than sides. Almost whole mesosoma with very fine reticulation, slightly reduced on dorsal face of propodeum and absent from its almost smooth posterior face. Methoracic spiracular tubercles slightly surpassing dorsal face of propodeum. Dorsal face of propodeum slightly convex, without medial groove. Dorsum of petiolar node with reduced reticulation. Gaster with reduced sculpture.

Structural characteristics of major worker (Figs. 7 - 9): Similar to minor worker. Head large, subtruncate, squared, in frontal view with straight hind margin and slightly narrowed close to mandible base, completely matt. Eyes not surpassing sides of head in frontal view. Ocelli absent. Clypeus with medial lobe distinctly surpassing sides, anteriorly shallowly notched, not or slightly impressed along midline close to anterior margin, medial ridge not as strongly developed as in minor worker, anteriorly reduced in one specimen. Mandible with a very small sixth tooth at base of masticatory margin. Mesosoma almost completely matt, only posterior face of propodeum with fine reticulation and shiny. Anterior margin of mesonotum slightly elevated over posterior margin of pronotum. Dorsal face of propodeum strongly convex, distinctly higher than metathoracic spiracular tubercles. Legs relatively short. Node of petiole, if seen from front or rear, distinctly widened towards dorsal margin. Gaster with relatively dense, very fine punctuation, weakly shiny.

DISTRIBUTION: Philippine Islands: known from Luzon, Leyte, and Mindanao.

ETYMOLOGY: The new species is dedicated to our valued friend Stefan Schödl (1957-2005), who collected part of the type material. We have chosen this rather long specific epithet to avoid possible secondary homonymy with species described in *Camponotus*, i.e. *C. schoedli* Dumpert, 2006 and *C. stefani* McArthur, 2007.

***Forelophilus philippinensis* sp. nov.**

(Figs. 3, 10 - 15)

TYPE MATERIAL: Holotype (minor worker): Luzon, Laguna, Los Baños, Mt. Makiling, Rain Forest Park, 14.II.1999, leg. S. Schödl, # 5 (NHMW). Paratypes: Luzon, Laguna, Los Baños, Mt. Makiling, 300 - 600 m, 10.II.1996, leg. H. Zettel, # 76, 1 minor worker (CZW); Luzon, Quezon, Atimonan, Quezon National Park, Old Zigzag Road, 24.-30.III.1998, leg. H. Zettel, # 165, 1 minor worker (CZW); Bayagnan Is. (Surigao del Norte Prov.), 15 km W of Surigao City, San José, 7.II.2000, leg. S. Schödl, # 5, 1 minor worker (NHMW); Mindanao, Surigao del Norte, 40 km S of Surigao City, Songkoy Spring, 8.II.2000, leg. H. Zettel, # 231, 1 minor worker (UPLB), 1 intermediate worker (CZW).

DIAGNOSIS (minor worker; Figs. 3, 10 - 12): Scape orange or partly infuscated, flagellum totally light coloured, tibiae yellowish. Clypeus brown, with distinct median ridge. Whole vertex with numerous long setae. Pronotum with numerous long setae. Tibiae with erect setae. Tarsi wider than in other species.

DESCRIPTION:

Measurements: Holotype (minor worker): TL = 3.6 mm; HW = 0.87 mm; HL = 0.85 mm; CI = 102; EL = 0.24 mm; OMD = 0.32 mm; SL = 0.91 mm; SI = 105; PW = 0.58 mm; HFL = 0.88 mm; HFI = 102. Paratypes (minor workers; $n = 4$): TL = 3.3 - 3.7 mm; HW = 0.84 - 0.95 mm; HL = 0.84 - 0.96 mm; CI = 99 - 102; EL = 0.24 - 0.27 mm; OMD = 0.32 - 0.38 mm; SL = 0.87 - 0.97 mm; SI = 101 - 104; PW = 0.57 - 0.64 mm; HFL = 0.84 - 0.96 mm; HFI = 100 - 104. Paratype (intermediate worker; $n = 1$): TL = 4.1 mm; HW = 1.04 mm; HL = 1.03 mm; CI = 101; EL = 0.30 mm; OMD = 0.44 mm; SL = 1.01 mm; SI = 97; PW = 0.72 mm; HFL = 1.00 mm; HFI = 96.

Colour of minor and intermediate worker (Figs. 10 - 15): Black. Clypeus orange or brown. Frons brown. Flagellum of antenna completely orange or yellow. Femora light brown or orange. First tarsomere orange or brown except on black base. Whitish margins on tergites relatively narrow, distinct.



Figs. 10 - 12: *Forelophilus philippinensis* sp. nov., holotype, minor worker: (10) head, frontal; (11) body, lateral; (12) body, dorsal.



Figs. 13 - 15: *Forelophilus philippinensis* sp. nov., paratype, intermediate worker: (13) head, frontal; (14) body, lateral; (15) body, dorsal.



Structural characteristics of minor worker (Figs. 3, 10 - 12): Moderately shiny. Vertex medially and clypeus anteriorly (to varying extents and intensity) with reduced sculpture and shiny. Clypeus strongly convex, anterior margin straight, without lobe, medially slightly shorter than level of sides. Almost whole mesosoma with very fine reticulation, but strongly reduced on posterior face of propodeum which is strongly shiny. Metathoracic spiracular tubercles slightly surpassing dorsal face of propodeum. Dorsal face of propodeum almost straight in lateral view, without medial groove. Tarsi strongly widened. Petiolar node broadly rounded in lateral view, its dorsum with reduced reticulation. Gaster with fine shagreen, distinctly shiny.

Structural characteristics of intermediate worker (Figs. 13 - 15): Most similar to minor worker. Head sub-quadrate with strongly rounded posterior corners, hind margin almost straight in frontal view. Clypeus medially slightly surpassing level of sides, anterior margin slightly concave in middle. Mesosoma as in minor worker.

DISTRIBUTION: Philippine Islands: known from Luzon, Bayagnan, and Mindanao.

ETYMOLOGY: Named after the country of origin, The Philippines.

***Forelophilus overbecki* Kutter, 1931**

(Figs. 16 - 20)

TYPE MATERIAL EXAMINED: Lectotype (minor worker) by present designation, with following label data: "1927/5", "8/24", "Typus/Overbecki", "M.-Java, Sarangan, Lawoe-Geb. 1500-2000m\H.Overbeck", "*Forelophilus overbecki*", "GBIF-D/FoCol\0486\specimen+label\data documented", "LECTOTYPUS\ *Forelophilus overbecki* Kutter, 1931\des. Zettel & Zimmermann 2007" (MTKD). Paralectotype (dealate gyne) with label data: "1927/5", "8/05", "Typus/Overbecki ♀", "M.-Java, Sarangan, Lawoe-Geb. 1500-2000m\H.Overbeck", "*Forelophilus overbecki*", "GBIF-D/FoCol\0487\specimen+label\data documented", "PARALECTOTYPUS\ *Forelophilus overbecki* Kutter, 1931\Zettel & Zimmermann 2007" (MTKD). Paralectotype (minor worker) with label data: "M.-Java, Sarangan, Lawoe-Geb. 1500-2000m\H.Overbeck", "1927/5", "8/25", "Typus", "*Forelophilus overbecki*", "PARALECTOTYPUS\ *Forelophilus overbecki* Kutter, 1931\Zettel & Zimmermann 2007" (MZL).

DIAGNOSIS (minor worker; Figs. 16 - 18): Scape and tibiae brown. Clypeus brown, medially with small, elongate tubercle. Vertex with long setae medially. Pronotum with few moderately long setae. Tibiae with erect setae. Petiolar node broadly rounded in lateral view.

DESCRIPTION:

Measurements: Lectotype (minor worker): TL = 3.6 mm; HW = 0.91 mm; HL = 0.91 mm; CI = 100; EL = 0.25 mm; OMD = 0.36 mm; SL = 0.92 mm; SI = 101; PW = 0.61 mm; HFL = 0.92 mm; HFI = 101. Paralectotype (minor worker; $n = 1$): TL = 3.6 mm; HW = 0.85 mm; HL = 0.88 mm; CI = 97; EL = 0.25 mm; OMD = 0.37 mm; SL = 0.87 mm; SI = 102; PW = 0.61 mm; HFL = 0.89 mm; HFI = 105. Paralectotype (gyne; $n = 1$): TL = 6.9 mm; HW = 1.38 mm; HL = 1.38 mm; CI = 100; EL = 0.44 mm; OMD = 0.51 mm; SL = 1.04 mm; SI = 75; PW = 1.17 mm; HFL = 1.24 mm; HFI = 90.

Colour of minor worker (Figs. 16 - 18): Blackish brown. Mandibles yellowish. Flagellum orange (first segment infuscated). Legs middle brown, tibiae slightly darker than femora, tarsi black. Whitish margins on tergites narrow, indistinct.

Colour of gyne (Figs. 19, 20): Similar to worker. Clypeus and mandibles reddish. Hind margin of pronotum yellowish translucent. Tegulae and basal wing sclerites whitish yellow. Legs brown to reddish, only extreme base of tarsi black. Hind margins of tergites broadly whitish translucent.

Structural characteristics of minor worker (Figs. 16 - 18): Generally more shiny than both Philippine species. Vertex almost smooth, with strongly reduced microsculpture. Clypeus with distinctly convex middle lobe, its apex inconspicuously surpassing level of sides. Sides of mesosoma, pronotum and mesonotum matt. Metathoracic spiracular tubercles distinctly surpassing dorsal face of propodeum. Dorsal face of propodeum with strongly reduced reticulation, shiny, in lectotype with almost smooth medial groove (absent in paralectotype); posterior face with reduced reticulation, almost smooth dorsally. Tarsi moderately widened, similar to those of *F.*

F. stefanschoedli sp. nov. Dorsum of petiolar node smooth and shiny. Gaster almost smooth, with strongly reduced reticulation.

Structural characteristics of gyne (Figs. 19, 20): Similar to structural characteristics of worker. Dorsal surface almost completely matt (except narrow midline of mesosoma anteriorly) by dense, fine punctures or shagreen. Head sub-truncate, vertex straight in frontal view. Eye relatively large, distinctly surpassing outline of head. Three ocelli

small. Clypeus with medial lobe distinctly surpassing sides, anteriorly shallowly notched, slightly impressed along midline in distal third, without ridge or tubercle. Mandible with a very small sixth tooth at base of masticatory margin. Pronotum with three setae on both sides of hind margin. In lateral view, outline of mesoscutum and mesoscutellum almost straight. Mesoscutum longer than wide (1.15 times). Mesoscutellum shorter than wide (0.9 times). Metanotal furrow deep. Propodeum with simple, convex outline in



Figs. 16 - 18: *Forelophilus overbecki*, lectotype, minor worker: (16) head, frontal; (17) body, lateral; (18) body, dorsal.



Figs. 19 - 20: *Forelophilus overbecki*, paralectotype, gyne: (19) head, frontal; (20) body, lateral.



lateral view, with some setae on declivitous part. Tibiae without erect setae. Node of petiole, if seen from front or rear, distinctly widened towards dorsal margin. Gaster matt, but slightly shiny on white hind margins which occupy about one fifth of tergites 1 - 3 (narrower on tergite 4).

DISTRIBUTION: Indonesia: Java. The record from Borneo (Antweb 2006) needs confirmation.

DISCUSSION

Differences between species

The three species described in this study form a complex of closely related species. Other species, only known from illustrations on the Web (Antweb 2006, Antbase.net 2006 [sub *Camponotus* sp. 18]), seem to agree well in most structural characteristics, but partly differ distinctly in colour. The species studied here are rather uniform. Some selected measurements frequently used for *Camponotus* taxonomy did not yield reliable distinguishing characters. Differences between the three known species can be taken from the paragraphs "Diagnosis" in the species chapters, from the key (below), and also from the descriptions. However, it should be considered that these diagnoses are based on a small sample, and eventually re-definitions will be necessary after more specimens become available. This applies especially to colour, where some variation could be observed. Structural characteristics (especially on clypeus, propodeum, tarsi, etc.) as well as density and distribution of setae on head, pronotum, and tibiae appear more reliable. In this context, however, it should be noted that with regard to the presence/absence of erect tibial setae the gyne of *F. overbecki* does not agree with the worker. After studying three specimens only, the authors cannot judge whether this variation is dependent on the morph or not, and therefore cannot rule out heterospecificity in the type material (it is unknown whether the types are a nest series or not, and syntopic occurrence of two species of *Forelophilus* is also known at Songkoy Spring, Mindanao). For reasons of name stability the authors decided to designate the single worker in MTKD as the lectotype of *F. overbecki*.

Key to species (based on workers)

- 1 Antenna yellow or orange, or scape only partly infuscated. Tarsi relatively wide (Fig. 3). Erect setae numerous (Figs. 11, 14), all over vertex in frontal view of head (Figs. 10, 13).
F. philippinensis sp. nov.
- Scape brown or blackish and at least first segment of flagellum infuscated. Tarsi relatively slender (Fig. 2). Erect setae not so numerous (e.g., Figs. 5, 17), restricted to medial part of vertex in frontal view of head (Figs. 4, 7, 16). 2.
- 2 Tibiae without erect setae. In minor worker, anterior margin of clypeus straight. Petiolar node narrowly rounded in lateral view (Figs. 5, 8).
F. stefanschoedli sp. nov.
- Tibiae with erect setae. In minor worker, anterior margin of clypeus with short medial lobe. Petiolar node broadly rounded in lateral view (Fig. 17).
F. overbecki Kutter

Differences between genera

Kutter (1931) justified the description of the genus *Forelophilus* briefly: "The interesting new genus is similar to *Overbeckia* from Singapore regarding shape of antenna, lacking dimorphism, and number of maxillar and labial palp segments. However, the head is not truncate and the unusual formation of the thorax distinguishes *Forelophilus* from all other related genera." (originally in German, translated by the authors).

Bolton (2003: 26) commented: "*Forelophilus* and *Overbeckia* are both probably synonymous with *Camponotus*, as that huge and amorphous genus is currently defined. The genus-rank and subgenus-rank taxonomy of the tribe [= Camponotini] is in urgent need of attention. *Camponotus* has dozens of meaningless subgenera and the subgenera within *Polyrhachis*, despite recent work, refuse to make sense."

Regarding the characteristics used by Kutter (1931) to establish *Forelophilus*, it should be noted:

(1) The shape of the antenna (Fig. 1), especially the short, sub-quadrate flagellum segments, are extremely similar in *Forelophilus* and *Overbeckia* and distinguish both genera from *Camponotus*. This characteristic can be well recognized in worker morphs and gynes of various *Forelophilus* species, including undescribed ones illustrated on the Web.

(2) There is a worker polymorphism in *Forelophilus* (compare Figs. 4 and 7). It is interesting to note that Kutter (1931) proposed the lack of a dimorphism from his knowledge of three workers only.

(3) The palp formula 6,4 can be found in all Camponotini except *Camponotus megalonyx* Wheeler (Bolton 2003).

(4) The head of *Forelophilus* is not as truncate as in *Overbeckia*, but roundish in minor workers (Fig. 4) and squared and subtruncate in the major workers (Fig. 7).

(5) The dorsal outline of the mesosoma of the workers (Figs. 5, 8, 14, 17), with deep metanotal furrow, metathoracic spiracular tubercles, and transverse ridge on propodeum, seems to be a very valuable characteristic of *Forelophilus* species, including undescribed ones. However, the most typical component of this feature, the metathoracic spiracular tubercles surpassing the dorsal face of the propodeum (see Bolton 1994), is absent in the major worker (known only in *F. stefanschoedli* sp. nov.).

A comparison of *Forelophilus* and species of *Camponotus* from Southeast Asia, the Pacific islands, and Australia results in the observation that all species have a similar structure of the gaster by having a relatively short first tergite less than half of the gaster length (see definition of *Camponotus* by Bingham 1903). Characteristics used to distinguish certain clades or species of *Camponotus*, like number and length of setae on head parts and dorsum of mesosoma, and density,

length, and angle of elevation of setae on scape and tibiae, do not significantly differ between *Forelophilus* and *Camponotus*. Strong similarities can be observed between *Forelophilus* and *Camponotus* subgenus *Colobopsis*: both groups have wide frontal areas (maximum width between carinae more than one-third of head width) and raised metathoracic spiracles are also present in some *Colobopsis* spp. (A. McArthur, personal communication). However, the truncation of the clypeus is strong in *Colobopsis* (especially in major workers) and weak in *Forelophilus*, and the fore femur of *Forelophilus* is not incrassate as in *Colobopsis*.

The structure of the antenna supports a close relationship of *Forelophilus* and *Overbeckia*, and the structures of the mesosoma support the monophyly of *Forelophilus*. Whether this complex belongs to *Camponotus* s.l. or not, can be judged only after a thorough systematic and molecular study on this, the largest ant genus.

Zoogeography

Hitherto, the genus *Forelophilus* was known only from Java and Borneo (Kutter 1931, Antweb 2006, Antbase.net 2006 [sub *Camponotus* sp. 18]). The new findings extend the distribution of the genus across the Wallace-Dickerson Line to the Philippine Biogeographic Region.

Alpert *et al.* (2006) recorded 25 described species of *Camponotus* from the Philippines, while the genus *Forelophilus* was hitherto unknown from that country. Guessing from illustrations published on the Web (Antweb 2006, Antbase.net 2006), *Forelophilus* species recorded from Borneo are probably not conspecific with *F. stefanschoedli* sp. nov. or *F. philippinensis* sp. nov. On present knowledge both species appear to be Philippine endemics.

The paucity of records of both new species may indicate that they are rare. However, one reason for that "rarity" could be that they are rarely collected, because in the field minor workers are very similar to the common dolichoderine species *Dolichoderus thoracicus* Smith, 1860, which is known from the Philippines only in its blackish

variety. On the other hand, major workers may yet be detected in unsorted material of *Camponotus*, because key characteristics (Bolton 1994) lead rather to that genus than to *Forelophilus*. Therefore regional distribution in the Philippines should presently not be concluded. So far records of both new species are from the biogeographical subregions C ("Greater Luzon") and K ("Greater Mindanao"), as defined by Ong *et al.* (2002).

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