

On the ants (Hymenoptera: Formicidae) of the Philippine Islands: I. The genus *Pristomyrmex* MAYR, 1866

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Abstract

The Philippine fauna of the ant genus *Pristomyrmex* MAYR, 1866 is analysed. Three species are described as new: *Pristomyrmex distinguendus* sp.n. from Luzon and Leyte, *P. rugosus* sp.n. from Leyte, and *P. schoedli* sp.n. from Leyte. One species, *P. quadridens* WANG, 2003, is recorded from the Philippines for the first time. Further unpublished records are presented for *P. collinus* WANG, 2003, *P. longispinus* WANG, 2003, *P. picteti* EMERY, 1893, and *P. punctatus* (F. SMITH, 1860). The genus contains 55 species world-wide. Seventeen species (= 30.9 %) are recorded from the Philippines, nine of which are endemic. An identification key to the Philippine species of *Pristomyrmex* is presented.

Key words: Ants, Formicidae, *Pristomyrmex*, Philippines, key, new species, first record, fauna, endemism.

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Introduction

Pristomyrmex MAYR, 1866 is an easily recognised genus of the Myrmecini as defined by BOLTON (2003: 71). Recently, WANG (2003) revised the taxonomy of *Pristomyrmex*; this study also contains an overview on the history of the genus and a definition based on 30 morphological characteristics of the worker, and 27 of the male.

Within the Philippine fauna, workers of *Pristomyrmex* can be easily distinguished from other myrmecine ants by the combination of the following characters: antenna 11-segmented and without well defined club; antennal scrobes absent, or reduced and situated above the small eyes; anterior clypeal margin denticulate or crenulate; mandible distally broadened and with long axis rotated so that the masticatory margin is (almost) vertical; petiole pedunculate (see BOLTON 1994). Most Philippine species of *Pristomyrmex* have pronotal spines, a characteristic which is only found in two other myrmecine genera occurring in the Philippines, *Acanthomyrmex* EMERY, 1893 and *Pheidole* WESTWOOD, 1839, both of which have 12-segmented antennae.

Only a small part of the material treated in the present study was identified by Wang (labelled in 1998) and included in his excellent revision. These additional specimens were either collected later or had not been sorted at that time.

The 55 species of *Pristomyrmex* are distributed in the tropics and subtropics from Africa to Japan and Australia (see WANG 2003). The majority (36 species) are Oriental in the widest sense (incl. New Guinea), with one species extending its range to the southeastern Palearctic Region. Six of seven Australian species are endemic, as are all five African species, and three species on the island of Mauritius. As shown in this paper, the Philippines certainly is a centre of diversity for two reasons: First, species reached the Philippines from Sundaland and from the Papuan sub-region, both of which are very rich in species; secondly, there are several species which seem to be endemic on certain islands. Seventeen species (= 30.9 % of world fauna; including new species and records) inhabit the Philippines, nine of which are endemic (see Discussion and Tab. 1).

This paper adds three new species and one first record from the Philippines, assigns old Philippine records to islands, provinces, and actual locality names, and analyses the Philippine *Pristomyrmex* fauna zoogeographically. The author also wants to encourage Filipino entomologists to pay attention to these beautiful ants, which are interesting not only faunistically, but even more in ecological aspects: Most species seem to be indicators for undisturbed or weakly disturbed forests and thus might be useful for habitat conservation measures.

Material and methods

All specimens are dry mounted on card squares or triangles. Examination of specimens was carried out with a LEICA Wild M10 binocular microscope; measurements were taken at magnifications of 80 × and 128 ×. Digital photographs were taken with a Leica DFC camera attached to a Leica MZ16 binocular microscope using Image Manager IM50 and processed with Auto-Montage Pro and Adobe Photoshop 7.0 programmes.

Terminology and method of description follow WANG (2003), definitions of AL and TL2 follow WANG (2003: fig. 2).

Measurements and indices (see also WANG 2003: figs. 1-3):

- HW Head width. Maximum width of head, in full-face view in front of eyes (excluding eyes).
- HL Head length, in full-face view, excluding mandibles measured from midpoint of a straight line across pre-occipital margin either to frontal-most point of apex of median tooth of anterior clypeal margin or, if median tooth short or absent, to midpoint of line connecting frontal-most apices of the two lateral teeth of anterior clypeal margin.
- CI Cephalic index. $HW / HL * 100$.
- SL Scape length. Length of antennal scape, including lamella encircling base of scape but excluding basal condyle.

- SI Scape index. $SL / HW * 100$.
- PW Pronotal width. Maximum width of pronotum in dorsal view.
- AL Alitrunk length. Diagonal length of alitrunk in lateral view, from frontal-most point of declivous area of pronotum to posterior-most point of apex of metapleural lobe.
- EL Eye length. Maximum length of eye.
- TL Total length = $TL1 + TL2 + TL3$. TL1: Line measured from apex of closed mandibles to midpoint of a straight line across occipital margin, in full-face view. TL2: Straight line from declivous area of pronotum to point at which posterior margin of postpetiole meets uppermost point of articulation of gaster. TL3: Line from anterior-uppermost point of articulation to apex of gaster.
- PSL1 Pronotal spine length. Straight distance from anterior base to apex of pronotal spine.
- PSL2 Propodeal spine length. Straight distance from posterior base to apex of propodeal spine.
- PPI Postpetiole index. $PPW / PPL * 100$. PPW: maximum width of postpetiole in dorsal view. PPL: dorso-median length of postpetiole.

All measurements are taken in millimetres. For paratypes the minimum and maximum values are presented; n refers to the number of specimens measured.

Locality data are arranged zoogeographically, within the Philippines the sequence follows the regions and sub-regions listed by ONG & al. (2002) (see also Tab. 1). Data are presented in the following order: (1) for Material examined: "island, province, locality" for large islands consisting of several administrative provinces, or "island, locality" for small island identical with or part of one province. (2) for Previous records: "island: province (locality / -ies)" for large islands consisting of several administrative provinces, or "island (locality)" for small island identical with or part of one province. #-numbers are sample (locality) numbers, but do not always refer to nest series.

Acronyms of repositories:

- CZW Coll. H. & S.V. Zettel, Vienna, Austria
- NHMW Natural History Museum, Vienna, Austria
- UPLB University of the Philippines, Los Baños, Philippines
- USC University of San Carlos (Entomological Collection), Cebu City, Philippines

Diagnoses of species are given for the purpose of distinguishing the Philippine species from each other. Specimens of some endemic species have not been available for study, although the author asked for permission to study some paratype specimens. In such cases the diagnoses are based on the descriptions and diagnoses by WANG (2003), and photographs of type specimens presented by ALPERT & al. (2006) were used to confirm some characteristics.

Treatment of species

The species are discussed in alphabetical order. According to WANG (2003), *P. divisus*, *P. pulcher*, and *P. punctatus* belong to the *P. punctatus* species group; *P. simplex* to the *P. levigatus* species group; *P. picteti* to the *P. umbripennis* species group; and all remaining species (including the new species) to the *P. quadridens* species group. Some species group characteristics used by WANG (2003) are difficult to recognize or to evaluate (e.g., dentation of mandibles, palp

formula, lamella of scape). Although the grouping is obviously useful for a phylogeny of the genus, it is less helpful for this faunal survey. Instead, a key primarily based on more easily recognizable characteristics is presented.

Pristomyrmex bicolor EMERY, 1900

Material examined: Luzon: Laguna Pr., Mt. Banahaw, above Kinabuhayan, trail to Crystalino, 24.XI.1995, leg. J. Kodada & R. Rigová, det. Wang M., 1 ♂ (NHMW).

Diagnosis of worker: TL 4.5 - 6.2 mm. Clypeus dorsally with strong median carina, ventrally variably modified, but always without distinct central tooth. Masticatory margin of mandible with diastema. Dorsum of head rugoreticulate, of alitrunk smooth. Pronotal spines very long ($PSL1 > 0.35$, usually > 0.40), much longer than propodeal spines. First gastral tergite without setae.

Previous records from the Philippines: Palawan (Binaluan) [types of *P. taurus*] (STITZ 1925); Luzon: Laguna (Mt. Banahaw) (WANG 2003).

General distribution: Malay Peninsula, Java, Borneo, Philippines (WANG 2003).

Notes: The worker from Mt. Banahaw is the single specimen of *P. bicolor* known from east of the Wallace' and Dickerson's Lines, which delimit the Pleistocene Sunda Shelf area to the east. It differs from other material examined (including a syntype of *P. bicolor*) in a completely smooth pronotum and agrees in that characteristic with the type of *P. taurus* STITZ, 1925 from Palawan (synonymy and discussion see WANG 2003: p. 425); also see discussion.

Pristomyrmex brevispinosus EMERY, 1887

No material from the Philippines examined.

Diagnosis of worker: TL 3.0 - 4.3 mm. Clypeus dorsally with median carina, ventrally with distinct central tooth. Masticatory margin of mandible with diastema. Dorsum of head (at least behind eyes) and alitrunk rugoreticulate. Pronotal spines tooth-like ($PSL1 0.06 - 0.12$) subequal in length or slightly shorter than propodeal spines. First gastral tergite without setae.

Previous records from the Philippines: Mindanao: Bukidnon (Malaybalay) (WANG 2003).

General distribution: Japan (YAMANE & TERAYAMA 1999); Taiwan, Thailand, Malay Peninsula, Sumatra, Borneo, Philippines, Sulawesi (WANG 2003).

Pristomyrmex collinus WANG, 2003

Material examined: Luzon: Laguna Pr., Los Baños, Mt. Makiling, 13. - 18.XI.1992, leg. H. Zettel (# 1), det. Wang M., 1 ♂ (CZW); Laguna Pr., Los Baños, Mt. Makiling, Mud Spring, 23. - 24.I.1999, leg. H. Zettel (# 167), 1 ♂ (CZW); Laguna Pr., Mt. Banahaw, above Kinabuhayan, trail to Crystalino, 24.XI.1995, leg. J. Kodada & R. Rigová, det. Wang M., 3 ♂♂ (NHMW); Camarines Sur Pr., Lake Buhí area, nr. Itbog, Twin Falls, 22.III.1998, leg. H. Zettel (# 164), 3 ♂♂ (CZW); Tablas: San Agustin, Dubduban, Busai Falls, 23. - 25.XI.1994, leg. H. Zettel (# 70), det. Wang M., 1 ♂ (CZW); Mindanao: Surigao del Norte Pr., 40 km S Surigao, Songkoy Spring, 8.II.2000, leg. S. Schödl (# 11), 1 ♂ (NHMW).

Diagnosis of worker: TL 3.3 - 3.9 mm. HW 0.77 - 0.94. Clypeus ventrally with central tooth. Antennal scrobe absent. Masticatory margin of mandible with diastema. Dorsum of head and alitrunk smooth and punctate, with



Figs. 1 - 2: *Pristomyrmex distinguendus* sp.n. (1) Head, full face view; (2) habitus, lateral view.

sparse, relatively short setae. Pronotal spines tooth-like, subequal in length to propodeal spines. Anterior face of petiolar node distinctly separated from dorsal surface of peduncle. First gastral tergite without setae.

Previous records from the Philippines: Luzon: Laguna (Los Baños, Mt. Makiling, Mt. Banahaw), Romblon Prov: Tablas (San Agustin), Panay (without further information), Negros Oriental (Cuernos de Negros, Dumaguete [type locality]) (WANG 2003). – Luzon: Camarines Sur (Mt. Isarog Natural Park) (ALPERT & al. 2006).

General distribution: endemic to Philippines.

***Pristomyrmex costatus* WANG, 2003**

No material from the Philippines examined.

Diagnosis of worker: TL 4.1 - 4.6 mm. Clypeus dorsally with strong median carina, ventrally without central tooth. Masticatory margin of mandible with diastema. Dorsum of head and alitrunk rugoreticulate. Pronotal spines moderately long (PSL1 0.19 - 0.27), distinctly longer than propodeal spines. First gastral tergite without setae.

Previous records from the Philippines: Mindanao: Davao (Mt. McKinley) (WANG 2003).

General distribution: Malay Peninsula, Singapore, Borneo, Philippines (WANG 2003).

***Pristomyrmex curvulus* WANG, 2003**

No material examined.

Diagnosis of worker: TL 4.6 - 5.3 mm. Clypeus dorsally with median carina, ventrally with transverse ridge. Masticatory margin of mandible with diastema. Dorsum of head and alitrunk smooth and punctate. Pronotal spines very long (PSL1 > 0.35), longer than long propodeal spines (PSL2 > 0.11). First gastral tergite without setae.

Previous records from the Philippines: Negros Oriental (Cuernos de Negros, Dumaguete [type locality]) (WANG 2003).

General distribution: endemic to Philippines.

***Pristomyrmex distinguendus* sp.n. (Figs. 1, 2)**

Type material: holotype (worker): Luzon: Camarines Sur Pr., 20 km E Naga, E Carolina, slopes of Mt. Isarog,

4.III.1999, leg. F. Seyfert (# 19) (NHMW); paratypes: Laguna Pr., Los Baños, Mt. Makiling, from UPLB to Mud Spring, 18.XI.1999, leg. H. Zettel (# 207), 1 ♂ (CZW); Laguna Pr., Los Baños, Mt. Makiling, 500 - 1144 m, 14.XI.1993, leg. H. Zettel (# 21a), *P. collinus* det. Wang M., 1 ♂ (CZW); Quezon Pr., Atimonan, Quezon NP, Old Zigzag Road, 27. - 28.I.2002, leg. H. Zettel (# 300), 4 ♂♂ (CZW, UPLB); Leyte: Baybay, Leyte State University, c. 50 - 100 m, Calbiga-a River, 20. - 21.III.2005, leg. H. Zettel & C. Pangantihon (# 422), 1 ♂ (CZW).

Diagnosis of worker: Ventral surface of clypeus with strongly prominent tooth at centre. Pronotum with pair of short teeth (PSL1 0.02 - 0.05), which shorter than propodeal spines (PSL2 0.05 - 0.09). Dorsum of head and alitrunk smooth and polished, with many long hairs; dorsum of head with scarce punctures (hair pits). Antennal scrobe present, its ventral margin defined by a ridge reaching at least level of centre of eye; petiolar node with two or three pairs of hairs.

Measurements: Holotype worker: TL 3.32, HL 0.80, HW 0.81, CI 101, SL 0.80, SI 100, EL 0.17, PW 0.58, AL 0.87, PPW 0.26, PPL 0.27, PPI 96. – Paratype workers (n = 7): TL 2.84 - 3.41, HL 0.68 - 0.81, HW 0.69 - 0.83, CI 100 - 103, SL 0.70 - 0.85, SI 100 - 104, EL 0.15 - 0.19, PW 0.48 - 0.59, AL 0.75 - 0.90, PPW 0.21 - 0.28, PPL 0.23 - 0.27, PPI 91 - 103.

Description of worker: Head (Fig. 1): Mandibles smooth and shiny. Masticatory margin of mandible with four teeth: strongest apical + second strongest preapical + long diastema + two small basal teeth of similar size that are more or less fused. Basal margin of mandible almost straight, lacking distinct tooth. Clypeus with median longitudinal carina in caudal half (specimens from Luzon) or along entire length (specimen from Leyte). Anterior clypeus margin with median tooth and one pair of lateral teeth. Ventral centre of clypeus with strongly prominent tooth. Palp formula 1, 3. Frontal carinae strong, extending caudad further than level of posterior eye margins. Antennal scrobes present, laterally delimited by distinct ridge reaching caudally at least to level of centre of eye. Frontal lobes very weak; thus, antennal insertion almost entirely exposed.

Antennal scapes, when lying on dorsum of head, slightly surpassing occipital margin of head. Eyes containing c. 8 - 10 ommatidia in longest row. Profile shape of alitrunk and pedicel segments as in Fig. 2. Pronotum with pair of short teeth, PSL1 0.02 - 0.05. Propodeum with pair of spines, PSL2 0.05 - 0.09. Metapleural lobes subtriangular, acute. Dorsum of alitrunk distinctly convex. Petiole in profile with fairly long peduncle, node with weakly developed angles, anterodorsal one on slightly higher level than posterodorsal one. Postpetiole in profile rounded dorsally, in dorsal view broadening from front to back. Dorsum of head smooth and polished, with scattered hair pits which are small in specimens from Luzon and relatively large in specimen from Leyte; on scrobal areas, at least anteriorly, with some transverse rugae. Dorsum of alitrunk smooth and polished, with only very fine hair pits. Petiole, postpetiole, and gaster smooth and shiny. Dorsal surfaces of the head and alitrunk with numerous long erect or suberect hairs. Dorsum of petiolar node with 2 - 3 pairs of hairs; dorsum of postpetiole with 1 - 2 pairs. First gastral tergite lacking erect or suberect hairs. A few pairs of forward projecting hairs present near anterior clypeal margin. Scapes and tibiae with numerous erect to suberect hairs. Colour reddish-brown.

Comparative notes: This species is similar to *P. collinus*, but differs in a good number of characteristics: The dorsal surface of the head and the alitrunk has many long setae. The pronotal spines are distinctly shorter than the propodeal spines. The antennal scrobes are present and laterally delimited by a ridge reaching caudally at least to level of centre of eye. The clypeus has three teeth, with the median tooth longest (observed also in one specimen of *P. collinus*, in which dentation of clypeus is more variable than in *P. distinguendus* sp.n.).

General distribution: endemic to Philippines.

Pristomyrmex divisus WANG, 2003

No material examined.

Diagnosis of worker: TL 3.0 - 3.4 mm. Eye of moderate size, 8 - 10 ommatidia in longest row. Frontal carina short, not extending to level of posterior margin of eye. Lateral portions of clypeus not reduced. Masticatory margin of mandible with diastema. Dorsum of head foveolate, of alitrunk smooth and with some rugae. Pronotal spines absent, propodeal spines long. Petiole with long peduncle not clearly separated from short and high node.

Previous records from the Philippines: Negros Oriental (Dumaguete [type locality]) (WANG 2003).

General distribution: endemic to Philippines.

Pristomyrmex flatus WANG, 2003

No material examined.

Diagnosis of worker: TL 3.7 - 4.2 mm. HW 0.98 - 1.04. Clypeus dorsally with indistinct median carina (only posteriorly indicated), ventrally with weak medial tubercle. Masticatory margin of mandible with diastema. Dorsum of head and alitrunk smooth, on head sparsely punctate. Pronotal spines tooth-like, propodeal spines slightly longer. Anterior face of petiolar node not separated from dorsal surface of peduncle. First gastral tergite without setae.

Previous records from the Philippines: Luzon: Ilocos Norte (Banqui = "Bauqui" [type locality]) (WANG 2003).

General distribution: endemic to Philippines.

Pristomyrmex hirsutus WANG, 2003

No material examined.

Diagnosis of worker: TL 5.8 mm. Clypeus dorsally with reduced median carina, ventrally with small tooth. Masticatory margin of mandible with long diastema. Dorsum of head and alitrunk rugoreticulate. Pronotal spines short (PSL1 c. 0.10), propodeal spines tooth-like. Petiole with high, dorsally rounded node. First gastral tergite with numerous, evenly distributed, erect or suberect setae.

Previous records from the Philippines: Mindanao: Misamis Oriental ("Mt. Balatukan SW Gingoan" [type locality]) (WANG 2003).

General distribution: endemic to Philippines.

Pristomyrmex longispinus WANG, 2003

Material examined: Negros: Negros Oriental Pr., Cuernos de Negros, Valencia, Apolong, Casaroro Falls, 25. - 26.X.2004, leg. C. Pangantihon (# P400), 5 ♂♂ (CZW); *ibid.*, 25. - 26.X.2004, leg. H. Zettel (# 400), 2 ♂♂ (NHMW); *ibid.*, 9. - 13.III. 2005, leg. H. Zettel (# 420), 2 ♂♂ (CZW); *ibid.*, 26.III.2006, leg. H. Zettel & C. Pangantihon (# 451), 6 ♂♂ (CZW).

Diagnosis of worker: TL 4.5 - 5.7 mm. Clypeus dorsally without median carina, ventrally with transverse ruga. Masticatory margin of mandible with diastema. Dorsum of head and alitrunk smooth, on head sparsely punctate. Pronotal spines very long (PSL1 0.40 - 0.50) about twice as long as propodeal spines (PSL2 0.18 - 0.26). Petiolar node not separable from peduncle. First gastral tergite without setae.

Previous records from the Philippines: Negros Oriental (Cuernos de Negros, Dumaguete [type locality]) (WANG 2003).

General distribution: endemic to Philippines.

Pristomyrmex picteti EMERY, 1893

Material examined: Luzon: Laguna Pr., Los Baños, Mt. Makiling, 150 - 600 m, 13. - 14.XI.1993, leg. H. Zettel (# 21), det. Wang M., 1 dealate gyne (CZW). Leyte: Leyte Pr., N Tacloban, Babatngon, Busay Falls, 28.I.2000, leg. H. Zettel (# 220), 1 alate gyne (CZW); Leyte Pr., Baybay, Mt. Pangasugan, Calbiga-a River, 50 - 200 m, 12.II.2000, leg. H. Zettel (# 236), 1 ♂ (CZW).

Diagnosis of worker: TL 4.1 - 5.9 mm. Eyes very small, with 3 - 4 ommatidia in longest row. Clypeus dorsally with median carina, ventrally with transverse ruga. Masticatory margin of mandible without diastema. Dorsum of head and alitrunk foveolate. Pronotal spines absent, propodeal spines relatively short. Node of petiole longer than high, well separated from peduncle.

Previous records from the Philippines: Palawan (Binaluan) (STITZ 1925); - Luzon: Ilocos Norte (Banqui = "Bauqui"), Rizal (Montalban), Laguna (Los Baños, Mt. Makiling, Mt. Banahaw); Palawan (Binaluan, Puerto Princessa); Negros Oriental (Cuernos de Negros, Dumaguete); Mindanao: Davao (Mt. Apo) (WANG 2003); - Luzon: Camarines Sur (Mt. Isarog Natural Park) (ALPERT & al. 2006).

General distribution: Malay Peninsula, Singapore, Philippines, New Guinea (WANG 2003).



Figs. 3 - 4: *Pristomyrmex rugosus* sp.n. (3) Head, full face view; (4) habitus, lateral view.

***Pristomyrmex pulcher* WANG, 2003**

No material examined.

Diagnosis of worker: TL 2.7 - 3.1 mm. Lateral portions of clypeus not reduced. Masticatory margin of mandible with diastema, basal margin with broad tooth. Dorsum of head and alitrunk rugoreticulate. Pronotal spines absent, propodeal spines long. Petiole almost triangular in lateral view, peduncle not clearly separated from node. Tibiae yellow.

Previous records from the Philippines: Camiguin (without further information) (ALPERT & al. 2006).

General distribution: Malay Peninsula (WANG 2003), Philippines (ALPERT & al. 2006).

***Pristomyrmex punctatus* (F. SMITH, 1860)**

Material examined: Marinduque: 1 km N Sihi, Malinao Spring, 16.II.1998, leg. H. Zettel (# 139), 1 ♂ (NHMW). Camotes: Pacijan Island, San Francisco, Northern Poblacion, Lake Danao, 27.II.2001, leg. H. Zettel (# 281), 1 ♂ (CZW); Leyte: Leyte Prov., Hilusig, 14.II.2000, leg. H. Zettel (# 238), 1 ♂ (CZW). Bohol: Loboc, bank of Loboc River at Loboc Falls, 27.XI.2005, leg. C. Pangantihon (# P424a), 23 ♀♀ (CZW, NHMW); same locality and date, leg. H. Zettel (# 424a), 4 ♀♀ (NHMW). Mindanao: Surigao del Norte, 40 km S Surigao, Songkoy Spring, 8.II.2000, leg. H. Zettel (# 231), 16 ♀♀ (CZW); same locality and date, leg. S. Schödl (# 11), 6 ♀♀ (NHMW); Surigao del Norte, SW Bacuag, Payapag, "Little Baguio" Waterfalls, 6.II.2000, leg. H. Zettel (# 228), 1 ♂ (CZW).

Diagnosis of worker: TL 2.6 - 3.3 mm. Lateral portions of clypeus reduced. Masticatory margin of mandible with diastema, basal margin with or without inconspicuous tooth. Dorsum of head and alitrunk rugoreticulate. Pronotal spines absent, propodeal spines long. Petiole with peduncle not clearly separated from node. Tibiae brown or reddish.

Previous records from the Philippines: Mindoro Occidental (San José), Samar (without further information), Mindanao: Agusan (Talacogon) (WANG 2003).

General distribution: southern and central China, Japan, Taiwan, Thailand, Vietnam, Singapore, Borneo, Philippines, New Guinea (WANG 2003).

***Pristomyrmex quadridens* EMERY, 1897**

Material examined: Leyte: Baybay, Leyte State University, c. 50 m, Lago-Lago River, 19.III.2005, leg. H. Zettel & C. Pangantihon (# 421), 44 ♀♀ (CZW, NHMW, USC).

First record for the Philippines!

Diagnosis of worker: TL 3.3 - 4.1 mm. Clypeus ventrally with median tooth. Masticatory margin of mandible with diastema. Dorsum of head and alitrunk smooth and sparsely foveolate; foveae on head large. Pronotal spines tooth-like about as long as propodeal spine. First gastral tergite without setae.

General distribution: Previously known from New Guinea and some nearby islands (Ceram, Ambon, etc.); WANG (2003: fig. 162) postulated an allopatric distribution of *P. quadridens* and the closely related species *P. brevispinosus*, which is also recorded from the Philippines. As shown in this study, the two species have an overlapping distribution in the region "Greater Mindanao".

***Pristomyrmex rugosus* sp.n. (Figs. 3, 4)**

Type material: holotype (worker): Leyte: Leyte Pr., Baybay, Mt. Pangasugan, Calbiga-a River, 50 - 200 m, 12.II.2000, leg. H. Zettel (# 236) (NHMW); paratypes: same data, 5 ♀♀ (CZW); same locality, c. 50 - 100 m, Calbiga-a River, 20. - 21.III.2005, leg. H. Zettel & C. Pangantihon (# 422), 2 ♀♀ (CZW, USC).

Diagnosis of worker: Ventral surface of clypeus with prominent tooth at centre. Pronotum with pair of long spines (PSL1 0.15 - 0.17), which are distinctly longer than short propodeal teeth (PSL2 0.04 - 0.05). Dorsum of head and alitrunk with foveolate-reticulate sculpture or rugoreticulum, with long, relatively dense pilosity; petiolar node and postpetiolar nodes smooth, each with several pairs of hairs on dorsum. First gastral tergite without erect or suberect hairs.

Measurements: Holotype worker: TL 4.26, HL 1.05, HW 1.02, CI 98, SL 1.09, SI 106, EL 0.22, PW 0.72, AL 1.14, PPW 0.31, PPL 0.34, PPI 89. - Paratype workers (n = 7): TL 4.01 - 4.26, HL 0.94 - 1.05, HW 0.94 - 1.02, CI 97 - 101, SL 1.01 - 1.06, SI 102 - 107, EL 0.19 - 0.21, PW 0.63 - 0.70, AL 1.00 - 1.12, PPW 0.27 - 0.30, PPL 0.30 - 0.32, PPI 90 - 97.

Description of worker: Head (Fig. 3): Mandibles more or less striate. Masticatory margin of mandible with four teeth: strongest apical + second strongest preapical + long diastema + two small basal teeth of similar size. Basal margin of mandible almost straight, lacking distinct tooth. Clypeus with strong median longitudinal carina and one pair of more or less developed lateral carinae. Anterior clypeus margin with median tooth and three pairs of lateral teeth. Ventral centre of clypeus with strongly prominent tooth. Palp formula 1, 3. Frontal carinae strong, extending caudad further than level of posterior eye margins. Antennal scrobes present, laterally delimited by distinct ridge reaching caudally at least to level of centre of eye. Both frontal carinae and lateral ridge confluent with strong rugoreticulum of head. Frontal lobes absent, antennal insertion entirely exposed. Antennal scapes, when lying on dorsum of head, surpassing occipital margin of head. Eyes containing 10 - 12 ommatidia in longest row. Profile shape of alitrunk and pedicel segments as in Fig. 4. Pronotum with pair of relatively long spines, PSL1 0.15 - 0.17. Propodeum with pair of teeth, PSL2 0.04 - 0.05. Metapleural lobes subtriangular, apex weakly to moderately rounded. Dorsum of alitrunk anteriorly convex, posteriorly straight. Petiole in profile with fairly long peduncle, node with weakly developed, high anteriodorsal angle, posteriodorsally rounded. Postpetiole in profile rounded dorsally, in dorsal view broadening from front to back. Dorsum of head, except for transversely rugous scrobal areas, and alitrunk with coarse rugoreticulum. Sides of pronotum similarly reticulate, but rugae less high. Petiole, postpetiole, and gaster smooth and shiny. Dorsal surfaces of head, alitrunk, petiole, and postpetiole with numerous long erect or suberect hairs. First gastral tergite lacking erect or suberect hairs. A few pairs of forward projecting hairs present near anterior clypeal margin. Scapes and tibiae with numerous erect to suberect hairs. Colour dark reddish-brown.

Comparative notes: This species is most similar to *P. sulcatus*, but differs in having relatively long pronotal spines, dorsally more rounded node of petiole, and relatively large eyes with more ommatidia (10 - 12 vs. 6 - 7 in *P. sulcatus* fide WANG 2003). From typical *P. sulcatus*, it can be easily distinguished by the numerous setae on the petiole and postpetiole and by the more reticulate dorsum of the pro-mesonotum (with coarser longitudinal ridges in syntype of *P. sulcatus*). However, judging from the specimens deposited in NHMW and identified by M. Wang, *P. sulcatus* as redescribed and interpreted by WANG (2003) is a variable species and may include further unrecognized taxa. From three other species, which are recorded from the Philippines, the new species differs as follows: from *P. bicolor* in the much shorter pronotal spines, in smaller size, and the presence of a central tooth on the ventral surface of the clypeus; from *P. brevispinosus* in the absolutely and relatively longer pronotal spines; and from *P. costatus* in the presence of a central tooth on the ventral surface of the clypeus, slightly shorter pronotal spines, and more coarse rugoreticulum on dorsum of alitrunk.

General distribution: endemic to Philippines.

***Pristomyrmex schoedli* sp.n.** (Figs. 5 - 7)

Type material: holotype (worker): Leyte: Baybay, Leyte State University, c. 50 - 100 m, Calbiga-a River, 20. - 21.III.2005, leg. H. Zettel & C. Pangantihon (# 422) (NHMW);



Fig. 5: *Pristomyrmex schoedli* sp.n., habitus, dorsal view (Matthias Buch pinxit).

paratypes: same data, 119 ♀♀ (CZW, UPLB, USC); Leyte Pr., Baybay, VISCA, 50 m, above Forestry Department, stream, 11.II.2000, leg. H. Zettel (# 235), 2 ♀♀ (CZW); same locality and date, leg. S. Schödl (# 14), 2 ♀♀ (NHMW); Leyte Pr., Baybay, VISCA, 50m, 31.I.2000\ leg. H. Zettel (# 222), 1 ♀ (CZW); Baybay, Leyte State University, c. 50 m, Lago-Lago River, 19.III.2005, leg. H. Zettel & C. Pangantihon (# 421), 5 ♀♀ (CZW).

Diagnosis of worker: Ventral surface of clypeus with strongly prominent tooth at centre. Clypeus without median carina, anterior margin usually with seven (rarely five) small denticles. Pronotum with pair of very long spines (PSL1 0.38 - 0.44), which are much longer than propodeal spines (PSL2 0.09 - 0.13). Dorsum of head and alitrunk smooth and polished; dorsum of head with scarce punctures (hair pits). Frontal carinae posteriorly faded; antennal scrobes indistinct. Anterior face of petiolar node distinct from dorsal surface of peduncle. Petiolar node with two or three pairs of hairs.

Measurements: Holotype worker: TL 4.44, HL 1.04, HW 1.15, CI 110, SL 1.17, SI 102, EL 0.22, PW 0.70, AL 1.05, PPW 0.30, PPL 0.32, PPI 94. - Paratype workers (n = 10): TL 4.19 - 3.41, HL 0.99 - 1.10, HW 1.12 - 1.23, CI 113 - 121, SL 1.19 - 1.28, SI 103 - 107, EL 0.21 - 0.26, PW 0.72 - 0.75, AL 1.04 - 1.16, PPW 0.29 - 0.32, PPL 0.30 - 0.37, PPI 104 - 118.



Figs. 6 - 7: *Pristomyrmex schoedli* sp.n. (6) Head, full face view; (7) habitus, lateral view.

Description of worker: Head (Fig. 6): Mandibles smooth and shiny, with or without a few longitudinal rugae. Masticatory margin of mandible with four teeth: strongest apical + second strongest preapical + long diastema + two small basal teeth of similar size. Basal margin of mandible almost straight, lacking tooth. Clypeus short, without median longitudinal carina. Anterior clypeus margin with short median tooth and three (rarely two) pairs of short lateral denticles. Ventral centre of clypeus with prominent tooth. Palp formula 1, 3. Frontal carinae anteriorly strongly developed, posteriorly indistinct and extending caudad at most to level of posterior eye margins, but usually shorter. Antennal scrobes indistinct, laterally not delimited. Frontal lobes absent; antennal insertion entirely exposed. Frons anteriorly with very fine median impression, variably reduced to short longitudinal groove. Antennal scapes, when lying on dorsum of head, slightly surpassing occipital margin of head. Eyes containing c. 10 - 12 ommatidia in longest row. Profile shape of alitrunk and pedicel segments as in Fig. 7. Pronotum with pair of long spines, PSL1 0.38 - 0.44. Propodeum with pair of short spines, PSL2 0.09 - 0.13, distinctly shorter than distance between apices. Dorsum of alitrunk somewhat flattened, behind pronotal spines almost straight in lateral view. Metapleural lobes almost rectangular, with acute or weakly rounded apex. Petiole in profile with long peduncle; peduncle distinct from anterior surface of node; node with weakly developed angles, anterodorsal one on slightly higher level than posterodorsal one. Postpetiole in profile rounded dorsally, in dorsal view slightly broadening from front to back. Dorsum of head smooth and polished, with some very fine hair pits; scrobal areas anteriorly with few transverse wrinkles. Dorsum of alitrunk smooth and polished, with only a few, very fine hair pits. Petiole, postpetiole, and gaster smooth and shiny. Dorsal surfaces of head and alitrunk with numerous long erect or suberect hairs. Dorsum of petiolar node with 2 - 3 pairs of hairs; dorsum of postpetiole with several pairs. First gastral tergite lacking erect or suberect hairs. A few pairs of forward projecting hairs present near anterior clypeal margin. Scapes and tibiae with numerous erect to suberect hairs. Colour reddish-brown.

Comparative notes: This species is similar to *P. curvulus*, but differs in the absence of a median carina on the clypeus and in the reduced frontal carina. From *P. longispinus* this species differs in the shape of the petiole, in the relatively short propodeal spines and in shorter pilosity. The cephalic index of *P. schoedli* sp.n. (113 - 221) is slightly larger than in *P. curvulus* and *P. longispinus* (97 - 105 and 103 - 109; data from WANG 2003).

General distribution: endemic to Philippines.

***Pristomyrmex simplex* WANG, 2003**

Material examined: Luzon: Laguna Pr., Mt. Banahaw, above Kinabuhayan, trail to Crystalino, 24.XI.1995, leg. J. Kodada & R. Rigová, det. Wang M., 1 ♂ (NHMW).

Diagnosis of worker: TL 2.4 - 2.7 mm in types from New Guinea, 3.0 mm in Philippine specimen. Eyes small. Anterior clypeus margin with medial denticle and pair of strong lateral teeth. Masticatory margin of mandible without diastema. Dorsum of head and alitrunk foveolate. Pronotal spines absent, propodeal spines tooth-like. Petiolar node high, well separated from short peduncle.

Remarks: The single worker from the Philippines is considerably larger than the type specimens from New Guinea and was not included in the type material by WANG (2003).

Previous records from the Philippines: Luzon: Laguna (Mt. Banahaw) (WANG 2003).

General distribution: New Guinea, Philippines (WANG 2003).

Identification key to the Philippine species of *Pristomyrmex* (workers only)

- 1 Pronotal spines not at all developed. 2
- Pronotal spines developed, short and triangular or long (Figs. 2, 4, 5, 7). 6
- 2 Dorsal surface of head and alitrunk rugoreticulate. 3
- Dorsal surface of head and alitrunk punctate or foveolate. 4

- 3 Femora and tibiae reddish or brown; basal margin of mandible with or without inconspicuous tooth. *P. punctatus*
- Femora and tibiae yellow; basal margin of mandible with a broad tooth. *P. pulcher*
- 4 Masticatory margin of mandible without diastema; petiolar node in profile longer than high and distinct from peduncle. *P. picteti*
- Masticatory margin of mandible with diastema; petiolar node in profile higher than long or not clearly separated from peduncle. 5
- 5 Frontal carina short, not extending to level of posterior margin of eye; masticatory margin of mandible with diastema. *P. divisus*
- Frontal carina long, extending to level of posterior margin of eye; masticatory margin of mandible without diastema. *P. simplex*
- 6 Dorsal surface of head (and usually also alitrunk) rugoreticulate (Figs. 3, 4). 7
- Dorsal surface of head and alitrunk smooth or punctate (Figs. 1, 2, 5 - 7). 11
- 7 First gastral tergite with numerous, evenly distributed, erect or suberect setae. *P. hirsutus*
- First gastral tergite without erect or suberect setae (Fig. 4). 8
- 8 Ventral surface of clypeus without central tooth. 9
- Ventral surface of clypeus with a central tooth. .. 10
- 9 Pronotal spines very long (at least 0.36 mm), usually longer than distance between their bases. *P. bicolor*
- Pronotal spines short (shorter than 0.30 mm), much shorter than distance between their bases. *P. costatus*
- 10 Pronotal spines very short (0.06 - 0.12 mm), at most as long as propodeal spines. . *P. brevispinosus*
- Pronotal spines relatively long (0.15 - 0.17 mm), distinctly longer than propodeal spines (Fig. 4). *P. rugosus* sp.n.
- 11 Pronotal spines triangular, short (compare Fig. 2). 12
- Pronotal spines long (compare Fig. 7). 15
- 12 Dorsum of head with large foveolate punctures. *P. quadridens*
- Dorsum of head with relatively fine punctures (Fig. 1). 13
- 13 Petiolar node in profile without distinct anterior face separated from upper surface of peduncle; head width 0.98 - 1.04 mm. *P. flatus*
- Petiolar node in profile with anterior face distinctly separated from upper surface of peduncle; head width 0.77 - 0.94 mm. 14
- 14 Pronotal spines distinctly shorter than propodeal spines (Fig. 2); antennal scrobes present, laterally delimited by ridge reaching caudally at least to level of centre of eye (Fig. 1). *P. distinguendus* sp.n.
- Pronotal spines subequal in length to propodeal spines; antennal scrobes absent, laterally not delimited by ridge. *P. collinus*
- 15 Clypeus with median carina. *P. curvulus*
- Clypeus without median carina (Fig. 6). 16
- 16 Petiolar node in profile lacking distinct anterior surface separated from dorsal surface of peduncle; propodeal spines relatively long (PSL2 0.18 - 0.26). *P. longispinus*
- Petiolar node in profile with distinct anterior surface separated from dorsal surface of peduncle (Fig. 7); propodeal spines relatively short (PSL2 0.09 - 0.13). *P. schoedli* sp.n.

Discussion

Taxonomy and morphology

Since the revision by WANG (2003) the taxonomy of *Pristomyrmex* is well known. However, a few of the widely distributed "species" may in fact be assemblages of highly similar species. One of them is *P. sulcatus*, a relative of *P. rugosus* sp.n. (see comparative notes of that species). The synonymy of *P. taurus* and *P. bicolor* (WANG 2003) needs to be re-examined, as soon as more material from the Philippines becomes available. *Pristomyrmex collinus* sensu WANG (2003) also consists of at least two species, because one paratype of *P. distinguendus* sp.n. has been identified as *P. collinus* by M. Wang. As shown in the comparative notes of *P. distinguendus* sp.n., these two species are easily separable by several characters. The single paratype of *P. distinguendus* sp.n. from Leyte differs slightly from material originating in Luzon, but is presently considered conspecific. The single specimen of *P. simplex* known from the Philippines is much larger than the types from New Guinea and differs in a number of additional characteristics (see WANG 2003); more material is required to confirm or reject conspecificity.

In general, intraspecific variability appears to be very low in species of *Pristomyrmex*, which makes identification relatively simple compared to many other myrmicine genera.

Ecology

Most species of *Pristomyrmex* dwell in the rainforest, foraging as predators or scavengers (WANG 2003). Of the species collected by the author, only *P. punctatus* has been found in obviously disturbed habitats; this species is the most widespread in the genus (see WANG 2003). All other Philippine species seem to be confined to humid forest habitats. Typical collection sites are wet, mossy rock faces or fallen tree trunks. Rarely, specimens have been observed foraging on leaves (a few specimens of *P. longispinus* and *P. schoedli*). A nest of *P. quadridens* has been discovered in a piece of rotten wood (dimensions about 15 × 20 × 50 cm) laying on the moist soil and rocks on a river bed. Usually specimens of *Pristomyrmex* are only collected in small numbers, but approximately 100 *P. schoedli* workers were collected within 10 minutes from a fallen log at Baybay (site # 422) and numerous specimens remained un-

Tab. 1: Checklist of Philippine species of *Pristomyrmex*, with distribution in biogeographical regions (following ONG & al. 2002). Abbreviations: A: Batanes; B: Babuyan; C: Greater Luzon; D: Lubang; E: Greater Mindoro; F: Greater Palawan; G: Burias; H: Sibuyan; I: Romblon-Tablas; J: Greater Negros-Panay; K: Greater Mindanao; L: Camotes; M: Siquijor; N: Camiguin; O: Greater Sulu; P: Sibutu; + = species occurs also outside the Philippines; e = species endemic to Philippines; ? record may belong to an undescribed species.

Species	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	+/e
<i>P. bicolor</i> EMERY, 1900			C			F											+
<i>P. brevispinosus</i> EMERY, 1887											K						+
<i>P. collinus</i> WANG, 2003			C						I	J	K						e
<i>P. costatus</i> WANG, 2003											K						+
<i>P. curvulus</i> WANG, 2003										J							e
<i>P. distinguendus</i> sp.n.			C								K						e
<i>P. divisus</i> WANG, 2003										J							e
<i>P. flatus</i> WANG, 2003			C														e
<i>P. hirsutus</i> WANG, 2003											K						e
<i>P. longispinus</i> WANG, 2003										J							e
<i>P. picteti</i> EMERY, 1893			C			F				J	K						+
<i>P. pulcher</i> WANG, 2003														N			+
<i>P. punctatus</i> (F. SMITH, 1860)			C		E						K	L					+
<i>P. quadridens</i> EMERY, 1897											K						+
<i>P. rugosus</i> sp.n.											K						e
<i>P. schoedli</i> sp.n.											K						e
<i>P. simplex</i> WANG, 2003			C?														+
number of species / region	0	0	7	0	1	2	0	0	1	5	10	1	0	1	0	0	

collected, which suggests that nest sizes in *Pristomyrmex* can occasionally be high. Low worker numbers, large distance between specimens running on trails, and the relatively slow motion of undisturbed specimens make *Pristomyrmex* rather discreet animals. Nevertheless, *Pristomyrmex* seem to be rare organisms. Deforestation on many Philippine islands may already have reduced the diversity of those species, which are restricted to moist forests.

Species diversity and regional endemism in the Philippines

At present, 55 species of *Pristomyrmex* are described (WANG 2003, and this paper). Seventeen species are recorded from the Philippines (= 30.9 % of world fauna). Of these seventeen species, nine species seem to be endemic to the Philippines (= 16.4 % or one sixth of world fauna). The question, whether species are regionally endemic or not, needs to be answered with caution due to the relatively small number of collections. Table 1 presents records of the species in the biogeographical regions of the Philippines (as de-

finied by ONG & al. 2002). In this context it is interesting to note that most of the endemic species (except *P. collinus* and *P. distinguendus*) are so far only recorded from one region, but four of the eight non-endemic species are recorded from two to four regions in the Philippines (see Tab. 1). Whether this fact is influenced by rarity of some species or reflects real regional endemism should be investigated in future. Most species records are from Greater Mindanao (10 species), Greater Luzon (7 species), and Greater Negros-Panay (5 species) (Tab. 1), probably because of the more intensive collecting activities and more suitable habitats on the larger islands.

Acknowledgements

My first thanks are addressed to the late Stefan Schödl for many enjoyable days together in the museum and in the field, when we could discuss ant taxonomy and diversity among many other topics. Stefan's ideas as well as his collections in the Philippines contribute much to the present study. Additional specimens used for this study have been

provided by J. Kodada and R. Rigová (Bratislava), C. Pangantihon (USC, Cebu City), and F. Seyfert (Vienna). My entomological research in the Philippines is supported by the University of the Philippines in Los Baños, the University of San Carlos in Cebu City, the Leyte State University (formerly Visayan College of Agriculture) in Baybay, and the Camarines Sur State Agricultural College in Pili; I cordially thank all the many scientists in the mentioned institutions who helped me in manifold ways. Further, my thanks are due to Matthias Buch (Vienna), who prepared the excellent water colour illustration (Fig. 5); to Harald Schillhammer (NHMW, Vienna) for assistance in preparing the digital photographs; to two anonymous reviewers for valuable remarks to improve an earlier version of the manuscript; and to Birgit Schlick-Steiner and Florian Steiner for organizing independent reviews.

Zusammenfassung

Die philippinische Fauna der Ameisengattung *Pristomyrmex* MAYR, 1866 wird analysiert. Drei Arten werden neu beschrieben: *Pristomyrmex distinguendus* sp.n. von Luzon und Leyte, *P. rugosus* sp.n. von Leyte und *P. schoedli* sp.n. von Leyte. Eine weitere Art, *P. quadridens* WANG, 2003, wird erstmals von den Philippinen gemeldet. Unveröffentlichte Nachweise werden für die Arten *P. collinus* WANG, 2003, *P. longispinus* WANG, 2003, *P. picteti* EMERY, 1893 und *P. punctatus* (F. SMITH, 1860) präsentiert. Das Genus umfasst weltweit 55 Arten. Siebzehn Spezies (= 30.9 %) sind von den Philippinen nachgewiesen, neun davon gelten als endemisch. Ein Bestimmungsschlüssel für die philippinischen *Pristomyrmex*-Arten wird vorgestellt.

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