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A revision of the ant genus *Octostruma* Forel 1912 (Hymenoptera, Formicidae)

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JOHN T. LONGINO

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Abstract

The ant genus *Octostruma* is restricted to the Neotropics, where it is an inhabitant of forest leaf litter and soil. The genus is reviewed, with an emphasis on the fauna of the MesoAmerican corridor. A total of 34 species are recognized, of which 19 are described as new. A key to species is provided, and the following new species are described: *O. ascrobicula* Longino, **sp. nov.**, *O. ascrobis* Longino, **sp. nov.**, *O. convallis* Longino, **sp. nov.**, *O. convallisur* Longino, **sp. nov.**, *O. cyrtinotum* Longino, **sp. nov.**, *O. excertirugis* Longino, **sp. nov.**, *O. gymnogon* Longino, **sp. nov.**, *O. gymnosoma* Longino, **sp. nov.**, *O. leptoceps* Longino, **sp. nov.**, *O. limbifrons* Longino, **sp. nov.**, *O. megabalzani* Longino, **sp. nov.**, *O. montanis* Longino, **sp. nov.**, *O. obtusidens* Longino, **sp. nov.**, *O. pexidorsum* Longino, **sp. nov.**, *O. planities* Longino, **sp. nov.**, *O. schusteri* Longino, **sp. nov.**, *O. triquetrilabrum* Longino, **sp. nov.**, *O. triangulabrum* Longino, **sp. nov.**, and *O. trithrix* Longino, **sp. nov.** *Octostruma lutzi* (Wheeler) and *O. amrishi* (Makhan) are removed from synonymy with *O. balzani*

(Emery). Queens are newly associated with workers for *O. amrishi* (Makhan), *O. rugiferoides* Brown & Kempf, and *O. wheeleri* (Mann).

Key words: biodiversity, taxonomy, Myrmicinae, Basicerotini, identification

Introduction

In the tropics the soil, leaf litter, and rotting wood on the forest floor are home to a diverse community of small ants. Although poorly known until recently because of their small size and cryptic ways, these ants are relatively easily sampled with litter sifting and extraction techniques. As quantitative sampling of litter ant communities enters the repertoire of ecologists and conservation biologists (e.g., Colwell *et al.*, 2008; Longino & Colwell, 2011), updating the taxonomy of litter ants is crucial.

Small predaceous ants in the tribes Dacetini and Basicerotini are often abundant and diverse components of tropical litter ant communities. Brown and Kempf (1960) provided a species-level revision of the tribe Basicerotini, but at that time very few specimens were available for study. Recent inventories of litter arthropods in Central America have yielded thousands of separate collections of basicerotines and greatly clarified species boundaries. Colombia and other parts of South America undoubtedly have a much larger basicerotine fauna that remains to be uncovered, and more intensive sampling of the South American litter fauna is sorely needed.

This report revises the strictly New World genus *Octostruma*. Companion works have reviewed New World *Rhopalothrix* (Longino and Boudinot, 2013) and *Eurhopalothrix* (Longino, 2013). Palacio (1997) reviewed the *Octostruma* of Colombia, recording six species for the country, but no comprehensive species-level revision has been carried out since Brown and Kempf (1960). *Octostruma* as construed here is a heterogeneous assemblage, held together solely by the 8-segmented antenna. Baroni Urbani and de Andrade (2007) proposed a synonymization of the tribe Basicerotini with the Dacetini and that all basicerotine genera, including the genus *Octostruma*, be placed in the single genus *Basicros* Schulz, 1906. There is currently variable acceptance of Baroni Urbani and de Andrade's reclassification. The main purpose of this paper is to describe new species from Central America, not to redefine genus boundaries, and I follow the classification of Brown and Kempf (1960) and Bolton (2003).

Biology

Brown and Kempf (1960) summarized the biology of basicerotines as follows:

The basicerotines all come from tropical or subtropical areas, and predominantly from mesic habitats, particularly rain forest, where they live primarily in the upper layers of the soil and in the soil cover, including large and small pieces of rotten wood. They are fairly common in soil cover berlesates. Nests have been found in snail shells, and in the peaty masses gathered about epiphytic ferns above the ground level. So far as is known, colonies are small, consisting of one or more dealate—or rarely ergatoid—females, and a few workers. Judging from the structure of the workers and females, one would suppose that they were predaceous on small arthropods...

Besides this summary, the behavior of three basicerotine species has been studied. Wilson (1956) observed a small captive colony of *Eurhopalothrix biroi* (Szabó, 1910), a New Guinea species. Workers moved slowly and captured a variety of small, soft-bodied prey, including spiders, symphylans, entomobryid Collembola, campodeids, and hemipteran nymphs. Wilson and Brown (1984) observed a captive colony of *Eurhopalothrix heliscata* Wilson and Brown, a species from Singapore. The colony contained over 400 workers, multiple alate and dealate queens, several adult males, and brood. Foraging workers acted "rather like miniature ferrets," readily wedging themselves into small crevices. They foraged solitarily, attacking a variety of prey but mostly termites. They used their sharply-toothed mandibles to abruptly snap onto appendages of prey, maintaining purchase and slowly reaching around with the gaster to sting the prey. The strongly sclerotized labrum was also employed to press against the clamped appendage. The behavioral repertoire was limited. There did not appear to be

trophallaxis, as workers and larvae fed directly from prey in the brood chambers. Nor did there appear to be any form of alarm communication. While there was generally an increase in the number of foragers when clusters of prey were presented, there was no evidence of any pheromone-based recruitment. Workers were non-aggressive and responded to disturbance by tucking the appendages and becoming immobile, often for minutes at a time. Wilson and Hölldobler (1986) studied captive colonies of *Basiceros manni* Brown & Kempf, 1960 from Costa Rica and observed behavior not substantially different from *E. heliscata*. Foraging workers of many basicerotines are often encrusted with a firmly bonded layer of soil, which is thought to function as camouflage, enhancing crypsis (Hölldobler & Wilson, 1986).

Knowledge of the basic natural history of these ants has hardly progressed since the observations of Wilson, Brown, and Hölldobler. More specimens are now available for examination due to quantitative litter sampling, enhancing knowledge of basicerotine diversity and distribution, but discovering nests remains exceedingly difficult. Quantitative samples of 1 m² litter plots reveals that small basicerotines can be very frequent, occurring in over 50% of samples in some cases, but never in large numbers. Individual samples usually contain fewer than ten workers, and workers are often accompanied by dealate queens. These results suggest that colonies, at least among New World species, are usually small, with tens of workers.

Characters

Octostruma workers vary greatly in the shape of the labrum and in mandibular dentition. Unfortunately, these two characters are rarely visible on point-mounted museum specimens, which typically have the mandibles closed. Identification is much easier if the mandibles are spread prior to examination. When examining specimens in fluid or preparing fluid-stored specimens for dry-mounting, an insect pin can be driven between the mandibles from the ventral side, wedging one of the mandibles open. A single open mandible is often sufficient to see the dentition and the labrum shape.

The labrum always has a raised transverse rim on the dorsum, immediately anterior to the articulation with the head capsule. The lateral margins are thickened and form two "arms", joined by thinner cuticle medially, which variously project forward or converge to form the shape of the anterior margin (Fig. 1). The anterior margins of *Octostruma* labra bear a fringe of translucent setae that are best seen in fluid (Fig. 2). These setae are soft, relatively thick, and often capitate. They look more like the translucent papillae of a marine organism than the typical sclerotized setae of insects, and their function is unknown.

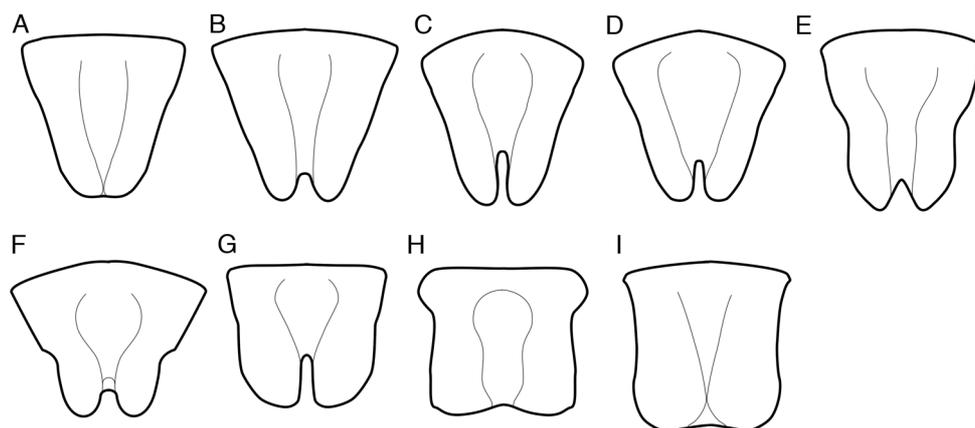


FIGURE 1. Labra of *Octostruma* workers. Drawings are not to scale. A. *O. lepticeps*, *O. triquetrilabrum*, *O. triangulabrum*, *O. wheeleri*. B. *O. gymnosoma*, *O. schusteri*. C. *O. cyrtinotum*, *O. montanis*, *O. planities*. D. *O. iheringi*. E. *O. balzani* complex: *O. amrishi*, *O. balzani*, *O. batesi*, *O. betschi*, *O. gymnogon*, *O. lutzi*, *O. megabalzani*, *O. stenognatha*, *O. trithrix*. F. *O. excertirugis*, *O. obtusidens*. G. *O. rugiferoides*. H. *O. ascrobis*, *O. convallis*. I. *O. pexidorsum*.

The mandible is a complex three-dimensional structure that is triangular in cross section, with three faces: dorsal, ventral, and interior. The dorsal face is usually in the same plane as the clypeus, and there is a prominent basal ridge that abuts the clypeus when the mandible is closed. The dorsal face rounds into the ventral face which is

flat to shallowly concave. The ventral face meets the interior face at a sharp, well-demarcated angle. The interior face is moderately to strongly concave. The masticatory margin, with serial teeth, is at the juncture of the interior and dorsal faces. The dorsal face is usually roughened, while the ventral and interior faces are smooth and shining. The teeth of the masticatory margin are prominent (Fig. 3). A convention used in this paper is to number the teeth from the base, such that tooth one is adjacent to the basal rim. In some species the basal rim of the dorsal face is offset from the first tooth, forming a small denticle that is a continuation of the basal rim (e.g., Fig. 3A). Some species have denticles between the major teeth, and these are not numbered (e.g., Fig. 3D). Each of the main teeth typically has an appressed seta that extends from the base of the tooth to or near the apex, on the dorsal surface. There is often a thin layer of clay-like material adhering to the mandibular teeth, and the appressed tooth setae may play a role in soil adherence ("holding setae" of Hölldobler and Wilson, 1986).

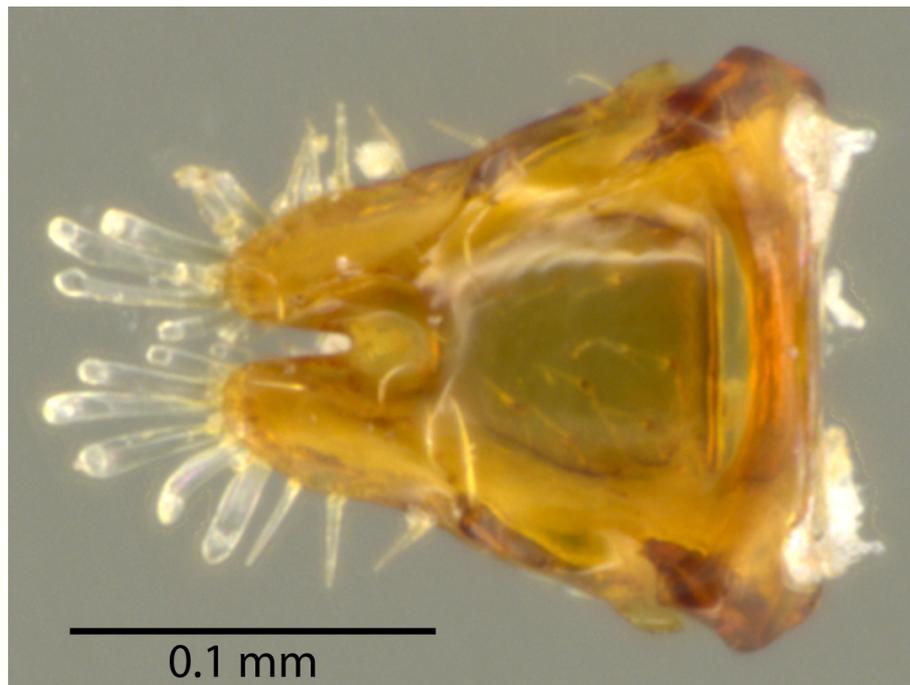


FIGURE 2. Labrum of *Octostruma iheringi* (Honduras, Gracias a Dios: Las Marias; CASENT0627354), ventral view.

The setae on the dorsal surfaces of the body fall into two discrete categories: (1) abundant, short, appressed-to-curved setae; and (2) sparse, long, erect setae that are clavate, spatulate, or in the form of brushes. Hölldobler and Wilson (1986) referred to these as "holding" and "brush" setae, respectively, associating them with putative soil-binding and camouflage functions. The holding setae were hypothesized to enhance adherence of a soil layer, while brush setae functioned to gather the soil particles that the holding setae would anchor. Among the Central American *Octostruma*, some species certainly seem to support this hypothesis. The face is nearly always covered with a thin, cement-like soil layer that covers the underlying cuticle. The holding setae are embedded in the soil layer, while the brush setae project above (Fig. 4). However, many species rarely have a soil layer, yet they still have the erect brush setae and, albeit sparsely, the underlying holding setae. Thus, I refer to these as the clavate or spatulate setae and ground pilosity, respectively.

The erect spatulate setae are variously disposed on the face, dorsal mesosoma, and gaster. They are easily seen and usually there is no other erect pilosity. The number and location of the setae are highly constrained on the face (Fig. 5) and mesosoma, with species varying in the presence or absence of setae at a number of "landmark" positions. Highly similar species, especially in the *O. balzani* complex, may differ in the presence or absence of a single seta. However, identification is often bedeviled by both variation (missing or additional setae) and by setae lost due to wear.

Queens are only slightly larger than workers. The meso- and metasoma are enlarged relative to workers, but mean HW varies from 1–1.2 times mean HW of the corresponding workers. Intercaste workers are common. They are larger than typical workers, may have a more convex mesosoma, and often have additional erect setae on the face and mesosomal dorsum. Although the male of the genus has not yet been described, males have been collected. However, few are associated with workers and they are not treated in this paper.

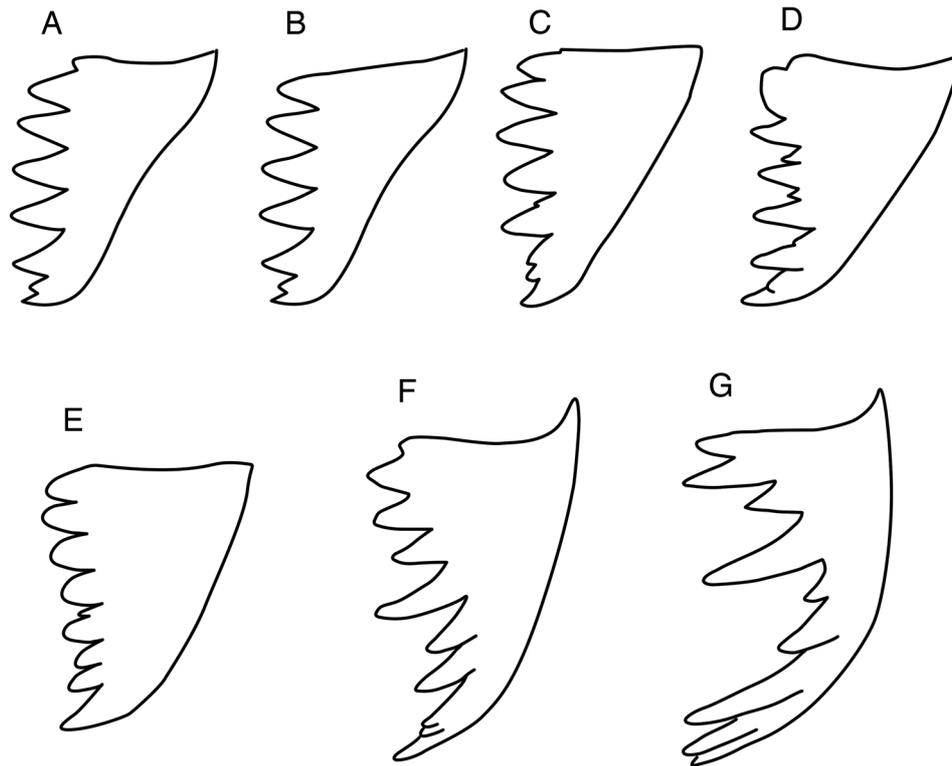


FIGURE 3. Mandibles of *Octostruma* workers. Drawings are not to scale. A. *O. triangulabrum*, *O. wheeleri*, *O. triquetrilabrum*. B. *O. cyrtinotum*, *O. gymnosoma*, *O. montanis*, *O. planities*, *O. schusteri*. C. *O. iheringi*. D. *O. balzani* complex: *O. amrishi*, *O. balzani*, *O. batesi*, *O. betschi*, *O. gymnogon*, *O. lutzi*, *O. megabalzani*, *O. stenognatha*, *O. trithrix*. E. *O. excertirugis*, *O. obtusidens*. F. *O. rugiferoides*. G. *O. ascorbis*, *O. convallis*.

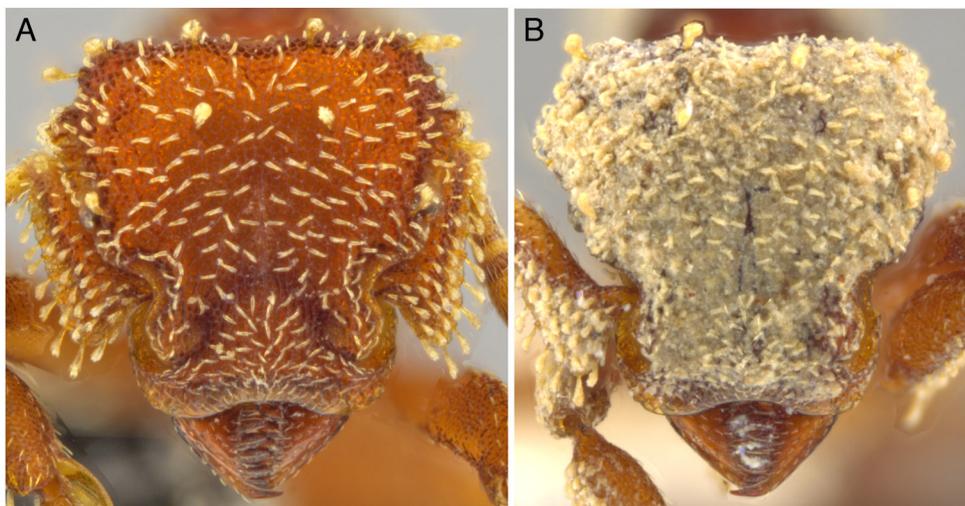


FIGURE 4. Face of *O. obtusidens*, showing worker without (A) and with (B) layer of adhering soil.

Measurements and Indices

HW: head width; in full-face view, maximum width of head capsule.

HL: head length; in full-face view, maximum length of head, from line tangent to anteriormost projection of clypeus to line tangent to posteriormost projection of vertex margin.

ML: mesosoma length; in lateral view, distance from base of anterior face of pronotum (at inflection point between downward-sloping anterior face and flange-like anteriormost projection of pronotum [the latter extending to occipital foramen and usually partially hidden by head capsule]) to posteriormost extension of metapleural or propodeal lobe (whichever extends further).
 CI: cephalic index; $100 \cdot HW/HL$.

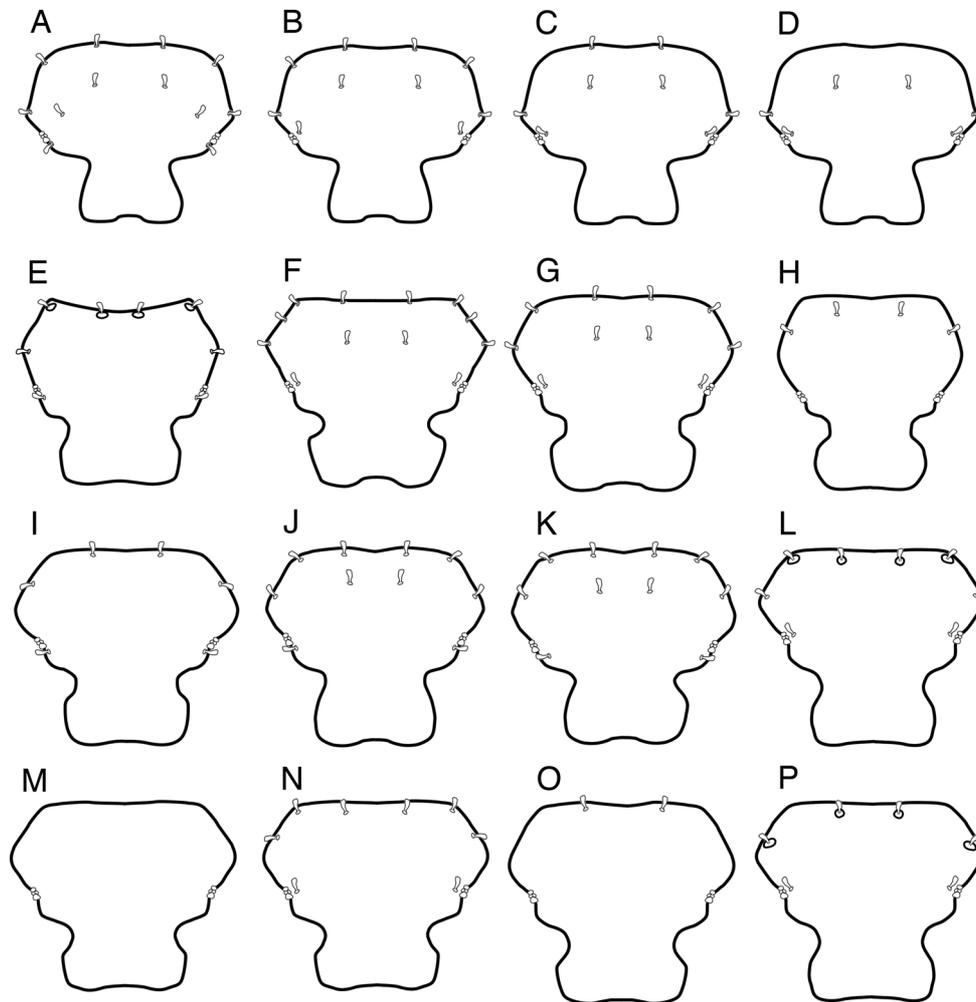


FIGURE 5. Full face view of *Octostruma* species, showing outline of headcapsule and disposition of spatulate setae. Depictions of seta number and location are species averages and individuals may vary. A. *O. trithrix*, *O. lutzi* (part). B. *O. balzani*, *O. lutzi* (part), *O. megabalzani*. C. *O. amrishi*. D. *O. gymnogon*. E. *O. iheringi*. F. *O. obtusidens*. G. *O. exertirugis*. H. *O. lepticeps*. I. *O. wheeleri*. J. *O. triangulabrum*. K. *O. triquetrilabrum*. L. *O. cyrtinotum*. M. *O. gymnosoma*. N. *O. schusteri*. O. *O. planities*. P. *O. montanis*. Note the enlarged seta pits on *O. iheringi*, *O. cyrtinotum*, and *O. montanis*. Drawings are not to same scale.

Methods

Specimens were obtained primarily from three major arthropod inventory projects. The Arthropods of La Selva Project (ALAS) ran from 1992–2005 in Costa Rica, at La Selva Biological Station and the adjacent Barva Transect, a continuously forested elevational transect from 50–2000 m elevation. Litter arthropods were sampled with replicated Berlese, Winkler, and miniWinkler samples. MiniWinkler samples are arthropods extracted from 1 m² plots of chopped and sifted litter and dead wood (Fisher, 1999). Conservation International's Tropical Ecology Assessment and Monitoring Project (TEAM) ran from 2004–2007, also at La Selva, and employed miniWinkler sampling. The Leaf Litter Arthropods of MesoAmerica Project (LLAMA) ran from 2007–2012, carrying out

quantitative miniWinkler sampling at 34 wet forest sites from Nicaragua to Chiapas, Mexico. The quantitative sampling allows assessment of abundance for many of the species treated here.

Observations were made at 63 × magnification with a Leica MZ12.5 dissecting microscope. Measurements were made with a dual-axis micrometer stage with output in increments of 0.001 mm. However, variation in specimen orientation, alignment of crosshairs with edges of structures, and interpretation of structure boundaries resulted in measurement accuracy to the nearest 0.01 mm. All measurements are presented in mm.

Available cytochrome c oxidase I (COI) sequences available on BOLD (Ratnasingham and Hebert 2007) were consulted, but are not included in a systematic fashion in this revision. However, in multiple instances, clusters of COI sequences facilitated the discovery of correlated morphological characters, strengthening confidence in species hypotheses and revealing morphological characters useful in identification. All collection information and accessions [BOLD and GenBank (JF863424, JF863433, JF863638, JN289254, JN289322, JN289325, JN289329, JN289330, JN289339, JN289363, JN289365, KF371472-KF371518)] for the sequence data cited here are publicly available on Barcode of Life Data System (BOLD - www.barcodinglife.org) in the dataset: A revision of the ant genus *Octostruma* Forel 1912 (Hymenoptera, Formicidae) ([dx.doi.org/10.5883/DS-NEOCTO](https://doi.org/10.5883/DS-NEOCTO)).

All holotypes and paratypes associated with the new species described here have unique specimen-level identifiers ("specimen codes") affixed to each pin. Specimen codes should not be confused with collection codes, which are associated with particular collection events. When reported, collection codes follow the collector. Specimen collection data are derived from a specimen database and are not direct transcriptions of labels. Latitudes and longitudes are reported in decimal degrees, as a precise point (five decimal places) followed by an error term in meters. Distribution maps were created in DIVA-GIS (Hijmans *et al.*, 2013) and modified with Photoshop CS3. Images of holotypes and all specimen data on which this paper is based are available on AntWeb (AntWeb 2013).

Repositories

Collections are referred to by the following acronyms:

AMNH: American Museum of Natural History, New York, NY, USA.

BMNH: The Natural History Museum, London, U.K.

CAS: California Academy of Sciences, San Francisco, CA, USA.

EAPZ: Escuela Agrícola Panamericana, Tegucigalpa, Honduras.

ECOSCE: Colección Entomológica de El Colegio de la Frontera Sur, San Cristóbal, Chiapas, Mexico.

ICN: Insect Collection, Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá D.C., Colombia.

INBC: Instituto Nacional de Biodiversidad, Costa Rica.

JTLC: John T. Longino, personal collection, University of Utah, Salt Lake City, UT, USA.

MCZC: Museum of Comparative Zoology, Cambridge, MA, USA.

MHNG: Muséum d'Histoire Naturelle, Geneva, Switzerland.

MNHN: Muséum National d'Histoire Naturelle, Paris, France.

MSNG: Museo Civico di Storia Naturale "Giacomo Doria," Genoa, Italy.

MZSP: Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil.

NMW: Naturhistorisches Museum, Vienna, Austria.

PUCE: Museo de Zoología, Escuela de Biología, Pontificia Universidad Católica del Ecuador, Quito, Ecuador.

UCDC: University of California, Davis, CA, USA.

USNM: National Museum of Natural History, Washington, DC, USA.

UVGC: Colección de Artrópodos, Universidad del Valle de Guatemala, Guatemala City, Guatemala.

Synopsis of the genus *Octostruma* Forel 1912

Octostruma Forel, 1912: 196 [as subgenus of *Rhopalothrix*]. Type-species: *Rhopalothrix simoni* (junior synonym of *Rhopalothrix iheringi*), by subsequent designation of Wheeler, 1913: 82.

Octostruma in Myrmicinae, Dacetini: Forel, 1917: 246; Wheeler, 1922: 667; Emery, 1924: 328; Donisthorpe, 1943: 676; Brown, 1948: 102; Baroni Urbani & De Andrade, 1994: 31.

Octostruma in Myrmicinae, Basicerotini: Brown, 1949: 92; all subsequent authors to the last entry above; Bolton, 1994: 105; Bolton, 1998: 67.
Octostruma as subgenus of *Rhopalothrix*: Forel, 1917: 246; Wheeler, 1922: 667; Emery, 1924: 328.
Octostruma as genus: Brown, 1948: 102; Brown, 1949: 92; Brown & Kempf, 1960: 181; all subsequent authors except the following.
Octostruma as junior synonym of *Basiceros*: Baroni Urbani & De Andrade, 2007: 88.

Taxonomic synopsis

Octostruma amrishi (Makhan, 2007), **stat. rev.** Suriname.
Octostruma ascrobicula Longino, **sp. nov.** Ecuador.
Octostruma ascrobis Longino, **sp. nov.** Guatemala.
Octostruma balzani (Emery, 1894). Bolivia.
= *Octostruma barberi* (Mann, 1922). Guatemala.
= *Octostruma equilatera* (Weber, 1934). Nicaragua.
Octostruma batesi (Emery, 1894). Brazil.
Octostruma betschi Perrault, 1988. French Guiana.
Octostruma convallis Longino, **sp. nov.** Costa Rica.
Octostruma convallisur Longino, **sp. nov.** Panama.
Octostruma cyrtinotum Longino, **sp. nov.** Honduras.
Octostruma excertirugis Longino, **sp. nov.** Guatemala.
Octostruma gymnogon Longino, **sp. nov.** Costa Rica.
Octostruma gymnosoma Longino, **sp. nov.** Mexico.
Octostruma iheringi (Emery, 1888). Brazil.
= *Octostruma godmani* (Forel, 1899). Panama.
= *Octostruma simoni* (Emery, 1890). Venezuela.
= *Octostruma simoni spei* (Forel, 1912). Colombia.
= *Octostruma simoni wighti* (Wheeler, 1908). Jamaica.
Octostruma impressa Palacio, 1997. Colombia.
Octostruma inca Brown & Kempf, 1960. Peru.
Octostruma lepticeps Longino, **sp. nov.** Honduras.
Octostruma limbifrons Longino, **sp. nov.** Panama.
Octostruma lutzi (Wheeler, 1913), **stat. rev.** Dominica.
Octostruma megabalzani Longino, **sp. nov.** Panama.
Octostruma montanis Longino, **sp. nov.** Nicaragua.
Octostruma obtusidens Longino, **sp. nov.** Costa Rica.
Octostruma onorei (Baroni Urbani & De Andrade, 2007). Ecuador.
Octostruma petiolata (Mayr, 1887). Brazil.
Octostruma pexidorsum Longino, **sp. nov.** Colombia.
Octostruma planities Longino, **sp. nov.** Nicaragua.
Octostruma rugifera (Mayr, 1887). Brazil.
= *Octostruma truncata* (Forel, 1912). Brazil.
Octostruma rugiferoides Brown & Kempf, 1960. Mexico.
Octostruma schusteri Longino, **sp. nov.** Guatemala.
Octostruma stenognatha Brown & Kempf, 1960. Brazil.
Octostruma stenoscapa Palacio, 1997. Colombia.
Octostruma triangulabrum Longino, **sp. nov.** Mexico.
Octostruma triquetrilabrum Longino, **sp. nov.** Costa Rica.
Octostruma trithrix Longino, **sp. nov.** Mexico.
Octostruma wheeleri (Mann, 1922). Guatemala.

Key to *Octostruma* (workers)

1. Face crossed by a clearly defined arcuate carina; anterior portion of face concave, differentiated from posterior portion, delimited by frontal carinae and facial arc (Fig. 6); HW < 0.65 2
- Face lacking a sharp arcuate carina and differentiated anterior portion, occasionally a low arcuate convexity present, but not clearly defined and anterior portion not differentiated (e.g., Fig. 7); HW variable 8

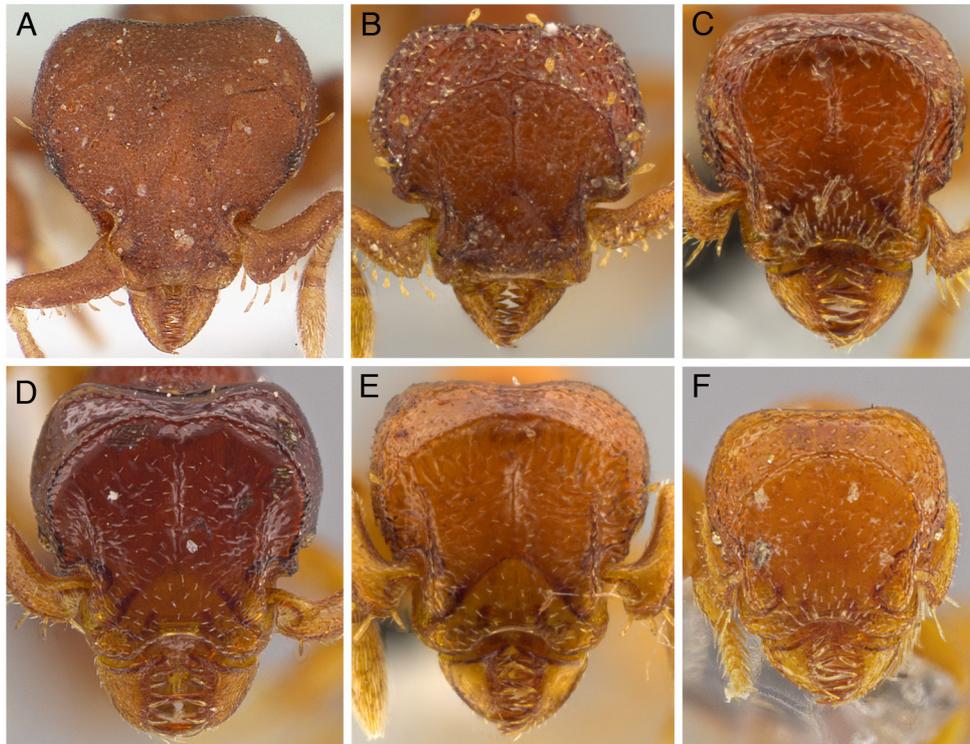


FIGURE 6. Face views of (A) *O. rugifera*, (B) *O. rugiferoides*, (C) *O. ascribis*, (D) *O. limbifrons*, (E) *O. convallis*, (F) *O. ascribicula*. Images are not to scale. Image of *O. rugifera* from AntWeb (2013).

2. Antennal scrobe deep and conspicuous with distinct posterior and ventral margins; vertex behind facial arc foveolate, punctate, or rugose (Fig. 6A, B) 3
- Antennal scrobe shallow and inconspicuous, fading posteriorly and ventrally; vertex behind facial arc smooth and shining with sparse puncta (Fig. 6C–F) 4
3. Face anterior to facial arc uniformly densely punctate; posterior margin of vertex lacking erect setae; facial arc joins dorsal margin of scrobe posterior to eye; eye composed of > 5 ommatidia (Fig. 6A) (Venezuela, southern Brazil) *O. rugifera*
- Face anterior to facial arc shallowly rugulose; posterior margin of vertex with pair of erect setae; facial arc joins dorsal margin of scrobe anterior to eye; eye minute, composed of < 5, partially fused ommatidia (Fig. 6B) (southern Mexico, Guatemala) *O. rugiferoides*
4. Facial arc continuous with frontal carinae (Fig. 6C, F) 5
- Facial arc extending laterally beyond frontal carinae, with shallow trough separating posterior ends of frontal carinae and facial arc (Fig. 6D, E) 6
5. Facial arc more pronounced, arc relatively broader and less semicircular, frontal carinae proportionally longer and more convergent anteriorly, joining facial arc posterior to compound eye (Fig. 6C); pronotal dorsum smooth and shiny, differentiated from shallowly foveolate mesonotum (Central America) *O. ascribis*
- Facial arc less pronounced, arc more strongly curved and semicircular, frontal carinae shorter and less convergent, joining facial arc at level of compound eye (Fig. 6F); mesonotal foveolation extending onto pronotal dorsum, weakening anteriorly (Panama, Colombia) *O. ascribicula*
6. Facial arc strong throughout, much stronger than frontal carinae (Fig. 6D) (Panama) *O. limbifrons*
- Facial arc distinct but less elevated, becoming irregular and somewhat weaker laterally, frontal carinae stronger than lateral portions of facial arc (Fig. 6E) 7
7. Promesonotal dorsum uniformly foveolate; three pairs of spatulate setae along facial arc (Ecuador) *O. convallisur*
- Pronotum smooth and shiny, differentiated from foveolate mesonotum; one pair of spatulate setae on posterolateral corners of facial arc (Costa Rica) *O. convallis*
8. Antennal scrobe shallow, not or only feebly margined; base of scape without flattened anterior lobe 9
- Antennal scrobe deep and sharply demarcated with a carinate rim; base of scape with flattened anterior lobe 10
9. Mandible elongate, with basal margin meeting masticatory margin at oblique angle, closed mandibles with pronounced gap

- between anterior margin of clypeus and masticatory margins; metanotal groove impressed; HW 0.50–0.56 (Panama to Ecuador) *O. stenoscapa*
- Mandible subtriangular, basal margin meeting masticatory margin at close to right angle, closed mandibles flush with anterior margin of clypeus; HW > 0.68 (Colombia to Bolivia) *O. inca*
10. Metanotal groove broadly impressed, promesonotum and dorsal face of propodeum forming two distinct convexities; basal tooth of mandible broad and blunt, differentiated from acute second tooth; HW > 0.66 (Colombia) *O. impressa*
- Metanotal groove thin or absent, if more broadly impressed then basal tooth of mandible acute and similar to second tooth; other characters variable 11
11. Mandible with basal tooth blunt/truncate or in the form of a rectangular lamina (Fig. 3D); second tooth from base acute, differentiated from basal tooth or lamina; vertex lobes uniformly punctate and opaque, never rugulose or smooth; face rarely obscured by a layer of soil; HW < 0.68 (*O. balzani* complex) 12
- First and second basalmost teeth of mandible similar in shape, either acute or rounded (Fig. 3A, B, C, E); vertex lobes punctate, rugose, rugulose, or nearly smooth; face sometimes obscured by layer of soil; HW > 0.57 20
12. In most workers of a series, posterolateral vertex margin with an erect spatulate seta (Fig. 5A, B); mesosoma usually with one or two pairs of spatulate setae, rarely lacking them 13
- In most workers of a series, posterolateral vertex margin lacking erect seta (Fig. 5C, D); mesosoma usually lacking spatulate setae 19
13. Posterior half of head with posterolateral margin shorter than anterolateral margin (Fig. 7A), giving head a more triangular appearance; basal lobe of scape weakly developed, margins proximal and distal to basal bend at approximate right angle . 14
- Posterior half of head with posterolateral margin subequal to or longer than anterolateral margin (Fig. 7B), giving head more transverse appearance; basal lobe of scape strongly developed, margins proximal and distal to basal bend at acute angle . . 16

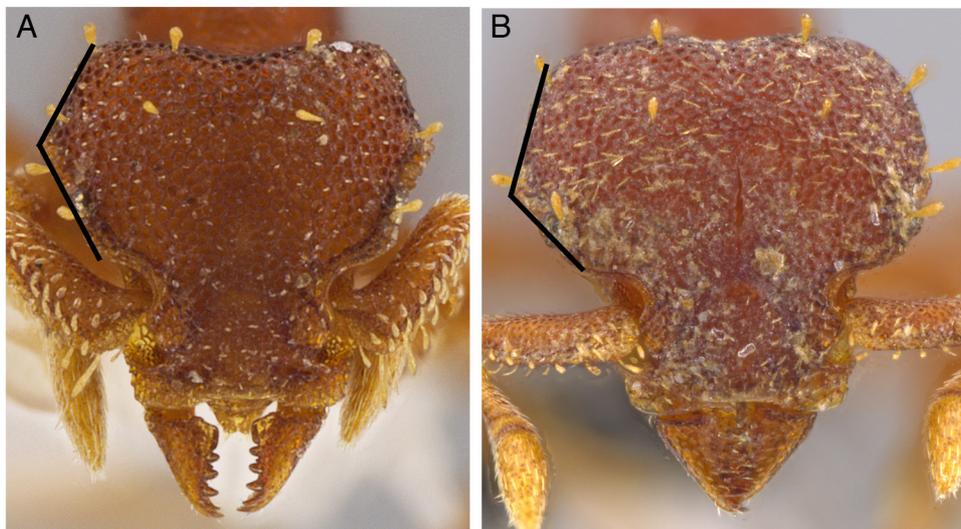


FIGURE 7. Face views of (A) *O. betschi* and (B) *O. balzani*.

14. Mesosoma with one pair of spatulate setae, on mesonotum; anterior portion of face convex; dorsal surface of scape with thin ground pilosity; CI 99–103 (southern Brazil) *O. stenognatha*
- Mesosoma with two pairs spatulate setae, one on pronotum and one on mesonotum; anterior portion of face convex or somewhat concave; dorsal surface of scape with thin or spatulate ground pilosity; CI 106–111 15
15. Dorsal surface of scape with short appressed spatulate setae; anterior portion of face somewhat concave (Amazonian South America) *O. betschi*
- Dorsal surface of scape with thin ground pilosity; anterior portion of face flat to convex (eastern Andean foothills) . *O. batesi*
16. Mesosoma typically with two pairs spatulate setae, one pair in anterior half of promesonotum and one pair in posterior half (Lesser Antilles) *O. lutzi*
- Mesosoma typically with one pair spatulate setae, on posterior half of promesonotum (mainland Neotropics) 17
17. In most workers of a series, a spatulate seta present between anterior seta on side of head (near eye) and anteromedial vertex seta (Fig. 5A); in profile view, metanotal groove completely absent or weakly impressed (Fig. 8A); first gastral tergite typically with 8–16 erect setae (Mexico to Honduras) *O. trithrix*
- In most workers of a series, no spatulate seta between anterior seta on side of head and medial vertex seta (Fig. 5B); in profile view, metanotal groove usually visible as a small notch (Fig. 8B); gastral setae variable 18
18. Color red brown; typically < 16 erect setae on first gastral tergite (<10 in northern Central America, where sympatric with *O. trithrix*), more clustered posteriorly, apically broader, more spatulate (Fig. 9A); HW 0.50–0.63 (average 0.57, $n=27$) (widespread in Neotropics) *O. balzani*
- Color dark brown; typically about 20 erect setae on first gastral tergite, more evenly distributed across tergite, relatively linear and less spatulate (Fig. 9B); HW 0.61–0.66 (mountains of Panama, Peru, Bolivia) *O. megabalzani*

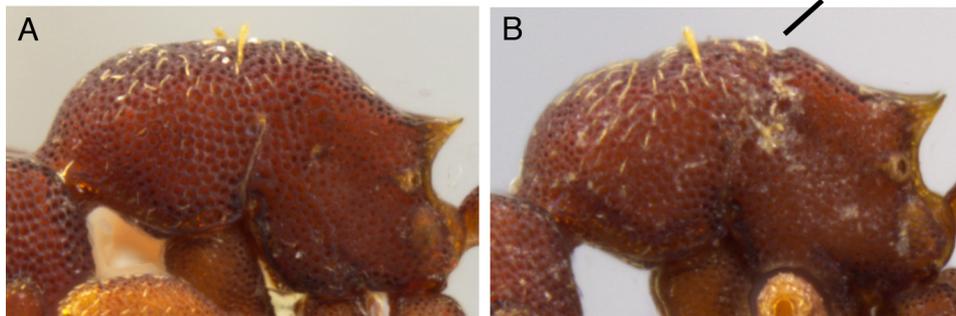


FIGURE 8. Profile view of mesosoma, (A) *O. trithrix* and (B) *O. balzani*.

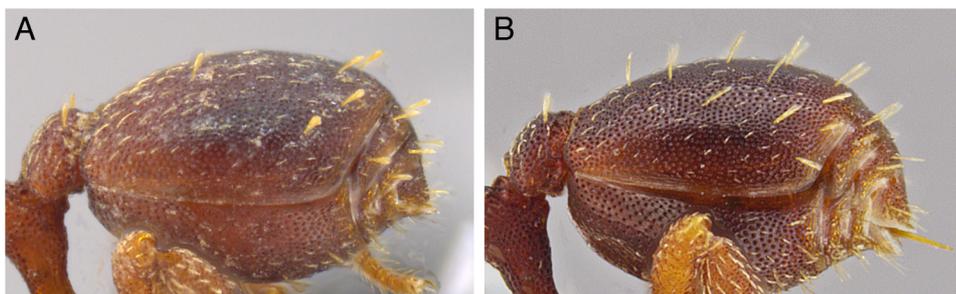


FIGURE 9. Setae on first gastral tergite of (A) *O. balzani* and (B) *O. megabalzani*.

19. Posterior margin of vertex usually lacking spatulate setae (Fig. 5D); color dark brown (mountains of Central America) *O. gymnogon*
- Posterior margin of vertex usually with medial pair of spatulate setae (Fig. 5C); color lighter red brown (Central America and northern South America) *O. amrishi*
20. A single tall, transverse carina extends between propodeal spines, separating dorsal and posterior faces of propodeum, broadening laterally and extending to the apex of the propodeal spine, joining vertical plane of spine at a right angle, forming a roof-like structure over the posterior face of the propodeum and creating a thin-walled, concave propodeal spine that looks like a box corner (Fig. 10A) 21
- Transverse carina between propodeal spines present or absent; if present, thin and fading medially, at most weakly expanded laterally (Fig. 10B) 23
21. Pair of long filiform setae projecting from petiolar peduncle anterior to spiracle (these setae very fine and often difficult to see) (Fig. 11) (this character also present on *O. pexidorsum*, elsewhere in key); shorter filiform setae projecting from sides of postpetiole; promesonotum with moderately impressed longitudinal sulcus; face with 8 spatulate setae, arranged around periphery of face, none medially (Fig. 5E); promesonotum and first gastral tergite lacking spatulate setae (widespread in Neotropics) *O. iheringi*
- Filiform setae lacking on petiole and postpetiole; other characters variable 22
22. Mesosoma with two pairs erect setae, one on pronotum and one on mesonotum; dorsal promesonotum with broad, shallow, longitudinal sulcus; HW 0.74 (Ecuador) *O. onorei*
- Mesosoma lacking erect setae; dorsal promesonotum evenly convex; HW 0.85–0.90 (petiolar node in dorsal view strongly transverse) (southern Brazil) *O. petiolata*
23. Basal five teeth of mandible bluntly rounded (Fig. 3E); labrum about as wide as long; anterior labral lobes separated, about as wide as long (Fig. 1F); HW < 0.68 24
- Basal five teeth of mandible acute (Fig. 3A, B); labrum longer than wide; anterior labral lobes separate and longer than wide or confluent (Fig. 1A, B, C, I); HW variable 25
24. Face sculpture foveolate with at most faint longitudinal rugulae (Fig. 12A); when covered with soil, any rugulae usually not visible; face with 10–14 large spatulate setae projecting above ground pilosity; ground pilosity curved, projecting from surface; first gastral tergite with > 10 spatulate setae; first gastral tergite punctate over entire surface, although puncta somewhat smaller and sparser posteriorly; color orange brown (Guatemala to Colombia) *O. obtusidens*
- Face sculpture longitudinally rugose, interspaces matte but not foveolate (Fig. 12B); when covered with soil, rugulae often project through soil layer; face with at most 10 spatulate setae; ground pilosity fully appressed; first gastral tergite with < 10 spatulate setae; first gastral tergite punctate on anterior half, fading to nearly smooth and shining posteriorly; color red brown (Mexico to Ecuador) *O. exertirugis*
25. Ground pilosity abundant, subdecumbent, woolly; apical half of labrum with parallel sides, apex blunt but not bilobed (Fig. 11); pair of long filiform setae projecting from petiolar peduncle anterior to spiracle (these setae very fine and often difficult to

see) (Fig. 11) (this character also present on the more common *O. iheringi*); shorter filiform setae projecting from sides of postpetiole and anteromedian first gastral sternite; HW 0.63–0.71; CI 106–111 (Amazonian Colombia) *O. pexidorsum*
 - Ground pilosity sparse, fully appressed, not woolly; labrum shape variable; filiform setae lacking on petiole, postpetiole, first gastral sternite; HW and CI variable 26

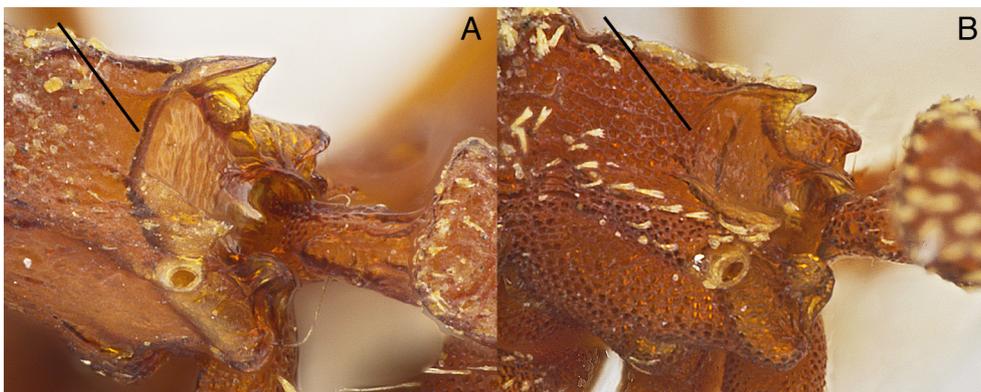


FIGURE 10. Oblique view of propodeal spines of (A) *O. iheringi* and (B) *O. obtusidens*.



FIGURE 11. *Octostruma iheringi*, dorsal view of petiole and postpetiole, showing sensory setae.

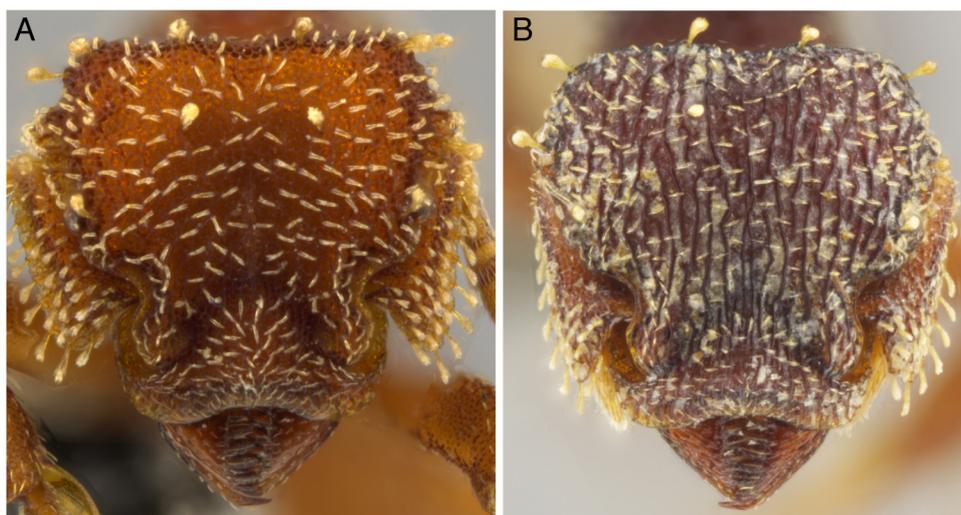


FIGURE 12. Face views of (A) *O. obtusidens* and (B) *O. exertirugis*.

26. Labrum apex blunt, not distinctly bilobed; sides of labrum straight and evenly converging (Fig. 1A) 27
 - Labrum apex distinctly bilobed, sides of labrum straight or slightly concave, anterior lobes porrect, parallel and separate (Fig. 1B, C) 30
27. Head very narrow (Fig. 5H), CI 94 (Honduras) *O. lepticeps*
 - Head broader (Fig. 5I, J, K), CI > 100 28
28. Face with at most six spatulate setae (Fig. 5I); promesonotum never with spatulate setae; face and dorsal pronotum matte but mostly smooth, not rugulose (Central America) *O. wheeleri* (Mann)
 - Face with 8-10 spatulate setae (Fig. 5J, K); promesonotum lacking or with one pair of spatulate setae; face and dorsal pronotum with stronger reticulate rugulose sculpture (although still faint compared to many other *Octostruma*) 29
29. Mesonotum with a pair of spatulate setae (southern Mexico) *O. triangulabrum*
 - Mesonotum lacking spatulate setae (Costa Rica, Panama) *O. triquetrilabrum*
30. Anterior half of dorsal face of propodeum moderately to distinctly convex, demarcating broadly impressed metanotal groove (Fig. 13A); HW 0.6–0.7; face typically with 6 or 8 spatulate setae (as few as 2 on some Costa Rican *O. montanis*), seta-bearing pits along vertex margin large (Fig. 5L, P); mesosomal dorsum with or without spatulate setae 31
 - Dorsal face of propodeum flat or weakly convex over entire length; metanotal groove not impressed, or if slightly impressed, not as a result of a dorsal propodeal convexity (Fig. 13B); HW < 0.72 or > 0.80; face with 0 to 8 spatulate setae, seta-bearing pits not unusually large (Fig. 5M, N, O); mesosomal dorsum lacking spatulate setae 32

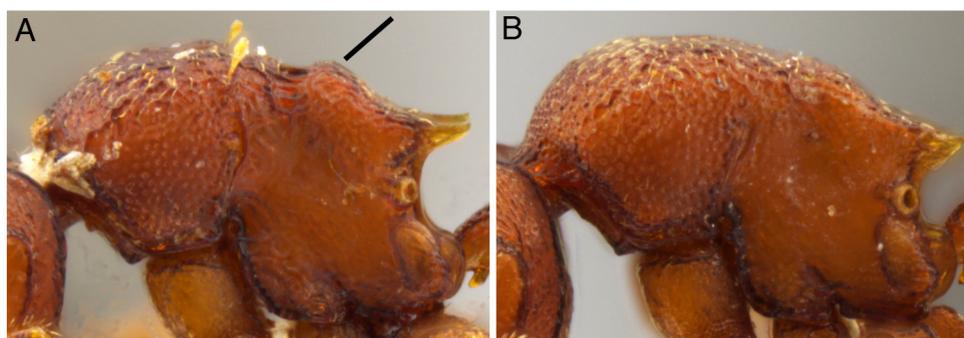


FIGURE 13. Profile view of mesosoma of (A) *O. cyrtinotum* and (B) *O. planities*.

31. Mesosomal dorsum lacking spatulate setae; face with 2 to 6 spatulate setae (Fig. 5P) (Nicaragua, Costa Rica) ... *O. montanis*
 - A single pair of spatulate setae on the mesonotum; face with 8 spatulate setae (Fig. 5L) (Honduras, Nicaragua) ... *O. cyrtinotum*
32. HW < 0.72; face typically with 2 spatulate setae on posteriomedian vertex margin (Fig. 5O) (Mexico to Costa Rica)
 *O. planities*
 - HW > 0.80; face typically with 0 or 6 spatulate setae 33
33. Face lacking spatulate setae (Fig. 5M) (southern Mexico) *O. gymnosoma*
 - Face with 6 spatulate setae (Fig. 5N) (Guatemala) *O. schusteri*

Species Accounts

Octostruma amrishi (Makhan, 2007) Revised Status

(Figs 1E, 3D, 5C, 15, 42)

Pyramica amrishi Makhan 2007:1, figs. 1,2. Holotype worker: Suriname, Kasikasima, 27 Mar 1996 (D. Makhan) [repository unknown; see discussion in Bolton *et al.*, 2008] (not examined). Combination in *Octostruma*; junior synonym of *Octostruma balzani*: Bolton, Sosa-Calvo, *et al.* 2008: 62. **Revised Status.**

Geographic range. Honduras to southern Peru and Amazonian Brazil.

Description. *Worker.* HW 0.54–0.64, HL 0.50–0.60, WL 0.54–0.70, CI 106–110 (n=8). Matching in most respects the description for *O. balzani*; mandible with 8 teeth (Fig. 3D), tooth 1 a broad blunt lamella, strongly differentiated from tooth 2, teeth 2–5 acute, similar in shape, with denticles between them; teeth 5–8 forming an apical fork, with 5 and 8 large, 6 and 7 small partially confluent denticles (*O. balzani* complex); face setation as in Fig. 5C, lacking erect setae on posterolateral margins of head (present in *O. balzani*, *O. megabalzani*, and *O. trithrix*), a medial pair present on vertex margin (lacking in *O. gymnogon*); mesosomal dorsum usually lacking a pair of erect setae (present in *O. balzani*, *O. megabalzani*, and *O. trithrix*); metanotal groove usually not impressed in profile view (impressed in *O. balzani*, *O. megabalzani*). When sympatric with *O. balzani*, *O. amrishi* is often a lighter red brown.



FIGURE 14. Full face view of *Octostruma* queens. A. *O. wheeleri*. B. *O. cyrtinotum*. C. *O. iheringi*. D. *O. balzani*. E. *O. obtusidens*. F. *O. excertirugis*. G. *O. rugiferoides*. H. *O. convallis*. I. *O. ascrobis*. Scale bars are 0.2 mm.



FIGURE 15. *Octostruma amrishi*, worker (INBIOCRI001259486, Costa Rica), face and lateral views. Scale bar = 0.25 mm face view, 0.5 mm lateral view.

Queen (previously undescribed). HW 0.60, HL 0.56, WL 0.73, CI 106 (n=1). Similar in all respects to *O. balzani*.

Biology. *Octostruma amrishi* is a lowland to lower montane species. It occurs mostly in mature wet forest, less often in second growth forest. In the northern part of the range in Central America, where *O. gymnogon* does not

occur, it extends into cloud forest to 1500 m. In southern Central America, where *O. gymnogon* occurs, it exhibits an elevationally parapatric distribution with *O. gymnogon* and is restricted to elevations below 600 m. Almost all collections are from Berlese and Winkler samples of sifted litter and rotten wood from the forest floor. Dealate queens and intercaste workers occasionally occur together with workers in litter samples. One collection was of foragers on clay soil in a rainforest. See additional comments under *O. balzani*.

Comments. Sampling of *Octostruma* is less thorough in South America than in Central America, but specimens that match the morphology of *O. amrishi* occur in lowland to midmontane rainforest in northern South America and throughout the Amazonian lowlands. Specimens from the southern portion of the range, including Amazonian Brazil and the eastern and western foothills of the Ecuadorian Andes, show reduced punctation on the first gastral tergite, becoming smooth and shining on a variable extent of the posterior portion of the tergite. See additional comments under *O. balzani*.

Although the type of *O. amrishi* was not examined, if it exists, the characteristic setal pattern can be seen on the figures in the original publication.



FIGURE 16. *Octostruma ascribicula*, holotype worker (MCZ-ENT00511413), face and lateral views. Scale bar = 0.25 mm face view, 0.5 mm lateral view.

***Octostruma ascribicula* Longino, sp. nov.**

(Figs 6F, 16, 45)

Type material. *Holotype worker*: ECUADOR, Manabí: 78 km NE Chone [-0.363 -79.739 ±10km], 450 m, 9 Jun 1976, forest, ex sifted leaf litter (S. & J. Peck, B345) [MCZC, unique specimen identifier MCZ-ENT00511413].

Geographic range. Ecuador.

Diagnosis. Antennal scrobe very shallow, not distinctly margined; face with arcuate carina; frontal carinae extending back and joining termini of facial arc (in *O. convallis*, *O. convallisur*, and *O. limbifrons*, frontal carinae and facial arc do not join, the termini of the facial arc extend laterally beyond the termini of the frontal carinae); facial arc weak, semicircular, frontal carinae short, joining facial arc at level of compound eye (facial arc strong, less semicircular, frontal carinae longer, joining facial arc posterior to compound eye in *O. ascribis*); mesonotal foveolation extending onto dorsal pronotum, weakening anteriorly (mesonotum foveolate, pronotum contrastingly smooth and shining with sparse puncta in *O. ascribis*); HW 0.42 (0.46–0.51 in *O. ascribis*).

Description. *Worker*. HW 0.42, HL 0.41, WL 0.42, CI 103 (n=1). Differing from *O. ascribis* in the characters of the Diagnosis; similar to *O. ascribis* in most other respects (see complete description of *A. ascribis*). The *queen* is unknown.

Etymology. The name refers to being a small version of *O. ascribis*. It is a noun in apposition and thus invariant.

***Octostruma ascrobis* Longino, sp. nov.**

(Figs 1H, 3G, 6C, 14I, 17, 44)

Type material. *Holotype worker*: GUATEMALA, Izabal: 5 km NW Morales, 15.51351, -88.86647, ± 26 m, 245 m, 17 May 2009, 2° lowland rainforest, ex sifted leaf litter (LLAMA, Wm-B-04-1-01) [CAS, unique specimen identifier CASENT0611295]. *Paratype workers*: same data except 15.51078, -88.86105, ± 50 m, 195 m (LLAMA, Wa-B-04-1-22) [MCZC, CASENT0611224; USNM, CASENT0611225]; 15.51465, -88.86440, ± 28 m, 280 m, 18 May 2009 (LLAMA, Wm-B-04-1-09) [UVGC, CASENT0611425; MZSP, CASENT0611426].



FIGURE 17. *Octostruma ascrobis*, holotype worker (CASENT0611295), queen (CASENT0614238, Guatemala), face and lateral views. Scale bar = 0.2 mm face views, 0.5 mm lateral views.

Geographic range. Mexico (Chiapas) to Costa Rica.

Diagnosis. Antennal scrobe very shallow, not distinctly margined; face with arcuate carina; frontal carinae extending back and joining termini of facial arc. *Octostruma convallis* is similar, but the frontal carinae and facial arc do not join. They are separated by a transverse trough, and the termini of the facial arc extend laterally beyond the termini of the frontal carinae.

Description. *Worker*. HW 0.46–0.51, HL 0.43–0.49, WL 0.43–0.50, CI 102–107 (n=9). Labrum rectangular, formed of strap-like lateral portions joined by a thin translucent lamella (Fig. 1H); mandible strongly bowed, in profile view with mandible closed, basal portion of mandible in same plane as clypeus, apex of mandible strongly down-turned, the down-turned portion subequal in length to basal portion; with mandible fully open, dorsal face fully perpendicular to plane of clypeus and teeth projecting dorsally; mandible with 10 teeth (Fig. 3G), tooth 1 continuous with basal rim of dorsal surface, teeth 1–7 as in Fig. 3G, teeth 7–10 form an apical fork perpendicular to base of dorsal face, tooth 7 long and separate, tooth 8 about 1/3 length of tooth 7, teeth 9 and 10 slightly longer than 7, joined to near tip (or could be seen as single tooth bifid at the tip), tooth 9 slightly shorter than 10; dorsal surface of mandible roughened; ventral surface narrow, smooth and shiny; interior surface strongly concave, smooth and highly polished; scape flattened, with pronounced anterobasal lobe, dorsal surface shallowly foveolate anteriorly, grading to smooth and shining posteriorly; clypeus strongly emarginate anteriorly; frontal carinae sharp, narrow, divergent, joining and continuous with similar carina that arches across vertex; frontal carinae and arch delimit

anterior concave surface that is shiny, with irregular median longitudinal carina and faint transverse rugulae laterally; side of head near compound eye shallowly foveolate; vertex posterior to facial arc largely smooth and highly polished, with distinct, sparse, uniformly distributed puncta; compound eye small, circular, composed of 4–5 somewhat confluent ommatidia; short carina passes obliquely between antennal socket and eye, extending a short distance posterior to eye and toward frontal carina; antennal scrobe below eye, very shallow and not delimited with carina or flange; scrobe and undersurface of head shallowly foveolate.

Promesonotum forming continuous convexity in profile; metanotal groove not impressed; propodeum a single, concave, sloping surface, not differentiated into dorsal and posterior faces; propodeal spines in the form of flattened perpendicular plates, right-angled to slightly acute, extending anteriorly as raised carinae that curve medially and join at the metanotal groove, extending ventrally as narrow lamella, thus posterodorsal face of propodeum entirely delimited by raised carinae confluent with propodeal spines; propodeal spiracle large, located immediately below propodeal spine and abutting posterior margin; pronotum sculpture smooth and shining with sparse puncta, like posterior vertex; mesonotum with feeble, mesh-like sculpture, contrasting sharply with pronotum and clearly demarcating juncture of pro- and mesonotum; posterodorsal face of propodeum shallowly foveolate; mesopleuron and side of propodeum not differentiated, matte, very faintly punctate.

Petiole in profile with peduncle not differentiated from node, anterior surface sloping evenly from petiolar foramen to node, dorsal face of node sloping posteriorly to projecting transverse cuticular rim, short concave posterior face beneath rim; anteroventral margin with small tooth or angle; dorsal face of node smooth and shining; postpetiole low, broad, crescent-shaped in dorsal view, dorsal face shallowly foveolate anteriorly, smooth and shining posteriorly, delimited anteriorly and posteriorly by thin transverse rim; first gastral tergite shallowly foveolate anteriorly, grading to smooth and shining at posterior rim; first gastral sternite foveolate anteriorly, grading to sparsely punctate with smooth and shining interspaces posteriorly.

Labrum fringed on sides and apex with soft translucent thick setae, one of these on each anterior labral lobe much longer than the others, projecting ventrally; extreme base of ventral surface of mandible with very fine, long seta that curves forward and nearly touches ventrally projecting labral seta; each larger mandibular tooth with prominent fully appressed seta; anterior margin of scape with seven stiff clavate setae; clypeus with sparse fully appressed ground pilosity, anterior face with sparser and much less visible ground pilosity, posterior face essentially lacking ground pilosity; 1–3 stout clavate setae variably distributed between apex of oblique supraocular carina and outer margin of facial carina, near juncture of frontal carina and transverse carina; mesonotum, petiole and postpetiole lacking erect setae, ground pilosity extremely short, sparse, unnoticeable; mesotibia with short, thin, sparse, decumbent ground pilosity, a single large stout clavate seta and several thin shorter erect setae at apex; mesobasitarsus with 2 pairs long, thin, erect setae; first gastral tergite with row of 4 clavate setae at posterior margin, following exposed tergites each with row of clavate setae; ground pilosity of first gastral tergite short, sparse, fully appressed, somewhat more noticeable than on mesosoma; first gastral sternite with sparse, thin but stiff erect setae over much of surface except narrow area near postpetiolar insertion.

Color red to red-orange.

Queen. HW 0.54–0.57, HL 0.52–0.53, WL 0.70–0.73, CI 102–107 (n=2). Labrum, mandible, and scape similar to worker; anterior clypeal margin very different from worker and highly distinctive, with a broad shallow semicircular concavity medially, flanked on each side by a deep semicircular notch that nearly "pinches off" an anterolateral portion of the clypeus between the notch and the large antennal socket (Fig. 14I); clypeus confluent with the vertex posteriorly, with no evidence of a clypeal suture; transverse facial carina and posterior frontal carinae feeble to absent, but marked by a semicircular row of about 9 erect spatulate setae; face anterior to row of setae flat, with faint transverse rugulae, lacking longitudinal median carina, face posterior to seta row like worker; ocelli distinct, anteromedian ocellus immediately anterior to seta row; compound eye large, multifaceted, about 12 ommatidia in longest row; outermost seta of seta row at inner margin of compound eye; antennal scrobe shallow, like worker.

Mesosoma with queen-typical alar sclerites; pronotum smooth and shining laterally and anteriorly, with faint rugulae and sparse puncta on humeri; mesoscutum and axillae irregularly longitudinally rugulose; scutellum smooth and shining medially, with a few puncta and faint rugulae laterally; anepisternum and katepisternum separated by strong sulcus, both smooth and shining; posterodorsal propodeum concave, shallowly foveolate; side of propodeum matte with faint puncta; propodeal spines pronounced, in the form of flattened perpendicular plates, right-angle to slightly acute in profile; propodeal spiracle smaller and lower compared to worker, anterior to ventral propodeal lamella.

Petiole similar to worker, but posterior rim more pronounced and projecting; postpetiole also with a posterior projecting rim, ventral margin with a short acute tooth; first gastral tergite punctate over much of surface, grading to sparser and smaller puncta at posterior border, with 6–8 erect clavate setae along posterior border, about 6 scattered over disc; first gastral sternite densely punctate, with abundant short, stiff, erect setae.

Color red.

Biology. This species inhabits lowland rainforest, from sea-level to 1000 m elevation, but is most abundant below 500 m. All specimens are from samples of sifted leaf litter and rotten wood from the forest floor. Frequencies in quantitative samples of 1 m² litter plots range from 0–16%. Dealate queens occasionally occur in samples, and one sample contained an alate queen. Worker number in samples is always < 10.

Etymology. The name refers to the lack of sharply delimited antennal scrobes. It is a dative plural noun and thus invariant.

***Octostruma balzani* (Emery, 1894)**

(Figs 1E, 3D, 5B, 7B, 8B, 9A, 14D, 18, 42)

Rhopalothrix balzani Emery 1894: 217, pl. 1, fig. 10. Lectotype worker (here designated): Bolivia; cantoni di Coroico e Chilumani-Yungas, 1600m, 1891 (Balzan) [presumed; see Comments] [MCSN, CASENT0904969] (examined); queen: same data as lectotype [MCSN, examined]. Combination in *Octostruma*: Brown 1949: 92.

Rhopalothrix (Octostruma) barberi Mann, 1922: 42. Syntype workers: Guatemala, Alta Vera Paz, Cacao, Trece Aguas (Barber & Schwarz) [USNM] (examined). Combination in *Octostruma*: Brown, 1949: 92. Junior synonym of *O. balzani*: Brown & Kempf, 1960: 194.

Rhopalothrix (Octostruma) equilatera Weber, 1934: 52, fig. 10. Syntype workers: Nicaragua, "Tuli Creek near San Mejuel" [assumed Rio Tule near San Miguelito; see Noble, 1918], Nov 1916, from stomach of *Dendrobates tinctorius* (C. R. Halter) [MCZC] (examined). Combination in *Octostruma*: Brown 1949: 92. Junior synonym of *Octostruma balzani*: Brown & Kempf, 1960: 194.

Geographic range. Northern Mexico (Tamaulipas, Nuevo Leon) to southern Brazil (Paraná).

Description. *Worker.* HW 0.50–0.63 (lectotype HW 0.58), HL 0.46–0.58, WL 0.51–0.63, CI 104–113 (n=26). Labrum as in Fig. 1E, sides concave, strap-like lateral portions converging from base to mid-length, then becoming porrect, joined by a thin translucent lamella but leaving distinctly bilobed apex; mandible triangular, in profile view with mandible closed, in same plane as clypeus, apex of mandible not down-turned; with mandible fully open, dorsal face remains in same plane as clypeus; mandible with 8 teeth (Fig. 3D), tooth 1 continuous with basal rim of dorsal surface, tooth 1 a broad blunt lamella, strongly differentiated from tooth 2, teeth 2–5 acute, similar in shape, with denticles between them; teeth 5–8 forming an apical fork, with 5 and 8 large, 6 and 7 small partially confluent denticles; dorsal surface of mandible roughened; ventral surface concave, smooth and shining; interior surface narrow, concave, smooth and shining; scape flattened, with pronounced anterobasal lobe, dorsal surface shallowly rugulose punctate; clypeus with broad, shallow emargination anteriorly; face matte, densely punctate rugulose throughout; frontal carinae faint, nearly obsolete; antennal socket deep, dorsal rim of socket continuous with pronounced dorsal margin of antennal scrobe; antennal scrobe deep, strongly delimited dorsally, posteriorly, and ventrally with sharply defined thin cuticular rim; compound eye small, circular, composed of about 7 ommatidia; short feeble carina extends from ventral margin of antennal socket across floor of scrobe toward compound eye; scrobe matte but smoother than sculpture on face; vertex lobes and undersurface of head densely punctate; occipital carina obsolete.

Promesonotum forming continuous convexity in profile; metanotal groove forming a thin impressed notch visible in profile view; posterodorsal propodeum a single, concave, sloping surface, not differentiated into dorsal and posterior faces; propodeal spines in the form of acute flattened perpendicular plates, extending ventrally as very thin carinae, not forming ventral lamellae; propodeal spiracle medium-size, diameter less than width of base of propodeal spine, located below propodeal spine and abutting posterior margin; entire mesosoma uniformly matte, densely punctate.

Petiole in profile with peduncle differentiated from node, anterior surface concave from petiolar foramen to node, node subquadrate, with long sloping dorsal face and short vertical posterior face; anteroventral margin with acute tooth; postpetiole low, broad, crescent-shaped in dorsal view; entire petiole and postpetiole densely punctate; entire gaster densely punctate, tergal puncta denser than sternal puncta.

Anterior labral lobe with about three thin stiff setae on side, tuft of soft, thick, translucent, capitate setae of unequal length projecting from apex (like Fig. 2); each larger mandibular tooth with fully appressed seta running length of tooth; anterior margin of scape with about seven stiff spatulate setae; clypeus and face with very sparse fully appressed ground pilosity; face typically with ten erect spatulate setae arranged as in Fig. 5B; mesonotum typically with a pair of erect spatulate setae located at the juncture of pro- and mesonotum; mesotibia with 5 clavate seta of variable size at apex; petiole usually lacking erect setae; postpetiole with 0–2 erect setae; first gastral tergite with 4–16 erect setae, these clustered posteriorly, relatively broadened apically; ground pilosity fully appressed, sparse (length of setae less than distance between them); first gastral sternite with moderately abundant, somewhat clavate erect setae over much of surface except narrow area near postpetiolar insertion.

Color red brown.

Queen. HW 0.53–0.67, HL 0.50–0.61, WL 0.64–0.80, CI 104–112 (n=11). Labrum, mandible, scape, antennal scrobe, and head sculpture similar to worker; face with 8–10 erect setae distributed symmetrically around lateral and posterior margins of head, a seta on low ridge in front of each compound eye, 2–4 setae across vertex between compound eyes; ocelli distinct; compound eye large, multifaceted, about 12 ommatidia in longest row.

Mesosoma with queen-typical alar sclerites; sculpture like in worker; anepisternum and katepisternum separated by strong sulcus; posterodorsal propodeum concave; propodeal spines pronounced, in the form of flattened perpendicular plates, acute in profile; pronotum with about 4 erect setae, mesoscutum with 8–16, axilla with 1, scutellum with 2, metanotum with 2, petiolar node with 2, postpetiolar disc with 2–4, first gastral tergite with 20–40. Other characters similar to worker.

Biology. *Octostruma balzani* is a widespread Central and South American species that is common in many localities. It occurs in a variety of forested habitats: wet to seasonal dry, second growth to mature, lowland to montane. It usually occurs from sea level to the lower edges of cloud forests, typically around 1400 m. The highest elevation record is 1650 m in Nuevo León, Mexico. Almost all collections are from Berlese and Winkler samples of sifted litter and rotten wood from the forest floor. In quantitative 1 m² litter plot samples, within-sample abundance is tens of workers or fewer, but the species can occur in nearly every sample, suggesting a high density of small colonies. Dealate queens and intercaste workers often occur together with workers in litter samples.

Comments. Species in the *Octostruma balzani* complex share the following characters: the basal tooth of the masticatory margin of the mandible is broad and lamelliform, and the following four teeth are contrastingly narrow and acutely pointed; the surfaces of the face and dorsal mesosoma are uniformly punctate, with no rugae or smooth areas; and HW is 0.50–0.68. They have sparse spatulate setae and very inconspicuous appressed pubescence, and unlike many other *Octostruma* they rarely have a layer of soil adhering to the surface. In many wet forest areas of Central America they are among the most common ants in litter samples.

Brown and Kempf (1960) treated the group as a single polytypic species, *O. balzani*, with the three synonyms *O. barberi*, *O. equilatera*, and *O. lutzi*. They had no evidence of sympatry of forms but acknowledged the high variability among the specimens they examined. Perrault (1988) discovered the occurrence of sympatric forms in French Guiana, identifying one of them as *O. balzani* s.s. and the other as a new species *O. betschi*. The inadequately characterized *O. amrishi* was described from Suriname and quickly synonymized with *O. balzani*. All of these taxa have been reevaluated in this study and several new species described from the *O. balzani* complex.

Quantitative inventory projects in Central America have produced hundreds of individual collections from Costa Rica to Mexico, revealing multiple localities with evidence of two or three sympatric species. All the specimens involved are extremely similar in size, shape, mandibular dentition, labrum structure, and surface sculpture. They mainly differ in the disposition of spatulate setae on the face and mesosoma and the degree of impression of the metanotal groove. They also vary to an extent in color and habitat preference. Local bimodal distributions of morphological characters are used as evidence of sympatric species, but there is always a small percentage of specimens that are intermediate and cannot be reliably identified.

Octostruma batesi, *O. betschi*, and *O. stenognatha* share a somewhat triangular head shape and a reduced anterior lobe on the base of the scape. They appear to be allopatric or parapatric in South America, with *O. stenognatha* occurring in southern Brazil, *O. batesi* in the Andes, and *O. betschi* occurring throughout Amazonia and into the eastern foothills of the Andes. *Octostruma lutzi* is restricted to the islands of Dominica and Guadeloupe, and has two pairs of erect setae on the promesonotum (a trait shared with *O. batesi* and *O. betschi*).

The remaining five species—*O. amrishi*, *O. balzani*, *O. gymnogon*, *O. megabalzani*, and *O. trithrix*—occur in Central and South America and are all extremely similar. Of the five, *O. balzani* is the most widespread and the most variable. It is sympatric with *O. trithrix* from Honduras northward, with *O. amrishi* and *O. gymnogon* in lowland wet forest areas from eastern Honduras to Panama, and with *O. megabalzani* in the highlands of southern Costa Rica and western Panama.

The overlap of *O. balzani* with *O. trithrix* occurs throughout eastern Mexico, south through the Petén region and southeastern Guatemala and into the northern Honduran lowlands, as far east as La Ceiba. In Chiapas, four Project LLAMA community samples suggest that *O. trithrix* prefers warmer or more disturbed habitats. These four LLAMA sites in eastern Chiapas fell on a disturbance and temperature gradient: Salto de Agua at 100 m elevation was scrubby second growth forest surrounded by a largely agricultural landscape; Playón de la Gloria at 160 m elevation was an ecotone between second growth vegetation and a large primary forest reserve; Metzabok at 575 m elevation was also ecotonal, like Playón de la Gloria; Nahá at 985 m elevation was a large area of mature wet forest. Only *O. trithrix* was found at Salto de Agua; both species were similarly abundant at Playón de la Gloria and Metzabok; and only *O. balzani* was found at Nahá. The evidence for two sympatric species was less clear in two community samples from the Atlantic coast of Honduras, Lancetilla Botanical Garden and a site near La Ceiba. The strength of the metanotal groove was variable, and sometimes the face had the *O. balzani* setal pattern on one side and the *O. trithrix* pattern on the other.

Octostruma balzani overlaps with *O. amrishi* in lowland rainforest habitats from the La Moskitia region of eastern Honduras south to Amazonia. In Central America, *O. balzani* is more likely to be in the warmer and/or more disturbed habitats, while *O. amrishi* favors cooler or mature forest habitats. For example, on Cerro Saslaya, an isolated mountain range in eastern Nicaragua, a community sample from lowland rainforest around 300 m elevation was a mix of *O. balzani* and *O. amrishi*, while a sample from montane forest around 1000 m elevation was pure *O. amrishi*. *Octostruma amrishi* is the dominant species in lowland wet forests of Panama and northern South America.

Octostruma gymnogon is a darker, montane version of *O. amrishi*. Allopatric populations occur in the mountains along the Guatemala-Honduras border and in Costa Rica. In Costa Rica, *O. gymnogon* has a sharp elevationally parapatric distribution with *O. amrishi*. On the Barva transect in Costa Rica, *O. amrishi* occurs from sea level to 300 m elevation, and *O. gymnogon* occurs from 500 m to 1100 m elevation.

The five similar species in Central America appear to segregate by climate and habitat, with *O. trithrix* favoring the warmest, driest, and most disturbed habitats; *O. amrishi*, *O. gymnogon*, and *O. megabalzani* favoring the coolest, wettest, least disturbed habitats (and segregating by elevation); and *O. balzani* falling in between.

The *O. balzani* complex is undersampled in many parts of its range. Given the complexity revealed in Central America and the paucity of characters separating sympatric forms, the true diversity of this group is undoubtedly greater than the simple arrangement proposed here, but molecular data will be needed to further reveal patterns.

The type locality of *O. balzani* is Bolivia. In the original description, specimens from two localities are described: "Bolivia; cantoni di Coroico e Chilumani-Yungas (Balzan); un esemplare di Salinas sul Beni è un poco più piccolo, ma non altrimenti differente." The Emery collection has a queen and several workers from Coroico and the single worker from Salinas. A worker from the Coroico series was imaged by the California Academy of Sciences and the images posted on Antweb; this worker was chosen as the Lectotype. The pin with the lectotype bears the label "*Rhopalothrix balzani* Em." in Emery's handwriting but there is no locality label. However, it is clearly part of the Coroico series.

Octostruma balzani was named for Luigi Balzan, for whom Emery wrote this moving and poignant tribute:

After a long journey across Bolivia, made very uncomfortable for lack of funds, Luigi Balzan returned to Italy a few months ago, bringing important zoological and anthropological collections. His sturdy physique, that had resisted the hardships and tropical climates, surrendered to a pernicious fever this past 20 September, in Padova, his homeland. For many years I was in correspondence with Balzan, who came to see me in Bologna before leaving; his unexpected death at a young age deeply saddened me.



FIGURE 18. *Octostruma balzani*, worker (CASENT0611293, Guatemala), face and lateral view. Scale bar = 0.25 mm face view, 0.5 mm lateral view.

***Octostruma batesi* (Emery, 1894)**

(Figs 1E, 3D, 42)

Rhopalothrix batesi Emery 1894: 218, pl. 1, fig. 11. Holotype worker: Brazil, Amazonas [MCSN] (AntWeb image examined, CASENT0904968). Combination in *Octostruma*: Brown 1949: 92. See also Brown & Kempf, 1960: 201, fig. 19.

Geographic range. Brazil (Amazonas), Ecuador, Bolivia.

Comments. The holotype of *O. batesi* closely matches three MCZC collections I have examined, two from the Andean foothills in Ecuador and one from the Andean foothills in Bolivia. The type is slightly larger than any of the other specimens. Brown and Kempf (1960) examined the holotype and provided measurements HW 0.71, HL 0.64, WL 0.78, CI 111. Measurements of the holotype using the AntWeb image were smaller: HW 0.65, HL 0.59, CI 110. Measurements for one worker each from the three MCZC collections are HW 0.53–0.60, HL 0.50–0.55, CI 107–111.

Octostruma batesi is very similar to the widespread *O. betschi* of the Amazonian lowlands, the latter differing in the presence of appressed spatulate setae on the scape and a somewhat more concave face. *Octostruma batesi*, *O. betschi*, and *O. stenognatha* are all similar in size and head shape and possibly form a clade. Although geographic coverage is poor, the known specimens form an allopatric or parapatric replacement series in South America. However, the provenance of the holotype of *O. batesi* is uncertain. The type locality, in the original publication and on the specimen, is simply "Amazonas."

***Octostruma betschi* Perrault, 1988**

(Figs 1E, 3D, 7A, 19, 42)

Octostruma betschi Perrault 1988: 303, 2 figs. Holotype worker, paratype workers, queen: French Guiana, [published locality of "5°30'S, 53°W" is incorrect] (J. M. Betsch) [MNHN] (not examined).

Geographic range. Amazonian Brazil and Peru, French Guiana.

Comments. The combination of *O. balzani*-group mandibles, two pairs of setae on the promesonotum, and flattened setae on the scape uniquely characterize this distinctive species. New measurements for the worker are HW 0.51–0.57, HL 0.47–0.53, CI 106–108 (n=4). The queen is reported with measurements HW 0.58, HL 0.55, CI 105 (Perrault, 1988).



FIGURE 19. *Octostruma betschi*, worker (MCZ-ENT00511313, French Guiana), face and lateral view. Scale bar = 0.25 mm face view, 0.5 mm lateral view.

***Octostruma convallis* Longino, sp. nov.**

(Figs 1H, 3G, 6E, 14H, 20, 44)

Type material. *Holotype worker*: COSTA RICA, Puntarenas: Monteverde, 10.3, -84.8, ± 2 km, 1500 m, 21 Jul 1984, cloud forest, ex sifted leaf litter on ground (J. Longino) [CAS, unique specimen identifier CASENT0627381]. *Paratype workers*: same data except 9 Jul 1984 [USNM, CASENT0627383; INBC, CASENT0627384]; 15 Jun 1991 (J. Longino#2900-s) [MCZC, CASENT0639166]; 13 Mar 2003 (L. A. Schonberg) [JTLC, JTLC000003934]; 17 Mar 2003 (L. A. Schonberg) [JTL, CJTLC000004888].

Geographic range. Costa Rica.

Diagnosis. Antennal scrobe very shallow, not distinctly margined; face with arcuate carina; frontal carinae and facial arc separated by a transverse trough, and the termini of the facial arc extend laterally beyond the termini of the frontal carinae (termini of facial arc join frontal carinae in *O. ascrobis*, *O. ascrobicula*); facial arc not strongly elevated, becoming irregular and somewhat weaker laterally, frontal carinae stronger than lateral portions of facial arc (facial arc strong throughout, much stronger than frontal carinae in *O. limbifrons*); pronotum smooth and shiny, differentiated from foveolate mesonotum (promesonotal dorsum uniformly foveolate in *O. convallisur*).

Description. *Worker*. HW 0.52–0.54, HL 0.50–0.52, WL 0.54–0.56, CI 102–106 (n=2). Labrum rectangular, formed of strap-like lateral portions joined by a thin translucent lamella (Fig. 1H); mandible strongly bowed, in profile view with mandible closed, basal portion of mandible in same plane as clypeus, apex of mandible strongly down-turned, the down-turned portion subequal in length to basal portion; with mandible fully open, dorsal face fully perpendicular to plane of clypeus and teeth projecting dorsally; mandible with 10 teeth (Fig. 3G), tooth 1 continuous with basal rim of dorsal surface, teeth 1–7 as in Fig. 3G, teeth 7–10 form an apical fork perpendicular to base of dorsal face, tooth 7 long and separate, tooth 8 about 1/3 length of tooth 7, teeth 9 and 10 slightly longer than 7, joined to near tip (or could be interpreted as single tooth bifid at the tip), tooth 9 slightly shorter than 10; dorsal surface of mandible smooth; ventral surface narrow, smooth and shiny; interior surface strongly concave, smooth and highly polished; scape flattened, with pronounced anterobasal lobe, dorsal surface smooth and shining; clypeus strongly emarginate anteriorly, smooth and shining; frontal carinae sharp, narrow, extending more or less straight back and ending before reaching transverse facial arc; facial arc broad, not strongly semicircular, extending toward sides of head beyond termini of frontal carinae, curving forward to form irregular carina or gibbosity between compound eye and frontal carina; a shallow trough separates frontal carinae and facial arc; frontal carinae and facial arc delimit anterior concave surface that is shiny, with irregular median longitudinal carina and faint transverse rugulae laterally; side of head near compound eye shallowly foveolate; vertex posterior to facial arc largely smooth and highly polished, with distinct, sparse, uniformly distributed puncta; compound eye small, circular, composed of 4–5 somewhat confluent ommatidia; antennal scrobe below eye, very shallow and not delimited with carina or flange; scrobe and undersurface of head shallowly foveolate.

Promesonotum forming continuous convexity in profile; metanotal groove not impressed; propodeum forming a single, concave, sloping surface, not differentiated into dorsal and posterior faces; propodeal spines low and obtuse, extending anteriorly as raised carinae that curve medially and join at the metanotal groove, extending

ventrally as narrow lamella, thus posterodorsal propodeum entirely delimited by raised carinae confluent with propodeal spines; propodeal spiracle large, located immediately below propodeal spine and abutting posterior margin; pronotum sculpture smooth and shining with sparse puncta, like posterior vertex; mesonotum with feeble, mesh-like sculpture, contrasting sharply with pronotum and clearly demarcating juncture of pro- and mesonotum; posterodorsal face of propodeum shallowly foveolate; mesopleuron and side of propodeum not differentiated, feebly rugulose.

Petiole in profile with peduncle not differentiated from node, anterior surface sloping evenly from petiolar foramen to node, dorsal face of node sloping posteriorly to projecting transverse cuticular rim, short concave posterior face beneath rim; anteroventral margin without tooth or angle; dorsal face of node smooth and shining; postpetiole low, broad, crescent-shaped in dorsal view, dorsal face shallowly foveolate anteriorly, smooth and shining posteriorly, delimited anteriorly and posteriorly by thin transverse rim; first gastral tergite shallowly foveolate anteriorly, grading to smooth and shining at posterior rim; first gastral sternite foveolate anteriorly, grading to sparsely punctate with smooth and shining interspaces posteriorly.

Labrum fringed on sides and apex with soft translucent thick setae, one of these on each anterior labral lobe much longer than the others, projecting ventrally; extreme base of ventral surface of mandible with very fine, long seta that curves forward and nearly touches ventrally projecting labral seta; each larger mandibular tooth with prominent fully appressed seta; anterior margin of scape with 6–7 stiff clavate setae; clypeus and face devoid of ground pilosity; 1 stout clavate seta on each side of facial arc, posterior to compound eye and lateral to frontal carinae; mesonotum, petiole and postpetiole lacking erect setae, ground pilosity extremely short, sparse, unnoticeable; mesotibia with short, thin, sparse, decumbent ground pilosity, a single large stout clavate seta and several thin shorter erect setae at apex; mesobasitarsus with 2 pairs long, thin, erect setae; first gastral tergite devoid of clavate setae, following exposed tergites each with row of clavate setae; ground pilosity of first gastral tergite short, sparse, fully appressed, somewhat more noticeable than on mesosoma; first gastral sternite with sparse, thin but stiff erect setae over much of surface except narrow area near postpetiolar insertion.

Color orange.

Queen. HW 0.62, HL 0.61, WL 0.84, CI 103 (n=1). Labrum, mandible, anterior clypeal margin, and scape similar to worker; clypeus smooth and shining with sparse puncta, separated from vertex with distinct suture; frontal carinae distinct, extending to level of posterior margin of compound eye; transverse facial arc feeble, marked by a semicircular row of 11 erect clavate setae; face anterior to row of setae flat, irregularly rugose, lacking longitudinal median carina, face rugosity extending posteriorly across facial arc, grading to smooth and shining with sparse puncta near occipital carina; ocelli distinct, anteromedian ocellus immediately anterior to seta row; compound eye large, multifaceted, about 12 ommatidia in longest row; outermost seta of seta row at inner margin of compound eye; antennal scrobe shallow, like worker.

Mesosoma with queen-typical alar sclerites; pronotum smooth and shining laterally and anteriorly, with faint rugulae and sparse puncta on humeri; mesoscutum, axilla, and scutellum irregularly longitudinally rugulose; anepisternum and katapisternum separated by strong sulcus, anepisternum smooth and shining, katapisternum smooth and shining anteriorly, feebly punctatorugose posteriorly; metapleuron distinct, with deep transverse sulcus, separated from side of propodeum by dorsoventral sulcus; metapleuron and side of propodeum feebly punctatorugose; posterodorsal propodeum foveolate; propodeal spines pronounced, in the form of flattened perpendicular plates, right-angle in profile; propodeal spiracle smaller and lower compared to worker, anterior to ventral propodeal lamella; mesoscutum with 6 erect clavate setae.

Petiole similar to worker, but posterior rim more pronounced and projecting; postpetiole also with a posterior projecting rim, ventral margin with a short acute tooth; first gastral tergite punctate over much of surface, grading to sparser and smaller puncta at posterior border; petiole and postpetiole lacking erect setae; first gastral tergite with 6 erect clavate setae along posterior border, about 10 scattered over disc; first gastral sternite densely punctate, with abundant short, stiff, erect setae.

Color red.

Biology. This species inhabits cloud forest, from 1100–1600 m. All specimens are from samples of sifted leaf litter and rotten wood from the forest floor. A total of 8 workers and 1 dealate queen are known, from 7 Winkler samples. All but one of the specimens are from the ridge crest cloud forest above the community of Monteverde, 1500–1600 m, in the Cordillera de Tilarán. One worker is from 1100 m on the Barva Transect, in the Cordillera Volcánica Central.

Comments. This species and the closely similar *O. ascrobis* form an elevational replacement series in Costa Rica, with *O. ascrobis* being a widespread lowland species and *O. convallis* being a montane endemic with a narrow range.

Etymology. The name refers to shallow trough that separates the frontal carinae from the transverse carina on the vertex. It is a genitive singular noun and thus invariant.



FIGURE 20. *Octostruma convallis*, holotype worker (CASENT0627381), queen (CASENT0627382, Costa Rica), face and lateral views. Scale bar = 0.2 mm face views, 0.5 mm lateral views.

***Octostruma convallisur* Longino, sp. nov.**
(Figs 21, 44)

Type material. *Holotype worker*: PANAMA, Chiriquí: west of Finca Palo Santo near Nueva California [8.78, -82.64, unknown error], 1550 m, 5 Mar 1959, debris at base of stump (H. S. Dybas) [MCZC, unique specimen identifier MCZ-ENT00511411]. *Paratype queen, worker*: same data [USNM, MCZ-ENT00511410; MCZC, MCZ-ENT00511415].

Geographic range. Panama, Colombia.

Diagnosis. Antennal scrobe very shallow, not distinctly margined; face with arcuate carina; frontal carinae and facial arc separated, the termini of the facial arc extend laterally beyond the termini of the frontal carinae (termini of facial arc join frontal carinae in *O. ascrobis*, *O. ascrobicula*); facial arc not strongly elevated, becoming irregular and somewhat weaker laterally, frontal carinae stronger than lateral portions of facial arc (facial arc strong throughout, much stronger than frontal carinae in *O. limbifrons*); promesonotal dorsum uniformly foveolate (pronotum smooth and shiny, differentiated from foveolate mesonotum in *O. convallis*).

Description. *Worker*. HW 0.43–0.56, HL 0.43–0.55, WL 0.47–0.59, CI 100–102 (n=3). Labrum rectangular, formed of strap-like lateral portions joined by a thin translucent lamella (Fig. 1H); mandibles closed on available specimens, but appear generally similar to *O. convallis*; dorsal surface of mandible smooth; scape flattened, with pronounced anterobasal lobe, dorsal surface with faint microsculpture, feebly shining; clypeus strongly emarginate anteriorly, smooth and shining; frontal carinae sharp, narrow, extending more or less straight back and ending before reaching transverse facial arc; facial arc broad, not strongly semicircular, extending toward sides of head

beyond termini of frontal carinae, curving forward to form irregular carina or gibbosity between compound eye and frontal carina; a shallow trough separates frontal carinae and facial arc; frontal carinae and facial arc delimit anterior concave surface that is feebly shiny, with irregular median longitudinal carina and very faint rugulae laterally; side of head near compound eye shallowly foveolate; vertex posterior to facial arc largely smooth and shiny, with distinct, sparse, uniformly distributed puncta; compound eye small, circular, composed of 4–5 somewhat confluent ommatidia; antennal scrobe below eye, very shallow and not delimited with carina or flange; scrobe and undersurface of head feebly foveolate to punctatorugose.

Promesonotum forming continuous convexity in profile; metanotal groove not impressed; posterodorsal propodeum a single, concave, sloping surface, not differentiated into dorsal and posterior faces; propodeal spines angular on holotype, acute and spiniform on Barro Colorado Island specimen, extending anteriorly as raised carinae that curve medially and join at the metanotal groove, extending ventrally as narrow lamella, thus posterodorsal propodeum entirely delimited by raised carinae confluent with propodeal spines; a low carina extends transversely across posterodorsal surface, between bases of propodeal spines; propodeal spiracle large, located immediately below propodeal spine and abutting posterior margin; promesonotum with feeble, mesh-like sculpture, juncture of pro- and mesonotum not differentiated; posterodorsal face of propodeum shallowly foveolate; side of pronotum smooth and shining; mesopleuron and side of propodeum matte.

Petiole in profile with peduncle not differentiated from node, anterior surface sloping evenly from petiolar foramen to node, dorsal face of node sloping posteriorly to projecting transverse cuticular rim, short concave posterior face beneath rim; anteroventral margin without tooth or angle; dorsal face of node smooth and shining; postpetiole low, broad, crescent-shaped in dorsal view, dorsal face shallowly foveolate anteriorly, smooth and shining posteriorly, delimited anteriorly and posteriorly by thin transverse rim; first gastral tergite shallowly foveolate anteriorly, grading to smooth and shining at posterior rim; first gastral sternite foveolate anteriorly, grading to sparsely punctate with smooth and shining interspaces posteriorly.

Labrum fringed on sides and apex with soft translucent thick setae, one of these on each anterior labral lobe much longer than the others, projecting ventrally; extreme base of ventral surface of mandible with very fine, long seta that curves forward and nearly touches ventrally projecting labral seta; each larger mandibular tooth with prominent fully appressed seta; anterior margin of scape with 6–7 stiff clavate setae, basalmost seta the longest, on apex of anterobasal lobe (lacking a shorter seta proximal to this one, on inner side of lobe); clypeus and face devoid of ground pilosity or with very sparse, fully appressed ground pilosity; 5–7 stout clavate seta irregularly distributed on facial arc; mesonotum, petiole and postpetiole lacking erect setae, ground pilosity extremely short, sparse, unnoticeable; mesotibia with short, thin, sparse, decumbent ground pilosity, a single large stout clavate seta and several thin shorter erect setae at apex; mesobasitarsus with 2 pairs long, thin, erect setae; first gastral tergite with 4 clavate setae on posterior margin, following exposed tergites each with row of clavate setae; ground pilosity of first gastral tergite short, sparse, fully appressed, somewhat more noticeable than on mesosoma; first gastral sternite with sparse, thin but stiff erect setae over much of surface except narrow area near postpetiolar insertion.

Color orange.

Queen. HW 0.51–0.63, HL 0.48–0.60, WL 0.68–0.85, CI 104–105 (n=2). Labrum, mandible, and scape similar to worker; anterior clypeal margin different from worker, with a broad semicircular concavity medially, flanked on each side by a smaller semicircular notch; clypeus smooth and shining with sparse puncta, separated from vertex with distinct suture; frontal carinae distinct, fading at about level of mid-length of compound eye; transverse facial arc feeble, marked by a semicircular row of 10 erect clavate setae (5 setae on Colombia queen); face anterior to row of setae flat, irregularly rugose, with weak longitudinal median ruga (median ruga absent on Colombia queen), face rugosity extending posteriorly across facial arc, grading to smooth and shining with sparse puncta near occipital carina; ocelli distinct, anteromedian ocellus immediately anterior to seta row; compound eye large, multifaceted, about 12 ommatidia in longest row; antennal scrobe shallow, like worker.

Mesosoma with queen-typical alar sclerites; lateral and anterior pronotum with faint, minute punctatorugose sculpture, fading on sides; mesoscutum, axilla, and scutellum irregularly longitudinally rugulose; anepisternum and katepisternum separated by strong sulcus, both smooth and shining; metapleuron distinct, with shallow transverse sulcus, separated from side of propodeum by dorsoventral sulcus; metapleuron and side of propodeum matte; posterodorsal propodeum foveolate; propodeal spines pronounced, in the form of flattened perpendicular plates, acute; propodeal spiracle smaller and lower compared to worker, anterior to infradental propodeal lamella; mesoscutum with 10 erect clavate setae, scutellum with 2 (axilla also with seta on Colombia queen).

Petiole similar to worker, but posterior rim more pronounced and projecting; ventral margin of postpetiole with short right-angle tooth; first gastral tergite punctate over much of surface, grading to smooth and shining at posterior border; petiole and postpetiole lacking erect setae; first gastral tergite with 40–50 erect setae; first gastral sternite densely punctate, with abundant short, stiff, erect setae.

Color red.

Biology. The type series was collected at a site in the mountains of western Panama, presumably cloud forest (1550 m elevation), in "debris at base of stump." A worker was collected in forest floor leaf litter on Barro Colorado Island. The Colombia queen was collected in a forest litter Berlese sample, at a mid-elevation wet forest site (1000 m).

Etymology. The name refers to it being a southern version of *O. convallis*. It is a noun in apposition and thus invariant.



FIGURE 21. *Octostruma convallisur*, holotype worker (MCZ-ENT00511411), paratype queen (MCZ-ENT00511415), face and lateral views. Scale bar = 0.2 mm face view, 0.5 mm lateral view.

***Octostruma cyrtinotum* Longino, sp. nov.**

(Figs 1C, 3B, 5L, 13A, 14B, 22, 43)

Type material. *Holotype worker*: HONDURAS, Olancho: PN La Muralla, 15.09832, -86.74043, ±20 m, 1530 m, 2 May 2010, cloud forest, ex sifted leaf litter (LLAMA, Wa-C-01-1-06) [CAS, unique specimen identifier CASENT0615495]. *Paratype workers*: same data except 15.09734, -86.73912, ±20 m, 1490 m (LLAMA, Wm-C-01-1-01) [MCZC, CASENT0639167; USNM, CASENT0639168; UCDC, CASENT0639169; UVGC, CASENT0639170; EAPZ, CASENT0639171]; 15.09489, -86.73944, ±125 m, 1420 m (LLAMA, Wm-C-01-2-01) [ECOSCE, CASENT0627374; MZSP, CASENT0627375; JTLC, CASENT0627376].

Geographic range. Honduras, Nicaragua.

Diagnosis. Face lacking transverse arcuate carina; basal five teeth of mandible acute; apex of labrum bilobed;

face typically with 8 spatulate setae, seta-bearing pits along vertex margin large; filiform setae lacking on petiole, postpetiole, first gastral sternite; anterior half of dorsal face of propodeum convex, demarcating impressed metanotal groove; a single pair of spatulate setae on the mesonotum.

Description. *Worker.* HW 0.70–0.80, HL 0.65–0.74, WL 0.78–0.90, CI 107–112 (n=8). Labrum as in Fig. 1C, sides slightly concave, strap-like lateral portions converging from base to near apex, joined by thin translucent cuticle medially but leaving distinctly bilobed apex, with deep median notch; mandible triangular, in profile view with mandible closed, in same plane as clypeus, apex of mandible not down-turned; with mandible fully open, dorsal face remains in same plane as clypeus; mandible with 8 teeth (Fig. 3B), tooth 1 continuous with basal rim of dorsal surface, teeth 1–5 acute, similar in shape, a minute denticle between 4 and 5, teeth 5–8 forming an apical fork, with 5 and 8 large, 6 and 7 small partially confluent denticles; dorsal surface of mandible roughened; ventral surface flat and parallel to clypeus apically, twisting basally to nearly perpendicular orientation basally, smooth and shining; interior surface concave, smooth and shining; scape flattened, with pronounced anterobasal lobe, dorsal surface shallowly rugulose; clypeus with broad, shallow emargination anteriorly; clypeus smooth and shiny with sparse shallow puncta; face shallowly irregularly rugulose with shiny surface; frontal carinae faint, nearly obsolete; antennal socket deep, dorsal rim of socket continuous with pronounced dorsal margin of antennal scrobe; antennal scrobe deep, strongly delimited dorsally, posteriorly, and ventrally with sharply defined thin cuticular rim; compound eye small, circular, composed of about 7 ommatidia; distinct carina extends from ventral margin of antennal socket across floor of scrobe to compound eye; scrobe floor smooth and shiny; vertex margin anterior to occipital carina smooth and shining (top of head, not visible in face view); occipital carina extends anteriorly on ventral surface of head nearly to hypostoma; postgenal suture visible as dark line on undersurface of head; undersurface rugulose.

Promesonotum moderately convex in profile, promesonotal suture moderately impressed, promesonotum with broad, weak, longitudinal impression; metanotal groove more strongly impressed, conspicuous in profile view; propodeum with distinct dorsal and posterior faces; dorsal face distinctly convex anteriorly, forming a gibbosity in profile view; propodeal spines well-developed, in the form of acute flattened perpendicular plates, extending ventrally as thin carinae; single well-defined transverse carina extends between propodeal spines, separating dorsal and posterior faces of propodeum; propodeal spiracle medium-size, diameter less than width of base of propodeal spine, located below propodeal spine and abutting posterior margin; all surfaces of mesosoma matte except posterior face of propodeum, which is shiny; dorsum of promesonotum irregularly rugose, dorsal face of propodeum faintly rugulose, posterior face of propodeum smooth, lateral pronotum punctate; meso- metapleuron and side of propodeum confluent, smooth.

Petiole in profile with peduncle differentiated from node, node with differentiated anterior face; node subquadrate, with long sloping dorsal face and short vertical posterior face; anteroventral margin with pronounced, anteriorly-directed peg-like tooth; postpetiole low, broad, crescent-shaped in dorsal view; dorsum of petiolar node rugose; dorsum of postpetiole faintly rugulose anteriorly, grading to punctate posteriorly; first gastral tergite and sternite densely punctate, tergal puncta fainter posteriorly but still extending to posterior border.

Anterior labral lobe with radiating tuft of soft, thick, translucent, capitate setae of unequal length projecting from apex (like Fig. 2); each larger mandibular tooth with fully appressed seta running length of tooth; anterior margin of scape with about nine stiff spatulate setae; clypeus and face with fine, sparse fully appressed ground pilosity; face typically with eight erect spatulate setae arranged as in Fig. 5L; setae on vertex margin arising from large, ringed puncta; pronotum lacking erect setae (one pair on CASENT0610706, Honduras, Olancho: 11km NNE Catacamas); mesonotum typically with a pair of erect spatulate setae located at the juncture of pro- and mesonotum (lacking on CASENT0610830, Honduras, Francisco Morazán, 21km S Guaimaca); mesotibia with conspicuous ground pilosity, about 5 spatulate setae of variable length at apex; petiole and postpetiole lacking erect setae; first gastral tergite with 2–4 (typically 4) long spatulate setae at posterior margin, 3–8 setae on disc, ground pilosity fully appressed, sparse (length of setae less than distance between them); first gastral sternite with abundant spatulate setae clustered on posterior half, anterior half to one third devoid of setae, sternal setae shorter than tergal setae.

Color red brown.

Queen. HW 0.89–0.91, HL 0.78–0.81, WL 1.14–1.17, CI 111–115 (n=3). Head shape as in Fig. 14B; labrum, mandible, scape, antennal scrobe, and head sculpture similar to worker; face with 8 erect setae distributed as in worker, plus 1–2 on central frons, anterior to lateral ocelli; ocelli distinct; compound eye large, multifaceted, about 12 ommatidia in longest row.

Mesosoma with queen-typical alar sclerites; pronotum irregularly rugose anteriorly, punctatorugose laterally; mesoscutum coarsely longitudinally rugose; axilla and scutellum coarsely irregularly rugose; anepisternum and katepisternum separated by strong sulcus; anepisternum, katepisternum, and side of propodeum matte, mostly smooth with variable faint rugulae; propodeum and propodeal spines similar to worker; pronotum with about 4 erect setae, mesoscutum with about 6, axilla with 1, scutellum with 2, metanotum with 2, petiolar node with 2, postpetiolar disc with 2, first gastral tergite with about 20. Other characters similar to worker.

Biology. *Octostruma cyrtinotum* is a moderately abundant montane species in Honduras and Guatemala. All records are from 1300–1700 m. It occurs in mesophyll cloud forest, and montane forests with various mixtures of pine, oak, and *Liquidambar*. All collections are from Berlese and Winkler samples of sifted litter and rotten wood from the forest floor. In quantitative 1 m² litter plot samples, it can occur in up to 28% of samples. Dealate queens are occasionally found together with workers in litter samples.

Comments. This species is very similar to the allopatric *O. montanis*, from montane sites in southern Nicaragua and northern Costa Rica. The two differ only in small differences in the number of spatulate setae. The three species *O. cyrtinotum*, *O. montanis*, and *O. planities* possibly form a clade based on shared labral shape, similar size and shape, and orange coloration. *Octostruma planities* is a lowland species, showing an elevational parapatric distribution with both *O. cyrtinotum* and *O. montanis*.

Etymology. The name refers to the convexity on the propodeal dorsum. It is a noun in apposition and thus invariant.

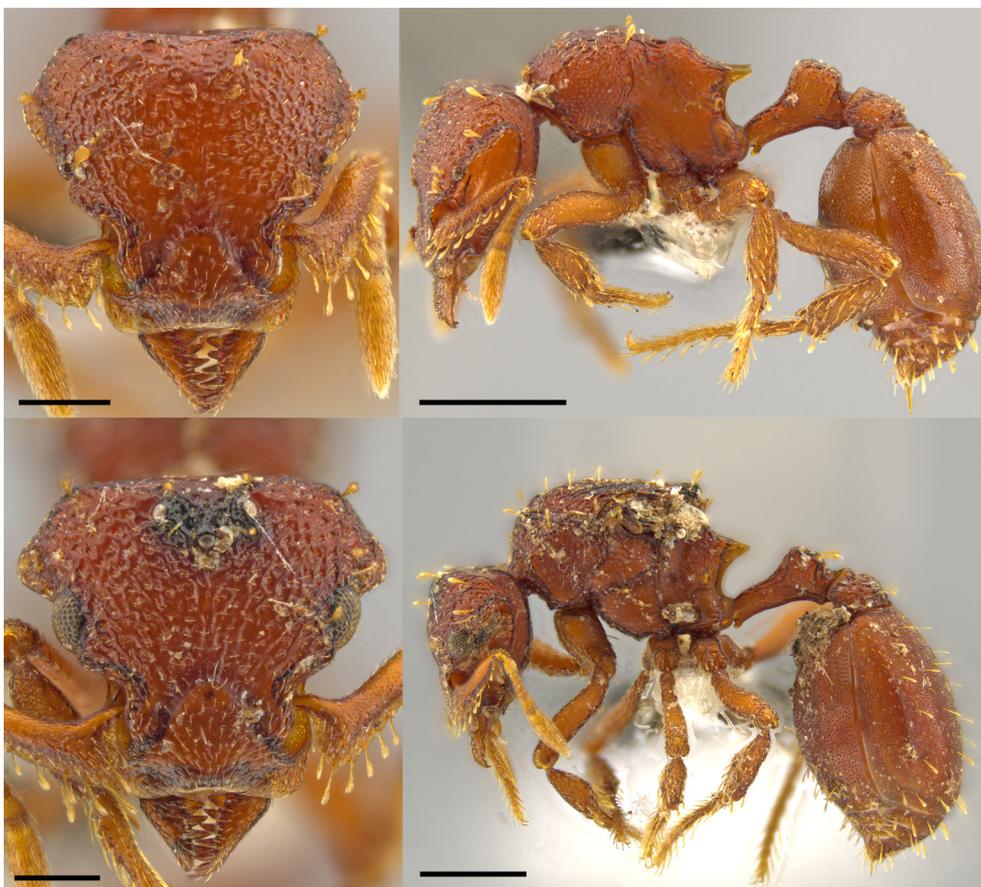


FIGURE 22. *Octostruma cyrtinotum*, holotype worker (CASENT0615495), queen (CASENT0627372, Honduras), face and lateral views. Scale bar = 0.2 mm face views, 0.5 mm lateral views.

***Octostruma exertirugis* Longino, sp. nov.**

(Figs 1F, 3E, 5G, 12B, 14F, 23, 43)

Type material. *Holotype worker*: GUATEMALA, Izabal: 5 km NW Morales, 15.51465, -88.86440, ±28 m, 280 m,

18 May 2009, 2° lowland rainforest, ex sifted leaf litter (LLAMA, Wm-B-04-1-09) [CAS, unique specimen identifier CASENT0629828]. *Paratype workers, queen*: same data [EAPZ, CASENT0629829; ECOSCE, CASENT0629830; CAS, CASENT0629831; JTLC, CASENT0629832]; same data except 15.51430, -88.86479, ±50 m, 250 m, 17 May 2009 (LLAMA, Wa-B-04-2-36) [USNM, CASENT0610160; MCZC, CASENT0610161]; 15.51351, -88.86647, ±26 m, 245 m (LLAMA, Wm-B-04-1-01) [UVGC, CASENT0611289; INBC, CASENT0611290; MZSP, CASENT0611291].

Geographic range. Mexico (Chiapas) to Costa Rica.

Diagnosis. Face lacking transverse arcuate carina; basal five teeth of mandible bluntly rounded (Fig. 3E); face sculpture longitudinally rugose; ground pilosity fully appressed; first gastral tergite punctate on anterior half, fading to nearly smooth and shining posteriorly.

Description. *Worker.* HW 0.57–0.66, HL 0.55–0.63, WL 0.64–0.77, CI 103–110 (n=15). Labrum as in Fig. 1F, wider than long, strap-like lateral portions converging from base to near apex, joined by thin translucent cuticle medially but leaving distinctly bilobed apex, with distinct median notch; mandible triangular, in profile view with mandible closed, in same plane as clypeus, apex of mandible not down-turned; mandible with 8 teeth (Fig. 3E), tooth 1 continuous with basal rim of dorsal surface, teeth 1–5 bluntly rounded, similar in shape, a minute denticle between 4 and 5, teeth 6–7 smaller, not as blunt, tooth 8 long and acute; masticatory margin evenly curved, with no development of downturned apical fork; dorsal surface of mandible punctate; ventral surface concave, twisting toward articulation, broad basally and narrowing abruptly to narrow apical half to third; scape flattened, with pronounced anterobasal lobe, dorsal surface somewhat roughened; clypeus with broad, shallow emargination anteriorly; clypeus and face irregularly longitudinally rugose; frontal carinae faint, nearly obsolete; antennal socket deep, dorsal rim of socket continuous with pronounced dorsal margin of antennal scrobe; antennal scrobe deep, pocket-like, strongly delimited dorsally, posteriorly, and ventrally with sharply defined thin cuticular rim; compound eye small, circular, composed of about 7 ommatidia; feeble carina extends from ventral margin of antennal socket across floor of scrobe to compound eye; at about midlength on ventral margin of scrobe a variably-developed short carina extends perpendicularly onto floor of scrobe; ventral half of scrobe floor anterior to this short carina shallowly foveolate, rest of scrobe floor smooth, matte; vertex margin anterior to occipital carina densely punctulate, matte (top of head, not visible in face view); occipital carina extends a short distance onto ventral surface of head, fading before reaching level of compound eye; undersurface of head rugulose.

Promesonotum and dorsal face of propodeum forming an even convexity in profile, promesonotal suture not impressed, promesonotum with broad, weak, longitudinal impression; metanotal groove not impressed; propodeum with distinct dorsal and posterior faces meeting at a broadly obtuse angle; propodeal spines well-developed, in the form of right-angled flat translucent perpendicular plates, extending ventrally as thin carinae; irregular rugulae extend between propodeal spines, faint to absent medially, weakly separating dorsal and posterior faces of propodeum; propodeal spiracle large, diameter similar to width of base of propodeal spine, located below propodeal spine and abutting posterior margin; all surfaces of mesosoma matte; dorsum of promesonotum irregularly rugose, dorsal face of propodeum faintly punctate, posterior face of propodeum smooth, lateral pronotum punctate; dorsolateral propodeum punctate, lower propodeum and mesopleuron confluent and smooth.

Petiole in profile with peduncle differentiated from node, node with differentiated anterior face; node subquadrate, with long sloping dorsal face and short vertical posterior face; anteroventral margin with pronounced, anteriorly-directed peg-like tooth; postpetiole low, broad, crescent-shaped in dorsal view; dorsum of petiolar node and postpetiole punctate; first gastral tergite and sternite anteriorly with dense, confluent puncta, on disc puncta are sparse with smooth shiny interspaces, on posterior margin puncta are more dense but smaller than anterior puncta and not confluent.

Anterior labral lobe with radiating tuft of soft, thick, translucent, capitate setae of unequal length projecting from apex (like Fig. 2); each larger mandibular tooth with fully appressed seta running length of tooth; anterior margin of scape with about 11 spatulate setae; clypeus and face with fine, sparse fully appressed ground pilosity; face typically with 10 erect spatulate setae arranged as in Fig. 5G; pronotum with one pair erect setae on humeri; mesonotum with a pair of erect spatulate setae; mesotibia with conspicuous spatulate ground pilosity, about 5 short spatulate setae of variable length at apex; petiole with 2 erect setae; postpetiole with 2 erect setae; first gastral tergite with 2 spatulate setae at posterior margin, 2–6 (usually 2) setae on disc, ground pilosity fully appressed,

sparse (length of setae less than distance between them); first gastral sternite with abundant short clavate to spatulate setae on posterior half to two thirds of sternite.

Color red brown.

Queen. HW 0.58–0.64, HL 0.61–0.65, WL 0.81–0.90, CI 95–101 (n=5). Head shape as in Fig. 14F; labrum, mandible, scape, and head sculpture similar to worker; antennal scrobe floor entirely smooth and matte; face with about 8 erect setae distributed as in worker, plus 2–6 on central frons, anterior to lateral ocelli; ocelli distinct; compound eye large, multifaceted, about 12 ommatidia in longest row.

Mesosoma with queen-typical alar sclerites; pronotum shallowly rugulose anteriorly, with dense confluent puncta laterally; mesoscutum, axilla, and scutellum shallowly longitudinally rugulose; anepisternum and katepisternum separated by strong sulcus; anepisternum, katepisternum, and most of side of propodeum with dense confluent puncta, with smooth matte patch in center of lower side of propodeum; dorsal face of propodeum faintly punctate; posterior face of propodeum smooth and shining dorsally, faintly foveolate ventrally; propodeal spines similar to worker; first gastral tergite and sternite with relatively uniform puncta, interspaces subequal in width to puncta, smooth and shining; pronotum with 2–4 erect setae, mesoscutum with 2–6, axilla, scutellum, and metanotum lacking erect setae, petiolar node with 2, postpetiolar disc with 2, first gastral tergite with about 10. Other characters similar to worker.

Biology. *Octostruma exertirugis* is a moderately abundant lowland species from Mexico to Costa Rica. All records are from sea level to 800 m. It occurs in mature to highly disturbed rainforest and in seasonal moist forest. All collections are from Berlese and Winkler samples of sifted litter and rotten wood from the forest floor. In quantitative 1 m² litter plot samples, it can occur in up to 16% of samples and is as or more abundant in second growth forest than in mature forest. Dealate queens are occasionally found together with workers in litter samples.

Etymology. The name refers to the pronounced rugae on the face, that often project through the soil layer. It is a dative plural noun and thus invariant.



FIGURE 23. *Octostruma exertirugis*, holotype worker (CASENT0629828), queen (CASENT0610434, Mexico, Chiapas), face and lateral views. Scale bar = 0.2 mm face views, 0.5 mm lateral views.

***Octostruma gymnogon* Longino, sp. nov.**

(Figs 1E, 3D, 5D, 24, 42)

Type material. *Holotype worker*: COSTA RICA, Alajuela: Casa Eladio, Rio Peñas Blancas, 10.31667, -84.71667, ± 2 km, 800 m, 26 Apr 1987, primary wet forest, sifted leaf litter (J. Longino#1579-s) [INBC, unique specimen identifier CASENT0627379]. *Paratype workers, queen*: same data [INBC, CASENT0627380]; same data except (J. Longino#1578-s) [CAS, LACM ENT 143374; USNM, LACM ENT 143375]; 27 Apr 1988 (J. Longino#2015-s) [MCZC, LACM ENT 143379; MZSP, LACM ENT 143380]; 10 May 1989 (J. Longino#2529-s) [UVGC, INBIOCRI001281404; EAPZ, INBIOCRI001281422]; 23 May 1990 (J. Longino#2701-s) [UCDC, INBIOCRI001282517]; 2 Mar 2004 (J. Longino#5278-s) [CAS, JTLC000005383; JTLC, JTLC000005390].

Geographic range. Guatemala to Panama.

Diagnosis. Mandible with 8 teeth (Fig. 3D), tooth 1 a broad blunt lamella, strongly differentiated from tooth 2, teeth 2–5 acute, similar in shape, with denticles between them; teeth 5–8 forming an apical fork, with 5 and 8 large, 6 and 7 small partially confluent denticles (*O. balzani* complex); face setation as in Fig. 5D, lacking erect setae on posterolateral margins of head (present in *O. balzani*, *O. megabalzani*, and *O. trithrix*) and on the posteromedian margin (present in *O. amrishi*); mesosomal dorsum lacking a pair of erect setae (present in *O. balzani*, *O. megabalzani*, and *O. trithrix*); metanotal groove not impressed in profile view (impressed in *O. balzani* and *O. megabalzani*).

Description. *Worker*. HW 0.62–0.68, HL 0.56–0.59, WL 0.62–0.68, CI 109–114 (n=6). Matching in almost every respect the description for *O. balzani*, except the differences outlined in the Diagnosis and key. *Octostruma gymnogon* is generally darker brown than either *O. amrishi* or *O. balzani*.

Queen. HW 0.66, HL 0.60, WL 0.79, CI 110 (n=1). Similar in all respects to *O. balzani*.

Biology. *Octostruma gymnogon* is a montane species. It occurs mostly in mature cloud forest. On the Barva Transect in Costa Rica it shows a sharp elevationally parapatric distribution with *O. amrishi* and is restricted to elevations above 400 m. Almost all collections are from Berlese and Winkler samples of sifted litter and rotten wood from the forest floor. Dealate queens and intercaste workers occasionally occur together with workers in litter samples. See additional comments under *O. balzani*.

Etymology. The name refers to the lack of a spatulate seta on the posterolateral vertex margin. It is a noun in apposition and thus invariant.



FIGURE 24. *Octostruma gymnogon*, holotype worker (CASENT0627379), face and lateral views. Scale bar = 0.2 mm face view, 0.5 mm lateral view.

***Octostruma gymnosoma* Longino, sp. nov.**

(Figs 1B, 3B, 5M, 25, 43)

Type material. *Holotype worker*: MEXICO, Chiapas: 2km SE Custepec, 15.72099, -92.95054, ± 200 m, 1520 m, mesophil forest, ex sifted leaf litter, 17 May 2008 (LLAMA, Wm-A-02-1) [CAS, unique specimen identifier JTLC000015356]. *Paratype workers*: same data [ECOSCE, CASENT0609703; JTLC, CASENT0627366].

Geographic range. Mexico (Chiapas).

Diagnosis. Face lacking transverse arcuate carina; basal five teeth of mandible acute; apex of labrum bilobed; face and mesosomal dorsum lacking erect setae.

Description. *Worker.* HW 0.88–0.98, HL 0.76–0.82, WL 0.91–1.07, CI 115–120 (n=3). Labrum as in Fig. 1B, triangular, about as long as wide, strap-like lateral portions converging from base to near apex, joined by thin translucent cuticle medially but leaving distinctly bilobed apex, with short median notch; mandible triangular, in profile view with mandible closed, in same plane as clypeus, apex of mandible not strongly down-turned; with mandible fully open, dorsal face remains in same plane as clypeus; mandible with 8 teeth (Fig. 3B), tooth 1 continuous with basal rim of dorsal surface, teeth 1–5 acute, similar in shape, teeth 5–8 forming an apical fork, with 5 and 8 large, 6 and 7 small partially confluent denticles; dorsal surface of mandible roughened; ventral surface flat and parallel to clypeus apically, twisting basally to nearly perpendicular orientation basally, smooth and shining; interior surface concave, smooth and shining; scape flattened, with pronounced anterobasal lobe, dorsal surface very faintly sculptured; clypeus with broad, shallow emargination anteriorly; clypeus and face matte, with very faint sculpture, nearly smooth (difficult to determine sculptural detail; three known specimens have a thin layer of wax-like material on face); frontal carinae faint, nearly obsolete; antennal socket deep, dorsal rim of socket continuous with pronounced dorsal margin of antennal scrobe; antennal scrobe deep, strongly delimited dorsally, posteriorly, and ventrally with sharply defined thin cuticular rim; compound eye small, circular, composed of about 7 ommatidia; distinct carina extends from ventral margin of antennal socket across floor of scrobe to compound eye; scrobe floor matte, faintly foveolate anteriorly, grading to smooth posteriorly; occipital carina distinct, extending anteriorly on ventral surface of head nearly to hypostoma; postgenal suture visible as dark line on undersurface of head; undersurface sculpture similar to face.

Promesonotum moderately convex in profile, promesonotal suture moderately impressed, medial mesonotum with shallow longitudinal impression; metanotal groove moderately impressed, inconspicuous in profile view, stronger in dorsal view, with coarse longitudinal rugae in depression; propodeum with distinct dorsal and posterior faces; dorsal face flat, sloping; propodeal spines well-developed, in the form of acute flat translucent perpendicular plates, extending ventrally as thin carinae; a few thin carinulae extend between propodeal spines, separating dorsal and posterior faces of propodeum; propodeal spiracle small, diameter much less than width of base of propodeal spine, slightly projecting on low tubercle, located below propodeal spine and anterior to posterior margin of propodeum; all surfaces of mesosoma matte except posterior face of propodeum, which is shiny; dorsum of pronotum and lateral mesonotum irregularly rugose, medial impression of mesonotum smooth, dorsal face of propodeum faintly punctate, posterior face of propodeum smooth, lateral pronotum very faintly punctate; meso-metapleuron and side of propodeum confluent, smooth.

Petiole in profile with peduncle differentiated from node, node with differentiated anterior face; node triangular, with posterodorsal face long, sloping, medially impressed; anteroventral margin with acute tooth; postpetiole low, broad, crescent-shaped in dorsal view; dorsa of petiolar node and postpetiole faintly sculptured like frons; first gastral tergite covered with very faint, dense, confluent puncta, appearing shagreened; first gastral sternite anteriorly smooth, shiny to faintly shagreened, posteriorly punctate, interspaces subequal in width to puncta, smooth and shining.

Anterior labral lobe with radiating tuft of soft, thick, translucent, capitate setae of unequal length projecting from apex (like Fig. 2); each larger mandibular tooth with fully appressed seta running length of tooth; anterior margin of scape with about 10 spatulate setae; clypeus and face with fine, sparse fully appressed ground pilosity; face, mesosomal dorsum, petiole, postpetiole, and first gastral tergite lacking erect setae; mesotibia with moderately abundant ground pilosity, about 5 short spatulate setae at apex; second and subsequent gastral tergites with usual complement of clavate setae; first gastral sternite with abundant short clavate setae on posterior half to two thirds, anterior portion devoid of setae.

Color dark brown.

The *queen* is unknown.

Biology. *Octostruma gymnosoma* is known only from the three type workers, all from one Winkler sample of sifted litter and rotten wood from the forest floor. The sample was taken in mesophyll cloud forest in the Sierra Madre de Chiapas, at 1520 m elevation.

Comments. This is the largest Central American species. It is very similar to the allopatric *O. schusteri*, from Volcán Atitlán in Guatemala. The two differ only in the presence of spatulate setae on the face of *O. schusteri*.

Etymology. The name refers to the general lack of spatulate setae on the dorsal surfaces. It is a noun in apposition and thus invariant.



FIGURE 25. *Octostruma gymnosoma*, holotype worker (JTLC000015356), face and lateral views. Scale bar = 0.2 mm face view, 0.5 mm lateral view.

***Octostruma iheringi* (Emery, 1888)**

(Figs 1D, 2, 3C, 5E, 10A, 11, 14C, 26, 43)

Rhopalothrix iheringi Emery 1888: 361. Holotype queen: Brazil, Rio Grande do Sul [MCSN] (not examined). Combination in *Octostruma*: Brown, 1949: 92.

Rhopalothrix godmani Forel, 1899: 41, pl. 3, fig. 4. Holotype queen: Panama, Chiriquí, David (Champion) [BMNH?] (not examined). Combination in *Octostruma*: Brown, 1949: 92. Junior synonym of *Octostruma iheringi*: Brown & Kempf, 1960: 187.

Rhopalothrix simoni Emery, 1890: 67. Holotype worker: Venezuela, Caracas (Simon) [MCSN?] (not examined). Combination in *Octostruma* (*Octostruma*): Forel, 1912: 196. Combination in *Octostruma*: Brown, 1949: 92. Junior synonym of *Octostruma iheringi*: Brown & Kempf, 1960: 187.

Rhopalothrix simoni r. *spei* Forel, 1912: 196. Syntype workers: Colombia, Magdalena, "Hacienda de l'Esperanza," base of Sierra Nevada de Santa Marta, in rotten wood (Forel) [MHNG] (not examined). Combination in *Octostruma*: Brown, 1949: 92. Junior synonym of *Octostruma iheringi*: Brown & Kempf, 1960: 187.

Rhopalothrix simoni var. *wighti* Wheeler, 1908: 161. Syntype workers: Jamaica, road to Shot-over, 2 miles west Port Antonio, about 500ft altitude, under stone (Wight) [AMNH?, MCZC] (MCZC syntypes examined). Combination in *Octostruma*: Brown, 1949: 92. Junior synonym of *Octostruma iheringi*: Brown & Kempf, 1960: 187.

Rhopalothrix simoni st. *spei* var. *sulcata* Santschi, 1936: 201; unavailable name. Worker: Panama, "Puebloviejo" (Bierig). Material referred to *Octostruma iheringi*: Brown & Kempf, 1960: 187.

Geographic range. Southern Mexico to southern Brazil, Jamaica.

Description. *Worker.* HW 0.70–0.79, HL 0.63–0.73, WL 0.75–0.84, CI 106–111 (n=11). Labrum as in Fig. 1D and 2, sides slightly concave, strap-like lateral portions converging from base to near apex, joined by thin translucent cuticle medially but leaving distinctly bilobed apex, with median notch; mandible triangular, in profile view with mandible closed, in same plane as clypeus, apex of mandible not strongly down-turned; with mandible fully open, dorsal face tilted obliquely relative to clypeus; mandible with 8 teeth (Fig. 3C), tooth 1 continuous with basal rim of dorsal surface, teeth 1–5 acute, tooth 1 smaller than tooth 2, teeth 2–5 similar in size, a minute denticle between 4 and 5, teeth 5–8 forming an apical fork, with 5 and 8 large, 6 and 7 small partially confluent denticles; dorsal surface of mandible roughened; ventral surface flat and parallel to clypeus apically, twisting basally to nearly perpendicular orientation basally, smooth and shining; interior surface concave, smooth and shining; scape flattened, with pronounced anterobasal lobe, dorsal surface faintly sculptured; clypeus with broad, shallow emargination anteriorly; clypeus shallowly punctate or punctatorugulose; face shallowly longitudinally rugulose with shiny surface, median ruga sometimes stronger than others; frontal carinae faint, nearly obsolete; antennal socket deep, dorsal rim of socket continuous with pronounced dorsal margin of antennal scrobe; antennal scrobe deep, strongly delimited dorsally, posteriorly, and ventrally with sharply defined, translucent foliaceous cuticular rim; compound eye small, circular, composed of about 5 ommatidia; distinct carina extends from ventral margin of antennal socket across floor of scrobe to compound eye; scrobe floor faintly foveolate anteroventrally, smooth and

matte to feebly shining elsewhere; vertex margin anterior to occipital carina smooth (top of head, not visible in face view); occipital carina distinct, extending anteriorly on ventral surface of head to beyond level of compound eye but not reaching hypostoma; undersurface rugulose.

Promesonotum and dorsal face of propodeum form a continuous convexity in profile; promesonotal suture obsolete; promesonotum with shallow, longitudinal impression; metanotal groove obsolete to weakly impressed; propodeum with distinct dorsal and posterior faces; propodeal spines pronounced, in the form of acute translucent perpendicular plates, extending ventrally as broad foliaceous laminae; a single broad, translucent, transverse carina extends between propodeal spines, separating dorsal and posterior faces of propodeum; this carina broadens laterally and extends onto the propodeal spine, joining it at a right angle, forming an unusual roof-like structure over the posterior face of the propodeum and creating a thin-walled, concave propodeal spine that looks like a horse ear (Fig. 10A); propodeal spiracle large, located below propodeal spine and confluent with the ventral lamina, such that the translucent lamina can be seen as the back wall when looking through the spiracular orifice; all surfaces of mesosoma matte; dorsum of promesonotum irregularly rugose, dorsal and posterior faces of propodeum smooth, lateral pronotum faintly punctate; meso-metapleuron and side of propodeum confluent, smooth.

Petiole in profile with peduncle differentiated from node, node with distinct anterior face; node nearly triangular, with long sloping dorsal face and short vertical posterior face, dorsal and posterior faces separated by a distinct transverse carina; anteroventral margin with pronounced, anteriorly-directed peg-like tooth; postpetiole low, broad, crescent-shaped in dorsal view; dorsum of petiolar node rugose; dorsum of postpetiole faintly rugulose anteriorly, grading to punctate posteriorly; first gastral tergite and sternite uniformly punctate, interspaces subequal in width to puncta, smooth and shining.

Anterior labral lobe with radiating tuft of soft, thick, translucent, capitate setae of unequal length projecting from apex (Fig. 2); each larger mandibular tooth with fully appressed seta running length of tooth; anterior margin of scape with about 10 spatulate setae; clypeus and face with fine, sparse fully appressed ground pilosity; face typically with eight erect spatulate setae arranged as in Fig. 5E; setae on vertex margin arising from large, ringed puncta; mesosomal dorsum lacking erect setae; mesotibia with conspicuous subdecumbent clavate ground pilosity, about 2 larger spatulate seta at apex; petiole with 2 erect setae (rarely absent); postpetiole lacking erect setae; first gastral tergite lacking spatulate setae, ground pilosity fully appressed, sparse (length of setae less than distance between them); first gastral sternite with abundant short clavate setae over most of surface; pair of distinctive, long, extremely fine setae extending perpendicularly from petiolar peduncle, anterior to spiracle; similar but shorter pair of setae extending from sides of postpetiole, a few similar fine setae on anterior first gastral sternite, a short clavate seta extending posteriorly from posterior margin of hind coxa.

Color orange red.

Queen. HW 0.84, HL 0.71, WL 0.99, CI 119 (n=1). Head shape as in Fig. 14C; labrum, mandible, scape, antennal scrobe, and head sculpture similar to worker; face with 8 erect setae distributed as in worker; ocelli distinct; compound eye large, multifaceted, about 12 ommatidia in longest row.

Mesosoma with queen-typical alar sclerites; pronotum irregularly rugose anteriorly, punctatorugose laterally; mesoscutum longitudinally rugose; axilla and scutellum irregularly rugose; scutellum with median impression; anepisternum and katepisternum separated by strong sulcus; anepisternum, katepisternum, and side of propodeum matte, mostly smooth with variable faint rugulae; propodeum and propodeal spines similar to worker, but dorsal face of propodeum much shorter than posterior face; pronotum with 2 erect setae, mesoscutum with about 6, axilla with 1, scutellum with 2, metanotum with 2, petiolar node with 2, postpetiolar disc with 0, first gastral tergite with 4. Other characters similar to worker.

Biology. *Octostruma iheringi* is a widespread lowland species. In Central America it occurs in wet to seasonally dry habitats, in both mature and second growth forest, from sea level to about 800 m elevation. Almost all collections are from Berlese and Winkler samples of sifted litter and rotten wood from the forest floor. Dealate queens occasionally occur together with workers in litter samples. An alate queen was taken in July 1997, in the lab clearing of La Selva Biological Station, Costa Rica, a lowland rainforest site.



FIGURE 26. *Octostruma iheringi*, worker (CASENT0178002, Paraguay), queen (CASENT0639172, Costa Rica), face and lateral views. Scale bar = 0.2 mm face views, 0.5 mm lateral views. Worker images from AntWeb (2013).

***Octostruma impressa* Palacio, 1997**

(Fig 44)

Octostruma impressa Palacio 1997: 411, figs. 1D-H. Holotype worker: Colombia, Antioquia: Municipio de Frontino, Parque Nacional Natural Orchídeas, 500 m NE Estación Venados, 950 m, 6 Apr 1996 (E. Palacio) [ICN, ICN-MHN-HY-5022] (not examined).

Geographic range. Colombia.

Comments. Palacio (1997) reports the measurements of this species as HW 0.67–0.77, HL 0.65–0.75, CI 102–103. From the description, it seems to combine characters of *O. inca* and *O. balzani*. The head size and shape, the large compound eyes, and the impressed metanotal groove are similar to *O. inca*. The mandibular dentition and the basal scape lobe are apparently like *O. balzani*. The original publication indicates that a paratype has been deposited at MCZC, but a loan of all MCZC *Octostruma* did not contain it.

***Octostruma inca* Brown & Kempf, 1960**

(Figs 27, 44)

Octostruma inca Brown & Kempf 1960: 185, figs. 16, 29. Holotype worker: Peru, "unknown locality... probably on the Amazon drainage" (W. Weyrauch, No. 732) [MZSP]; paratype workers: same data as holotype [MZSP, MCZC]; non-type queen: Bolivia [MCZC] (MCZ paratype workers and non-type queen examined). Description of larva: Wheeler & Wheeler, 1977: 600.

Geographic range. Colombia, Peru, Bolivia.

Comments. The combination in the worker of large compound eyes with many ommatidia, antennal scrobe a

shallow impression without carinate rim, base of scape lacking flattened anterior lobe, and $HW > 0.68$ uniquely identify this species. The measurements reported in Brown and Kempf (1960) for the holotype of *O. inca* are considerably larger than the six workers measured for this report. HW of six measured workers, including three paratypes, is 0.69–0.87; HW of the holotype is reported as 0.91. The larva described by Wheeler and Wheeler (1977) was a specimen from Colombia sent by W. L. Brown. MCZC material examined for this report includes what appear to be two nest series collected by W. L. Brown in Dept. Valle, Colombia.



FIGURE 27. *Octostruma inca*, paratype worker (MCZ-ENT00030879, Peru), paratype queen (MCZ-ENT00303382, Bolivia), face and lateral views. Scale bar = 0.25 mm face views, 0.5 mm lateral views.

***Octostruma lepticeps* Longino, sp. nov.**

(Figs 1A, 5H, 28, 43)

Type material. *Holotype worker*: HONDURAS, Cortés: PN Cusuco, 15.48940, -88.23621, ± 20 m, 1290 m, mesophyll forest, ex sifted leaf litter, 30 May 2010 (LLAMA, Wa-C-06-2-12) [CAS, unique specimen identifier CASENT0617645].

Geographic range. Honduras.

Diagnosis. Basal five teeth of mandible acute; labrum triangular with straight, evenly converging sides, anterior lobes converging and confluent at apex, such that labrum apex is blunt but not distinctly bilobed; head very narrow, CI 94.

Description. *Worker*. HW 0.68, HL 0.73, WL 0.87, CI 94 (n=1); labrum as in Fig. 1A, sides straight, strap-like lateral portions converging from base to apex, apex bluntly rounded, not bilobed; mandible triangular, in profile view with mandible closed, base in same plane as clypeus, evenly curved downward toward apex; mandibles closed on holotype, but basal teeth visible, acute, apparently as in Fig. 3B, tooth 1 continuous with basal rim of dorsal surface; dorsal surface of mandible roughened; ventral surface flat, smooth and shining; interior surface concave, smooth and shining; scape with pronounced anterobasal lobe, dorsal surface smooth, matte; clypeus with broad, shallow emargination anteriorly; clypeus smooth, sublucid, with sparse puncta; face uniformly irregularly rugose; frontal carinae faint, nearly obsolete; antennal socket deep, dorsal rim of socket continuous with pronounced dorsal margin of antennal scrobe; antennal scrobe deep, strongly delimited dorsally, posteriorly, and ventrally with sharply defined thin cuticular rim; compound eye small, circular, composed of about 7 ommatidia; distinct carina extends from ventral margin of antennal socket across floor of scrobe to compound eye; scrobe floor

matte; vertex margin anterior to occipital carina smooth, matte (top of head, not visible in face view); occipital carina extends anteriorly on ventral surface of head about to level of compound eye; postgenal suture visible as impressed line on undersurface of head; undersurface rugulose.

Promesonotum moderately convex in profile, promesonotal suture moderately impressed; metanotal groove not impressed; propodeum with distinct dorsal and posterior faces; dorsal face weakly convex; propodeal spines well-developed, acute, laterally flattened, extending ventrally as thin carinae; propodeal spiracle somewhat protruding, located below propodeal spine, not quite abutting posterior margin, diameter about equal to width of base of propodeal spine; all surfaces of mesosoma matte; entire promesonotum irregularly rugose, with similar sculpture to face; mesopleuron and side of propodeum confluent; entire mesopleuron and propodeum smooth.

Petiole in profile with peduncle differentiated from node, node with distinct anterior face; posterodorsal face of node an even convexity; anteroventral margin with anteriorly-directed tooth subtended by short posterior flange; postpetiole low, broad, weakly crescent-shaped in dorsal view; dorsum of petiolar node and postpetiole punctatorugose; first gastral tergite and sternite densely punctate, interspaces smooth and shining, tergal puncta smaller posteriorly; first gastral sternite strongly convex, with prominent blunt medial keel.

Anterior labral lobe with radiating tuft of soft, thick, translucent, capitate setae of unequal length projecting from apex (like Fig. 2); each larger mandibular tooth with fully appressed seta running length of tooth; anterior margin of scape with about nine stiff clavate setae; clypeus, face, promesonotal dorsum, petiolar node, and dorsal postpetiole with conspicuous, yellow, appressed ground pilosity of long, thin setae; face of holotype appears largely devoid of erect setae but specimen may have lost setae; a single spatulate seta present on one lateral vertex margin, and what may be a seta near medial vertex margin (Fig. 5H drawn to show what may be setal arrangement on typical specimens); mesosomal dorsum lacking erect setae; mesotibia with conspicuous ground pilosity, about 5 spatulate setae of variable length at apex; petiole and postpetiole lacking erect setae; first gastral tergite lacking erect setae, ground pilosity fully appressed, sparse (length of setae less than distance between them); first gastral sternite with abundant spatulate setae clustered on posterior half, anterior half devoid of setae.

Color dark brown.

The *queen* is unknown.

Biology. This is known from a single worker collected in mesophyll cloud forest at 1290 m elevation. The specimen was in a sample of sifted leaf litter from the forest floor.

Etymology. The name refers to narrow head relative to other species. It is a noun in apposition and thus invariant.



FIGURE 28. *Octostruma lepticeps*, holotype worker (CASENT0617645), face and lateral views. Scale bar = 0.2 mm face view, 0.5 mm lateral view.

***Octostruma limbifrons* Longino, sp. nov.**

(Figs 6D, 29, 44)

Type material. *Holotype worker*: PANAMA, Chiriquí: 24 km W El Hato del Volcan [8.833, -82.754, ±10 km], 1160 m, 26 Jun 1976, cloud forest, ex sifted leaf litter (A. F. Newton) [MCZC, unique specimen identifier MCZ-ENT00511414].

Geographic range. Panama.

Diagnosis. Antennal scrobe very shallow, not distinctly margined; face with arcuate carina; frontal carinae and facial arc separated, the termini of the facial arc extend laterally beyond the termini of the frontal carinae (termini of facial arc join frontal carinae in *O. ascrobis*, *O. ascrobicula*); facial arc strongly elevated and continuous to juncture with antennal socket, lateral portions of facial arc as strong as frontal carinae (facial arc weaker, lateral portions weaker than frontal carinae in *O. convallis*, *O. convallisur*); promesonotum with differentiated anterior and dorsal faces (evenly convex in *O. convallis*, *O. convallisur*).

Description. *Worker.* HW 0.63, HL 0.59, WL 0.65, CI 106 (n=1). Labrum rectangular, formed of strap-like lateral portions joined by a thin translucent lamella (Fig. 1H); mandibles closed on available specimen, but appear generally similar to *O. convallis*; dorsal surface of mandible roughened, microfoveolate; scape flattened, with pronounced anterobasal lobe, dorsal surface smooth and shining; clypeus strongly emarginate anteriorly, smooth and shining; frontal carinae sharp, narrow, extending more or less straight back and ending before reaching transverse facial arc; facial arc strongly developed, forming continuous carina that curves forward to join posterior margin of antennal socket, with distinct trough between frontal carina and lateral facial arc; frontal carinae and facial arc delimit anterior face that is shiny, with distinct median longitudinal ruga and faint rugulae laterally, face immediately anterior to facial arc smooth, concave; compound eye small, circular, composed of 4–5 somewhat confluent ommatidia; side of head near compound eye and vertex posterior to facial arc smooth and shiny, with distinct, sparse, uniformly distributed puncta; antennal scrobe below eye, very shallow and not delimited with carina or flange; scrobe surface shiny, punctate; side of head posterior to scrobe completely smooth and shiny, with no puncta; undersurface of head rugose.

Promesonotum somewhat flat-topped, with distinct anterior face rounding into horizontal dorsal face; metanotal groove not impressed; propodeum with a single, concave, sloping surface, not differentiated into dorsal and posterior faces; propodeal spines acute, extending anteriorly as raised carinae that curve medially and join at the metanotal groove, extending ventrally as narrow lamellae, thus posterodorsal propodeum entirely delimited by raised carinae confluent with propodeal spines; a low carina extends transversely across posterodorsal surface, between bases of propodeal spines; propodeal spiracle large, located immediately below propodeal spine and abutting posterior margin; lateral, anterior, and dorsal pronotum smooth and shining with sparse puncta; mesonotum with denser puncta, sculpture differentiated from dorsal pronotum; posterodorsal face of propodeum shallowly foveolate; mesopleuron confluent with side of propodeum, shining, with smooth patches and feeble minute puncta and rugulae.

Petiole in profile with peduncle not differentiated from node, anterior surface sloping evenly from petiolar foramen to node, dorsal face of node sloping posteriorly to projecting transverse cuticular rim, short concave posterior face beneath rim; anteroventral margin with denticle; dorsal face of node faintly foveolate/punctate; postpetiole low, broad, crescent-shaped in dorsal view, dorsal face densely punctate, delimited anteriorly and posteriorly by thin transverse rim; first gastral tergite densely punctate, puncta becoming smaller posteriorly; first gastral sternite punctate with smooth and shining interspaces, puncta larger than on tergite.

Labrum fringed on sides and apex with soft translucent thick setae; each larger mandibular tooth with prominent fully appressed seta; anterior margin of scape with 7 stiff filiform (not clavate) setae, basalmost seta the longest, on apex of anterobasal lobe (lacking a shorter seta proximal to this one, on inner side of lobe); clypeus and face devoid of ground pilosity; face, dorsal mesosoma, petiole and postpetiole lacking erect setae; mesotibia with short, thin, sparse, decumbent ground pilosity, a single large filiform seta and several thin shorter erect setae at apex; mesobasitarsus with several pairs thin, erect setae, apical pair longest; first gastral tergite with 3 stiff filiform setae on posterior margin, following exposed tergites each with row of setae; ground pilosity of first gastral tergite sparse, fully appressed, length of setae subequal to distance between them; first gastral sternite with sparse, thin but stiff erect setae over much of surface except narrow area near postpetiolar insertion.

Color red brown.

The *queen* is unknown.

Biology. The holotype was collected at a cloud forest site in western Panama, in a Berlese sample of forest floor leaf litter.

Etymology. The name refers to the strong facial arc. It is a noun in apposition and thus invariant.



FIGURE 29. *Octostruma limbifrons*, holotype worker (MCZ-ENT00511414), face and lateral views. Scale bar = 0.25 mm face view, 0.5 mm lateral view.

***Octostruma lutzi* (Wheeler, 1913) Revised Status**

(Figs 1E, 3D, 5A, 5B, 30, 42)

Rhopalothrix (*Octostruma*) *lutzi* Wheeler, 1913: 241. Lectotype worker: Dominica, Laudet & Long Ditton, near Roseau (Lutz) [MCZC, MCZ-ENT00303378] (examined); non-type queen: same data as lectotype [AMNH?] (not examined). Combination in *Octostruma*: Brown, 1949: 92. Junior synonym of *Octostruma balzani*: Brown & Kempf, 1960: 194. **Revised Status.**

Geographic range. Dominica, Guadeloupe.

Description. *Worker.* Dominica: HW 0.56–0.61, HL 0.55–0.59, WL 0.61–0.64, CI 102–104 (n=3). Guadeloupe: HW 0.57–0.62, HL 0.53–0.58, WL 0.60–0.65, CI 107–109 (n=6). Face setation as in Fig. 5A or 5B; mesosoma typically with two pairs spatulate setae, one on pronotum and one on mesonotum (pronotal setae lacking in all other *balzani*-group species except *O. batesi* and *O. betschi*); posterolateral margin of head subequal to or longer than anterolateral margin (posterolateral margin shorter than anterolateral margin in *O. batesi* and *O. betschi*); color dark brown on Guadeloupe.

Queen. The Dominica queen described by Wheeler was not examined. Guadeloupe queen: HW 0.65–0.66, HL 0.61–0.62, WL 0.77–0.80, CI 105–108 (n=3). Labrum, mandible, scape, antennal scrobe, and head sculpture similar to worker; face with 8–10 erect setae distributed symmetrically around lateral and posterior margins of head, a seta on low ridge in front of each compound eye, 4 setae across vertex between compound eyes; ocelli distinct; compound eye large, multifaceted, about 12 ommatidia in longest row.

Mesosoma with queen-typical alar sclerites; sculpture like workers; anepisternum and katepisternum separated by strong sulcus; posterodorsal propodeum concave; propodeal spines pronounced, in the form of flattened perpendicular plates, acute in profile; pronotum with 4 erect setae, mesoscutum with 10–12, axilla with 1, scutellum with 2, metanotum with 2, petiolar node with 4, postpetiolar disc with 4, first gastral tergite with about 40. Other characters similar to worker.

Biology. *Octostruma lutzi* is an island species endemic to Dominica and Guadeloupe in the Lesser Antilles. The syntypes were collected "sifting leaves in forest and among bananas and tree-ferns along the edge of it." (Wheeler, 1913). On Guadeloupe, it occurs from sea level to 800 m elevation, in a variety of forested habitats including wet and seasonal dry forest, mahogany plantation, and cloud forest. All Guadeloupe specimens are from Winkler samples of sifted litter and rotten wood from the forest floor. Dealate queens often occur together with workers in litter samples.

Comments. The original syntype series of *O. lutzi* contained both *O. lutzi* (one of which was designated lectotype in Brown and Kempf, 1960) and *Eurhopalothrix guadeloupensis* Longino 2013. Wheeler's description of *O. lutzi* pertains to *O. lutzi* for the most part, but the description of pilosity better fits the *Eurhopalothrix* worker. The identity of the described queen remains uncertain.

The degree to which the Dominica and Guadeloupe populations are differentiated is poorly known. Examined

workers from Dominica (the MCZC type series of *O. lutzi*) have distinctly narrower heads than workers from Guadeloupe (CI 102–104 vs. 107–109). The Dominica workers are light orange brown and the Guadeloupe workers are dark brown, but the former are also over 100 years old and may have faded.

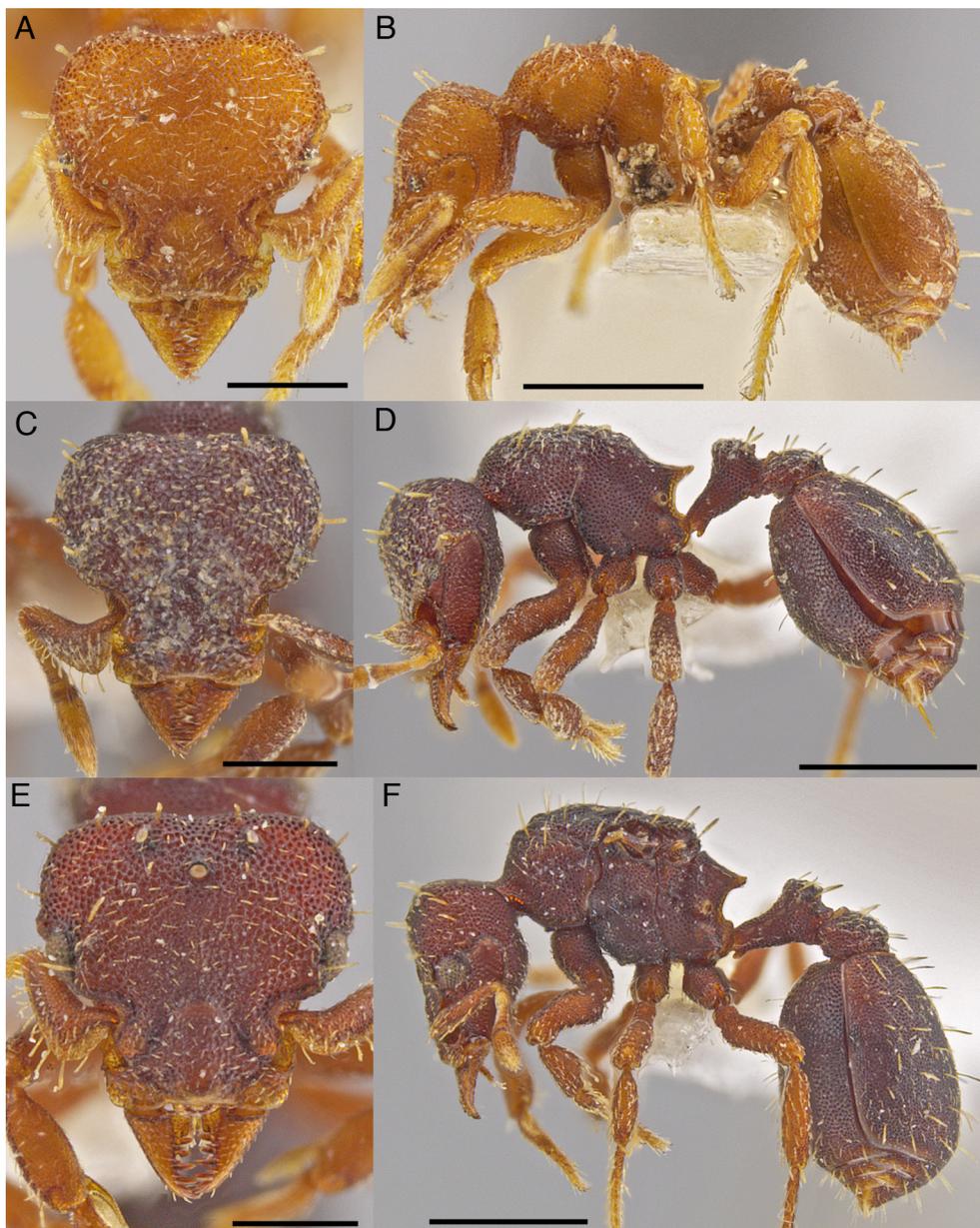


FIGURE 30. *Octostruma lutzi*, lectotype worker (MCZ-ENT00303378), face (A) and lateral (B) views. Guadeloupe worker (CASENT0630337) and queen (CASENT0630322), face (C, E) and lateral (D, F) views. Scale bar = 0.25 mm face views, 0.5 mm lateral views.

***Octostruma megabalzani* Longino, sp. nov.**

(Figs 1E, 3D, 5B, 9B, 31, 42)

Type material. *Holotype worker*: PANAMA, Chiriquí: 24 km W El Hato del Volcan [8.833, -82.754, ±10 km], 1160 m, 26 Jun 1976, cloud forest, ex sifted leaf litter (A. F. Newton) [MCZC, unique specimen identifier MCZ-ENT00511006]. *Paratype queen, worker*: same data [MCZC, MCZ-ENT00511004; USNM, MCZ-ENT00511005].

Geographic range. Bolivia, Peru, western Panama, southern Costa Rica.

Diagnosis. Differing from *O. balzani* as follows (*O. balzani* characters in parentheses): petiole with a pair of erect setae (typically lacking); postpetiole with 2–4 erect setae (0–2); first gastral tergite with 16–22 erect setae,

more or less evenly distributed on tergite, gastral setae stiff, flattened, but nearly linear, very weakly clavate (first gastral tergite with 4–16 erect setae, these clustered posteriorly, relatively more broadened apically); color dark brown (red brown); HW 0.61–0.66 (HW 0.50–0.63).

Description. *Worker.* HW 0.61–0.66, HL 0.56–0.61, WL 0.60–0.66, CI 107–111 (n=7). Similar in most respects to *O. balzani* except for the characters in the diagnosis.

Queen. HW 0.67, HL 0.62, WL 0.84, CI 108 (n=1). Labrum, mandible, scape, antennal scrobe, and head sculpture similar to worker; face with 8 erect setae distributed symmetrically around lateral and posterior margins of head, a seta on low ridge in front of each compound eye, 6 setae across vertex between compound eyes; ocelli distinct; compound eye large, multifaceted, about 12 ommatidia in longest row.

Mesosoma with queen-typical alar sclerites; sculpture like workers; anepisternum and katepisternum separated by strong sulcus; posterodorsal propodeum concave; propodeal spines pronounced, in the form of flattened perpendicular plates, acute in profile; pronotum with 4 erect setae, mesoscutum with 10, axilla with 1, scutellum with 2, metanotum with 2, petiolar node with 2, postpetiole and gaster missing from single queen available for examination. Other characters similar to worker.

Biology. *Octostruma megabalzani* is a montane species. The lowest elevation record is 950 m in Panama, and the highest record is 2000 m in southern Peru. It has been collected most often in mature cloud forest and montane oak forest habitats, but has also been collected in litter beneath cultivated coffee. All collections are from Berlese and Winkler samples of sifted litter and rotten wood from the forest floor.

Comments. The Andean and Central American specimens of *O. megabalzani* appear identical. Both occur in elevational parapatry with lowland *O. balzani*. Whether the Andean and Central American populations are members of one montane clade or convergently evolved montane forms is an open question.



FIGURE 31. *Octostruma megabalzani*, holotype worker (MCZ-ENT00511006), face and lateral view. Scale bar = 0.25 mm face view, 0.5 mm lateral view.

***Octostruma montanis* Longino, sp. nov.**

(Figs 1C, 3B, 5P, 32, 43)

Type material. *Holotype worker:* NICARAGUA, Matagalpa: RN Cerro Musún, 12.97796, -85.23242, ±50 m, 1350 m, 1 May 2011, wet cloud forest, ex sifted leaf litter (R.S.Anderson#2011-008) [CAS, unique specimen identifier CASENT0627340]. *Paratype workers:* same data [CAS, CASENT0623873; USNM, CASENT0627338; MCZC, CASENT0627339; MZSP, CASENT0627341]; same data except 12.97056, -85.23388, ±20 m, 1120 m, 2 May 2011 (LLAMA, Wm-D-01-1-06) [INBC, CASENT0639986; UCDC, CASENT0639988; CAS, CASENT0639990; JTLC, CASENT0639991].

Geographic range. Southern Nicaragua, Costa Rica.

Diagnosis. Face lacking transverse arcuate carina; basal five teeth of mandible acute; apex of labrum bilobed; face typically with 6 spatulate setae (8 in *O. cyrtinotum*), seta-bearing pits along vertex margin large; filiform setae lacking on petiole, postpetiole, first gastral sternite; anterior half of dorsal face of propodeum convex, demarcating impressed metanotal groove; mesonotum lacking spatulate setae (with a pair in *O. cyrtinotum*).

Description. *Worker.* HW 0.73–0.78, HL 0.69–0.72, WL 0.80–0.85, CI 106–109 (n=4). Differing from *O. cyrtinotum* in the characters of the Diagnosis; otherwise similar in most respects to *O. cyrtinotum*.

The *queen* is unknown.

Biology. *Octostruma montanis* is a cloud forest species known from two sites: Cerro Musún in southern Nicaragua and Monteverde in Costa Rica. Cerro Musún is an isolated mountain surrounded by largely deforested lowlands. The slopes from 700 m elevation to the peak at 1400 m are a protected reserve. The LLAMA project carried out Winkler sampling across the full elevational range of the reserve, and *O. montanis* was restricted to parts of the reserve above 1100 m. In Monteverde in the Cordillera de Tilarán, northern Costa Rica, *O. montanis* occurs in the ridge crest cloud forest at 1500 m elevation, but not lower. All collections are from Winkler samples of sifted litter and rotten wood from the forest floor.

Comments. Three worker series from Reserva Musún in Nicaragua are uniform in face setal pattern, as in Fig. 5P. Two worker series, each of two workers, are known from Monteverde, Costa Rica, and they vary in setal pattern. One series is identical to the Musún specimens, with the same number and disposition of setae, and the same enlarged seta-bearing pits. The other has only the posteromedian seta pair and the pits are not enlarged. The seta pair at the lateral vertex angles and the pair near the eyes are missing and there are no differentiated pits at these sites, so their absence is probably not due to wear. This setal pattern is the same as *O. planities*, which occurs in the nearby dry-forest lowlands. In all other characters the specimens are like other *O. montanis* specimens.

Etymology. The name refers to its restriction to montane habitats. It is a dative plural noun and thus invariant.



FIGURE 32. *Octostruma montanis*, holotype worker (CASENT0627340), face and lateral views. Scale bar = 0.2 mm face view, 0.5 mm lateral view.

***Octostruma obtusidens* Longino, sp. nov.**

(Figs 1F, 3E, 4, 5F, 10B, 12A, 14E, 33, 43)

Type material. *Holotype worker:* COSTA RICA, Heredia: La Selva Biological Station, 10.43333, -84.01667, ±2 km, 50 m, 16 Mar 1993, wet forest, nest under dead wood (J. Longino#3390) [INBC, unique specimen identifier CASENT0629827]. *Paratype workers, queen:* same data [CAS, CASENT0627385; CAS, CASENT0629813; USNM, CASENT0629814; MCZC, CASENT0629815; MZSP, CASENT0629816; UVGC, CASENT0629817; EAPZ, CASENT0629818; ECOSCE, CASENT0629819; UCDC, CASENT0629820; CAS, CASENT0629821; CAS, CASENT0629822; CAS, CASENT0629823; CAS, CASENT0629824; CAS, CASENT0629825; JTLC, CASENT0629826].

Geographic range. Guatemala to Colombia.

Diagnosis. Face lacking transverse arcuate carina; basal five teeth of mandible bluntly rounded (Fig. 3E); face sculpture foveolate with at most faint longitudinal rugulae (longitudinally rugose on *O. excertirugis*); ground pilosity curved, projecting from surface; first gastral tergite punctate over entire surface (punctate on anterior half, fading to nearly smooth and shining posteriorly on *O. excertirugis*).

Description. *Worker.* HW 0.67–0.74, HL 0.62–0.64, WL 0.76–0.80, CI 104–116 (n=6). Labrum as in Fig. 1F,

wider than long, strap-like lateral portions converging from base to near apex, joined by thin translucent cuticle medially but leaving distinctly bilobed apex, with distinct median notch; mandible triangular, in profile view with mandible closed, in same plane as clypeus, apex of mandible not down-turned; mandible with 8 teeth (Fig. 3E), tooth 1 continuous with basal rim of dorsal surface, teeth 1–5 bluntly rounded, similar in shape, a denticle between 4 and 5, teeth 6–7 smaller, not as blunt, tooth 8 long and acute; masticatory margin evenly curved, with no development of downturned apical fork; dorsal surface of mandible smooth and shining; ventral surface rounding into dorsal surface; scape flattened, with pronounced anterobasal lobe, dorsal surface roughened, microfoveolate; clypeus with broad, shallow emargination anteriorly; clypeal dorsum convex medially, clypeal suture impressed, forming shallow trough between clypeus and frons; clypeus and face densely foveolate, overlain with faint irregular rugulae; frontal carinae faint, nearly obsolete; antennal socket deep, dorsal rim of socket continuous with pronounced dorsal margin of antennal scrobe; antennal scrobe deep, pocket-like, strongly delimited dorsally, posteriorly, and ventrally with sharply defined laminar cuticular rim; compound eye small, circular, composed of about 7 ommatidia; feeble carina extends from ventral margin of antennal socket across floor of scrobe to compound eye; scrobe foveolate; occipital carina extends a short distance onto ventral surface of head, fading at level of compound eye; undersurface of head foveolate.

Promesonotum and dorsal face of propodeum forming an even convexity in profile, promesonotal suture not impressed, promesonotum with broad, weak, longitudinal impression; metanotal groove not impressed; propodeum with distinct dorsal and posterior faces meeting at a broadly obtuse angle; propodeal spines well-developed, acute, laterally flattened, internal surface concave, with dorsal margin of spine forming carina that curves medially but does not extend to midline, spine extending ventrally as thin infradental carina; irregular rugulae extend between propodeal spines, faint to absent medially, weakly separating dorsal and posterior faces of propodeum; propodeal spiracle large, diameter similar to width of base of propodeal spine, located below propodeal spine and abutting posterior margin; dorsum of promesonotum foveolate, overlain with weak rugulae; side of mesosoma and dorsal face of propodeum foveolate; posterior face of propodeum smooth, sublucid.

Petiole in profile with peduncle differentiated from node, node with differentiated anterior face; node subquadrate, with long sloping dorsal face and short vertical posterior face; anteroventral margin with pronounced, anteriorly-directed peg-like tooth; postpetiole low, broad, crescent-shaped in dorsal view; dorsum of petiolar node and postpetiole foveolate; first gastral tergite and sternite densely punctate.

Anterior labral lobe with radiating tuft of soft, thick, translucent, capitate setae of unequal length projecting from apex (like Fig. 2); each larger mandibular tooth with fully appressed seta running length of tooth; dorsal surface of scape, clypeus, face, promesonotal dorsum, legs, dorsal petiolar node, dorsal postpetiole, and first gastral tergite covered with conspicuous ground pilosity of small clavate setae that are strongly curved and projecting from the surface (not appressed), ground pilosity absent from side of mesosoma, dorsal and posterior propodeum; larger erect, brush-like spatulate setae conspicuous, anterior margin of scape with about 10, face with about 12 arranged as in Fig. 5F, promesonotum with 4, apex of mesotibia with 5, petiolar node with 2, postpetiole with 2, first gastral tergite with 16 evenly distributed on tergite, first gastral sternite with 15–20 smaller clavate setae, more clustered posteriorly and medially.

Color orange.

Queen. HW 0.72–0.78, HL 0.68–0.71, WL 0.96–0.99, CI 102–113 (n=3). Head shape as in Fig. 14E; mandible smooth and shiny; clypeus and face irregularly rugose, rugae somewhat longitudinally oriented on frons; antennal scrobe foveolate; ocelli distinct; compound eye large, multifaceted, about 12 ommatidia in longest row.

Mesosoma with queen-typical alar sclerites; anterior pronotum shallowly foveolate rugulose, lateral pronotum foveolate; mesoscutum and scutellum with weak foveolation overlain with prominent longitudinal rugulae; mesopleuron, metapleuron, and side of propodeum punctate; transverse mesopleural sulcus prominent, delimited above and below with a distinct carina; transverse metapleural sulcus delimited with an elliptical carina; dorsal face of propodeum foveolate rugulose, posterior face smooth; propodeal spines similar to worker; first gastral tergite and sternite punctate.

Ground pilosity thin and sparse, not clavate like worker; erect setae long and clavate, not spatulate and brush-like; face with about 22 erect setae, pronotum with 5–8, mesoscutum with 10–12, axilla with 1, scutellum with 2, metanotum with 2, petiolar node with 2, postpetiole with 6, first gastral tergite with 35–40.

Color orange to red orange, ocellar triangle darker brown.

Biology. *Octostruma obtusidens* is a moderately abundant lowland species. All Central American records are

from sea level to 800 m. It occurs in mature to highly disturbed rainforest and in seasonal moist forest. Most collections are from Berlese and Winkler samples of sifted litter and rotten wood from the forest floor. In quantitative 1 m² litter plot samples, it can occur in up to 11% of samples. Dealate queens are occasionally found together with workers in litter samples. One nest was observed at La Selva Biological Station in Costa Rica. A colony occurred in a 2–3 cm diameter nest in a soil cavity beneath a rotting palm trunk. The colony was polygynous, with at least 4 dealate queens. The nest contained an egg of Phasmatodea.

Comments. All examined material is from Central America with the exception of a single worker from MCZC, labeled simply "Bogota, Luis Maria Murillo." It does not differ in any substantial way from Central American material.

Etymology. The name refers to the blunt teeth on the mandible. It is a noun in apposition and thus invariant.

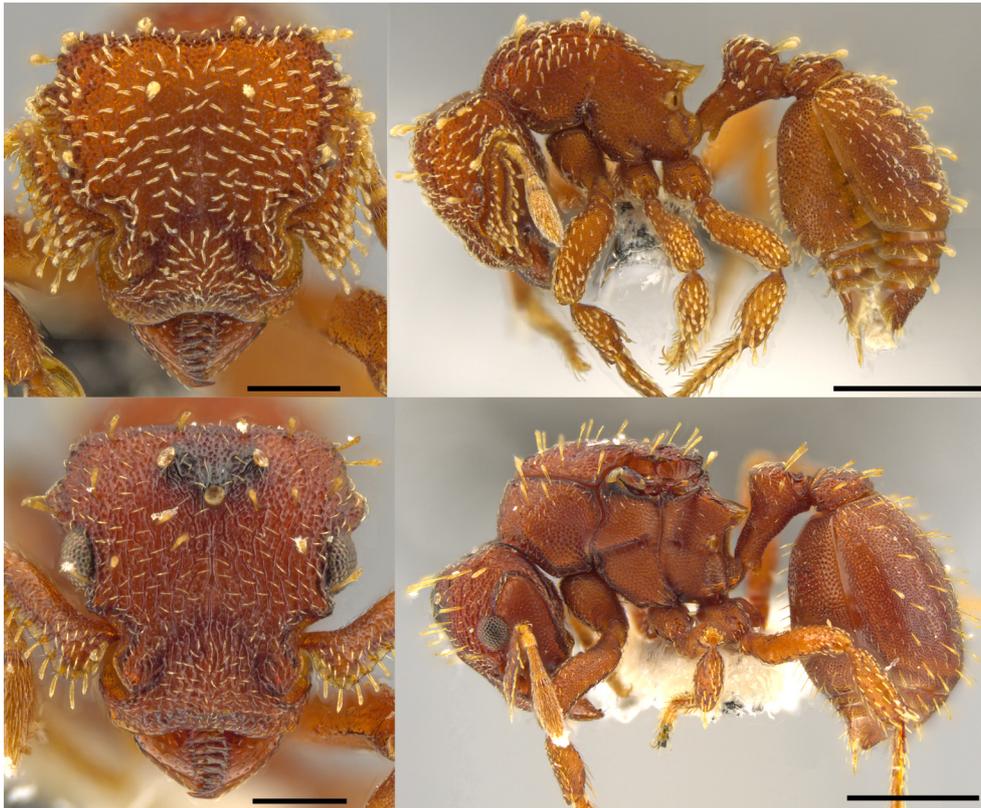


FIGURE 33. *Octostruma obtusidens*, holotype worker (CASENT0629827), paratype queen (CASENT0627385), face and lateral views. Scale bar = 0.2 mm face views, 0.5 mm lateral views.

***Octostruma onorei* Baroni Urbani & De Andrade, 2007**

(Fig 44)

Basiceros onorei Baroni Urbani & De Andrade 2007: 133, fig. 47. Holotype worker: Ecuador, Tungurahua: Baños de Agua Santa, 01°24'S 78°25'W, 1860 m, sendero Bella Vista, leaf-litter, 26 Aug 2004 (C. Baroni Urbani & M. L. De Andrade) [PUCE] (not examined).

Geographic range. Ecuador.

Comments. This species is known only from the holotype. From the description, it appears to be a version of *O. iheringi*. It shares with *O. iheringi* the structure of the propodeal spines, the longitudinal trough on the mesosomal dorsum, and the general habitus (based on the description and the figures in the original publication). It differs in having erect setae on the mesosoma and first gastral tergite, and the first gastral tergite is smooth and shining.

***Octostruma petiolata* Mayr, 1887**

(Fig 44)

Rhopalothrix petiolata Mayr 1887: 580. Holotype queen: Brazil, Santa Catarina [NMW?] (not examined). Description of worker: Emery 1894: 217. Combination in *Octostruma*: Brown 1949: 92. See also Brown & Kempf, 1960: 182.

Geographic range. Southern Brazil.

Comments. This species is known from southern Brazil. Workers can be identified by the combination of strongly transverse petiolar node in dorsal view, mesosoma lacking erect setae, large size (HW 0.85–0.90), and strong laminar transverse carina joining the propodeal spines. I examined a worker from Itajubá, Santa Catarina State [MCZC].

***Octostruma pexidorsum* Longino, sp. nov.**

(Figs 11, 34, 44)

Type material. *Holotype worker*: COLOMBIA, Amazonas: 7 km N Leticia [-4.1466, -69.9343, unknown error], 75 m, 10 Feb 1972, forest, leaf litter (S. & J. Peck, B-230) [MCZC, unique specimen identifier MCZ-ENT00511319]. *Paratype workers*: same data [CAS, MCZ-ENT00511314; USNM, MCZ-ENT00511315; JTLC, MCZ-ENT00511316; MCZC, MCZ-ENT00511317, MCZ-ENT00511318, MCZ-ENT00511320, MCZ-ENT00511321, MCZ-ENT00511322].

Geographic range. Colombia.

Diagnosis. Face lacking transverse arcuate carina; basal five teeth of mandible acute; labrum longer than wide, sides nearly parallel, apex bluntly rounded, not bilobed; face densely punctate; ground pilosity of face, dorsal promesonotum, and first gastral tergite conspicuous, composed of thin, yellow, suberect and strongly curved setae, giving dorsum a scruffy or wooly appearance; pair of long filiform setae projecting from petiolar peduncle anterior to spiracle, shorter filiform setae projecting from sides of postpetiole and anteromedian first gastral sternite (these filiform setae otherwise only known in *O. iheringi*, see Fig. 11).

Description. *Worker*. HW 0.63–0.71, HL 0.59–0.65, WL 0.66–0.74, CI 107–111 (n=3). Labrum as in Fig. 11, longer than wide, sides nearly parallel, apex bluntly rounded, not bilobed; mandible triangular, in profile view with mandible closed, in same plane as clypeus, apex of mandible not down-turned; with mandible fully open, dorsal face remains in same plane as clypeus; mandible with 8 teeth, tooth 1 continuous with basal rim of dorsal surface, all teeth acute; tooth 1 smaller than teeth 2–5 and 8, teeth 5–8 forming an apical fork, with 5 and 8 large, 6 and 7 small partially confluent denticles; on one specimen with spread mandibles, a minute denticle between teeth 3 and 4; dorsal surface of mandible roughened; ventral surface flat and parallel to clypeus apically, twisting basally to nearly perpendicular orientation basally, smooth and shining; interior surface concave, smooth and shining; scape flattened, with pronounced anterobasal lobe, dorsal surface minutely densely punctate; clypeus with broad, shallow emargination anteriorly; clypeus and anterior face roughened and dull, grading to densely punctate on medial and posterior face; frontal carinae faint, nearly obsolete; antennal socket deep, dorsal rim of socket continuous with pronounced dorsal margin of antennal scrobe; antennal scrobe deep, strongly delimited dorsally, posteriorly, and ventrally with sharply defined thin cuticular rim; compound eye small, circular, composed of about 7 ommatidia; distinct carina extends from ventral margin of antennal socket across floor of scrobe to compound eye; scrobe floor faintly foveolate; occipital carina short, not extending anterior to occipital foramen; undersurface of head punctate. Mesosomal dorsum evenly convex in profile, promesonotal suture and metanotal groove not impressed; propodeum with distinct dorsal and posterior faces; propodeal spines well-developed, in the form of acute, laterally flattened plates, inner surface concave; a few transverse rugulae between propodeal spines; propodeal spiracle large, filling space between ventral margin of propodeal spine and metapleural lobe, extending posteriorly to form posterior margin of propodeum; entire pronotum, mesonotum, and dorsal face of propodeum densely punctate; mesopleuron and side of propodeum confluent, dorsal portion punctate, ventral portion smooth, matte; posterior face of propodeum faintly foveolate and sublucid.

Petiole in profile with peduncle differentiated from node, node with differentiated anterior face, posterodorsal face sloping to acute posterior rim; anteroventral margin with pronounced, anteriorly-directed peg-like tooth; postpetiole low, broad, crescent-shaped in dorsal view; dorsum of petiolar node and postpetiole densely punctate;

first gastral tergite and sternite densely punctate, puncta of sternite larger and more widely spaced than puncta of tergite.

Anterior labral lobe with radiating tuft of soft, thick, translucent, capitate setae of unequal length projecting from apex (like Fig. 2); each larger mandibular tooth with fully appressed seta running length of tooth; anterior margin of scape with about 7 stiff slightly clavate setae, seta on basal lobe longest, no seta proximal to this longest seta; ground pilosity of face, dorsal promesonotum, and first gastral tergite conspicuous, composed of thin, yellow, suberect and strongly curved setae, giving dorsum a scruffy or woolly appearance; face with 2–6 long, thin, stiff, erect setae, posteromedian pair always present, other variably distributed on lateral and posterolateral margins; mesonotum and petiolar node each with a pair of stiff, weakly clavate setae; apex of mesotibia with 2 stiff setae; postpetiole with 0–2 weakly clavate setae; first gastral tergite with 8–14 erect weakly clavate setae; first gastral sternite with abundant short stiff setae; pair of long filiform setae projecting from petiolar peduncle anterior to spiracle, shorter filiform setae projecting from sides of postpetiole and anteromedian first gastral sternite; ground pilosity of first gastral tergite sparse, seta length less than distance between them.

Color dark brown.

The *queen* is unknown.

Biology. The type series is from lowland Amazonian rainforest, in a Berlese sample of forest floor litter.

Etymology. The name refers to the woolly ground pilosity. It is a noun in apposition and thus invariant.



FIGURE 34. *Octostruma pexidorsum*, holotype worker (MCZ-ENT00511319), face and lateral views. Scale bar = 0.25 mm face views, 0.5 mm lateral views.

***Octostruma planities* Longino, sp. nov.**

(Figs 1B, 3B, 5O, 13B, 35, 43)

Type material. *Holotype worker*: NICARAGUA, Región Autónoma del Atlántico Sur: 27 km WSW Rama, 12.12267, -84.46227, ±100 m, 50 m, 18 Apr 2011, 2nd growth riparian forest, ex sifted leaf litter (J. Longino#7323-s) [CAS, unique specimen identifier CASENT0619872]. *Paratype workers*: same data [MCZC, CASENT0625029]; same data except 13 km WNW Rama, 12.19470, -84.33665, ±100 m, 190 m, 2nd growth forest, ex sifted leaf litter (J. Longino#7322-s) [USNM, CASENT0625016].

Geographic range. Mexico to Costa Rica.

Diagnosis. Face lacking transverse arcuate carina; basal five teeth of mandible acute; apex of labrum bilobed; face typically with 2 spatulate setae on posteromedian vertex margin (Fig. 5O), lacking elsewhere on face, mesosomal dorsum, and first gastral tergite; filiform setae lacking on petiole, postpetiole, first gastral sternite; dorsal face of propodeum flat or weakly convex over entire length; metanotal groove not impressed; HW < 0.72.

Description. *Worker*. HW 0.58–0.71, HL 0.55–0.65, WL 0.64–0.79, CI 104–109 (n=12). Similar in most respects to *O. cyrtinotum* and *O. montanis*, excepting the characters noted in the Diagnosis. Color orange.

The *queen* is unknown.

Biology. *Octostruma planities* is a lowland species that occurs in a wide variety of habitats including rainforest, seasonal moist forest, seasonal dry forest, and thorn scrub. Collections are from sea level to 600 m elevation. All collections are from Winkler or Berlese samples of sifted litter and rotten wood from the forest floor.

Comments. Specimens from wet forest sites on the Caribbean side of the range tend to have the surface of the clypeus matte, while specimens from dry habitats in central and western parts of the range have the clypeus shiny. Thus there is the potential of cryptic or ecotonal species.

Etymology. The name refers to its restriction to lowland areas. It is a genitive singular noun and thus invariant.



FIGURE 35. *Octostruma planities*, holotype worker (CASENT0619872), face and lateral views. Scale bar = 0.2 mm face view, 0.5 mm lateral view.

***Octostruma rugifera* (Mayr, 1887)**

(Figs 6A, 44)

Rhopalothrix rugifer Mayr 1887: 579. Syntype workers: Brazil, Santa Catarina [NMW?] (not examined). Combination in *Octostruma*: Brown 1949: 92. See also Brown & Kempf, 1960: 199.

Rhopalothrix (Octostruma) truncata Forel 1912: 196. Holotype queen: Brazil, Rio de Janeiro: Corcovado (Dr. Arth. Müller) [MHNG?] (not examined). Combination in *Octostruma*: Brown 1949: 92. Junior synonym of *Octostruma rugifera*: Brown & Kempf, 1960: 199.

Geographic range. Southern Brazil, Colombia, Venezuela.

Comments. Palacio (1997) reports a Colombian record, incorrectly reported as "*rugiferoides* (Mayr 1887)". Specimens from Brazil and Venezuela were directly compared, and no significant geographic variation was discovered.

***Octostruma rugiferoides* Brown & Kempf, 1960**

(Figs 1G, 3F, 6B, 14G, 36, 44)

Octostruma rugiferoides Brown & Kempf, 1960: 200, fig. 20. Holotype worker: Mexico, Veracruz: Pueblo Nuevo, near Tetzonapa, 13 Aug 1953, in leaf litter of dry, rocky, tropical evergreen forest (E. O. Wilson) [MCZC] (examined); paratype worker: same data as holotype but 7 Aug 1953 [MZSP].

Geographic range. Mexico, Guatemala.

Description. *Worker.* The description of Brown and Kempf is supplemented with these new measurements: HW 0.54–0.57, HL 0.53–0.54, WL 0.52–0.55, CI 103–105 (n=3).

Queen (previously undescribed). HW 0.59, HL 0.57, WL 0.68, CI 103 (n=1). Posterior margin of head evenly rounded (Fig. 14G); labrum, mandible, anterior clypeal margin, scape, antennal scrobe similar to worker; clypeus smooth, delimited from frons by faint clypeal suture; concave frons anterior to facial arc sublucid, very faintly rugulose; facial arc crenulate; sculpture posterior to arc irregularly rugulose, like worker; face with 10 erect setae distributed evenly on facial arc, 6 setae on posterior margin of head; ocelli distinct; compound eye multifaceted, about 6 ommatidia in longest row.

Mesosoma with queen-typical alar sclerites; pronotum mostly foveolate, with a few rugulae on humeri; mesoscutum and scutellum with faint foveolation overlain by irregular longitudinal rugae; anepisternum and katepisternum separated by strong sulcus; mesopleuron and side of propodeum foveolate; posterodorsal propodeum forming a single concave face, faintly foveolate; propodeal spines low, obtuse, laminar, continuous with an infradental lamella; on single available queen, pronotum with 2 erect setae, mesoscutum with 6, axilla with 1, scutellum with 2, postpetiole with 3, first gastral tergite with about 24.

Biology. The types were collected by E. O. Wilson in leaf litter of dry, rocky, tropical evergreen forest. New material collected by the LLAMA project was in scrubby wet forest of eastern Chiapas and the seasonal evergreen forests of the Tikal region in Guatemala. All specimens were from Winkler samples of sifted leaf litter from the forest floor.

Comments. Palacio (1997) reports *O. rugiferoides* for Colombia, but clearly meant *O. rugifera*, because he describes the species as occurring in Brazil and Argentina, and gives the author as (Mayr 1887). Comparison of new Guatemala and Chiapas material to the holotype revealed no significant geographic variation.

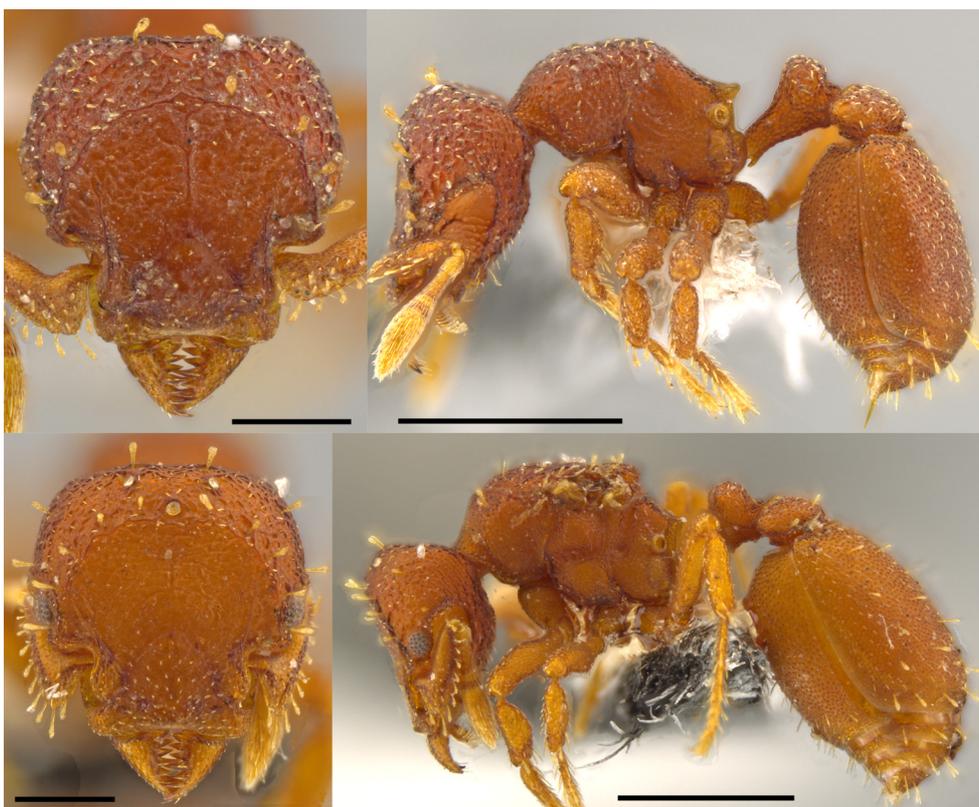


FIGURE 36. *Octostruma rugiferoides*, worker (CASENT0614166, Guatemala), queen (CASENT0610439), face and lateral views. Scale bar = 0.2 mm face view, 0.5 mm lateral view.

***Octostruma schusteri* Longino, sp. nov.**

(Figs 1B, 3B, 5N, 37, 43)

Type material. *Holotype worker:* GUATEMALA, Suchitepéquez: 5 km S Vol. Atitlán, 14.54074, -91.18815, ±35 m, 1400 m, 18 Jun 2009, cloud forest, ex sifted leaf litter (LLAMA, Wm-B-09-2-07) [CAS, unique specimen identifier CASENT0611856]. *Paratype workers:* same data except 5.5 km S Vol. Atitlán, 14.52857, -91.19569, ±200 m, 1070 m, riparian forest, ex sifted leaf litter (LLAMA, Wm-B-09-2-08) [USNM, CASENT0611871; MCZC, CASENT0627368; UVGC, CASENT0627369; JTLC, CASENT0627370].

Geographic range. Guatemala.

Diagnosis. Face lacking transverse arcuate carina; basal five teeth of mandible acute; apex of labrum bilobed; mesosomal dorsum and first gastral tergite lacking erect setae; HW > 0.80.

Description. *Worker.* HW 0.82–0.87, HL 0.71–0.74, WL 0.88–94, CI 116–119 (n=5). Differing from *O.*

gymnosoma in the following respects (*O. gymnosoma* characters in parentheses): clypeus and face sublucid, clypeus smooth with shallow, widely-spaced puncta, face shallowly irregularly rugulose, tops of rugae flattened, shining (clypeus and face matte, with fainter sculpture); side of pronotum smooth (faintly punctate); first gastral tergite uniformly punctate, puncta small, diameter subequal to interspaces, interspaces smooth and shining (first gastral tergite covered with very faint, dense, confluent puncta, appearing shagreened); face with 6–8 spatulate setae, as in Fig. 5N, missing setae near eyes on some specimens (face lacking erect setae).

The *queen* is unknown.

Biology. *Octostruma schusteri* is known from cloud forest on the slopes of Volcán Atitlán, 1070–1400 m elevation, all from Winkler samples of sifted litter and rotten wood from the forest floor.

Etymology. The name is in honor of Jack Schuster, Entomologist at the Universidad del Valle, Guatemala. It is a genitive singular noun and thus invariant.



FIGURE 37. *Octostruma schusteri*, holotype worker (CASENT0611856), face and lateral views. Scale bar = 0.2 mm face view, 0.5 mm lateral view.

***Octostruma stenognatha* Brown & Kempf, 1960**

(Figs 1E, 3D, 42)

Octostruma stenognatha Brown & Kempf, 1960: 196, figs. 25, 28. Holotype worker: Brazil, São Paulo, Agudos, 23 Jan 1955, in soil cover berlesate from very moist forest (W. W. Kempf, No. 1334) [MZSP] (not examined). Paratype workers, worker intercastes: same data as holotype; São Paulo, Cantareira, 1 Mar 1959 (Kempf & Santos); Rio de Janeiro, Itatiaia (J. F. Zikán, Coll. Borgmeier); Santa Catarina, Nova Teutonia, 27° 11' S, 52° 23' W, Aug 1952 (F. Plaumann) [MCZC] (examined). Paratype queen not examined.

Geographic range. Southern Brazil.

Comments. *Octostruma stenognatha*, *O. batesi*, and *O. betschi* are all similar in size and head shape and possibly form a clade. Although geographic coverage is poor, the known specimens form an allopatric or parapatric replacement series in South America.

***Octostruma stenoscapa* Palacio, 1997**

(Fig 44)

Octostruma stenoscapa Palacio 1997: 414, figs. 2D–F. Holotype worker: Colombia, Meta: Parque Nacional Natural La Macarena, La Curia, 580 m, 1987 (L. Schneider) [ICN, ICN-MHN-HY-3580] (not examined).

Geographic range. Panama, Colombia, Ecuador.

Description. *Worker.* Supplemental measurements to those reported in Palacio (1997): HW 0.50–0.56, HL 0.52–0.58, WL 0.59–0.69, CI 95–100 (n=4).

Biology. This species is now known from a range of habitats from central Panama to Ecuador. It has been collected in lowland rainforest, second growth forest, and cloud forest. Elevations range from near sea level to 1600 m.

Comments. This highly distinctive species has mandibles like *Basiceros*, unlike any other *Octostruma* species.

***Octostruma triangulabrum* Longino, sp. nov.**

(Figs 1A, 3A, 5J, 38, 43)

Type material. *Holotype worker*: MEXICO, Chiapas: Nahá, 16.96291, -91.59335, ±2 km, 950 m, 10 Jun 2008, mesophil forest, ex sifted leaf litter (LLAMA, Wm-A-07-all) [CAS, unique specimen identifier CASENT0608768]. *Paratype workers*: same data [JTLC, CASENT0608761]; same data except 16.97417, -91.58592, ±50 m, 950 m, 14 Jul 2007 (J. Longino#6047-s) [ECOSCE, JTLC000009758; USNM, JTLC000009759]; 16.97417, -91.58592, ±50 m, 950 m, 14 Jul 2007 (R. S. Anderson#2007-013) [MCZC, CASENT0602034]; 16.96313, -91.59337, ±50 m, 985 m, 8 Jun 2008 (LLAMA, Wa-A-07-1-06) [MZSP, CASENT0627348; UCDC, JTLC000014462]; 16.96318, -91.59337, ±50 m, 985 m, 8 Jun 2008 (LLAMA, Wa-A-07-1-07) [UVGC, CASENT0627349; CAS, CASENT0627350]; 16.94866, -91.59392, ±50 m, 930 m, 8 Jun 2008 (LLAMA, Wa-A-07-2-08) [CAS, JTLC000014488].

Geographic range. Mexico (Chiapas).

Diagnosis. With the characters of *O. wheeleri* and *O. triquetrilabrum*. Differing from *O. wheeleri* in the presence of 8–12 spatulate setae on face (6 on *O. wheeleri*) and shallow reticulate rugulose sculpture on face and dorsal pronotum (nearly smooth on *O. wheeleri*). Differing from both species in a pair of spatulate setae on the mesonotum (lacking in *O. wheeleri* and *O. triquetrilabrum*).

Description. *Worker*. HW 0.73–0.78, HL 0.68–0.73, WL 0.82–0.89, CI 106–109 (n=5). Labrum as in Fig. 1A, sides straight, strap-like lateral portions converging from base to apex, fused apically (not bilobed, at most with minute notch apically), joined medially by thin translucent cuticle; mandible triangular, in profile view with mandible closed, in same plane as clypeus, apex of mandible not down-turned; mandible with 8 teeth (Fig. 3A), basal rim of dorsal surface slightly offset from base of tooth 1, forming small denticle, teeth 1–5 acute, similar in shape, teeth 5–8 forming an apical fork, with 5 and 8 large, 6 and 7 small partially confluent denticles; dorsal surface of mandible roughened; ventral surface flat and parallel to clypeus apically, twisting basally to nearly perpendicular orientation basally, smooth and shining; interior surface concave, smooth and shining; scape flattened, with pronounced anterobasal lobe, dorsal surface roughened, dull; clypeus with broad, shallow emargination anteriorly; clypeus and face shallowly, irregularly rugulose, generally matte, tops of face rugulae sublucid; frontal carinae faint, nearly obsolete; antennal socket deep, dorsal rim of socket continuous with pronounced dorsal margin of antennal scrobe; antennal scrobe deep, strongly delimited dorsally, posteriorly, and ventrally with sharply defined thin cuticular rim; compound eye small, circular, composed of about 7 ommatidia; distinct carina extends from ventral margin of antennal socket across floor of scrobe to compound eye; scrobe floor faintly foveolate, matte; vertex margin anterior to occipital carina smooth, sublucid (top of head, not visible in face view); occipital carina extends anteriorly on ventral surface of head to level of compound eye; undersurface coarsely rugose.

Promesonotum moderately convex in profile, promesonotal suture not impressed, promesonotum with broad, weak, longitudinal impression; metanotal groove not impressed; propodeum with distinct dorsal and posterior faces; dorsal face weakly convex; propodeal spines well-developed, in the form of acute flattened perpendicular plates, extending ventrally as thin carinae; single well-defined transverse carina extends between propodeal spines, separating dorsal and posterior faces of propodeum; propodeal spiracle medium-size, diameter less than width of base of propodeal spine, located below propodeal spine and abutting to somewhat separated from posterior margin; all surfaces of mesosoma matte except posterior face of propodeum, which is shiny; dorsum of promesonotum irregularly shallowly rugulose laterally, smooth medially, dorsal and posterior face of propodeum smooth, lateral pronotum smooth; meso- metapleuron and side of propodeum confluent, smooth.

Petiole in profile with peduncle differentiated from node, node with differentiated anterior face; node subquadrate to triangular, with long sloping dorsal face, posterior face short to absent; anteroventral margin with acute to peg-like tooth; postpetiole low, broad, crescent-shaped in dorsal view; dorsum of petiolar node and

postpetiole shallowly rugulose, matte; first gastral tergite densely punctate, tergal puncta smaller posteriorly, interspaces sublucid; first gastral sternite smooth, matte anteromedially, punctate posteriorly.

Anterior labral lobe with radiating tuft of soft, thick, translucent, capitate setae of unequal length projecting from apex (like Fig. 2); each larger mandibular tooth with fully appressed seta running length of tooth; anterior margin of scape with about 8 stiff clavate setae; clypeus and face with fine, sparse fully appressed ground pilosity; face typically with 10 erect clavate setae arranged as in Fig. 5J; pronotum lacking erect setae; mesonotum with a pair of erect clavate setae; mesotibia with about 5 clavate seta of variable length at apex; petiole, postpetiole, first gastral tergite lacking erect setae; ground pilosity of first gastral tergite short, sparse, fully appressed; first gastral sternite with abundant clavate setae clustered on posterior half, anterior half devoid of setae.

Color dark red brown.

The *queen* is unknown.

Biology. *Octostruma triangulabrum* occurs in montane wet forest habitats, in both mesophyl cloud forest and wet pine-oak forests, throughout the central Chiapas highlands. It occurs from 900–2750 m elevation and can be moderately abundant (up to 13% of 1 m² plot litter samples in quantitative sampling). It is only known from Winkler and Berlese samples of sifted leaf litter.

Comments. This species and Costa Rica's *O. triquetrilabrum* are extremely similar allopatric forms, differing only in the presence or absence of mesonotal setae. Intensive sampling of the litter fauna in cloud forest sites in Nicaragua, Honduras, and Guatemala has failed to reveal additional populations. Both together are quite similar to the lowland *O. wheeleri*. *Octostruma triangulabrum* is sharply parapatric with *O. wheeleri* (see Comments under *O. wheeleri*).

Etymology. The name refers to the triangular labrum that is not bilobed at the apex. It is a noun in apposition and thus invariant.



FIGURE 38. *Octostruma triangulabrum*, holotype worker (CASENT0608768), face and lateral views. Scale bar = 0.2 mm face view, 0.5 mm lateral view.

***Octostruma triquetrilabrum* Longino, sp. nov.**

(Figs 1A, 3A, 5K, 39, 43)

Type material. *Holotype worker*: COSTA RICA, Puntarenas: Est. Biol. Los Llanos, near Santa Elena, 10.30487, -84.83735, ±100 m, 1150 m, 28 Feb 2004, moist forest, ex sifted leaf litter (J. Longino#5249-s) [INBC, JTLC000004551]. *Paratype workers*: same data [JTLC, JTLC000004543]; same data except Alajuela: Casa Eladio, Rio Peñas Blancas, 10.31667, -84.71667, ±2 km, 800 m, 10 May 1989, wet forest, ex sifted leaf litter on ground (J. Longino#2529-s) [CAS, INBIOCRI001281407]; 23 May 1990 (J. Longino#2701-s) [USNM, CASENT0627377; MCZC, CASENT0627378; UCDC, INBIOCRI001282521; MZSP, INBIOCRI001282522; CAS, INBIOCRI001282523].

Geographic range. Costa Rica, Panama.

Diagnosis. With the characters of *O. wheeleri* and *O. triangulabrum*. Differing from *O. wheeleri* in the

presence of 8–10 spatulate setae on face (6 on *O. wheeleri*) and shallow reticulate rugulose sculpture on face and dorsal pronotum (nearly smooth on *O. wheeleri*). Differing from *O. triangulabrum* in the absence of a pair of spatulate setae on the mesonotum (present in *O. triangulabrum*); first gastral sternite more uniformly punctate.

Description. *Worker.* HW 0.74–0.80, HL 0.68–0.72, WL 0.84–0.88, CI 109–111 (n=2). Matching in almost every respect the description for *O. triangulabrum*, except the differences outlined in the Diagnosis and key.

The *queen* is unknown.

Biology. *Octostruma triquetrilabrum* is known from two sites near Monteverde in the Cordillera de Tilarán, and one site in the mountains of western Panama. One Monteverde site is very wet, old-growth montane forest at 800 m on the Atlantic slope, and the other Monteverde site is a small patch of seasonal moist forest at 1150 m, just below the cloud forest on the Pacific slope. All specimens are from Winkler samples of sifted leaf litter.

Etymology. The name refers to the triangular labrum that is not bilobed at the apex. It is a noun in apposition and thus invariant.

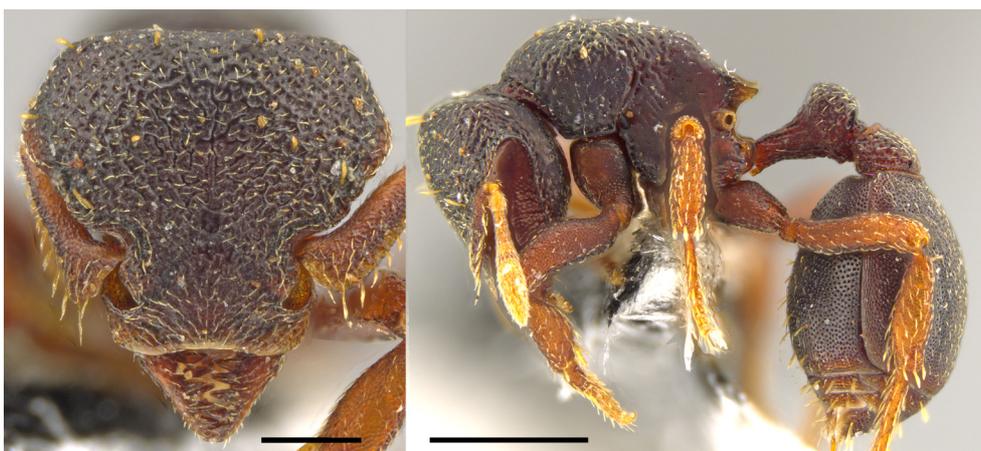


FIGURE 39. *Octostruma triquetrilabrum*, holotype worker (JTLC000004551), face and lateral views. Scale bar = 0.2 mm face view, 0.5 mm lateral view.

***Octostruma trithrix* Longino, sp. nov.**

(Figs 1E, 3D, 5A, 8A, 40, 42)

Type material. *Holotype worker:* MEXICO, Chiapas: 8 km SE Salto de Agua, 17.51611, -92.30168, ±50 m, 100 m, 14 Jun 2008, 2° wet forest, ex sifted leaf litter (LLAMA, Wa-A-08-2-03) [CAS, CASENT0639179]. *Paratype workers, queen:* same data [UCDC, CASENT0639180; UVGC, CASENT0639181; EAPZ, CASENT0639182; CAS, CASENT0639183; JTLC, CASENT0639184]; same data except 17.51442, -92.29500, ±50 m, 70 m (LLAMA, Wa-A-08-1-05) [ECOSCE, CASENT0639174; USNM, CASENT0639175; MCZC, CASENT0639176; MZSP, CASENT0639177; CAS, CASENT0639178].

Geographic range. Northern Mexico (Nuevo León) to Honduras.

Diagnosis. Mandible with 8 teeth (Fig. 3D), tooth 1 a broad blunt lamella, strongly differentiated from tooth 2, teeth 2–5 acute, similar in shape, with denticles between them; teeth 5–8 forming an apical fork, with 5 and 8 large, 6 and 7 small partially confluent denticles (*O. balzani* complex); face setation as in Fig. 5A, erect setae present on posterolateral margins of head (absent in *O. amrishi* and *O. gymnogon*); in most workers of a series, a seta present between anterior seta on side of head near eye and medial vertex seta (this seta typically absent in *O. balzani*, *O. megabalzani*, *O. amrishi*, and *O. gymnogon*); mesosomal dorsum with one pair of erect setae (absent in *O. amrishi*, *O. gymnogon*; 2 pairs in *O. lutzii*); metanotal groove not impressed in profile view (impressed in *O. balzani* and *O. megabalzani*).

Description. *Worker.* HW 0.54–0.62, HL 0.50–0.58, WL 0.52–0.66, CI 102–112 (n=7). Matching in almost every respect the description for *O. balzani*, except the differences outlined in the Diagnosis and key. In addition to characters in the Diagnosis, first gastral tergite typically with 8–16 erect setae, color red brown.

Queen. HW 0.59–0.64, HL 0.55–0.60, WL 0.70–0.75, CI 103–107 (n=7). Similar to *O. balzani* in most respects; 4–6 setae across vertex between compound eyes (2–4 in *O. balzani*); postpetiolar disc with 4–6 erect setae (2–4 in *O. balzani*).

Biology. In the southern portion of its range, *Octostruma trithrix* occurs in a variety of forested habitats: wet to seasonal dry, second growth to mature. It is typically lowland, occurring from sea level to around 700 m. In the northern part of the range it occurs in cloud forest, up to 1200 m elevation. Almost all collections are from Berlese and Winkler samples of sifted litter and rotten wood from the forest floor. In quantitative 1 m² litter plot samples, within-sample abundance is tens of workers or fewer, but the species can occur frequently, suggesting a high density of small colonies. Dealate queens may occur together with workers in litter samples.

Comments. See under *O. balzani*.

Etymology. The name refers to anterior row of three spatulate setae on the face. It is a noun in apposition and thus invariant.



FIGURE 40. *Octostruma trithrix*, holotype worker (CASENT0639179), face and lateral views. Scale bar = 0.25 mm face view, 0.5 mm lateral view.

Octostruma wheeleri (Mann, 1922)

(Figs 1A, 3A, 5I, 14A, 41, 43)

Rhopalothrix (*Octostruma*) *wheeleri* Mann, 1922: 43. Holotype worker: Guatemala, Livingston (Barber & Schwarz) [USNM] (not examined). Combination in *Octostruma*: Brown, 1949: 92.

Geographic range. Mexico (Chiapas), Guatemala, Honduras, Costa Rica, Panama.

Description. *Worker.* HW 0.69–0.85, HL 0.63–0.75, WL 0.75–1.05, CI 108–114 (n=10). Labrum as in Fig. 1A, sides straight, strap-like lateral portions converging from base to apex, fused apically (not bilobed, at most with minute notch apically), joined medially by thin translucent cuticle; mandible triangular, in profile view with mandible closed, in same plane as clypeus, apex of mandible not down-turned; mandible with 8 teeth (Fig. 3A), basal rim of dorsal surface slightly offset from base of tooth 1, forming small denticle, teeth 1–5 acute, similar in shape, teeth 5–8 forming an apical fork, with 5 and 8 large, 6 and 7 small partially confluent denticles; dorsal surface of mandible roughened; ventral surface flat and parallel to clypeus apically, twisting basally to nearly perpendicular orientation basally, smooth and shining; interior surface concave, smooth and shining; scape flattened, with pronounced anterobasal lobe, dorsal surface roughened, dull; clypeus with broad, shallow emargination anteriorly; clypeus and face sculpture varying from almost completely smooth to very shallowly, irregularly rugulose, generally matte; frontal carinae faint, nearly obsolete; antennal socket deep, dorsal rim of socket continuous with pronounced dorsal margin of antennal scrobe; antennal scrobe deep, strongly delimited dorsally, posteriorly, and ventrally with sharply defined thin cuticular rim; compound eye small, circular, composed of about 7 ommatidia; distinct carina extends from ventral margin of antennal socket across floor of scrobe to compound eye; scrobe floor faintly foveolate, matte; vertex margin anterior to occipital carina smooth, sublucid (top of head, not visible in face view); occipital carina extends anteriorly on ventral surface of head to level of compound eye; undersurface of head rugulose.

Promesonotum convex in profile, promesonotal suture not impressed; metanotal groove not impressed; propodeum with distinct dorsal and posterior faces; dorsal face weakly convex; propodeal spines well-developed, in the form of acute flattened perpendicular plates, extending ventrally as thin carinae; single well-defined

transverse carina extends between propodeal spines, separating dorsal and posterior faces of propodeum; propodeal spiracle medium-size, diameter less than width of base of propodeal spine, located below propodeal spine and abutting posterior margin; most surfaces of mesosoma matte, dorsal face of propodeum sublucid, posterior face shining; dorsum of promesonotum with sculpture similar to face, dorsal and posterior face of propodeum smooth, lateral pronotum smooth; meso-metapleuron and side of propodeum confluent, smooth.



FIGURE 41. *Octostruma wheeleri*, worker (JTLC000010028, Mexico, Chiapas), queen (CASENT0627351, Mexico, Chiapas), face and lateral views. Scale bar = 0.2 mm face views, 0.5 mm lateral views.

Petiole in profile with peduncle differentiated from node, node with differentiated anterior face; node triangular, with long sloping dorsal face; anteroventral margin with peg-like tooth; postpetiole low, broad, crescent-shaped in dorsal view; dorsum of petiolar node and postpetiole shallowly rugulose, matte; first gastral tergite densely punctate, interspaces sublucid; first gastral sternite uniformly punctate.

Anterior labral lobe with radiating tuft of soft, thick, translucent, capitate setae of unequal length projecting from apex (like Fig. 2); each larger mandibular tooth with fully appressed seta running length of tooth; anterior margin of scape with about 8 stiff clavate setae; clypeus and face with fine, sparse fully appressed ground pilosity; face typically with 6 erect clavate setae arranged as in Fig. 5I; mesosomal dorsum lacking erect setae; mesotibia with about 5 clavate seta of variable length at apex; petiole, postpetiole, first gastral tergite lacking erect setae; ground pilosity of first gastral tergite short, sparse, fully appressed; first gastral sternite with abundant clavate setae clustered on posterior half, anterior half devoid of setae.

Color dark brown.

Queen (previously undescribed). HW 0.86, HL 0.75, WL 1.06, CI 115 (n=1). Head shape as in Fig. 14A; labrum, mandible, scape, antennal scrobe similar to worker; clypeus and face shallowly irregularly rugulose, tops of rugulae sublucid; face with one pair erect setae in front of eyes, one pair on posterolateral margin, one pair on posteromedian margin, one pair on medial frons (8 total); ocelli distinct; compound eye large, multifaceted, about 12 ommatidia in longest row.

Mesosoma with queen-typical alar sclerites; pronotum matte, faintly and sparsely punctate anteriorly and laterally, coarsely rugulose on humeri; mesoscutum, scutellum, dorsal face propodeum coarsely longitudinally

rugose; anepisternum and katepisternum separated by strong sulcus; anepisternum, katepisternum, and side of propodeum matte, smooth; propodeal spines triangular, acute; pronotum with 2 erect setae, mesoscutum with about 12, axilla with 1, scutellum with 2, metanotum with 2, petiolar node with 2, postpetiolar disc with 2, first gastral tergite with about 25. Other characters similar to worker.

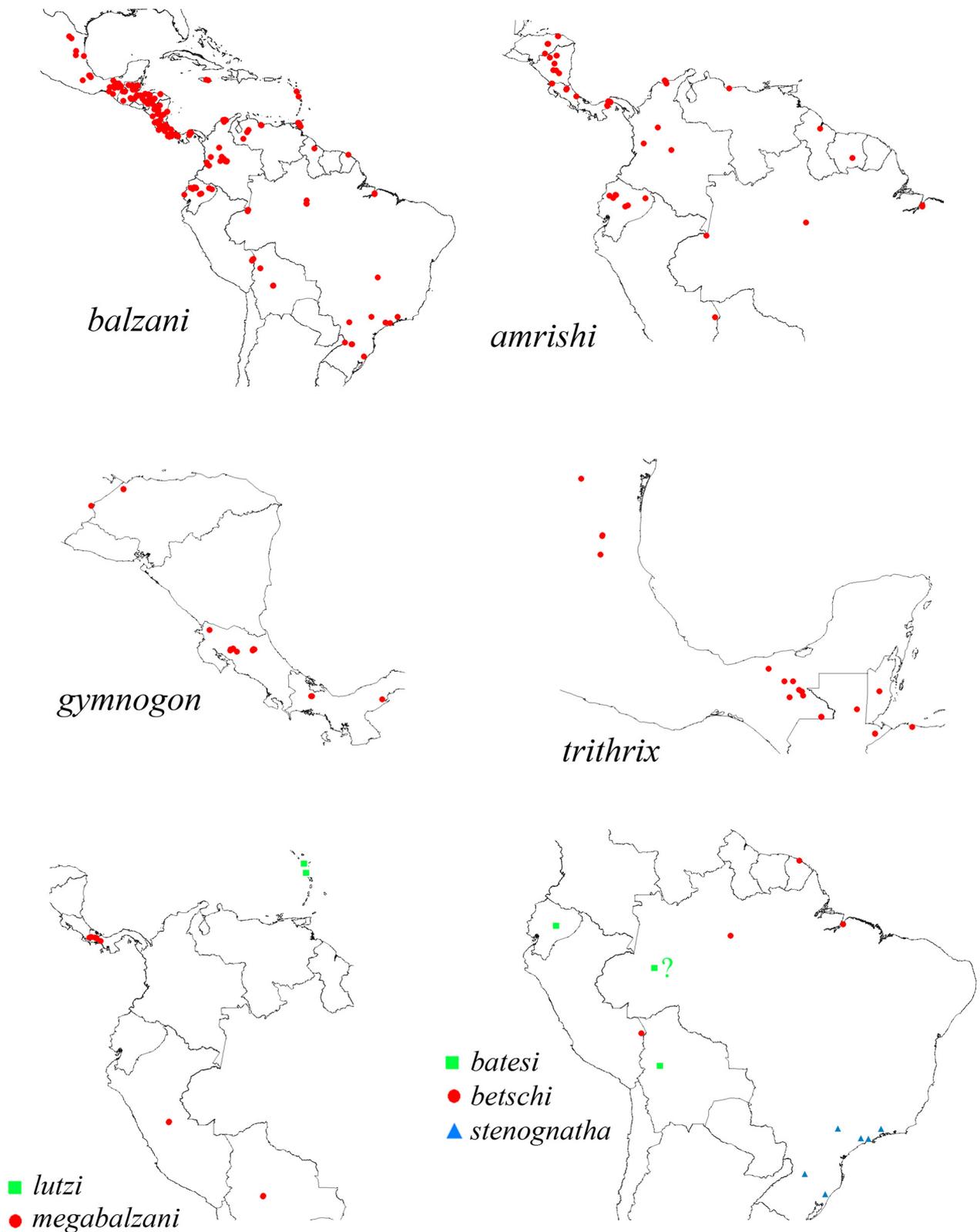


FIGURE 42. Distribution maps of *Octostruma* species.

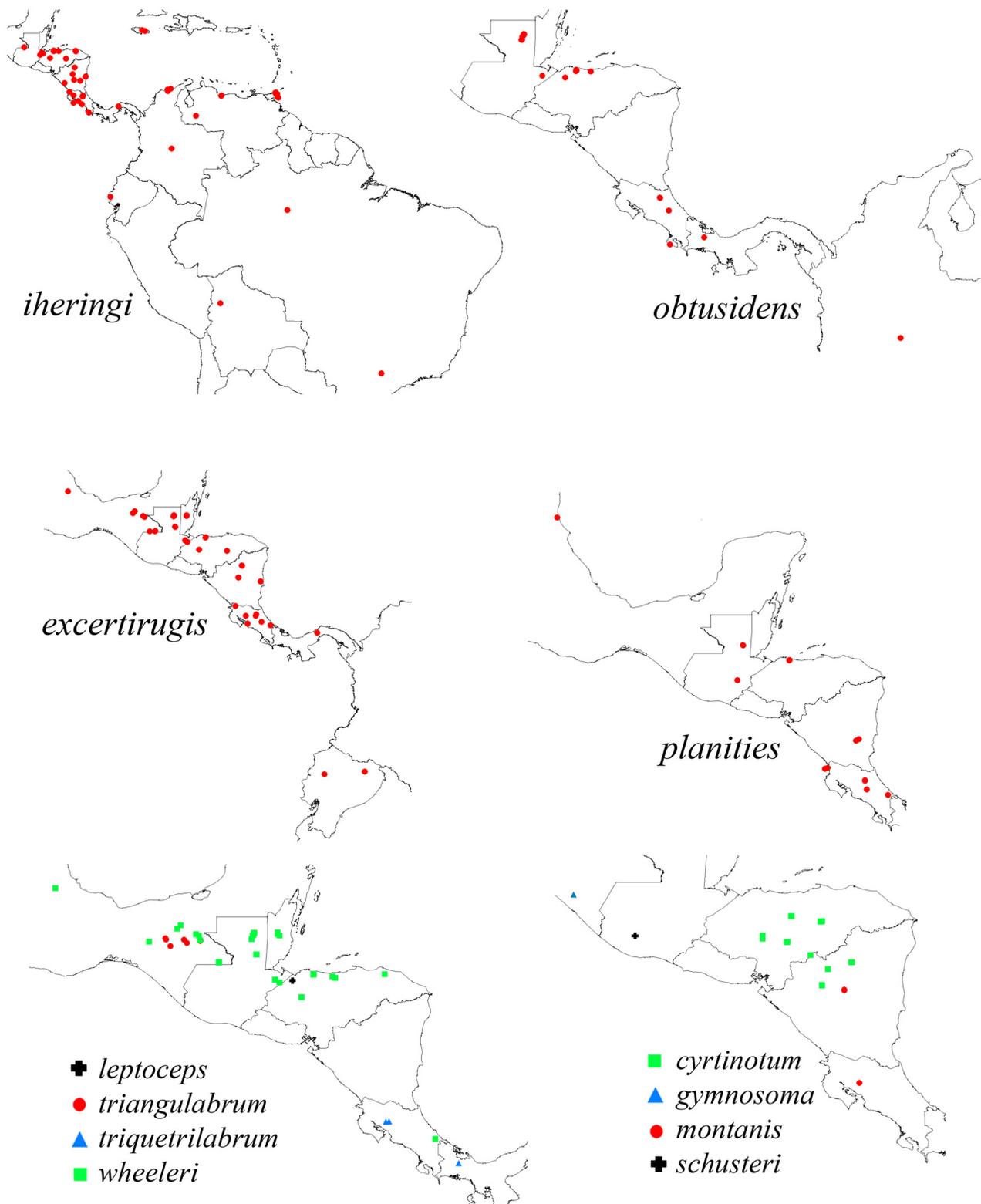


FIGURE 43. Distribution maps of *Octostruma* species.

Biology. *Octostruma wheeleri* occurs in lowland rainforest, seasonal moist forest, and occasionally in cloud forest habitats. It occurs from sea level to 1100 m elevation, with greatest abundance below 600 m (up to 16% of 1 m² plot litter samples in quantitative sampling). It is only known from Winkler and Berlese samples of sifted leaf litter.

Comments. Brown and Kempf (1960) measured and redescribed the holotype. The measurements (HW 0.71, HL 0.64, CI 111) and description clearly match the concept of *O. wheeleri* adopted here. Quantitative sampling in Chiapas revealed a sharp parapatric distribution with the highland *O. triangulabrum*, with a narrow zone of sympatry around 1000 m elevation. At three lowland sites in Chiapas, *O. wheeleri* occurred in 12%, 11%, and 12% of 100 plot samples, and *O. triangulabrum* was absent. At Nahá, at 980 m elevation and only 20 km away from one of the lowland sites (Laguna Metzabok at 570 m elevation), *O. triangulabrum* occurred in 13% of samples and a single *O. wheeleri* specimen was found.

Specimens from Chiapas to Honduras are uniform with respect to face setae. A worker from Las Marias in eastern Honduras is lacking the posteromedian pair. The single worker from Hitoy Cerere, Costa Rica, has a single posteromedian pair, lacking the lateral and ocular setae.

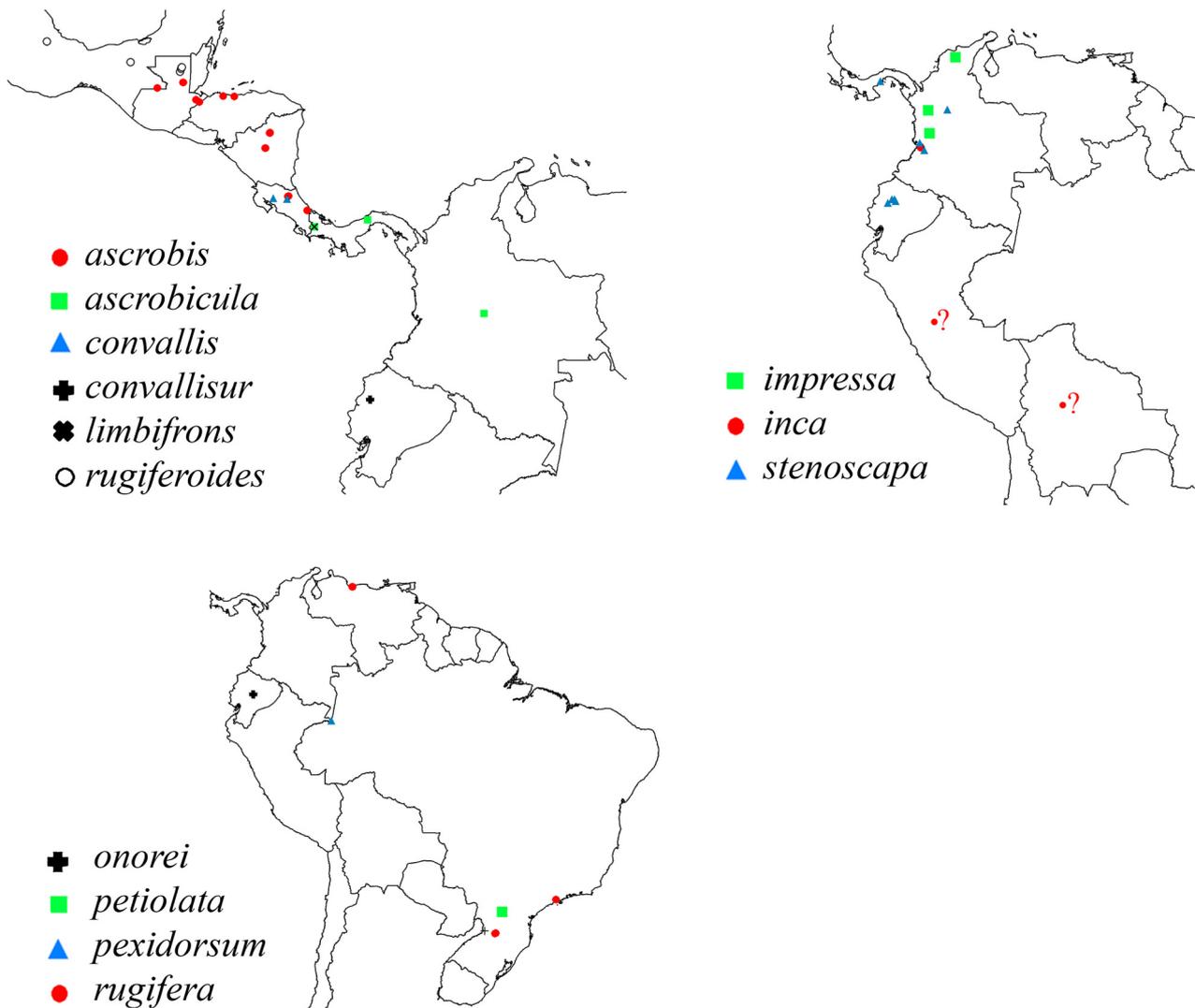


FIGURE 44. Distribution maps of *Octostruma* species.

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