A Review of the *Camponotus montivagus* Complex (Hymenoptera: Formicidae)

by

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ABSTRACT

The species comprising the *Camponotus montivagus* complex of MacKay & MacKay (1997) are re-examined. Although the MacKays placed this complex in the subgenus *Myrmentoma*, it is here removed from that subgenus and left unassigned until the relationships of all the New World subgenera of *Camponotus* are properly reevaluated, a task beyond the scope of this paper.

Based on an examination of appropriate type material I have determined that the MacKays misidentified two of the species. Specimens that are a part of the original sample from which *C. nitidus* Norton was described have been examined; since the name is a junior homonym, a replacement name, *C. rectithorax* was proposed by Forel (1895). The "lectotype" proposed by the MacKays for *C. rectithorax* Forel, is invalid, since it was not from Norton's original material; a proper lectotype is here designated. The putative "lectotype" is actually a syntype of *C. montivagus*; *C. montivagus* and *C. rectithorax*, *sensu* the Mackays, are thus coextensive. The species that they incorrectly identified as *C. montivagus* is equivalent to Norton's species and thus properly bears the name *C. rectithorax*. *Camponotus montivagus* var. *nuperus* Wheeler 1914 is a synonym of *C. rectithorax* (new synonymy).

Camponotus pertusus MacKay & MacKay, described from several workers from Trinidad is removed from this species complex and placed in the synonymy of the Nearctic species *C. essigi* M.R. Smith (new synonymy); the type locality is apparently not the West Indian island of Trinidad, but instead is presumably Trinidad, Humboldt County, California.

The *C. montivagus* complex is recharacterized in light of the above changes and a new key is presented for the species of this complex. Each species is represented by appropriate illustrations.

INTRODUCTION

MacKay & MacKay (1997) dealt with a few species of *Camponotus* from Central America and Trinidad in what they termed the *Camponotus*

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montivagus complex or group. In doing so they committed procedural and taxonomic errors; the purpose of the present paper is to re-analyze the *montivagus* complex and to correct those errors.

In 1868 Edward Norton, in two papers (1868a, 1868b) referred to a Mexican ant species as *Formica nitida* Norton (1868a, a nomen nudum) and subsequently described it as *Camponotus* (*Formica*) *nitidus* (1868b); this species had been observed at Orizaba, in the State of Veracruz by Prof. Sumichrast, who sent the specimens to Norton. Since the specific name was preoccupied by F. Smith 1859, the earliest of several such proposals (Bolton 1995), the new name *C. rectithorax* was proposed by Forel (1895). Forel regarded this ant as a northern race of his *C. montivagus*, which he had earlier described (1885) as a Guatemalan race of *C. nitidus*.

Later, Forel (1914) placed *C. montivagus* in the subgenus *Myrmamblys*, at that time a catch-all for a highly diverse assemblage of species, but Emery (1925) moved it to the subgenus *Myrmentoma*, a Holarctic group generally associated with northern, temperate zone, hardwood forests, commonly nesting in oaks, hickory and other hardwoods. In reviewing the subgenus *Myrmentoma*, however, Snelling (1988) excluded *C. montivagus* and its two subspecies with the remark that it ". . . appears to be most closely allied to those currently placed in the subgenus *Pseudocolobopsis*." Subsequent authors (Bolton 1995; MacKay & Mackay 1997) have interpreted this to constitute a transfer of these taxa to *Pseudocolobopsis*. This was not my specific intent, but the point is minor and now moot.

Most recently, MacKay & MacKay (1997) have examined the species in the *C. montivagus* complex, which they returned from *Pseudocolobopsis* to *Myrmentoma*. Two new species were described: *C. melinus* (Mexico) and *C. pertusus* (Trinidad); a lectotype was designated for *C. rectithorax* Forel.

MATERIALS AND METHODS

Specimens were examined from the following collections:

CASC - California Academy of Sciences, San Francisco.

LACM - Natural History Museum of Los Angeles County, Los Angeles.

MCZC - Museum of Comparative Zoology, Harvard University, Cambidge.

MNHG - Museum d'Histoire Naturelle, Geneve.

USNM - National Museum of Natural History, Washington.

The following abbreviations are used for measurements (mm) and ratios:

CI - cephalic index: HW/HL x 100.

EL - Eye length: Maximum length of eye in frontal view.

HL - Head length: Maximum length of head in frontal view, from dorsal margin of vertex to lowermost point of clypeus.

HW - Head width: Maximum width of head in frontal view, excluding the compound eyes.

OMD - Oculomandibular distance: Length of malar area, from lowest part of compound eye to nearest point of mandible.

SI - Scape index: SL/HL x 100.

TL - Total length: HL + WL + length of metasoma (petiole + gaster)

WL - Weber's length: diagonal length of mesosoma, from anterior margin of pronotum to margin of propodeal valvules.

Systematics

Before dealing with the species of the *montivagus* complex, it is necessary to exclude *C. pertusus*, described by the MacKays from 2 specimens from Trinidad. In my opinion, this is the only species they treated that is, in fact, a true *Myrmentoma*, and it is here removed from the *montivagus* complex:

Camponotus (*Myrmentoma*) *essigi* M.R. Smith
(Figs. 3 & 7).

Camponotus caryae subsp. *essigi* M.R. Smith 1923:306; worker, gyne [USNM, LACM, MCZC; examined].

Camponotus (*Myrmentoma*) *essigi*: Creighton 1950:385, 387. Wheeler and Wheeler 1986:61. Snelling 1988:59, 68-69.

Camponotus (*Myrmentoma*) *nevadensis* Gregg 1973:39-43; worker [USNM, LACM, MCZC; examined]. Synonymy by Snelling 1988.

Camponotus pertusus MacKay & MacKay 1997:330-331; worker [USNM; examined; paratype in the MacKay collection not examined]. **New Synonymy**

This species was described from three major workers from an unspecified locality in Trinidad, in the West Indies. In the discussion following the description of *C. pertusus* the MacKays noted that this ant is "very closely related to *C. essigi*" and distinguished between the two by means of trivial differences in the lengths of the appressed gastral pubescence. *Camponotus essigi* is a common and well-known species in the western United States (Snelling 1988) and that it should be closely related to a species found in Trinidad seemed unlikely to me. I have examined the type and one paratype of *C. pertusus* and find that this taxon is conspecific with *C. essigi* (new synonymy), and is apparently not from the island of Trinidad.

The label on the type specimens reads merely "Trinidad/summer

1907/ O. W. Barrett" (the label clearly gives the year as 1907, not 1908 as stated by the MacKays in their paper). The only Trinidad that I can locate in the western United States is Trinidad, Humboldt County, California; *C. essigi* occurs in this area. While I have examined no other specimens collected by O. W. Barrett, it is certainly arguable that Trinidad refers to this community rather than the South American Island, where no species belonging to the subgenus *Myrmentoma* is known to exist. This would appear to be the correct type locality for *C. pertusus*.

Finally, it should be noted that Fig. 4 by the MacKays is wrongly identified as representing the head of the holotype of *C. pertusus*. Whatever it may be, it is not that ant: it is a frontal view of the head of a major worker of a *Camponotus* that is almost certainly not related to any of those treated in their paper. It is shown as distinctly longer than broad (CI ca. 87), with straight sides that are evenly convergent toward the mandible bases. The description *C. pertusus* gives the CI as 95-100 with the sides of the head broadly rounded and this accords with the type specimens. In the type the head is distinctly broad, about as broad as long. The sinuate ventral clypeal margin in the figure is not at all similar to the deep, semicircular median notch seen in *Myrmentoma* species and the *C. pertusus* types (Fig. 3). Because the figures are unreliable I cannot now hazard a guess as to what the species they illustrated might be, other than that it is neither what it purports to be nor a member of the *montivagus* complex.

With *C. pertusus* removed from the *montivagus* complex we are now left with what appears to constitute a natural complex of three morphologically similar and geographically proximate species. While the Mackays may be correct in removing *C. montivagus* and its allies from *Pseudocolobopsis*, I remain firm in my opinion that the three species remaining in this complex do not belong in *Myrmentoma*.

Myrmentoma and the *montivagus* complex

In my study of *Myrmentoma* (1988) I noted several features characteristic of this subgenus: "Both females and workers possess a distinct semicircular median notch on the apical margin of the clypeus; the head of the major, in frontal view, is approximately as broad as long, with the lateral margins not notably convergent from occipital corner to base of mandible. Pilosity, whether as erect hairs or as very fine appressed hairs, is sparse to scattered (except on the gaster of two species). The head shape of the female is similar to that of the worker media rather than that of the worker major."

The above characterization was certainly adequate to differentiate

the Nearctic *Myrmentoma* from other elements of that fauna. There are, however, additional characteristics that could have been noted, including that the head of the majors, in frontal view, is usually orbiculate in shape; when not clearly so, the margins are distinctly convex. The head shape of the minor and media workers is very different: the sides of the head are more or less straight and are either approximately parallel or convergent below. The distinction between major workers and the minors plus medias is clear-cut and intermediates between the two subcastes are uncommon.

The mandibles are stout and provided with five or six teeth. Sculpture varies and the outer surface may be smooth between scattered piligerous punctures or roughened and dull, with coarse punctures and/or distinct longitudinal costae. There is no specialized basal depression on the outer face.

The mesosoma, in profile, is usually more or less strongly arcuate, presenting a regular curve from the pronotum to the summit of the posterior face of the propodeum (except *C. hyatti* Emery, in which it is abruptly subangulate); the juncture of the dorsal and posterior faces of the propodeum varies from broadly rounded to subangulate, with the posterior face sometimes concave in profile. When viewed in profile, the anterior margin of the mesonotum is not abruptly raised above the posterior margin of the pronotum (Fig. 7).

Erect hairs are always present on the dorsum to varying degrees, including (but not limited to) the summit of the posterior declivity of the propodeum.

The node of the petiole is usually strongly convex or even subangulate in posterior view; in profile, the summit is narrowly rounded, but not acute. Erect hairs are present across the summit.

According to MacKay & MacKay, the species of the *montivagus* complex possess all those features that I ascribed to *Myrmentoma* in 1988, "except that the clypeal notch is poorly developed in some specimens of a given series or possibly in some of the species, and the head is usually longer than broad and narrowed anteriorly." This complex was further characterized as ". . . having long maxillary palps (extending nearly to foramen magnum . ."), in having all of the parts (pronotum, metanotum and propodeum) of the mesosoma in approximately the same plane, and in having a strongly angulate propodeum (except *C. melinum*)."

According to the criteria set forth by the MacKays, the *montivagus* complex is "definitely not a member of the subgenus *Pseudocolobopsis* as the antennal scapes are relatively long, the maxillary palps are long (characteristics never found in *Pseudocolobopsis*), the clypeal carina is

poorly developed (well developed in most *Pseudocolobopsis*), they are apparently monomorphic or weakly polymorphic (dimorphic in most *Pseudocolobopsis*, trimorphic in the rest) and the vertex is usually straight or broadly rounded (found in the *alboannulatus* complex, which is presently considered to be a member of *Pseudocolobopsis*, but which is quite distinct from the *montivagus* group)."

The statement that *Pseudocolobopsis* species never have "relatively" long antennal scapes or long maxillary palps applys only to gynes and major workers; minor workers do, indeed, possess long antennal scapes and long maxillary palpi as they do in nearly all species of *Camponotus*. They neglected to note that major workers of species assigned to other subgenera may also have short maxillary palpi and relatively short scapes.

Since so few specimens are known of the species of the *montivagus* complex, the statement that the species are monomorphic or weakly polymorphic could not be proven one way or the other, although I agree that this appears to be true. In my opinion, the MacKays advanced no convincing evidence that the several species in the *montivagus* complex should be excluded from *Pseudocolobopsis*, a subgenus for which is yet to be given a definition more restrictive than that established by Emery (1925).

Recharacterization of the *montivagus* complex

Beyond the few vague features set forth above, the MacKays have not shown that "this species complex is easily recognized among the Neotropical *Camponotus* species." In fact, none of the three species belonging to this complex is truly neotropical. The distributions of all three species are within the montane nearctic element that extends deeply into Central America. The several included species are found in the highlands of Mexico and Guatemala, where they occur in pine/oak woodlands. Colonies are found under the bark of pines (Norton 1868a) or in the trunks of live oaks (Wheeler 1914).

The statement that "[t]he strongly angulate pronotum separates this species complex from nearly all other New World species in the genus *Camponotus*" is puzzling. Presumably "pronotum" is a *lapsus* for propodeum, but, even so, the statement is incorrect. In fact, the type species of *Pseudocolobopsis*, *C. macrocephalus* Emery 1894, has a strongly angulate propodeal profile. And, the ". . . entire dorsum of the mesosoma is nearly in the same plane" in that species also, as it is in the *montivagus* complex.

The removal of *C. pertusus* from the *montivagus* complex necessitates the following recharacterization of the complex. Worker caste essen-

tially monomorphic, HW of largest workers only about 1.2-1.3X that of smallest workers. Head shape of gyne about as in largest workers.

Mandibles with 5 teeth; posterior margin of outer face cariniform; outer face with conspicuous basal triangular fovea; ventral margin of median lobe of clypeus either broadly convex (*C. melinus*, *C. rectithorax*, Fig. 2) or broadly and shallowly concave (*C. montivagus*, Fig. 1); clypeal disc broadly convex from side to side, without median carina; sides of head, in frontal view, straight or nearly so, broadest at level of eyes and evenly narrowed toward mandibular insertions; vertex flat to broadly convex in frontal view; scape relatively long, extending beyond dorsolateral angles of head; mesosomal dorsum nearly plane in profile, anterior margin of mesonotum raised above posterior margin of pronotum; juncture of dorsal and posterior faces of propodeum broadly rounded (Fig. 4) to subangulate (Figs. 5 & 6), posterior face straight to weakly concave in profile (more strongly concave when segment is partially collapsed); summit of petiole node sharp in profile, broadly convex in posterior view.

Pilosity, whether as coarse erect hairs or fine prostrate pubescence, sparse in all areas; mesosomal dorsum and petiole crest without erect hairs.

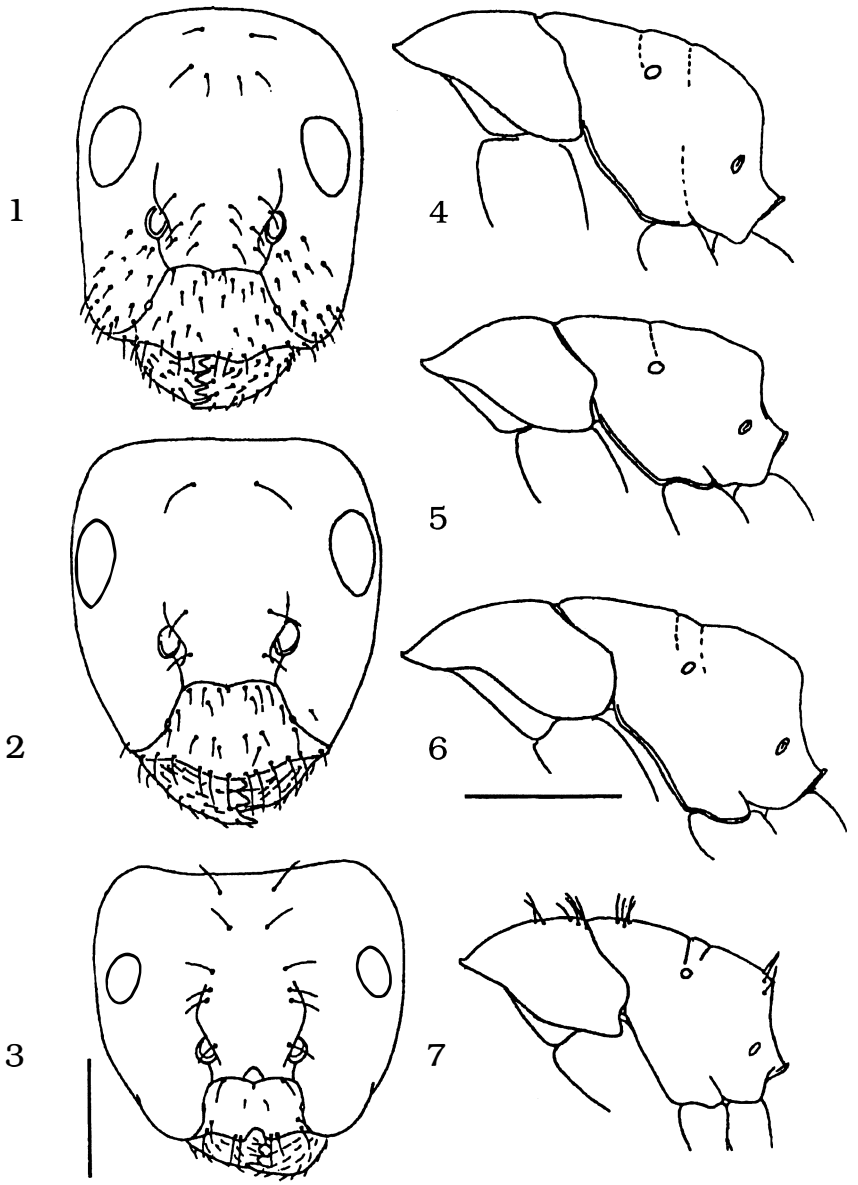
Features that are especially distinctive for this complex include the presence of the triangular mandibular fovea described above, the absence of a median clypeal carina, the nearly plane mesosomal dorsum that lacks standing hairs, the broadly rounded to subangulate propodeal profile with slightly convex posterior face, and the absence of standing hairs on the crest of the petiole. Additional features include the nearly monomorphic worker caste and the head shape of the gyne similar to that of the largest workers.

Placement of the *montivagus* complex

This complex must be specifically excluded from the subgenus *Myrmentoma* on the basis of all of the above characteristics, but especially the presence of the mandibular fovea and the lack of the deep semicircular notch, confined to the middle of the median clypeal lobe, that has long been recognized as diagnostic for all *Myrmentoma* species.

Similarly, exclusion from *Pseudocolobopsis*, *Colobopsis*, and other subgenera seems warranted. In all these the mandibular fovea is absent and standing hairs are usually present on the mesosomal dorsum. In many of these, too, a distinct median clypeal carina is present and the head shape is very different.

For the present, the systematic placement of this complex must remain uncertain pending a thorough re-evaluation of all the various



Figs. 1-7, *Camponotus* spp., major workers. 1-3, frontal view of head: 1, *C. montivagus* syntype; 2, *C. rectithorax* (= *C. nitidus* syntype); 3, *C. essigi* (= *C. pertusus* holotype). 4-7, lateral view of mesosoma:4, *C. melinus* paratype; 5, *C. montivagus* syntype; 6, *C. rectithorax* (= *C. nitidus* syntype); 7, *C. essigi*. Scale lines = 1 mm; figures 1, 2, 4-6 to same scale; figures 3, 7 to same scale.

groups of New World *Camponotus*.

KEY TO WORKERS OF *CAMPONOTUS MONTIVAGUS* COMPLEX

1. Ventral margin of median lobe of clypeus broadly and evenly convex (Fig. 2); malar area with at most a few erect hairs near margins of clypeus 2
— Ventral margin of median lobe of clypeus broadly and evenly concave (Fig. 1); malar area with 10+ erect hairs ..... *C. montivagus*
2(1) Propodeum, in profile, abruptly subangulate, posterior face slightly concave (Fig. 6) ..... *C. rectithorax*
— Propodeum, in profile, broadly rounded into vertical posterior face (Fig. 4) ..... *C. melinus*

Camponotus melinus MacKay & MacKay
(Fig. 4)

Camponotus (*Myrmentoma*) *melinus* MacKay & MacKay 1997:325, 326-327; figs. 1, 2, 7; workers. MEXICO, Morelos: (near Cuernavaca), 15 mi S El Guarda, 14 Nov. 1946, "WSR" [CASC, LACM; examined]. Paratypes in several other collections not examined.

The figure of the mesosoma of *C. melinus* is inaccurate, especially in the profile of both the pronotum and the propodeum. For that matter, the mesosomata of *C. montivagus* and *C. rectithorax* are also inaccurately portrayed. All three are more similar than the figures by the MacKays would suggest.

Little can be added to the information provided in the original description. This species is presently known only from the type series. In all respects it is similar to *C. rectithorax*, differing only in its paler color and the more rounded propodeal profile. These differences seem trivial and whether or not they are consistent when more material becomes available remains to be seen.

The MacKays cite the collector as "WSR [William Ross?]". The correct name for the collector is Wilda S. Ross, the former wife of E. S. Ross, Entomology Curator Emeritus at the California Academy of Sciences.

Camponotus montivagus Forel
(Figs. 1 & 5)

Camponotus nitidus race *montivagus* Forel 1885:347-348; worker, soldier. Lectotype, here designated: worker, "Tecpam"[= Tecpán], 7000 ft. el., Guatemala, M. Stoll (MHNG); paralectotypes: 6 workers, same data, 1 in LACM, 5 in MHNG.

Camponotus (*Myrmamblys*) *montivagus*: Forel 1914:272.

Camponotus (*Myrmentoma*) *montivagus*: Emery 1925:118.

Camponotus (*Pseudocolobopsis*) *montivagus*: Snelling 1988:57.

Camponotus (*Myrmentoma*) *rectithorax*: Mackay & Mackay 1997:325, 331-333. MISIDENTIFICATION

DIAGNOSIS

This species belongs to the *C. montivagus* complex, as redefined above, and is most similar to *C. rectithorax*. It differs from that species and from *C. melinus* in the presence of numerous erect to suberect hairs on the cheeks and malar areas. The mesosomal profile (Fig. 5) is essentially the same as that of *C. rectithorax*.

The MacKays misidentified this species as *C. rectithorax*, for which they designated a lectotype that is actually a syntype of *C. montivagus*. Their failure to correctly identify this species presumably is the result of either not having read the original description carefully (which does mention the presence of many erect hairs on the lower face) or of their failure to examine type material available in the Museum d'Histoire naturelle, Geneve.

Camponotus rectithorax Forel
(Figs. 3 & 6).

Formica nitida Norton 1868a:60. *Nomen nudum*.

Camponotus (*Formica*) *nitidus* Norton 1868b:2; worker. Junior secondary homonym of *Formica nitida* F. Smith 1859:138. Workerlectotype (by present designation): MEXICO [Orizaba, *teste* Norton 1886a, 1886b], May, deposited in MHNG; 2 worker paralectotypes also in MHNG.

Camponotus nitidus: Mayr 1870:378-379. Forel 1879:82-83.

Camponotus montivagus race *rectithorax* Forel 1895:44. New name for *Camponotus* (*Formica*) *nitidus* Norton 1868b, not *Formica nitida* F. Smith 1859.

Camponotus nitidus var. *nuperus* Wheeler 1914:58-59; workers, gyne: Guerrero Mill, Hidalgo, Mexico, W. M. Mann (MCZC, LACM). NEW SYNONYMY

Camponotus (*Myrmentoma*) *montivagus*: MacKay & MacKay 1997:325, 328-330, Figs. 3, 8, 11, 12. MISIDENTIFICATION

Forel proposed *C. rectithorax* as a replacement name for *C. nitidus* of Norton: "Pour le type de Norton je propose le nom de race *rectithorax* n.s.t." Therefore, the only specimens available for lectotype designation must be from Norton's original sample from Orizaba, Mexico. The designation of a Guatemalan specimen as lectotype is invalid.

At my request, Dr. Bernhard Merz sent three specimens from the Forel collection identified both as *C. nitidus* and *C. montivagus* st.

rectithorax; these bear red type labels. These three specimens are from an unspecified locality in Mexico and were sent to Forel by Henri de Saussure. They almost certainly are from Orizaba, a locality visited by de Saussure together with his friend Prof. Sumichrast. These appear to be extant remnants of the original material, a subset of which had been sent to Norton by Sumichrast. Since these specimens are identified as both *nitidus* and *rectithorax* in Forel's hand, there can be no question but that he understood these to be the same as Norton's species, and thus provided them with type labels. I am treating them as authentic types and have designated them as lectotype and paralectotypes above.

I examined the MacKays' "lectotype" of *C. rectithorax*, deposited in the MCZC and it is clearly a syntype of Forel's *C. nitidus* race *montivagus*. Additionally, the proposed lectotype was from Guatemala; no specimens were available from Mexico that displayed the features of *C. rectithorax* as defined by that Guatemalan specimen. In particular, while Mackay & Mackay characterized *C. rectithorax* as possessing numerous hairs on the clypeus, cheeks and malar areas, Norton stated clearly that there were only a "few scattered hairs on the face . . " Specimens agreeing with Norton's characterization seem to be generally distributed, if not common, at higher elevations in central Mexico (Hidalgo, Veracruz, Oaxaca, Morelos and Michoacán), but ranging south into the highlands of Guatemala.

This is also the ant mistakenly identified by the MacKays as *C. montivagus*. The erroneous identification is a result of their failure to examine the syntypes of *C. montivagus*. I have examined the types, in the Forel Collection, Museum d'Histoire naturelle in Geneva, 7 workers on 3 pins from "Techam, Guatemala". They are clearly conspecific with the ant mistakenly identified by the MacKays as *C. rectithorax*. When designating the lectotype for *C. rectithorax* they remarked that a ". . . second specimen, presumably in the Museum d'Histoire naturelle, Geneve, not found."

At my request Dr. Bernhard Merz searched the Forel collection and found the above three specimens identified in Forel's hand as *C. rectithorax*. These are equivalent to the species identified by the MacKays as *C. montivagus*.

Also, the MacKay's descriptive reference to the "well defined mesopropodeal notch" is puzzling; presumably the reference is to one or the other of the sutures defining the metanotum; the mesonotum is, of course, separated from the propodeum by both the scutellum and metanotum and there is no such structural feature as a "mesopropodeal notch".

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