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MEXICAN CEPHALOTINE ANTS
(HYMENOPTERA: FORMICIDAE)

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ABSTRACT: The previously undescribed male of *Procryptocerus scabriusculus* Emery is characterized and figured. *Cryptocerus insularis* Wheeler, previously known only from the lost holotype, is recharacterized and its relationship to *C. rohweri* Wheeler and *C. wheeleri* Forel is discussed. Soldiers and workers of all three are figured and a key is given for their separation.

***Procryptocerus scabriusculus* Emery, 1894**

Figure 1

In his excellent treatment of the cephalotine ants Kempf (1951) divided the genus *Procryptocerus* into a number of species complexes. In his analyses of these complexes he was able to place some names into synonymy; others were elevated to species level, and in general the systematics of the genus was put on a sound basis. Unfortunately, relationships within a given complex were left unresolved due to a lack of adequate representation of the alate forms. One of Kempf's complexes was composed of the forms previously ascribed to *P. striatus* (F. Smith), a starting total of thirteen "subspecies and varieties," which he reduced to seven species. Of these species, males were known and described for only two, *P. adlerzi* (Mayr) and *P. convergens* (Mayr).

While collecting in the vicinity of Cordoba, Veracruz, Mexico, during July, 1965, I was fortunate enough to secure several complete colonies of *P. scabriusculus* Emery, a member of this complex, in two of which were found alate individuals of both sexes. Since the previously undescribed male of this species exhibits a number of interesting characters which readily permit its separation from those of *P. adlerzi* and *P. convergens*, it seems worthwhile to describe it at this time.

The male differs from that of *P. adlerzi* most obviously in the presence of distinct apical spurs on the middle and hind tibiae, a trait which it shares with *P. convergens*. If I correctly understand Kempf's description of the *P. convergens* male, that of *P. scabriusculus* may be separated by the presence of a distinctly shining, sculptureless area on the frons (sculptured throughout in *P. convergens*, according to Kempf), the shorter hairs on the underside of the head (said to be longer than the antennal scape in *P. convergens*), and the decidedly less truncate subgenital plate.

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Male. Length of body, 7.2 - 8.5 mm; of forewing, 4.8 - 5.7 mm. Distance from anterior ocellus to apical margin of clypeus 0.8 times interocular distance; greatest ocular diameter 0.5 times maximum head length; maximum diameter of lateral ocelli slightly less than minimum distance between them; antennal scape longer than first two funicular segments combined. Mandibles rugosopunctate, with distinct, essentially longitudinal rugulae. Clypeal disc minutely tessellate, laterally with a few short rugulae; apical margin evenly concave medially. Longitudinal rugulae of face variable, rather coarse and close between eyes and antennal sockets; fine, close and parallel between antennal sockets; elsewhere moderately coarse, spacing variable, but absent from triangular area on frons in front of anterior ocellus; inter-rugal sculpturing consisting of very fine tessellation. Occiput rounded, without distinct corners.

Thoracic dorsum in profile not evenly rounded, the scutellum slightly bulging. Shoulders angulate, but not dentate, pronotal sides divergent caudad; pronotal dorsum free of sculpturing, the sides with a few fine striae below. Mayrian furrows of scutum deeply impressed; median lobe with numerous very fine oblique striae anteriorly and posteriorly, medially free of striae. Mesopleurae largely smooth, with a few fine striae below. Base of epinotum with a short triangular tooth on each posterior corner, the discal area with strong, essentially transverse, rugae; declivous face with strong transverse rugae. Middle and hind tibiae each with a single distinct apical spur. Wings slightly infuscated, marginal cell of fore-wing closed; hind wing with 6 - 8 hamuli.

Petiole about 1.6 times as long as wide, its sides slightly convex; anteriorly above with a few well-separated rugulae, with very short longitudinal rugulae along hind border. Postpetiole about 1.2 times longer than wide, free of sculpturing except for very short rugulae anteriorly and posteriorly. Abdomen subcylindrical; first tergite with fine short striae basally; remaining tergites smooth and shining, devoid of sculpturing. Genitalia and subgenital plate as illustrated.

Pubescence as described for *P. adlerzi* by Kempf (1958). Head, thorax, petiolar segments, and most of the first gastric tergite black; antennal scape fuscous-brown; funicular segments brown; legs reddish-brown, the tibiae lighter than the other segments; gastric segments brownish medially, lighter apically.

A male from colony No. 76513-2, collected at Cordoba, Veracruz, Mexico, July 13, 1965, by the author, has been selected as the andro-type and is deposited in the Los Angeles County Museum of Natural History.

At the time of my visit, *P. scabriusculus* was the most commonly encountered cephalotine; foraging (?) individuals were seen at dusk crawling up and down the trunks of the trees in which they nested. Of the six colonies taken, four appear to be complete; the two remaining were surely only frag-

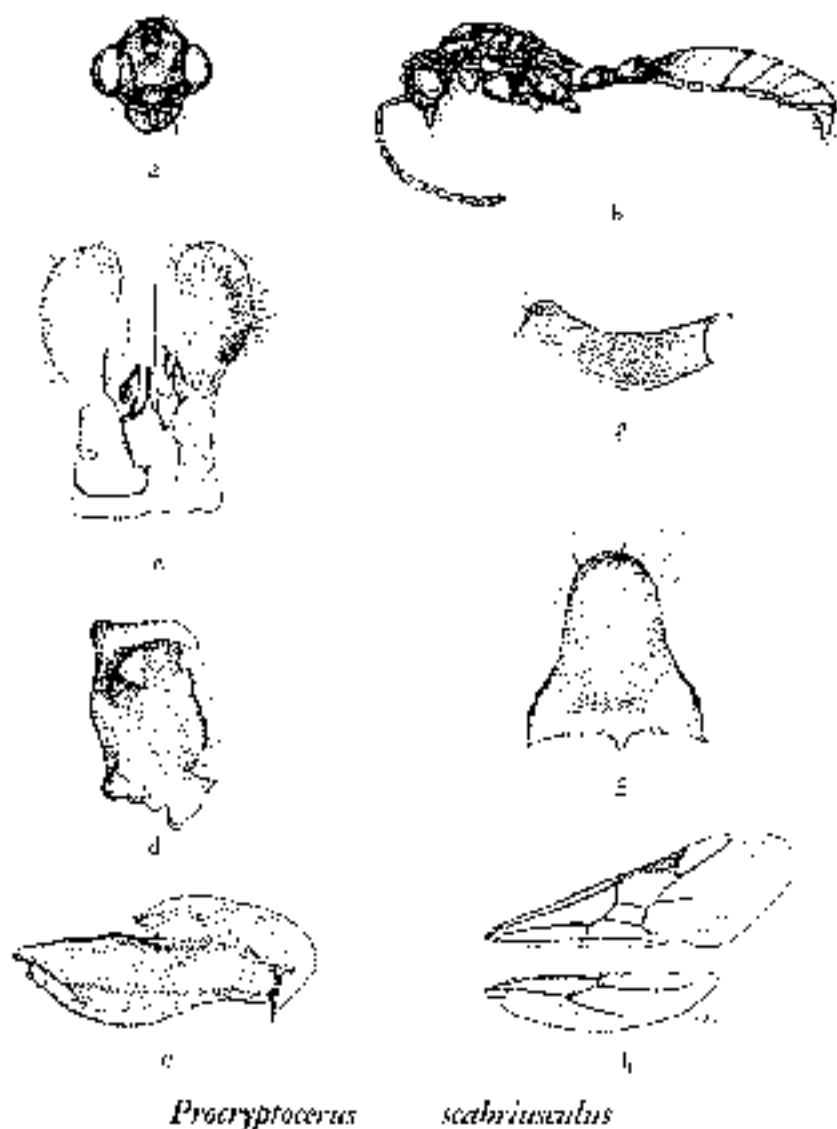


Figure 1. *Procryptocerus scabrisulcatus*. a, head; b, lateral aspect; c, genital capsule (left half, dorsal aspect; right half, ventral aspect without aedeagus); d, volsella, inner aspect; e, aedeagus, lateral aspect; f, subgenital plate, lateral aspect; g, subgenital plate, ventral aspect; h, fore and hind wings. Figures by Ruth DeNizola Snelling.

ments of a polydomous colony. All colonies were taken from dead twigs or limb stubs in living trees; none were found in the epiphyte samples which I examined, although *Cryptocerus (C.) multispinosus biguttatus* Emery was commonly found in such surroundings.

Foraging (?) individuals moved rather slowly, but when disturbed were capable of swift, agile movements for a short distance. Individuals of one colony (No. 76513-1) were seen on several occasions to move across the soil surface to another tree about seven feet from the nest tree. Although numerous presumed foragers were seen, none gave any clue as to the food habits. Twice, however, two different individuals accepted dead *Nasutitermes* workers; individuals regularly came to a honey-water mixture set out as bait.

On the evening of July 12, at 2045 hours, alate females from colony No. 76513-2 appeared and promptly took wing. Three males appeared at 2112 and remained on the stub for several minutes, showing no interest in the half dozen females nearby, which had emerged at 2105. The latter flew away at 2120, followed a few minutes later by the males. Two dealate females were taken the following night at 2203. A few workers were present on the stub at the same time as the sexual forms but did not pay them any attention. Shortly before the sexual phases appeared, a brief rain shower had thoroughly saturated the area; temperature was 72°F, humidity ca. 80-85%.

On several preceding nights, males were attracted to 15 watt ultraviolet "black light" tubes set up about 150 feet from the tree in which colony 76512-2 was located; unfortunately, the times at which these individuals arrived at the light source were not noted.

***Cryptocerus (Cryptocerus) insularis* Wheeler, 1934**

Figure 2

Wheeler (1934) described *C. pilosus insularis* on the basis of a single worker from Maria Madre Island (Tres Marias group), Nayarit, Mexico. Kempf (1958) showed that this ant was not allied to *C. pilosus* Emery, but belonged in his *rohweri*-subgroup, which also included *C. wheeleri*. Since the location of the unique type of *C. insularis* was unknown, he provisionally accorded it species status, but intimated it might prove to be either *C. rohweri* or *C. wheeleri*. *C. insularis* supposedly differed in the more prominent lateral pronotal teeth and the slightly emarginate anterior gastral border.

In 1964 I spent a day at the California Academy of Sciences, where the type evidently had been originally placed, in a futile effort to locate the missing type. In the Academy's type drawers is a unit tray with the original name of this ant, but no specimen. The type record carries the notation "type lost." A careful search through both the identified and unidentified formicid collections failed to produce the missing specimen. Since Kempf indicated that the type of *C. pilosus insularis* was not in the Wheeler Collection at the Museum of Comparative Zoology, it seems safe to assume that the specimen is no longer

extant. Accordingly, I have designated a NEOHOLOTYPE specimen from material at hand, and have selected a worker specimen taken on Maria Magdalena Island (Tres Marias group), Nayarit, March 25, 1964, ex colony No. 36425-c (R. R. Snelling)². This specimen is deposited in the collections of the Los Angeles County Museum of Natural History.

Kempf (1958) separated the workers of *C. rohweri* and *C. wheeleri* as follows:

"Lower face of head longitudinally striato-rugose; frontal carinae testaceous and semitranslucid.....*wheeleri* Forel

"Lower face of head reticulate-rugose; frontal carinae partly infuscated and solid.....*rohweri* Wheeler"

The workers of the insular form, when run through Kempf's key, will go directly to *C. wheeleri* with no difficulty. In his discussion of *C. wheeleri*, Kempf indicates additional characteristics by which the two species may be separated; the *C. insularis* workers differ from *C. rohweri* in exactly the same characters.

As pointed out above, Kempf allowed *C. insularis* to stand because of two apparently definitive characteristics which seemed to be at variance with the other species. The first of these is the more prominent lateral pronotal teeth. Wheeler, in his original description, stated that this form differs from "... typical *pilosus* in having the three lateral teeth of the pronotum longer and more acute." Wheeler based his concept of *C. pilosus*, specimens of which he had not seen, on Emery's description and figures of that species, and on a "related form" from Brazil. I must confess that I, too, have never seen *C. pilosus*; however, the normally excellent figures by Kempf should provide a good idea of the thoracic configuration. I have compared my material of *C. insularis* closely with Kempf's figures of *C. pilosus*, and fail to agree with Wheeler's claim. The anterior and middle lateral teeth in *C. insularis* exhibit some variation, but no individuals have these teeth any longer or more acute than the corresponding teeth in *C. pilosus*; if anything, they tend to be somewhat stouter. In many of the *C. insularis* workers the middle tooth is much reduced. The posterior tooth in the series before me is highly variable. It is safe to say, however, that on the whole it is better developed in *C. insularis* than in *C. pilosus*, if Kempf's figure may be considered to represent the average condition in that species.

Of the basal tergite Wheeler says "anterior border of the gaster at the articulation of the postpetiole less concave than in *C. pilosus* and without angular projections. . . ." In *C. pilosus* the first gastric segment at the articulation of the postpetiole is very decidedly concave, and on each side there are

²For the opportunity to collect ants on the Tres Marias Islands I am very deeply indebted to Mr. Richard F. Dwyer of Newport Beach, California. Mr. Dwyer provided transportation to the Islands aboard his vessel, then the "Gringa," now the "Sea Quest." To Mr. and Mrs. Dwyer and the crew of the "Gringa" my sincere thanks.

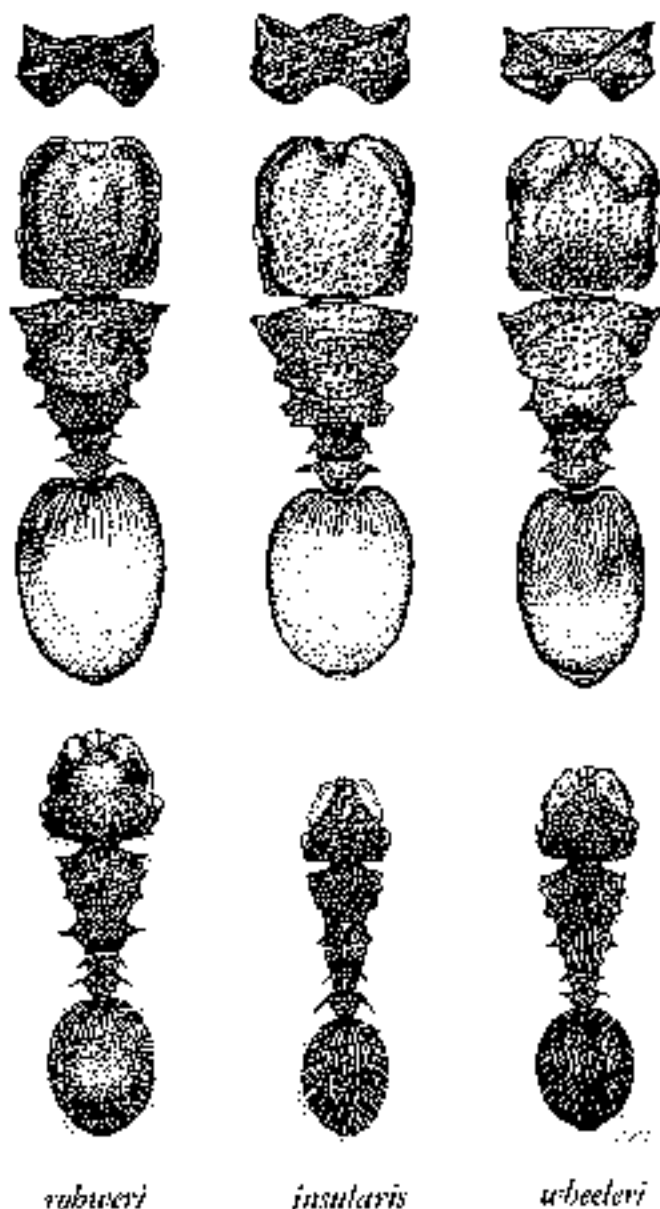


Figure 2. *Cryptoserus* species, soldier (including dorsal aspect of head) and workers, respectively of *C. rubicri*, *C. insularis* and *C. wheeleri*. Figures by Ruth DeNicola Stelling.

strong angular projections. On the basis of this statement by Wheeler, Kempf evidently was led to expect at least some indication of such a concavity in *C. insularis*. It does exist, but certainly not to the degree that Wheeler's statement implied; the concavity, and it can barely be called that, is no more pronounced in my *C. insularis* samples than it is in *C. rohweri* or *C. wheeleri*.

The above discussion intends to show that the characters by which Kempf separated the three species in this complex are highly variable. This by no means, however, can be considered evidence that there are no good distinctions between them. If Wheeler's original description of *C. insularis* had been less vague, much of the difficulty which Kempf encountered could have been avoided.

Through the courtesy of M. R. Smith and D. L. Smith I have been able to examine the U. S. National Museum's material of *C. wheeleri*; Professor Creighton has sent me samples of *C. rohweri*. With these specimens, plus my material of *C. insularis*, it is now possible to restudy this complex and to affirm the specific nature of all three forms.

The majors of the three species present the most obvious and consistent distinction. That of *C. rohweri* differs from both *C. insularis* and *C. wheeleri* in the presence of a fringe of setae along the lower margins of the cephalic disc; no indication of this fringe is present in available material of the other two. Furthermore the major of the first species has coarser and more close-set foveolae on the cephalic disc; these foveolae, and the spaces between them, are distinctly granulose, and the foveolae lack flattened silvery hairs. Creighton (*in litt.*) has noted these distinctions between *C. rohweri* and *C. insularis*, and the cotypes of *C. wheeleri* available to me show they will separate the former from that species as well.

The floor of the cephalic disc is similarly shaped in *C. rohweri* and *C. insularis*; when viewed from directly above, it is strongly humped in the middle. In *C. wheeleri*, the disc is essentially flat all the way across when viewed in this manner. When the head of *C. rohweri* is viewed from the side, the rim of the cephalic disc appears much more pronounced above than in most majors of either of the other two species. One of our specimens of *C. insularis*, however, has the rim very nearly as well-developed as in *C. rohweri*. This same specimen, and one other from the same colony, has the cephalic foveolae nearly as large and close as they are in *C. rohweri*; but these foveolae all possess the flattened, shining hairs which are absent in *C. rohweri* and the interspaces are not granulose and dull as in that species.

In *C. wheeleri* the transverse pronotal carina is rather strongly humped on either side of the pronounced median excision. In *C. insularis* and *C. rohweri* the carina, when viewed from the front, is distinctly sinuate, but the median excision is barely detectable, and the carina is not humped on either side. In *C. rohweri* the lateral spines of the petiole and post-petiole are longer and sharper than in the other two species.

The integument of *C. rohweri*, including that of the cephalic and thoracic foveolae, is everywhere granulate, imparting to the entire insect a dull appearance which is not much offset by the few shining hairs in the thoracic foveolae. This is in rather strong contrast to the condition of both *C. insularis* and *C. wheeleri*, in which the integument, while tessellate between the foveolae, is not at all granulate and hence somewhat shining. In addition, each foveola possesses a shining, flattened hair at its bottom, imparting a further luster to the insect.

The minors are by no means as readily separable; differences do exist, but they are more subtle and, apparently, subject to greater variation. As is the case with the majors, the minors of *C. rohweri* differ from those of the other species in the more distinctly granulose integument. In this character, however, the distinction is one of degree, and accordingly difficult to appreciate unless all three species are available for comparison. However, in both *C. insularis* and *C. wheeleri*, the sides of the thorax and the posterior surface of the epinotum, while conspicuously tessellate, are nonetheless moderately shining; in *C. rohweri* these areas are granulate and dull. The gaster of the latter species is conspicuously duller than is the case with the other two. This is especially obvious along the sides of the first gastric tergite.

The underside of the head of *C. rohweri* is reticulate-rugose (as pointed out by Kempf), while in the other two species it is striato-rugose. Furthermore, in the latter two species the frontal carinae are testaceous and semitranslucent, while in *C. rohweri* they are somewhat thickened and partially infuscated.

The minor of *C. rohweri* is relatively easily separated from *C. insularis* and *C. wheeleri*; the latter two species, however, are less readily separated from one another. The two principal distinctions which I have noted, and which I use in the key below, are of questionable validity, since only two minors of *C. wheeleri* are available for study. In *C. insularis* the maximum head width, at the upper margin of the eyes, is slightly less than the maximum length, the mandibles excluded. The two cotypes of *C. wheeleri* both have the maximum head width slightly greater than the maximum head length. The longitudinal rugulae of the promesonotum of *C. insularis* are rather regularly spaced, and are basically parallel to one another, not noticeably convergent anteriorly. In *C. wheeleri*, on the other hand, these rugulae are irregularly spaced, not essentially parallel with one another, and are definitely convergent anteriorly.

The three species are allopatric in distribution: *C. rohweri* is known from the mountain ranges of southern Arizona and northwestern Mexico³, *C. wheeleri* only from the types taken at Cuernavaca, Morelos, Mexico. *C. insularis* has been taken on the Tres Marias Islands, Nayarit, and on the coastal lowlands near Mazatlan, Sinaloa, Mexico.

³The presence of this species in Mexico is indicated by a single female taken 13.6 miles west of Alamos, Sonora, on July 17, 1963 by R. L. Westcott.

I consider the two specimens taken in quarantine and recorded by Kempf (1958: 134) as *C. wheeleri* to be examples of *C. insularis*; both were from unknown localities in Mexico. These two specimens have been examined and compared with my material of *C. insularis*, with which they agree quite closely. In all the characters discussed above, they coincide with *C. insularis* rather than *C. wheeleri*. The removal of these specimens from the records of *C. wheeleri* leaves only the original type series to represent that poorly known species.

The following key is intended to supplement that of Kempf (1958) in securing separations of the three species involved, since he was unable to include *C. insularis*.

KEY TO MEMBERS OF **CRYPTOCERUS WHEELERI** COMPLEX

- | | |
|--|-----------------------------|
| 1. Majors | 2 |
| Minors | 4 |
| 2. Lateral projecting lobe of mesonotum angulate or dentate; rim of cephalic disc without projecting setae..... | 3 |
| Lateral projecting lobe of mesonotum broadly rounded, not angulate or dentate; rim of cephalic disc with fringe of projecting setae..... | |
| <i>C. rohweri</i> Wheeler | |
| 3. Seen from above, floor of cephalic disc strongly humped in middle; transverse pronotal carina lacking distinct median excision..... | |
| <i>C. insularis</i> Wheeler | |
| Seen from above, floor of cephalic disc flat, not at all humped in middle; transverse pronotal carina sharp, strongly excised medially..... | |
| <i>C. wheeleri</i> Forel | |
| 4. Genal area longitudinally striato-rugose; frontal carinae testaceous and semitranslucent | 5 |
| Genal area reticulate-rugose; frontal carinae thickened, partly infuscated..... | |
| <i>C. rohweri</i> Wheeler | |
| 5. Maximum head width, at upper margin of eyes, slightly less than maximum length (mandibles excluded); rugulae of promesonotum regularly spaced, parallel, not convergent anteromedially..... | <i>C. insularis</i> Wheeler |
| Maximum head width slightly greater than greatest length (mandibles excluded); rugulae of promesonotum more irregular, not essentially parallel, distinctly convergent toward anterior middle..... | <i>C. wheeleri</i> Forel |

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