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## The Soldier Caste of *Pheidole* (*Ceratopheidole*) *clydei* Gregg (Hymenoptera, Formicidae)

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In 1950, the writer described a new species of the subgenus *Ceratopheidole*, and what was then the first such ant from the United States. Pergande had described the first North American species, however, from Mexico, as early as 1895. The specimens I had were sent to me by Mr. C. P. Stroud who collected them near Carrizozo, New Mexico. Unfortunately, they all belonged to the worker caste, so it was difficult to make precise comparisons with Pergande's species, *P. (C.) granulata*, represented by another caste. Nevertheless, Pergande's description was relied upon, with reservations, and a new species was proposed because it was felt that since the record of this group of ants from the United States was heretofore unknown and the geographic position of the ant was far enough removed to make it highly probable a new species had turned up, it would be confirmed when the soldier was discovered. Far sooner than was expected, a large number of individuals, both soldiers and workers, have been found and turned over to me for study. I am deeply indebted to Dr. W. S. Creighton for obtaining these specimens, for his generosity in sharing the material, and for permission to describe the soldier caste, without which the species diagnosis rested on tentative foundation. We are fortunate to be able to fill the gap shortly after the species was originally presented.

*Pheidole* (*Ceratopheidole*) *clydei* Gregg

SOLDIER: Length, 4.2 mm.; head index, 0.94.

Head, from clypeal to occipital border, subquadrate, only very slightly longer than broad; sides almost parallel. Clypeus sinuately excised along

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the anterior margin, and with a distinct median carina. Occipital border showing a definite and broad emargination; median sulcus of the head pronounced. Eyes placed in front of the middle of the head; approximately 80 to 83 facets. Frontal carinae low and slightly divergent posteriorly. Mandibles stout, with two heavy apical teeth and a long masticatory border lacking denticles, but provided with a longitudinal

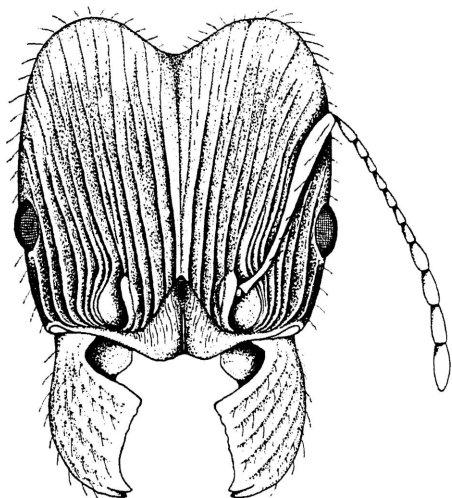


FIG. 1. Head of the soldier of *Pheidole* (*Ceratopheidole*) *clydei*.

groove bordered by two sharp ridges extending from the second tooth to the basal angle. Antennae slender; scape not flattened, but distinctly curved at the base and slightly incrassated towards the tip, extending to a point two-thirds of the distance from its insertion to the occipital corner of the head; funicular club composed of four segments, each approximately two times as long as broad, the remaining segments about one and one-half to two times as long as broad.

Thorax narrow, slightly less than one-half as wide as the head, humeral angles rounded; pro-mesonotum in profile very convex and smooth in outline, descending abruptly to a deeply impressed mesoepinotal suture, and the angle formed with the epinotum approaching 90 degrees. Epinotum long, flat, and nearly horizontal; declivity about two-thirds as long as the epinotal base; spines well developed, slightly divergent, projecting upward, and at least two-thirds as long as the basal face. Petiole narrow, slightly longer than high, rising to a sharp crest, with a shallow notch at the summit; anterior slope long and

gradual, posterior face steep. Postpetiole subtrapezoidal, rounded dorsally, flattened beneath, slightly more than twice as wide as the petiole, and furnished with distinct but blunt lateral conules.

Gaster broadly truncate along the anterior border, so that definite angles are formed with sides and quite far laterad of the attachment to the postpetiole.

Almost the entire dorsum of the head heavily sculptured; longitudinal rugae extend over the clypeus, front, vertex, and genae, being coarse on the front and genae, and dwindling to finer rugulae on the vertex; interrugal spaces coarsely punctate or granular, becoming somewhat

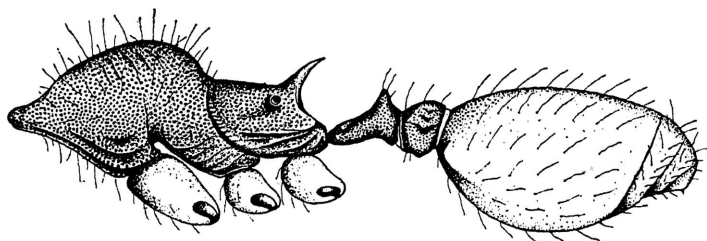


FIG. 2. Thorax and abdomen of the soldier of *Pheidole* (*Ceratopheidole*) *clydei*.

finer on the front where the surface is consequently more shining; occipital corners and gula glabrous, except for a few fine striae. Mandibles striato-punctate. Thorax heavily punctate and opaque, except the dorsum of the prothorax where the granules are much reduced and the surface shining. Petiole and postpetiole punctate both dorsally and laterally; opaque. Gastric sculpture with shallower and more sparse punctuation, producing a more granular appearance which does not obscure the shining surface.

Pilosity dense; erect, yellowish hairs of varying length cover all surfaces of the head, thorax, and abdomen, except the peduncle and lower surface of the petiole; some of the hairs are very long, especially those on the dorsum of the head and thorax; erect hairs present on the coxae, femora, tibiae, and on the dorsal aspect of the antennal scapes; mandibular hairs short; gastric hairs arise from distinct papillae which add materially to the surface sculpture. Pubescence absent except on the antennae.

Color of head yellowish red, thorax red to ferruginous, petiole and postpetiole brown, and gaster dark brown to black.

MORPHOTYPE: Soldier, deposited in the American Museum of Natural History.

ADDITIONAL MATERIAL IN TYPE SERIES: One hundred and forty-two soldiers and 100 workers are in the author's collection, the collections of W. S. Creighton, the American Museum of Natural History, the United States National Museum, and the Museum of Comparative Zoölogy.

REMARKS: The ants from which this description of the soldier caste has been drawn were all collected from a single colony by Dr. and Mrs. Creighton near Split Mountain, at an elevation of 500 feet in the Anza Desert State Park of southern California, on April 19, 1952. The nest appeared to be in crevices between a boulder and the thin laminae of rock sheared from its surface by weathering. The nest seemed to have no



FIG. 3. Split Mountain, Anza Desert State Park, California, showing smoke tree in the foreground. Site at which the specimens of *Pheidole* (*Ceratopheidole*) *clydei* were collected by the Creightons. Photograph by W. S. Creighton.

direct contact with the soil. All specimens of soldiers correspond identically with the description of the type except one which is decidedly darker in color, the head and thorax as well as the gaster being dark brown. The workers compare closely with the holotype and paratypes described in an earlier paper.

In the original description of *Pheidole clydei*, the worker was compared with the published descriptions of several other members of the subgenus *Ceratopheidole*, in the absence of type material. I have now been able to make direct comparisons between *clydei* and cotypes of *P. (C.) hecate* subsp. *bruesi* Wheeler from Newton, Jamaica, British West Indies, which are in the Creighton collection. There is not the slightest difficulty in separating *clydei* from *bruesi*. The latter appears to be a smaller species (soldier, 3.5 mm.; worker, 2.9 mm), although the workers of both species seem to be about the same size (*clydei*, 2.8–3.0 mm.). The soldiers are quite different in size, unless the specimen of *bruesi* measured is not a maximum soldier and therefore not comparable with that of *clydei*. In this event, the species *hecate* and its subspecies would be polymorphic, but *clydei* is definitely dimorphic, as can be ascertained unquestionably from the long series recently secured in the Anza Desert. This alone would be sufficient to distinguish them. The subspecies *bruesi* also differs in color, as it is a rich, red brown, and the surface is highly polished and shining on all parts of the body, and lacks sculpture save for transverse rugae on the thorax. The interrugal spaces, moreover, are devoid of granulations. The epinotal spines of *bruesi* are huge; they are longer than the base of the epinotum, stout, sharp, and proportionately larger in the worker (6 micrometer units in the semi-soldier, 6.5 units in the worker). Finally, the petiolar peduncle of *bruesi* is much longer and more slender than that of *clydei*.

Comparisons of *clydei* with *P. (C.) granulata* Pergande were attempted in my original description, but were hampered by the fact that Pergande expressed doubt in his paper as to whether his two specimens represented full-sized soldiers, and also said that true workers (minims) were unknown. One gains the impression from Pergande's account that *granulata* may be a polymorphic species, and if that is correct, then there is no doubt of the validity of *clydei*, which, as just explained, is dimorphic, as are the majority of the species in the genus *Pheidole*.

I have checked Pergande's description of *granulata* against the soldier of *clydei* herein described, and find the following contrasts and similarities between the two ants. The anterior clypeal margin of *clydei* differs in that it is sinuately excised, the antennal segments are one and one-half to two times as long as wide, the epinotal declivity is one-half or

more as long as the basal face, the spines are at least one-half as long as the epinotal base, and the first gastric segment lacks elongated foveolae. The two species seem to be alike, however, in that the eyes are situated closer to the mandibles than the occiput, the head is rugulose and granulate, the clypeus has a median carina, the gaster is granulate, and the scape has erect hairs. How similar the colors are is difficult to decide.

Specimens of *clydei* soldiers were sent to Dr. M. R. Smith who has compared them with soldiers of Pergande's *granulata* in the United States National Museum, and he states that the two ants are distinct. In addition, Smith has kindly lent me a soldier cotype of *granulata* so that I have been able also to make direct comparisons between the species involved. As a result of these observations, we may now state that *granulata* possesses a much larger head, the scapes reach to the occipital corners (extend only two-thirds of this distance in *clydei*), and the funicular segments are much more slender, especially those of the club which are very elongate and scarcely wider than the remaining antennal articles. The soldiers of *clydei* have longer and more acute epinotal spines, the superior border of the petiolar node is much sharper, the postpetiole is more conulate, and the sculpture of the body is quite different. The punctate or granulate surface of Pergande's ant covers the whole body, including much of the gaster, but in *clydei* this sculpture on the gaster is conspicuous only at the base of the first segment.

These two ants show more similarities between each other than to other members of the subgenus, yet there appears to be ample evidence for regarding them as distinct species. Pergande's ants came from Tepic, Mexico, a locality near the west coast and about midway between the northern and southern boundaries of the country. It is thus hundreds of miles south of the stations from which *clydei* has been obtained. I have recently confirmed the identification of specimens of *clydei* which Dr. L. F. Byars collected from Windy Point, 7100 feet, in the Santa Catalina Mountains of Arizona, in July of 1947. This is a relatively high elevation, but the locality is at the southern end of the range and has a south exposure. The climatic zones at this spot are somewhat above their usual levels. Byars' specimens are all workers and differ from others in my collection only in a greater opacity of the surface which seems to be traceable to an encrusted film.

The ant *Pheidole clydei* is known therefore from three localities: Carrizozo, New Mexico (type locality), southern Arizona, and southern California, a wide stretch of territory, but our knowledge of its range is still obviously incomplete. It may be expected to occur in the states of Sonora and Chihuahua, and perhaps other parts of Mexico, as well as

southern United States. Dr. Smith informs me that Dr. A. W. Grundmann at the University of Utah has recently discovered a species of *Ceratopheidole* near Vernal, Utah, which appears to be another new form, the second from within our borders.

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