

STUDIES OF NEW MEXICO ANTS. VII. THE GENUS
POGONOMYRMEX WITH SYNONYMY AND A
DESCRIPTION OF A NEW SPECIES
(HYMENOPTERA: FORMICIDAE)¹

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The genus *Pogonomyrmex* Mayr is very well represented in New Mexico which appears to be a region of intergradation of certain forms. Members of the genus flourish particularly in the arid valleys and plains, but *P. occidentalis*, the common western harvester, appears to be able to thrive at elevations above 6,000 feet and various other forms have been collected at such high elevations.

Pogonomyrmex (Pogonomyrmex) anergismus n. sp.

Holotype. Alate female (Cole Coll. No. N-331). Length, 7.5 mm. Head as broad as long, posterior corners broadly rounded, occipital border straight. Antennal scape reaching about three-quarters of the distance between its insertion and the occipital corner. Scutum very broadly convex in profile, nearly flat. Scutellum convex, extending dorsally from the posterior margin of the scutum. Basal surface of propodeum about twice as long as the declivious surface and descending to the propodeal spines at about a 45° angle, the declivious face nearly perpendicular. Petiolar node when viewed from the rear subrectangular, longer than its anterior peduncle, the superior border flattened, the corners rather truncate; when viewed in profile the superior border is quite sharp; apical half when viewed from above and behind somewhat broadly depressed medianly. Postpetiole when viewed from above subglobular, a little broader than long, about 1½ times as broad as the petiolar node. Propodeal spines notably shorter than the distance between their bases, stubby, broad at the base, rather blunt at the tip. Maxillary palpi 4-segmented, labial palpi 3-segmented.

Entire head with fine longitudinal rugules which tend to fade out on the occipital corners, the rugules being somewhat coarser just above the mandibular articulations and on the postgenae; interrugular spaces very faintly and finely punctulate; occipital corners with a few shallow elongate foveae. Pronotum with moderately fine transverse rugae; scutum finely and longitudinally rugulose; mesothoracic paraptera smooth, without rugulae; meso- and metathoracic epimera and episterna with prominent longitudinal rugae which continue transversely over the basal face of the propodeum; declivious surface of propodeum smooth. Lateral and posterior surfaces of petiolar node with fine transverse rugulae which are more prominent basally than apically. Dorsum of postpetiole with fine, irregular, transverse rugulae. Gaster smooth.

Entire body with moderately long, rather abundant, stiff, mostly coarse, golden hairs; those on clypeus long and pointed as are also the well developed ammochaetae; most of those elsewhere on head are blunt, shortest on frontal region, longest on vertex and occipital margin where they are largely clavate, sparse around the compound eyes and in the area between the median ocellus and clypeus; long, fine, reclinate, and subappressed on antennal scapes, suberect on first five funicular segments, largely subappressed and appressed on remaining segments. Hairs on thorax of variable length, longer and more pointed on pronotum; shorter and more clavate on scutum and scutellum; very short, blunt, and clavate on sides of thorax; long, slender, and pointed on fore coxae;

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very sparse and short on propodeum; nearly absent from anterior peduncle of petiole; short and blunt on anterior surface of petiolar node; long and blunt on posterior and lateral surfaces of postpetiole; absent from venter of petiole and sparse on venter of postpetiole where they occur only on the swollen anterior portion. Hairs rather long, evenly distributed, and blunt on dorsum of gaster; longer, more slender, and pointed ventrally and terminally.

Body a rather uniform rich ferruginous color; antennae, anterior clypeal border, articulations, and posterior margins of gastric segments darker. Wings pale brownish hyaline; veins and stigma brown. Entire body shining.

Paratype. Male (Cole. Coll. No. N-331). Length, 6.3 mm. Very similar to the holotype in size, color, and general conformation, but differing in the following respects: Head broadest between the eyes; antennal scapes extending to the posterior margin of the compound eyes; compound eyes set a little more obliquely than those of holotype; cephalic rugulae absent except within and above the ocellar triangle, beneath and immediately around the compound eyes, and on the postgenae; cephalic hairs abundant, long, slender, pointed, longest on ventral and occipital surfaces, mandibles, and clypeal border. Scutellum smooth; without rugulae; rugae on pronotum much less prominent than in holotype; basal surface of propodeum less than $1\frac{1}{2}$ times as long as the declivity; propodeal spines angulate, short, very broad at the base, blunt at the tip. In general the body hairs are more abundant, more pointed, and more slender than in the holotype; not flexible; rather evenly distributed; some have a tendency to curve near the tip; shorter than those of other *Pogonomyrmex* males. Petiolar node with a very broad and very distinct depression on its posterior face, its apical margin less angular in profile than that of the holotype and the superior corners when viewed from above and behind more rounded; petiolar node with a broadly triangular flange-like ventral projection; hairs on petiole and postpetiole long, pointed, numerous, more robust than those on head and thorax. Mayrian furrows poorly developed. Wing venation variable. Gaster with long, slender, abundant, rather uniformly distributed hairs of approximately equal length; hairs on genitalia curved. Head, dorsum of thorax, legs (except coxae), petiole, postpetiole, and gaster very shining; coxae and the lateral portions of thorax glossy subopaque. Wings brownish hyaline; veins and stigma brown.

Certain characteristics of the male, notably the pilosity which is stiff, only moderately long, and not at all flexible, contrast markedly with those of males of other species in the genus.

Type locality. The holotype and the more than one hundred paratype males and alate females were collected by the writer from a semidesert shrub area 15 mi. E. of Silver City, New Mexico, on U. S. 260, at an elevation of 6,900 feet, on September 13, 1951. They were within a large flat pebble nest occupied by a large colony of *Pogonomyrmex barbatus rugosus* Emery, the host species. When the nest was opened myriad workers of *rugosus* and the males and females of the contrastingly different new species milled out. The *rugosus* workers grasped the parasitic species and scurried back into nest tunnels. No workers of the new form were found nor were there any *rugosus* sexual forms. The entire nest was excavated. The probability that the males and females represented a workerless nest parasite (which because of the gross similarity in size and coloration did not show sexual differences without magnification) prompted me to collect a large series, but fully an equal number including many callows was left in the nest. Subsequent examination showed that there was a greater proportion of females than males in my sample.

Disposition of types. The holotype and a large series of paratype males and females are in the author's collection. Paratype males and females have been deposited in the Museum of Comparative Zoology (Harvard), the U. S. National Museum, the American Museum of Natural History, and in the collections of W. S. Creighton and R. E. Gregg.

POGONOMYRMEX (POGONOMYRMEX) BARBATUS COMPLEX

Pogonomyrmex barbatus (F. Smith)²

Myrmica barbata F. Smith, 1858, Cat. Hym. Brit. Mus., 6:130.

P. barbatus var. *fuscatus* Emery, 1895, Zool. Jahrb. Syst., 8:309. New

SYNONYMY.

I was unable to find the typical *barbatus* in New Mexico. Creighton (1950, pp. 119-120) recognizes two forms, in addition to *barbatus* (F. Smith), in the *barbatus* complex, namely *barbatus* subsp. *fuscatus* Wheeler and *barbatus* subsp. *rugosus* Emery. After I had studied my extensive New Mexico collections of the latter two dark forms I found that I was unable to separate them from each other. Into the continued study I incorporated additional collections from Arizona, Texas, Colorado, Utah, and California. These two dark forms show the same range of variation of color. The sculptural characteristics which Creighton (1950, p. 113) has designated for *rugosus* apply equally well to most specimens of *fuscatus*. In the extreme southern part of the range of the dark form there are specimens which show finer dorsal cephalic rugulation on the average and it is probably these forms that Creighton designated as *fuscatus*. The typical *barbatus* in its pure range is consistently of a uniform reddish ferruginous color. Aside from this important color difference, an average difference between the dark form and the typical *barbatus* is the spacing of the cephalic rugae, that of the latter form being decidedly closer. The interrugal cephalic sculpture is not significantly different in the typical *barbatus* and the dark form and it seems to be equally variable in both forms. Even some series of the typical *barbatus* from southern Mexico show as strong and opaque an interrugal sculpture as in the strongest specimens of the dark form.

It is evident that *barbatus fuscatus* Emery represents an intergrading population between *barbatus* (F. Smith) and *barbatus rugosus* Emery and it should therefore be synonymized with *barbatus* (F. Smith). This intergrading population is limited to western and southwestern Texas, southern New Mexico, and southeastern Arizona. In the western states and in northern Mexico the distribution of *barbatus barbatus* and *barbatus rugosus* is apparently chiefly an east to west face division with an intergrade zone extending through western Texas into Mexico. A northern finger of *barbatus barbatus* extends for a short distance over the international border into Arizona and probably into southern New Mexico. The Utah record for *barbatus barbatus* cannot be considered as correct. *P. barbatus rugosus*, the western race, extends over much of western Texas, northern New Mexico, northern and western Arizona, California, and northward from these regions. The eastern race, *barbatus barbatus*, reaches as far north as Kansas. The altitudinal differences between the two forms as cited by Creighton (1950, p. 119) do not seem to be consistent.

Another possible explanation of the status of *barbatus* and *barbatus rugosus* is that these are two separate species which hybridize introgressively. However, in this particular case I favor the previous explanation. I can find no data in my field notes which would indicate behavioral and similar differences between the two forms. *P. barbatus* does seem to be a bit less antagonistic to the intruder, however, and it is perhaps more sluggish in its movements. Unless or until the two forms can be shown to represent distinct species they should in my opinion be categorized as species and subspecies respectively.

In New Mexico *barbatus barbatus* and the intergrading populations mentioned previously have an extensive range and are very common. The colonies usually construct flattened, open mounds but occasionally they live beneath stones. They were observed at elevations ranging from 3,000 feet and were especially numerous in the more arid sections.

POGONOMYRMEX (P.) CALIFORNICUS COMPLEX

The typical *californicus* Buckley and the forms which have been named *longirostris* Emery, *hidleyi* Fore, *maricopa* Wheeler, and *barbata* M. Smith. There seems to be a great deal of hybridization in the complex and it is difficult and in some cases apparently impossible to pin down various of these

²For an otherwise complete synonymy see Creighton (1950, p. 119)

populations to definite taxonomic categories and names. There are probably produced various strains or "races" which may be partially isolated populations with stable characteristics for a considerable number of years. Some of these strains are very local ones and others are widespread geographical races. More than one type may occur in the same locality or even within the same nest. There is no indication that the hybridization is merely occasional.

At Las Cruces I collected long series from three nests (N-344, 4,200 ft.; H-399, 4,950 ft.; A-228, 3,750 ft.)³ all of which had sand craters. These populations are the equivalent of the Las Cruces "*californicus*" collected by Cockerell and determined by Wheeler and Creighton. The workers are rather small, the cephalic interrugal structure consists of faint punctures, the interrugal areas are quite shining and the propodeum is completely unarmed. Nests 25 mi. E. of Deming (N-340, 4,500 ft.) and 6 mi. W. of Deming (N-336) may also be so assigned. The typical *californicus* as characterized by Buckley occurs in southern California and is common in the Los Angeles area.

Populations from the Juan Tabo area of the Sandia Mountains (H-232, 6,000 ft.), 13 mi. N. of Bernardo (A-195, 6,200 ft.), and 18 mi. SE. of Bayard (H-381, 6,000 ft.) fit the series of Texas and New Mexico "*longinodis*," as determined by Creighton, in the Museum of Comparative Zoology. The cephalic interrugal sculpturing is distinct, the interrugal areas are only faintly shining, and the propodeum varies from being completely unarmed to possessing angles. *P. longinodis* is regarded by Creighton (1950, p. 114) to possess a characteristically elongated petiolar node. The proportional difference between the petiolar nodes of *longinodis* and *maricopa* was not borne out in my studies. The Texas and New Mexico series that I have examined and which Creighton regards as *longinodis* must belong to *maricopa* for they agree well with *maricopa* cotypes. They do not compare favorably with specimens based upon Emery's (1895, p. 311) characterization of *longinodis*, a form which occurs widely in desert sections of southern California and in western Arizona. The true *longinodis* is very similar to *maricopa*, but it is smaller on the average, often somewhat to considerably darker, and on the average the interrugal spaces are smoother and more shining. The degree of development of the nipple on the petiolar node varies considerably in *longinodis*. *P. longinodis* is in my opinion certainly more like *maricopa* than like *californicus* Buckley which seems to be restricted to the Los Angeles region of California. Creighton (1950, pp. 114 and 126) appears not to have distinguished the true *longinodis* from *californicus*, for his remarks on interrugal sculpture in couplet 12 would bring his eastern "*longinodis*" not to couplet 13 but to 16 which he admits on page 126.

The population at White Sands National Monument (N-365, 3,800 ft.) is equivalent to the type population of *maricopa* Wheeler from Alamogordo. The cephalic interrugal structure consists of dense punctures which make the interrugal areas opaque. The propodeum of the worker varies from an unarmed condition to the possession of long spines. In *maricopa* cotypes there is variable development of propodeal armature and at least one worker, which I have examined, has distinct propodeal teeth. In his key Creighton (1950, p. 114) separates *maricopa* from *hindleyi* Forel on the basis of propodeal armature. His couplet 20 delimits *maricopa* by its never possessing propodeal armature from *hindleyi* which always has spines, teeth, or (rarely) angles. Inasmuch as cotypes of *maricopa* show a range of unarmed and armed specimens, it is probable that *hindleyi* sensu Creighton and the *maricopa* types belong to the same form. The long-spined workers of *hindleyi* may be aberrants produced in the nests or they may be intergrades toward one of the spined forms in the genus.

At a point 20 mi. W. of Albuquerque (H-235 and H-236, 5,000 ft.) I collected long series of workers which varied from having the propodeum completely unarmed to possessing prominent spines. The unarmed specimens were not at all rare in the colonies. Other colonies with these same characteristics were found at Bernardo (H-276, 4,800 ft.); 13 mi. N. of Bernardo (A-197, 6,200 ft.); San Juan (N-215 and N-218, 5,900 ft.); Deming (N-337 and N-338,

³Numbers such as these which will be used henceforth in this paper indicate my collection numbers accompanied by elevations.

4,525 ft.); Embudo (N-209, 5,900 ft.); 20 mi. S. of Socorro (842). Colonies at the following places had the propodeum of the worker varying from being bare to possessing angles or denticles: 30 mi. E. of Carlsbad (A-261 and N-402A, 3,200 ft.); 20 mi. W. of Albuquerque (H-237, 5,000 ft.); Espanola (N-221); 13 mi. N. of Bernardo (N-301, 6,200 ft.); 25 mi. N. of Socorro (N-302, 6,000 ft.); 10 mi. S. of Mountainair (H-301 and H-302, 6,650 ft.).

In the same general area (Albuquerque) in which I found colonies with highly variable to no propodeal armature (H-235, H-236) there was also a co-existing colony (H-237) which showed a bare minimum of propodeal armature development, the maximum armature being represented only by distinct propodeal angles. Yet I believe that, although an average nest sample of the former *could* be assigned morphologically to *hindleyi* and one of the latter to *maricopa*, only strains may be represented. I have been able to distinguish these two populations only on the basis of the maximum development of propodeal armature. The frequency with which such a trait is expressed within and among colonies can be determined by a biometric study of adequate series of ants. I have found no evidence which would indicate a clinal significance of propodeal armature. The differences tend to be abrupt, according to my data. Considerably more collecting and study will be necessary before the status of *hindleyi* can be fixed properly.

The conditions which prevail in the *californicus* complex would seem to be very similar to those which have been discussed by Lewis (1953) for the colonial genus *Clarkia* of plants and the explanations of the mechanism of evolution in *Clarkia* would appear to apply in part to the composition of the *californicus* complex. It is also possible that these various populations are simply different phenotypes resulting from a rather extensive gene flow.

POGONOMYRMEX (P.) DESERTORUM COMPLEX

All of my New Mexico collections in the *desertorum* complex appear to be intergradient between *desertorum* Wheeler and *desertorum ferrugineus* Wheeler. I have examined series of both forms from other regions and have also studied specimens which had been compared with types. In the New Mexico workers the pronotum is transversely to asymmetrically rugulose with rather faint and somewhat shining interrugular sculpture. The opacity of the pronotum of the typical *ferrugineus* is produced by the rather extensive interrugular reticulation and not by the transverse rugulae (which are not strong in the cotypes). Couplet 10 in the key by Creighton (1950, p. 114) is then misleading and it would seem to be improved by the following substitution:

Pronotal dorsum usually predominantly transversely rugose, or rugulation pattern strongly asymmetrical: Interrugular spaces often densely, opaquely, and finely reticulate, occasionally subordinating the rugulae. (Southeastern Arizona)—*desertorum ferrugineus* Wheeler.

Intergrading in New Mexico to—

Pronotal dorsum usually with predominantly longitudinal rugulation, curving divergently anteriorly: interrugular spaces feebly sculptured and usually shining. (Western Texas)—*desertorum* Wheeler.

The intergrades cover a large region while the ranges of *desertorum* and *desertorum ferrugineus* are small. Even many of the series from around Tucson, Arizona, are intergradient to the typical *desertorum*. Further collecting may show whether the two races are near the ends of a gradual cline or whether they are local divergent populations of a type which could appear at random throughout the distribution.

Collections of the intergrades were made at the following localities: Bayard, 6,000 ft.; Deming, 4,300-4,550 ft.; White's City, 3,500 ft.; Las Cruces, 4,200 ft.; 30 mi. E. of Carlsbad, 3,600 ft.; Texas-New Mexico line on U. S. 180 and 62. The colonies construct circular sand craters in open semidesert areas.

POGONOMYRMEX (P.) HUACHUCANUS Wheeler

This interesting, very distinctive, and docile species was taken in considerable numbers beneath stones, usually with a semicircle of frass, at the following localities: 15 mi. W. Mountainair, 5,570 ft.; 16 mi. W. of Socorro (Water

Canyon), 6,550 ft.; 20 mi. N. of Silver City, 6,400 ft.; Silver City, 6,200 ft.; 7 mi. E. Tularosa, 5,300 ft. Creighton (1952, p. 72) believes that the numerous dealate females which he found in a nest near Springerville, Arizona, 5,600 feet, on July 30, had taken shelter there when a storm had interrupted the mating flight inasmuch as there had been heavy rainfall an hour or two before the nest was discovered. The nest also contained many males. However, the numerous nests which I opened at the Mountainair location all contained many dealate females and quantities of males although no rain had fallen for many days prior to the collection date, August 12. In no nest did I find alate females. It seems likely then that the females mate in flight, return to the nest, and then subsequently leave the parental nest and found new colonies. Some of these solitary nest-founding queens were observed under stones in the collecting area. There is also the possibility that mating occurs within the nest.

POGONOMYRMEX (P.) OCCIDENTALIS (CRESSION)

I believe this form to be the most common representative of its genus in central and northern New Mexico. In the southern part of the state it is less numerous. It constructs for the most part conical pebble mounds in arid sections. Collections were made at the following representative localities: Raton, 6,500-6,900 ft.; Capulin Mt. Natl. Mon., 7,100 ft.; Little Tesuque Canyon, near Santa Fe, up to 7,500 ft.; Cimarron Canyon, 6,500 ft.; Paos, 6,000-7,200 ft.; Bandlerier Natl. Mon., 5,800-6,100 ft.; Silver City, 6,200 ft.; White Sands Natl. Mon., 3,800 ft.; Las Vegas, 5,500-6,200 ft.; Gallup, 6,700 ft.; Socorro, 6,000 ft.; Mescalero, 6,800 ft.; Glenrio, 3,900 ft.; Dillia, 5,200 ft.; Beulah, 7,500 ft.

The White Sands National Monument record is a puzzler. The large colony was in pure gypsum sand at the picnic grounds and seemed to be thriving on the scraps from meals prepared by picnickers. There was a low and very irregular mound and I was unable to find this species in other extreme southern New Mexico localities. In the southern portion of the state the nests which I encountered were at high elevations. This record is decidedly more southern with respect to a combination of latitude and altitude than any other of which I am aware. I collected a large series consisting of nearly one thousand workers all of which fit *occidentalis*. Compared with Wheeler's (1902, p. 392) characterization of the subspecies *comanche* my specimens cannot possibly represent this form.

POGONOMYRMEX (P.) OCCIDENTALIS COMANCHE WHEELER

I found this subspecies at only three places, namely, 7 mi. S. of Albuquerque, 5,000 ft.; 18 mi. S. E. of Bayard, 6,000 ft.; and Silver City, 6,200 ft. The ants had constructed sand craters on dry stony areas of sagebrush and juniper.

POGONOMYRMEX (P.) OCCIDENTALIS COMANCHE WHEELER

In Part IX of my studies of New Mexico ants I shall give a detailed account of the distribution of habitats and habits of this species and describe the sexes.

POGONOMYRMEX (EPHEBOMYRMEX) IMBERICULUS WHEELER

This ant was rather common in dry areas at the higher elevations in the northern portion of the state where it nested beneath stones at the following localities: Dillia, 5,200 ft.; 12 mi. E. of Bernardo, 5,300 ft.; 18 mi. S. E. of Bayard, 6,000 ft.; Malpais Lava Beds, near Carrizozo, 8 mi. W. of Alamogordo, 5,800 ft.; 6 mi. NW. of Deming, 4,550 ft.; 23 mi. N. of Bernardo, 5,550 ft.; 7 mi. W. of Socorro, 7,000 ft.; 12 mi. N. of Lordsburg, 5,000 ft.; Las Cruces, 7,500 ft.; White's City, 3,200 ft.; Deming, 4,300-4,250 ft.; 30 mi. W. of Lordsburg, 5,000 ft.

Dr. Brown has requested that I add to my paper the synonymy of *P. californicus* subsp. *sinuatus* Olsen (*Bull. Mus. Comp. Zool.* 1934, Vol. 77, p. 504) with *P. californicus* subsp. *maricopa* Wheeler (*Psyche*, 1914, Vol. 21, p. 155). Variation in *maricopa* unimodal series covers the *sinuatus* types in the Museum of Comparative Zoology.

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