

No. 8.—Notes on the North American Harvesting Ants of the Genus
Pogonomyrmex Mayr¹

BY O. WILFRED OLSEN

During the past thirty years since the appearance of Professor W. M. Wheeler's² key to the genus *Pogonomyrmex*, many new forms of these interesting ants have been discovered. It is the purpose of this paper to give a key suitable for determining the workers of the North American species and also to give their geographic distribution. There are now known 36 North American forms represented by 2 subgenera, 21 species, 5 subspecies, and 10 varieties. Of this number *P. badius* Lat. is the only species occurring in the eastern United States, the others are desert and mountain forms found in the southwestern and western United States, Mexico and Canada, except one species from Guatemala and two species and a variety from Haiti. All of the recorded forms, except *P. desertorum* var. *tenuispina* Forel, are in Professor Wheeler's collection.

In reviewing the worker forms of this genus I have had the facilities of Professor Wheeler's collection and library. In addition he has freely given suggestions and advice for all of which I wish to acknowledge sincere appreciation.

Pogonomyrmex belongs to the subfamily *Myrmicinae* Lepeletier, 1836, which may be distinguished from the other subfamilies of the Formicidae by the following characters.

The cloacal orifice is ventral and slit shaped. The exsertile sting is long and well developed. The abdominal pedicel consists of two distinct segments, the petiole and postpetiole, the latter being much narrower than the first segment of the gaster. The clypeus is almost always prolonged between the frontal carinae, which covers the antennal insertions. The eyes are rarely vestigial or absent. Larvae are provided, at least in the younger stages, with hairs which are hooked, branched or of other forms for anchorage. The nymphs are nude, not spinning a cocoon.

The members of the genus *Pogonomyrmex* may be distinguished from those of the other genera of the *Myrmicinae* by the following combination of characters.

Workers are present and monomorphic, except in *Pog. badius* Lat. where they are polymorphic. The clypeus always extends between the frontal carinae which are separated. There are four segments in the maxillary and

¹ Biological Laboratories, Harvard University.

² New Agricultural Ants from Texas, *Am. Nat.*, **36**, pp. 97-99, 8 figs., 1902. *Psyche*, **9**, pp. 387-393 (1902).

three in the labial palps. The antennal fossae are not prolonged as grooves along the sides of the head. The postpetiole is articulated to the anterior end of the gaster which is of the usual shape. Antennae consist of 12 segments and with a more or less distinct club of four articles. The thoracic dorsum is smooth and without any trace of a mesoëpinotal or promesonotal sutures or impressions.

The North American *Pogonomyrmex* may be divided into two subgenera: the Subgenus *Pogonomyrmex* Mayr 1868¹, *s. str.*, consisting of forms of variable size and with a more or less well developed beard of long recurved hairs on the gular region and lower surface of the mandibles, and the subgenus *Ephebomyrmex* Wheeler 1902² which comprises those small forms not exceeding 5.5 mm. in length and without a beard.

The following key is adapted for identification of the workers of the North American species, subspecies, and varieties.

*Key to the Workers of the North American Species of
Pogonomyrmex Mayr*

1. Epinotum without distinct spines (*Pog. californicus* var. *hindleyi* has very short epinotal spines; anomalous paired or single spines occur in *Pog. badius*).....25
- Epinotum with one or two pairs of distinct spines, the posterior pair formed by the upturned projections of the metasternum (spines often reduced in some forms of *Pog. subdentatus*).....2
2. Epinotum with one pair of spines; beard of long recurved hairs present on gula and ventral side of mandibles; femora not incrassate, except in *Pog. guatemaltecus*. (A. Subgenus *Pogonomyrmex*).....8
- Epinotum with two pairs of spines; beard of long recurved hairs absent; femora incrassate. (B. Subgenus *Ephebomyrmex*).....3
3. Black or blackish brown; first pair of epinotal spines obviously much longer than broad at their bases and cylindrical in form; no distinct transverse ridge connecting them.....4
- Red in color; first pair of epinotal spines short and compressed, at most only slightly longer than the width of the base; bases connected by a distinct transverse ridge.....6
4. Dark brown, almost black; mandibles, except dentate border, sides of clypeus, cheeks, antennae, legs, thoracic spines, pe-

¹ Annuar. Soc. Nat. Modena, **3**, p. 169 (1868).

² Psyche, **9**, No. 317, p. 390 (1902).

duncle of petiole, anterior border and sides of petiole, and anterior margin of first gastric segment red: tip of gaster and margins of posterior segments yellow. Thorax longitudinally rugose; posterior surface of node of petiole convex, coarsely and longitudinally rugose, rugae converging anteriorly at tip.

Pog. (E.) saucius Wheeler and Mann

Color black; sculpture of thorax and shape of node of petiole different.5

5. Black; mandibles, tip of gaster and tarsi beyond the first joint deep red; thorax longitudinally reticulate-rugose; anterior surface of node of petiole rises to form a right angle with peduncle, half as long as posterior sloping flat surface; the two surfaces meet at a sharp ridge forming a broadly rounding anterior margin; posterior surface of node roughly reticulate-rugose and opaque; postpetiole and basal third or half of first gastric segment densely punctate and opaque, remaining segments shining.

Pog. (E.) schmitti Forel typical

Similar to *schmitti* typical except posterior surface of node of petiole not roughly reticulate rugose, but with broad, widely separated rugae, their interspaces coarsely punctate and opaque; postpetiole and base of gaster smooth and shining or with traces of fine punctures.

Pog. (E.) schmitti var. *sublaevigatus* Wheeler and Mann

6. Clypeus without a tooth-like projection before each antennal fovea; node of petiole conical in profile.

Pog. (E.) pima Wheeler

Clypeus with a tooth-like projection before each antennal fovea; node of petiole not conical in profile.7

7. Postpetiole sparsely punctate; subopaque; entire gaster smooth and shining.

Pog. (E.) imberbicus Wheeler

Postpetiole and basal half of first gastric segment densely and finely punctate and very opaque; the latter with sparse piligerous foveolae; remainder of gaster more shining.

Pog. (E.) townsendi Wheeler

8. Posterior angles of head smooth and shining. Sculpture of head and thorax very fine.9
Posterior angles of head not smooth and shining. Sculpture fine or coarse.12
9. Clypeus with a prominent and broad tooth-like projection anterior to each antennal fovea; frontal area without a median carinula.

Pog. dentatus sp. nov.

Clypeal tooth-like projection absent; frontal area with median carinula, often with two carinulae (*Pog. desertorum* Wheeler). 10

10. Dark uniform ferruginous color; gaster smooth but not shining.

Pog. desertorum var. *ferrugineus* var. nov.

Not dark ferruginous color; gaster shining. 11

11. Color uniformly yellowish red; diameter of epinotal spines greatest at base and tapering cone-like to a point; node of petiole longer than its peduncle.

Pog. desertorum Wheeler, typical

Color similar; epinotal spines as slender at base as at tip; node of petiole small and shorter than its peduncle.

Pog. desertorum var. *tenuispina* Forel

12. Sculpturing of head, mandibles and thorax fine; rugae of front very dense and without apparent interrugal sculpturing, those of sides of head and prothorax more widely separated and with distinct large, shallow foveolae; remainder of thorax without distinct interrugal sculpturing; frontal area with median carinula and delicate rugae, not shining; head barely concave posteriorly; ventral tooth of peduncle pronounced; abdomen elongate, wasp-like; large, 9.5-11.5 mm.; dark yellowish red; entirely subopaque.

Pog. wheeleri sp. nov.

Sculpturing of entire ant never so fine; rugae of front never so dense; head distinctly concave posteriorly. 13

13. Head distinctly concave posteriorly; densely rugose, rugae but little divergent posteriorly, with or without delicate interrugal sculpturing; large forms (*Pog. barbatus* F. Smith). 14

Head not distinctly concave posteriorly; not densely rugose; rugae of head distinctly divergent posteriorly; interrugal spaces distinctly sculptured (except *Pog. similis*); small to medium sized forms. 18

14. Head, thorax and legs deep blackish red; petiole, postpetiole, and especially the gaster, lighter. 15

Color not as above. 16

15. Head, thorax and legs dark red, nearly black; petiole, postpetiole and gaster red; interrugal spaces of head and thorax without sculpturing. Beard scanty.

Pog. barbatus F. Smith typical

Head, thorax and legs dark red, nearly black; petiole and postpetiole brown, gaster yellowish red, often with a dark band

transversing the distal margin of basal segment; interrugal spaces of head and thorax finely punctate. Beard full.

Pog. barbatus var. *marfensis* Wheeler

16. Ant bright ferruginous red throughout; rugae of head especially, and thorax finer and denser than *barbatus* typical.

Pog. barbatus var. *molefaciens* Buckley

Color and sculpture different.....17

17. Head and thorax brownish red, gaster in part or entirely brown; cephalic rugae coarser than *molefaciens*; interrugal spaces with delicate punctures; thoracic rugae coarser. Beard full.

Pog. barbatus var. *fuscatus* Emery

Color dark red, nearly black; tibiae, tarsi and funiculi red; cephalic rugae as in *barbatus* typical, interrugal spaces finely punctate; thoracic sculpture coarse. Beard scanty.

Pog. barbatus var. *nigrescens* Wheeler

Color ranges from ferruginous to black; head and thorax very coarsely rugose; interrugal spaces of head bear traces of 2-3 fine rugules; node of petiole rather coarsely and irregularly rugose. Beard full.

Pog. barbatus subsp. *rugosus* Emery

18. Anterior border of clypeus broadly but definitely excised.....19
Anterior border of clypeus straight.....23

19. Mandibles 6-dentate; head coarsely rugose, with interrugal spaces densely punctate; thorax reticulately rugose.

Pog. huachucanus Wheeler

Mandibles 7-dentate; thorax not reticulately rugose.....20

20. Sculpturing of head and thorax moderately fine; interrugal spaces without visible structure, giving to head, thorax, petiole and postpetiole a very opaque appearance; gaster smooth and subopaque.

Pog. similis sp. nov.

Sculpturing of head and thorax coarse; interrugal spaces densely punctate; head, thorax, petiole and postpetiole opaque; gaster smooth and shining.....21

21. Peduncle of petiole with prominent, downward projecting tooth; epinotal spines short, their length at most barely exceeding the distance separating their bases (epinotal spines of *Pog. occidentalis* var. *utahensis* short, but peduncle lacks prominent downward projecting tooth).

Pog. subdentatus Mayr

Peduncle without prominent downward projecting tooth, at most a rounded swelling; epinotal spines long or short.....22

22. Epinotal spines $1\frac{1}{2}$ times longer than the interbasal distance; infraspinal facet of epinotum rugose, scarcely shining; node of petiole as broad as long, or nearly so.

Pog. occidentalis Cresson typical

Epinotal spines short; node of petiole distinctly longer than broad.

Pog. occidentalis var. *utahensis* var. nov.

23. Interrugal spaces of head and thorax very coarsely and densely punctate giving a bead-like appearance at ordinary magnification; node of petiole and postpetiole without rugae, but densely punctate; basal half of first gastric segment finely punctate and subopaque, remaining segments with fine reticulation and shining; head, thorax, petiole and postpetiole very opaque; dark ferruginous, except gaster, which is brown.

Pog. salinus sp. nov.

Interrugal punctures not extraordinarily coarse and bead-like in appearance.....24

24. Node of petiole distinctly narrower than broad; interrugal spaces of head and thorax coarsely and densely punctate; thoracic dorsum strongly arched in profile (as in *Pog. californicus* typical); epinotal spines generally short; opaque, except gaster, which is smooth and somewhat shining.

Pog. comanche Wheeler

Node of petiole almost as broad as long; rugae of head and thorax prominent, their interspaces finely punctate and shining; thoracic dorsum not arched in profile; epinotal spines long; head and thorax shining, gaster smooth and very shining.

Pog. subnitidus Emery

25. Posterior angles of head smooth and shining.....26
Posterior angles of head not smooth and shining.....27

26. Clypeus deeply excised; frontal area without median carinula and strongly convex; epinotum with pair of slight swellings; node of petiole in profile very blunt and low, longer than high. Ferruginous.

Pog. sancti-hyacinthi Wheeler

Clypeus moderately excised; frontal area with or without median carinula and not convex; epinotum without swellings; node of petiole blunt in profile, but not low, as high as long; yellowish red.

Pog. apache Wheeler

27. Clypeus distinctly and broadly excised.....28
Clypeus not excised, but straight (*Pog. californicus* Buckley) ..29

28. Mandibles 5-dentate; node of petiole high and distinctly rounded in profile; rugosity of head and thorax coarse and reticulate. Workers monomorphic.

Pog. guatemaltecus Wheeler

Mandibles 7-dentate; node of petiole high and distinctly pointed in profile; rugosity of head and thorax coarse and parallel. Workers polymorphic.

Pog. badius Latreille

29. Node of petiole distinctly longer than its peduncle; postpetiole longer than high; mandibles except dentate border, clypeus and anterior portion of genæ light yellowish red, remainder of head and thorax darker; distal segments of gaster brown.

Pog. californicus subsp. longinodis Emery

Node of petiole not longer than its peduncle; color darker.30

30. Apical third or more of gaster black; petiole and postpetiole often brown; the former slender, its node less erect than in *Pog. californicus* typical, apex rounder or but slightly pointed.

Pog. californicus var. estebanius Pergande

Gaster not black.31

31. Epinotum with two extremely short and small distinct spines; interrugal spaces more densely and coarsely punctate than in *Pog. californicus* typical; head and thorax yellowish red.

Pog. californicus var. hindleyi Forel

Epinotum perfectly round and smooth.32

32. Rugae of head and thorax sharp and pronounced; interrugal spaces of head with shallow and more or less confluent depressions, those of thorax without sculpturing; head and thorax shining; gaster smooth and shining; light ferruginous red.

Pog. californicus Buckley typical

Rugae of head and thorax not sharp and pronounced; interrugal spaces densely and distinctly punctate; head and thorax not shining; light yellowish red or reddish.33

33. Interrugal spaces of head and thorax densely and very coarsely punctate; postpetiole higher than long and with a prominent transverse ventral protuberance; opaque, except gaster, which is smooth and shining; color dark reddish.

Pog. californicus var. barnesi M. R. Smith

Interrugal spaces densely but not coarsely punctate; postpetiole not higher than long and without a prominent ventral protuberance.34

34. Length of postpetiole distinctly greater than either its height or width; interrugal spaces of head and thorax densely and finely punctate; node of petiole and postpetiole shagreened; subopaque; gaster smooth and shining; dark yellowish red in color, except gaster, which is brown.

Pog. californicus subsp. maricopa Wheeler

Length of postpetiole equal to its height or width; interrugal spaces of head and thorax filled with shallow foveae; node of petiole and postpetiole shagreened; subopaque; gaster smooth and very shining; color reddish.

Pog. californicus subsp. sinaloanus subsp. nov.

A. SUBGENUS POGONOMYRMEX

1. POGONOMYRMEX APACHE Wheeler

Plates 2 and 9

Wheeler, Psyche, **9**, p. 392, ♀. 1902.

Geographical distribution:

Arizona: North Miller Canyon, Huachuca Mts. (W. M. Wheeler).

Texas: Fort Davis (W. M. Wheeler).

2. POGONOMYRMEX BADIUS (Latreille)

Plates 1 and 9

Formica badius Latreille, Fourmis, p. 238, pl. 11, fig. 71, A-D, ♀ ♀, 1802;

Myrmica crudelis (F. Smith), Mayr, Zoöl.-bot. Ges., Wien, Vol. **12**, p. 740, ♀

♂, 1862; Wheeler, Am. Nat., **36**, p. 92, fig. 8, ♀, 1902.

Geographical distribution:

Florida: Lake North, Sanford Flats (Schmitt); Inverness (C. M. Weed); Jacksonville (W. M. Wheeler); St. Augustine (C. T. Brues); Grant, Enterprise, Lakeland.

Georgia: Bowman's Station, Decatur Co. (J. C. Bradley); Thomasville, St. Simon's Isle.

Mississippi: Lucedale (R. W. Harned).

North Carolina: Duke Forest (A. S. Pearse).

3. POGONOMYRMEX BARBATUS (F. Smith)

Plates 2 and 9

Myrmica barbata F. Smith, Cat. Hym. Brit. Mus., **6**, p. 130, ♀, 1858; Mayr,

Verh. Zoöl.-bot. Ges., Wien, **37**, pp. 610, 611, ♀ ♂, 1887; Wheeler, Am.

Nat., **36**, p. 91, fig. 4, ♀, 1902.

Geographical distribution:

Mexico: Cerro del Chile, Chihuahua; Zapotlan, Colima (C. H. T. Townsend); Pachuca, Hidalgo (W. M. Mann); Guadalajara, Tuxpam (J. F. McClendon); Mexico (City?) (A. Herrera); Aguas Calientes (W. M. Wheeler.)
Texas: New Braunfels, Austin (W. M. Wheeler); Chisos Mts. (O. W. Williams); San Angelo, Langtry.

4. *POGONOMYRMEX BARBATUS* var. *FUSCATUS* Emery

Plate 10

Emery, Zoöl. Jahrb. Abth. Syst., 8, p. 309, ♀, 1895.

Geographical distribution:

Arizona: Oracle, 4000 ft., Post Canyon, Pinaleno Mts., 5000-6000 ft., Tempe, Bowie (W. M. Wheeler).
Colorado: Pueblo (Schmitt).
Mexico: San Jose de Guaymas (L. O. Howard).
New Mexico: Clayton (W. M. Wheeler); Alamogordo (G. v. Krockow).
Texas: Limpio Canyon, Fort Davis Mts.; Fort Davis, Langtry (W. M. Wheeler); Laredo (J. F. McClendon); Chisos Mts. (O. W. Williams).

5. *POGONOMYRMEX BARBATUS* var. *MARFENSIS* Wheeler

Plate 10

Wheeler, Am. Nat., 36, p. 98, ♀, 1902.

Geographical distribution:

New Mexico: Deming, White Sands, White Water, Roswell (T. D. A. Cockerell); Alamogordo, Rincon (G. v. Krockow); Engle (Nora Newberry); Santa Fé.
Texas: Chisos Mts. (W. B. Phillips); Marfa and San Esteban, Presidio Co.; Alpine, Pisano Pass, Brewster Co. (W. M. Wheeler).

6. *POGONOMYRMEX BARBATUS* var. *MOLEFACIENS* Buckley

Plate 9

Buckley, Proc. Acad. Nat. Sci. Phil. p. 45, ♀, 1860; Proc. Ent. Soc. Phil., p. 348, ♀ ♀, 1867; Emery, Zoöl. Jahrb. Abth. Syst., 8, p. 308, ♀ ♀ ♂, 1895.

Geographical distribution:

Arizona: Phoenix, Mouth Miller Canyon, Huachuca Mts., 4500 ft.; Post Canyon, Pinaleno Mts.; Jerome, Bensen, Tempe, Apache Camp, South Catalina Mts.; Oracle, 4500 ft., Texas Pass, Dragon Mts.; Hereford, Sabino Canyon, South Catalina Mts.; Palmerlee, Huachuca Mts.; Garden Canyon, Huachuca Mts., 5000 ft.; Palmacoles, Huachuca Mts., 5000 ft.; Hunter's Canyon, Huachuca Mts., 5800 ft. (W. M. Wheeler); Tempe, Prescott (T. D. A. Cockerell); Kit's Peak, Baboquivari (Clark

and A. N. S. P.); Huachuca Mts., 3500-4500 ft. (C. R. Biederman); Ramsey Canyon, Huachuca Mts., 5800 ft. (W. M. Mann); Lowell's Ranger Stn., Pima Co.

Kansas: Newton.

Oklahoma: Bliss, Ponca City (A. C. Burrill); Tulsa (J. C. Bradley).

Mexico: Aguas Calientes (C. C. Deam); Tampico (D. L. Crawford); Queretaro, San Juan del Rio, Tamarindo, Teotihuacan, Patzingo, Oaxaca.

New Mexico: Mescalera (T. D. A. Cockerell); Engle (Nora Newberry); Clayton (W. M. Wheeler).

Texas: Austin, Del Rio (W. M. Wheeler); Amarillo, Bovina (T. D. A. Cockerell); Langtry (W. L. Braun); Brownsville (R. A. Vickery); Barksdale, Edwards Co., Richmond.

Utah: St. George (V. M. Tanner).

7. *POGONOMYRMEX BARBATUS* var. *NIGRESCENS* Wheeler

Plate 10

Wheeler, *Psyche*, **9**, pp. 389, 391, ♀, 1902.

Geographical distribution:

Arizona: Gila Bend Mts., Casa Granda, Bowie, Fenner Canyon, South Catalinas Mts., 3000 ft. (W. M. Wheeler).

New Mexico: Aden, Alamogordo, 4300 ft. (W. M. Wheeler); Albuquerque (W. H. Long); Mesa Negra (E. L. Hewitt and Ruth Reynolds).

Texas: Del Rio (W. M. Wheeler); Eagle Pass (May Backus); Laredo (F. C. Pratt); Barstow (J. C. Crawford); El Paso (J. C. Bradley); Musquiz Canyon, Fort Davis (Cornell U. Exped.).

8. *POGONOMYRMEX BARBATUS* subsp. *RUGOSUS* Emery

Plate 9

Emery, *Zoöl. Jahrb. Abth. Syst.*, **8**, pp. 309, 310, ♀, ♂, 1895.

Geographical distribution:

Arizona: Tucson, Indian Gardens in Grand Canyon, Tempe, Florence, Jerome (W. M. Wheeler); Cactus Plain (F. H. Snow).

California: San Jacinto (Theo. Pergande); Riverside (H. L. Quayle); Elsinore (C. F. Baker); Lakeside, Palm Springs, Jacumba (W. M. Wheeler); Needles (F. M. Carpenter); Victorville (E. C. Jaeger); San Diego (J. D. S.); Point Loma (Percy Lenard); Perris (J. C. Bradley).

9. *POGONOMYRMEX CALIFORNICUS* Buckley

Plates 2 and 11

Myrmica californica Buckley, *Proc. Acad. Nat. Sci. Phil.*, p. 336, ♀, 1867; Wheeler; *Am. Nat.*, **36**, p. 98, fig. 7, ♀, 1902; *Psyche*, **21**, pp. 153-154, ♀, ♀, ♂, 1914.

Geographical distribution:

Arizona: Yuma, Grand Canyon, Phoenix, Yucca, Welton, Tempe, Norton's (W. M. Wheeler), Wilcox (A. K. Fisher).

California: Lakeside, Claremont, Arroyo Seco, Pasadena, Needles, Coyote Wells, Saugus, Laguna Beach, Jacumba (W. M. Wheeler); San Jacinto (C. Emery); Point Loma, San Diego (Percy Lenard); Upland, Lompoc, Mission, San Diego (J. C. Bradley); San Pedro (T. D. A. Cockerell); Altamont (McLane); Sier Valley.

Mexico: Ojos del Diablo, Chihuahua (C. H. T. Townsend); Lower California (Albatross Exped.).

Nevada: Las Vegas (J. C. Bradley); Moapa (C. W. Creel).

New Mexico: Las Cruces, Rincon (T. D. A. Cockerell); Alamogordo, Mesilla Park (W. M. Wheeler).

Texas: El Paso (J. C. Bradley).

Utah: St. George (V. M. Tanner).

10. *POGONOMYRMEX CALIFORNICUS* var. *ESTEBANIUS* Pergande

Plate 11

Pergande, Proc. Cal. Acad. Sci. (2), 4, p. 33, 1893.

Geographical distribution:

Arizona: Tucson, Tucson Mts., Tempe, Florence, Gila Bend Mts., Yucca, Yuma, Phoenix (W. M. Wheeler); Thatcher (R. V. Chamberlin).

California: Mojave, Palm Springs, Hidden Spring Canyon, Little San Bernardino Mts. (W. M. Wheeler); Victorville, 12 miles east (E. C. Jaeger); Otis, Mojave Desert, Perris, Indio (J. C. Bradley); El Centro (Cornell Exped.).

11. *POGONOMYRMEX CALIFORNICUS* var. *HINDLEYI* Forel

Plate 11

Forel, Bull. Soc. Vaud. Sci. Nat., 50, p. 27, ♀, 1914.

Geographical distribution:

Arizona: Thatcher (R. V. Chamberlin).

California: Escondido (E. Hindley).

New Mexico: Albuquerque (W. H. Long).

12. *POGONOMYRMEX CALIFORNICUS* subsp. *BARNSEI* M. R. Smith

Plate 11

Smith, Ann. Am. Ent. Soc., 22, pp. 246-247, ♀, 1914.

Geographical distribution:

Arizona: Maricopa Co. (O. L. Barnes).

13. *POGONOMYRMEX CALIFORNICUS* subsp. *LONGINODIS* Emery

Plate 11

Emery, Zoöl. Jahrb. Abth. Syst., 8, p. 311, ♀, 1895.

Geographical distribution:

New Mexico: Alamogordo (W. M. Wheeler).

Texas: Marfa (W. M. Wheeler); Chisos Mts. (W. B. Phillips).

14. *POGONOMYRMEX CALIFORNICUS* subsp. *MARICOPA* Wheeler

Plate 12

Wheeler, Psyche, 21, p. 155, ♀ ♂, 1914.

Geographical distribution:

Arizona: Post Canyon, Pinalino Mts. 4000-6000 ft.; Phoenix, Sabino Canyon, South Catalina Mts.; Benson 3600 ft., Tucson, Yuma, Norton's, Welton, Texas Pass, Dragoon Mts. (W. M. Wheeler); Sanford, Graham Mts., Ash Creek (E. G. Holt); Ramsey Canyon, Huachuca Mts. (W. M. Mann); Coyote Mts. 3500 ft. (Clark and A. N. S. P.).

California: Needles (W. M. Wheeler); Brawley (J. C. Bradley); El Centro (Cornell U. Exped.).

Mexico: Ojo de S. Dijuela and Ojos del Diablo, Chihuahua (C. H. T. Townsend).

New Mexico: Alamogordo, Albuquerque (W. M. Wheeler); Roswell, Deming (T. D. A. Cockerell); Las Truces (Lillie Gerhardt); Engle (Nora Newberry); Mesilla Park (D. E. Merrill).

15. *POGONOMYRMEX CALIFORNICUS* subsp. *SINALOANUS* subsp. nov.

Plate 12

Worker.—Length 8-9 mm.

This handsome subspecies differs from the typical form of *californicus* and all its known forms by its deep ferruginous color, except *barnsei* which it resembles closely in this respect, but may be readily distinguished from it by the delicate interrugal punctures and shining appearance. Peduncle of petiole with distinct small ventral tooth; its node obviously narrower than long; length and height of postpetiole equal to its width, its ventral protuberance undeveloped. Node and postpetiole finely shagreened dorsally.

Described from 21 workers taken by Case at Sinaloa, Mexico.

16. *POGONOMYRMEX COMANCHE* Wheeler

Plate 3 and 12

Wheeler, *Psyche*, **9**, p. 392, ♀, 1902; **21**, pp. 156-157, ♂, 1914.

Geographical distribution:

Arizona: Graham Mts., Ash Creek, 3200 ft. (E. G. Holt).

New Mexico: Albuquerque (W. H. Long).

Texas: Metropolis, Travis Co. (W. M. Wheeler); Milano.

17. *POGONOMYRMEX DENTATUS* sp. nov.

Plate 12

Worker.—Length 8.5 mm.

Head rectangular, exclusive of the 7-toothed mandibles slightly broader than long; posterior margin slightly concave. Anterior border of the clypeus broadly but faintly excised; its sides with a large blunt tooth-like projection anterior to each antennal fovea. Frontal area triangular, broader by a third than long, without a median carinula. Eyes in the middle of the lateral surfaces of the head. Antennal scape not reaching to midway between the eye and posterior angle of the head. Thorax of the usual contour, with two long slender epinotal spines, their length being at least a third greater than the interbasal distance, directed obliquely upward, outward, and backward. Petiole compressed at its base, its peduncle shorter than its node, which is pointed in front so that the ascending dorsal surface forms an obtuse angle in profile; posterior descending surface gently convex; antero-ventral spine of petiole absent. Postpetiole campanulate; broader than long, its ventral protuberance prominent. Gaster and legs of the usual type.

Mandibles with coarse parallel striae. Frontal area smooth and shining. Clypeus, sides, and upper surface of head traversed by very delicate, parallel rugae, which are very close together and scarcely divergent posteriorly. Interrugal punctures indistinct and in a single row between each pair of rugae. Posterior angles of the head smooth and shining as in *desertorum*. Pleura of the pronotum densely punctate and without rugae, its dorsum covered with fine transverse rugae and the interrugal spaces densely and finely punctate; meso- and metathoracic and coxal rugae mostly transverse and very fine. Infraspinal facet smooth and shining. Petiole, postpetiole, and legs covered only with a delicate microscopic reticulum.

Head, body, and legs covered with bristly, pale yellow hairs, which are erect on the dorsal surface of the head and thorax and suberect on the other parts. Lower surface of the head and mandibles with a well developed beard. Pubescence absent.

Head and thorax yellowish red, gaster golden brown, mandibles, except the black dentate margin, and posterior margin of the petiole ferruginous. Eyes black.

This species is described from one specimen from the Pergande Collection of the United States National Museum taken at Mirafiera of the Cape Region of Lower California, Mexico.

Pog. dentatus is very similar to *desertorum* in appearance, but differing in its larger size, absence of median frontal carinula, short interbasal distance of epinotal spines, prominent ventral protuberance of postpetiole, presence of blunt tooth-like projections of clypeus before the antennal fossae (which suggested the name), the absence of rugae on the pleura of the pronotum, and darker mandibles and gaster.

18. *POGONOMYRMEX DESERTORUM* Wheeler

Plates 3 and 14

Wheeler, *Psyche*, 9, pp. 387-388, ♀, 1902.

Geographical distribution:

Arizona: Tucson and desert east, Benson, Tempe (W. M. Wheeler); Thatcher (R. V. Chamberlin); Bowie (Cornell U. Exped.).

New Mexico: Mesilla Park, Aden (W. M. Wheeler); Mesilla Park "Pluchea zone" (T. D. A. Cockerell); White Sands, Tularosa Desert (G. v. Krockow).

Texas: Fresno Canyon, Presidio, Langtry (W. M. Wheeler).

19. *POGONOMYRMEX DESERTORUM* var. *FERRUGINEUS* var. nov.

Plate 14

Worker.—Length 5.5-6 mm.

The worker of this variety differs from that of the typical form in the following characters: 1, The coloration: in the typical form the whole ant is yellowish red, while in the variety the entire ant is uniformly dark ferruginous red, except the eyes and the dentate mandibular margins which are black in both forms. 2, The epinotal spines of *desertorum* s. st. are separated at their bases by a distance equal to that of their length, while in the variety the interbasal distance of the spines is less than their length. 3, The rugae of the head and thorax of the typical form are very delicate and the interrugal punctures are in-

distinct and in a single row, but in the variety *ferrugineus* the rugae of the head and thorax are distinctly coarser and the interrugal spaces densely, but finely punctate. 4, The typical form is shining, but the variety is decidedly opaque.

This variety is described from 10 workers taken at Tucson, Arizona, one from the Pergande Collection and 9 collected by Mr. P. Klingenberg at College Peak on March 22, 1933.

20. *POGONOMYRMEX DESERTORUM* var. *TENUISPINA* Forel

Forel, Bull. Soc. Vaud. Sci. Nat., **50**, p. 269-270, ♀, 1914.

I am unable to find specimens of this variety in the collection. Forel gives the locality as the United States, collected by Pergande.

21. *POGONOMYRMEX GUATEMALTECUS* Wheeler

Plates 3 and 14

Wheeler, Psyche, **21**, p. 149-151, ♀ ♀, 1914.

Geographical distribution:

Guatemala: Zacapa (W. M. Wheeler).

22. *POGONOMYRMEX HUACHUCANUS* Wheeler

Plates 4 and 14

Wheeler, Psyche, **21**, pp. 151-152, ♀, 1914.

Geographical distribution:

Arizona: Mouth Miller Canyon, Huachuca Mts.; Sabino Canyon, South Catalina Mts.; Texas Pass, Dragoon Mts.; Oracle (W. M. Wheeler).

23. *POGONOMYRMEX OCCIDENTALIS* (Cresson)

Plates 4 and 13

Myrmica occidentalis Cresson, Proc. Ent. Soc. Phil., **4**, pp. 426-427, ♀ ♀, 1865; Mayr, Verh. Zoöl.-bot. Ges., Wien, **20**, p. 971, ♀, 1870; Wheeler, Am. Nat., **36**, pp. 92, 98, fig. 5, ♀, 1902; Gaige, Proc. Biol. Soc. Wash., **27**, pp. 93-96, ♀ ♀ ♂, 1914.

After a careful comparison of a series of 25 cotypes of workers and of one female of *occidentalis* var. *ruthveni* Gaige with a series of the typical forms of *occidentalis* Cresson I am compelled to consider the former as a synonym of the typical form.

Geographical distribution:

- Arizona*: Grand Canyon, just below "plateau," Garden Canyon, Huachuca Mts.; Ash Fork; Post Canyon Pinaleno Mts. 5000-6000 ft., Prescott, Coconino Forest, Grand Canyon (W. M. Wheeler); Yampai (T. D. A. Cockerell); Williams, Cameron, Lee's Ferry (A. C. Cole Jr.)¹.
- British Columbia*: Fairview (W. R. Buckell); Keremeos, Oliver, Okanagan Falls, Osoyoos (E. R. Buckell)¹.
- Colorado*: Colorado Springs, Buena Vista, Salida (W. M. Wheeler); Boulder (T. D. A. Cockerell); Littleton (A. C. Burrill); Grand Junction (E. H. Siegler); Silverton 12000 ft; Hayden Park, Co. 10000 ft. (E. J. Osler); Trinidad (W. M. Wheeler)¹.
- Idaho*: Lewiston (J. M. Aldrich); Pocatello (N. A. Weber); Craters of the Moon National Monument; Twin Falls, Rogerson, Nampa, Boise, Blackfoot, Arco, Idaho Falls, Weiser, Mountain Home, Shoshone, Ketchum, Hailey, Redfish Lake, Hagerman, Hammett, American Falls, Dubois, Hollister, Shoshone Falls, Rock Creek Canyon, Malta, Bliss (A. C. Cole, Jr.)¹; Parma, Virginia (G. W. Haug)¹.
- Kansas*: Stockton (R. C. Smith)¹.
- Montana*: Sanders (C. C. Adams); Custer Co. (E. R. Hutchins)¹.
- Nebraska*: Cambridge (A. P. M.).
- Nevada*: Maggie Basin, Eureka and Elko Co. (F. M. Gaige).
- New Mexico*: Albuquerque, Clayton, Pecos 6000 ft. (W. M. Wheeler); Las Vegas, Rowe, Las Valles, Embudo, Pinos Altos (T. D. A. Cockerell)¹, Kasolosky Road House, Pecos Valley, San Miguel Co. (E. D. Hewitt and Ruth Reynolds).
- North Dakota*: Medora (C. T. Brues).
- Oklahoma*: Bliss, Ponca City (A. C. Burrill); Woods Co. (R. D. Bird)¹.
- Oregon*: Echo, Pendleton, Ontario, Baker and LeGrande (A. C. Cole, Jr.).
- South Dakota*: Ardmore (E. J. Holt); Rapid City, Mitchell, Sioux Falls (A. C. Cole, Jr.)¹; Capa, Mobridge, Newell (H. C. Severin)¹.
- Utah*: Salt Lake Co. (R. V. Chamberlin); Lehi (W. A. Hooker); Sandy, Kaysville (E. H. Kalmbach); Brigham City (Grace Olsen); Tooele Valley, Delle, Granssville, Snowville, Ogden, Zion National Park, Kanab (A. C. Cole, Jr.)¹; Grants (R. C. Shannon)¹.
- Washington*: Camp Umatilla, Spokane (S. Henshaw); Almota.
- Wyoming*: Green River (J. M. Aldrich); Upper Geyser Basin, Yellowstone National Park (J. C. Bradley); Cheyenne, Laramie, Rawlins, Rock Springs, Kemmer, Cody, Ten Sleep (A. C. Cole, Jr.).

¹ Cole, A. C. Jr., The Relation of the Ant., *Pog. occidentalis* Cresson to Its Environment, Jour. Ohio Sci., (2) 32, pp. 133-134.

24. *POGONOMYRMEX OCCIDENTALIS* var. *UTAHENSIS* var. nov.

Plate 13

Worker.—Length 7.5–8.5 mm.

This variety differs from the typical form in the following respects: 1, The node of the petiole in profile terminates in a more or less well defined point directed caudad as in *subdentatus*, node not so wide as in *subdentatus*; viewed from above narrow and pointed as in *californicus*. 2, The epinotal spines are shorter than the distance between their bases, whereas in the typical form the length exceeds the interbasal distance by one half. 3, Cephalic rugae widely divergent posteriorly. 4, Interrugal punctures of head and thorax less pronounced than in *occidentalis*, s. st.; variety *utahensis* is subopaque, typical form opaque.

Male.—Head, thorax and node of petiole black, remainder dark brown, gaster with irregular darker bands; in the typical *occidentalis* head, thorax, antennae, coxae, and femora dark brown, remainder light yellowish red.

Female.—Cephalic rugae strongly divergent posteriorly; darker coloration than the typical form.

This variety is described from 13 workers, two males, and two females taken at Zion National Park, Utah, July 18, 1932 by W. S. Creighton.

25. *POGONOMYRMEX SUBNITIDUS* Emery

Plates 4 and 13

Emery, Zoöl. Jahrb. Abth. Syst., 8, p. 310, ♀, 1895; Wheeler, Psyche, 21, p. 156, 1914.

Geographical distribution:

California: Mt. Lowe, Arroyo Sacco near Altadena, Tejon Pass, Del Mar, Warren's, San Diego Co. (W. M. Wheeler); Los Gatos Cañon, Diablo Range (J. C. Bradley); La Jolla (C. T. Brues).

26. *POGONOMYRMEX SANCTI-HYACINTHI* Wheeler

Plates 5 and 13

Wheeler, Psyche, 9, pp. 388–389, ♀, 1902.

Geographical distribution:

New Mexico: Alamogordo.

Texas: Fort Davis, San Antonio (W. M. Wheeler).

27. *POGONOMYRMEX SUBDENTATUS* Mayr

Plates 5 and 14

Mayr, Verh. Zoöl.-bot. Ges., Wien, **20**, p. 971, ♀, 1870; Wheeler, Am. Nat., **36**, pp. 94, 95, 98, fig. 6, ♀, 1902.

Geographical distribution:

California: San Jacinto (H. Heath); Pacific Grove (J. C. Bradley); Palo Alto (W. M. Mann); Davis (T. W. Cook); Laguna Beach (W. M. Wheeler).

28. *POGONOMYRMEX SALINUS* sp. nov.

Plates 5 and 14

Worker.—Length 7 mm.

Head rectangular, exclusive of the 7-toothed mandibles as broad as long; posterior margin straight. Anterior border of the clypeus straight. Frontal area triangular, as broad as long, convex and strongly carinulate. Eyes in the middle of the lateral surfaces of the head. The antennae were broken off in this specimen. Thorax only barely longer than the head exclusive of the mandibles, from above it is broadest through the pronotum, transverse diameters of meso- and epinotum equal; in profile the dorsal outline is strongly convex in the pronotal region and gently sloping to the border of the mesonotum where a slight transverse depression occurs, epinotum weakly convex and armed posteriorly with a pair of short, pointed spines whose length is about $1\frac{1}{3}$ greater than the distance separating their bases and about $\frac{1}{2}$ less than that separating their outward pointing tips. Petiole short, the node longer than the peduncle, in profile the node is higher and the apex more pointed than in *occidentalis*; its anterior ascending surface straight, the posterior descending surface moderately convex; seen from above the anterior border broadly acute as in *desertorum*, transversely convex, slightly longer than broad. Ventral surface of the peduncle without a spine. Postpetiole campanulate, as long as broad posteriorly, evenly convex above, its ventral protuberance well developed and transverse. Gaster and legs of the usual form.

Mandibles subopaque, coarsely and deeply striated. Frontal area smooth and shining. Clypeus, front, and sides of head traversed with coarse longitudinal parallel rugae; interrugal spaces of clypeus smooth and shining, those of the front and sides of the head densely punctate as in *occidentalis*. Rugae distinctly divergent posteriorly. Thoracic sculpture coarse as on the head; rugae of the neck transverse and with-

out distinct interrugal sculpture, arcuately transverse on pronotum, longitudinal on mesonotum and meso- and metapleurae, and transverse on epinotum; interrugal spaces coarsely and densely punctate. Infraspinal facet rugose and scarcely glabrous. Stem of petiole and anterior surface of node shining, remainder of node and postpetiole densely covered with coarse punctures; basal half of first gastric segment densely and finely punctate, remainder of gaster finely reticulate and shining. Coxae faintly rugose, and like the legs covered with a fine reticulation.

Head, body, and legs sparsely beset with pale hairs. Beard of long recurved hairs on ventral side of mandibles and head well developed. No pubescence.

Whole ant of a very deep ferruginous color and opaque, except the gaster which is shining and brown, and the dentate apical margin of the mandibles and eyes which are black.

This species is described from a single specimen taken near Soda Springs, Bridgeport, California, by Mr. E. C. Jaeger on August 1, 1932.

29. *POGONOMYRMEX WHEELERI* sp. nov.

Plates 6 and 14

Worker.—Length 9.5–11.5 mm.

Head rectangular, exclusive of the 7-toothed mandibles slightly broader than long; posterior margin at the most only very slightly concave. Anterior border of the clypeus broadly and moderately excised. Frontal area triangular, its base $1\frac{1}{2}$ times as broad as its height, with a distinct median carinula. Eyes in middle of the lateral surfaces of the head. Antennal scape short, reaching only about $\frac{1}{3}$ of the distance from the posterior margin of the eye to the posterior corner of the head. Thorax strongly arched in profile and usually with a blunt projection at the apex of the pronotum; with two epinotal spines of rather variable length and shape, being rather short in some specimens, in others long and slender, and in still others somewhat spatulate. In all except the shortest spines the length slightly exceeds the interbasal distance; they are only slightly directed outward. Petiole compressed toward the base, its peduncle only slightly longer than the node, whose ascending anterior surface rises gently to a blunt apex and forms in profile an obtuse angle; posterior descending surface mildly convex; lower surface of petiole with a well developed, downwardly projecting tooth. Postpetiole campanulate, broader than

long; its ventral protuberance prominent. Gaster long and very wasp-like in appearance. Legs of the usual type.

Mandibles with moderately fine, parallel striae. Frontal area exceedingly finely striate under a high magnification and subopaque. Clypeus, and upper surface of head traversed by very delicate, parallel rugae which are very dense and not divergent except on the posterior border of the head and there only slightly. Interrugal punctures very indistinct on the front, more distinct on the sides of the head, and in a single row between each pair of rugae. Posterior angles of the head not smooth and shining. Thoracic and coxal rugae mostly transverse, those of the propleurae indistinct and with large, distinct interrugal foveolae arranged in single rows. Infraspinal facet smooth and shining. Petiole and postpetiole punctate and subopaque. Legs and gaster covered with a fine reticulation.

Body and legs beset with bristly pale yellow hairs, which are erect on the dorsal surface of the head and thorax and suberect elsewhere. Beard of long recurved hairs on the lower surface of head and mandibles. No pubescence.

Entire ant uniformly dark yellowish red except eyes and dentate margins of mandibles, which are black.

This species is described from twelve specimens taken at Escuinapa, Sinaloa, Mexico by J. H. Batty. It resembles *dentatus* and *desertorum* in the very delicate sculpturing, but differs from *dentatus* in its greater size, its dark coloration, presence of frontal carinula and antero-ventral spine on the petiole, coarser sculpturing, absence of tooth-like projections of the clypeus anterior to the antennal fossae, and the elongate gaster; from *desertorum*, by the rough posterior angles of the head.

30. POGONOMYRMEX SIMILIS sp. nov.

Plates 6 and 14

Worker.—Length 7 mm.

Head rectangular, exclusive of the 7-toothed mandibles; posterior margin slightly concave. Anterior margin of clypeus broadly, but at most very faintly excised. Frontal area triangular, broader than long, with a distinct, but not strong median carinula. Eyes in the middle of the lateral surfaces of the head. Antennal scapes reaching not quite half way between the eyes and posterior angles of the head. Thorax of the usual shape and with two epinotal spines whose length is about twice the distance between their bases; the basal portion of each spine

broad and somewhat flattened latero-medially. Petiole compressed at the base, a third shorter than its node, which is pointed anteriorly so that the ascending surface forms an obtuse angle in profile; posterior dorsal descending surface gently convex and longer than broad; ventral surface of the petiole with a low, broad, downward projecting tooth. Postpetiole campanulate and slightly broader than long, its transverse ventral protuberance rather small, but distinct. Gaster and legs of the usual configuration.

Mandibles with rather coarse, parallel striae. Frontal area smooth and shining. Clypeus, sides and surface of the head traversed by parallel rugae which are intermediate in coarseness between the delicate rugae of *desertorum* and the heavy ones of *occidentalis*; they are scarcely divergent posteriorly. Interrugal spaces densely, finely, and indistinctly foveolate, Posterior angles of the head rugose. Thoracic and coxal rugae mostly transverse, except those of the mesonotum which are usually longitudinal. Thoracic sculpture coarser than that of the head. Infraspinal facet of the epinotum smooth and shining. Descending posterior surface of node of petiole traversed by coarse striae; postpetiole finely shagreened. Legs and gaster covered with a microscopic reticulation.

Ant rather densely beset with pale yellow, bristly hairs which are erect on the thorax and dorsal surface of the head, suberect elsewhere. Underside of head and mandibles with a well developed beard of long, recurved hairs.

Dark ferruginous throughout, except the eyes and dentate margin of the mandibles which are black.

This species is described from fourteen specimens taken at Oracle, Arizona on March 13, 1919 by Prof. W. M. Wheeler on the north slope of Mt. Lemon at an altitude of 4500 feet.

It resembles *desertorum* in shape and size but differs in the slightly coarser sculpturing, darker coloration, flattened epinotal spines, and in having the posterior angles of the head rough. It differs from *occidentalis*, *subnitidus*, and *subdentatus* in having a less coarse sculpture, flattened epinotal spines, and differently shaped petiole and node.

B. SUBGENUS EPHEBOMYRMEX

31. POGONOMYRMEX (E.) IMBERBICULUS Wheeler

Plates 6 and 15

Wheeler, Am. Nat., **36**, pp. 86, 87-89, figs. 1, 2, ♀, 1902; Psyche, **9**, p. 390, 1902.

Geographical distribution:

New Mexico: Aden (W. M. Wheeler); Alamogordo (G. v. Krockow).

Texas: Mt. Bonnel, Austin; Del Rio, Langtry, Fort Davis (W. M. Wheeler);
Juno (Cornell Exped.).

32. *POGONOMYRMEX* (E.) *PIMA* Wheeler

Plates 7 and 15

Wheeler, Jour. N. Y. Ent. Soc., **17**, pp. 79-80, ♀, 1909.

Geographical distribution:

Arizona: Tucson and desert east, Mt. Lemmon, South Catalina Mts. 8000-9150 ft.; Bowie, Casa Grande, Tempe, Florence (W. M. Wheeler).

33. *POGONOMYRMEX* (E.) *SAUCIUS* Wheeler and Mann

Plates 7 and 15

Wheeler and Mann, Bull. Am. Mus. Nat. Hist., **33**, pp. 29-31, figs. 10-11, ♀, 1914.

Geographical distribution:

Haiti: Diquini, Furcy, Port au Prince, Cape Haitien (W. M. Mann).

34. *POGONOMYRMEX* (E.) *SCHMITTI* Forel

Plates 8 and 15

Forel, Ann. Soc. Ent. Belg., **45**, pp. 339-340, ♀, 1901; Wheeler and Mann, Bull. Am. Mus. Nat. Hist., **33**, pp. 27-29, fig. 9, ♀ ♀, 1914.

Geographical distribution:

Haiti: Haiti (M. J. Schmitt); Furcy, Petionville, Diquini, Port au Prince, Mountains north of Jacmel (W. M. Mann).

35. *POGONOMYRMEX* (E.) *SCHMITTI* var. *SUBLAEVIGATUS* Wheeler and Mann

Plate 15

Wheeler and Mann, Bull. Am. Mus. Nat. Hist., **33**, p. 29, ♀ ♀, 1914

Geographical distribution:

Haiti: Ennery, Mannesville, Diquini, Port au Prince (W. M. Mann).

36. *POGONOMYRMEX* (E.) *TOWNSENDI* Wheeler

Plates 8 and 15

Wheeler, Jour. N. Y. Ent. Soc., **17**, pp. 80-81, ♀, 1909.

Geographical distribution:

Arizona: Fort Grant, Pinaleno Mts. (Cornell U. Exped.); Tucson (W. M. Wheeler).

Mexico: Ojo del Cerro Chilicote, Chihuahua (C. H. T. Townsend).



Olsen, O W. 1934. "Notes on the North American harvesting ants of the genus *Pogonomyrmex* Mayr." *Bulletin of the Museum of Comparative Zoology at Harvard College* 77, 493–514.

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