

## Taxonomy of the *Camponotus festinatus* complex in the United States of America (Hymenoptera: Formicidae)

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### Abstract

The taxonomic status of the six United States species comprising the *Camponotus festinatus* (BUCKLEY, 1866) complex is reviewed. A neotype for *C. festinatus* is designated and the female castes are described. The remaining five species are redescribed relative to *C. festinatus*. *Camponotus fragilis* PERGANDE, 1894 sp.rev. is revived from synonymy; *C. pudorosus* EMERY, 1925 stat.n. is recognized as a distinct species. Two new species are described: *C. absquatulator* sp.n. (California) and *C. microps* sp.n. (Arizona).

**Key words:** *Camponotus*, *C. festinatus* complex, *C. festinatus*, *C. absquatulator* sp.n., *C. fragilis*, *C. microps* sp.n., *C. pudorosus*, *C. vafer*, Nearctic, taxonomy.

**Dedication:** This paper is dedicated to the memory of Stefan Schödl, a valued colleague I never had the opportunity of meeting in person.

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### Introduction

The prevailing concept of *Camponotus festinatus* (BUCKLEY, 1866) beginning with WHEELER (1902) up to and including that of MACKAY & MACKAY (2002) has always been uncertain. In part, this has been due to the lack of a proper description of this taxon; the original description was hopelessly vague and subsequent descriptions have done little to improve matters. A further difficulty was that over its entire range, extending from central Texas to the Pacific Coast and south well into Mexico, *C. "festinatus"* displayed a bewildering array of variant forms. Recently, genetic studies of nest populations in a limited area of southern Arizona by GOODISMAN & HAHN (2005) and by A.B. Lazarus & al. (unpubl.) have demonstrated the coexistence of several distinct species or incipient species.

The voucher specimens for the above cited genetic studies suggest that additional species remain to be described. "*Camponotus* nr. *festinatus* desert dark" and "*C. nr. festinatus* desert light" of GOODISMAN & HAHN (2005) will both fall within *C. festinatus* as here characterized, but both may be distinct species apart from *C. festinatus*. Similarly, "*C. nr. festinatus* long-legged form" of A.B. Lazarus & al. (unpubl.) may represent an additional new species. Voucher specimens of the collections used in those two studies are deposited in the MCZC (see below), but were made available too late for detailed consideration in this study.

As part of my ongoing study of the ants of California I have had to reevaluate the status of some of the species in the *Camponotus festinatus* complex. This has resulted in the realization that *C. fragilis*, described from the Lower California peninsula of Mexico was wrongly synonymized with *C. festinatus* and that there exists in the southern California deserts an additional species. I am taking this opportunity to define the *C. festinatus* complex, designate a neotype for *C. festinatus* and to provide a full descrip-

tion for this species, as well as to describe two new species, one from the Sonoran Desert of southern California (*C. absquatulator* sp.n.) and one from moderate elevations in the Chiricahua Mountains of southeastern Arizona (*C. microps* sp.n.).

### Specimens examined

The specimens utilized in this study are from a number of sources:

- CASC California Academy of Sciences, San Francisco, CA.
- LACM Natural History Museum of Los Angeles County, Los Angeles, CA.
- MCZC Museum of Comparative Zoology, Harvard University, Cambridge, MA.
- RAJC Robert A. Johnson, personal collection, Tempe, AZ.
- UCDC University of California, Davis, CA.
- USNM National Museum of Natural History, Washington, DC.

Paratypes of the two new species described below will be deposited in The Natural History Museum, London, BMNH.

### Measurements and terminology

Measurements of morphological features were made at 50× using a Leitz stereo microscope and an ocular micrometer. Measurements were recorded in hundredths of a millimeter. Head measurements were made in full-face (frontal) view. I have, when possible, given the results of measurements for 12 individuals of each class, mostly of randomly selected specimens, but deliberately seeking apparent largest and smallest specimens as part of the 12.

- CI Cephalic Index:  $HW / HL \times 100$ .
- EL Eye Length, measured in full face (frontal) view.
- EW Eye Width, measured in full face (frontal) view and perpendicular to EL.
- HFI Hind Femur Index:  $HFL / HW \times 100$ .

- HFL Length of Hind Femur, along dorsal margin, from articulation with trochanter to posterior-most extremity.
- HL Head Length: measured in full face view, from posterior margin of vertex to anterior-most margin of clypeus.
- HW Head Width: measured in full face view, the greatest measurable width of the head, exclusive of compound eyes.
- ICD Interocular Distance: shortest distance between inner margins of compound eyes in full face (frontal) view.
- IOD Interocellar Distance: minimum distance between lateral (posterior) ocelli in frontal view.
- ML Mesosomal Length: measured from anterior-most point of pronotum to posterior-most point of propodeum.
- OD Ocellus Diameter: maximum width across anterior ocellus in frontal view.
- OI Ocular Index:  $(EL / HL) \times 100$ .
- OMD Oculomandibular Distance: minimum length of malar area in lateral view, from anterior eye margin to nearest point of malar area.
- OOD Ocellocular Distance: minimum distance between a posterior (lateral) ocellus and inner margin of compound eye, in frontal view.
- PNW Pronotal Width: maximum width of pronotum in dorsal view.
- SI Scape Index:  $(SL / HW) \times 100$ .
- SL Scape Length: maximum straight-line length of scape, excluding basal condyle.

## Systematics

### *Camponotus festinatus* (BUCKLEY, 1866) complex

This is a small complex that ranges across the southwestern United States from central Texas to southern California, thence south into central Mexico. The complex is here defined by the following combination of features that will separate it from all other Nearctic species complexes: (1) the clypeus bears a well defined median ridge ("carina"); (2) the anterior margin of the clypeal median lobe is broadly transverse or shallowly concave; (3) the lateral margins of the head, as seen in full face view are evenly beset with short, stiff erect setae that extend from the base of the mandible to the posterolateral corner of the head (limited to the malar area in one species); (4) antennal scape shaft with at least a few erect setae, at least in major workers and queens; (5) side of pronotum of major workers often with standing setae above ventral margin; (6) appressed pubescence of gastral terga short and widely scattered, adjacent hairs separated by much more than their lengths; (7) head and body light yellowish brown with varying degrees of darker brownish infuscation.

*Camponotus festinatus* was described by the Texas State Geologist S.B. BUCKLEY (1866) as a species of *Formica*, one of 67 presumed new ant species from the United States. The descriptions were woefully inadequate and myrmecologists of the time despaired of recognizing his species since there were no clearly identifiable type specimens. WHEELER (1902) tackled these vexing difficulties and I can do no better than to quote from his opening remarks: "The sixty-seven odd descriptions are, indeed, fearfully

and wonderfully made. With a persistency, which at times seems almost intentional, the author selects for description the worthless, insignificant features of the ant's body\*, [\*Such, e.g., as the distance (sometimes measured to within one or two hundredths of an inch!) to which the wing tips of the female project beyond the abdomen as if, forsooth, the abdomen of these insects were incapable of expansion or contraction.] and passes without a word over the important, distinctive characters. His conception of generic characters is even more nebulous than his appreciation of specific differences. Sometimes he mistakes the sex of the form he is describing, and at other times confounds several very distinct forms in a single description."

"No wonder, therefore, that Prof. Forel wrote, in 1884: "Quant aux descriptions de Buckley, elles sont telles que je suis obligé d'en faire absolument abstraction, vu qu'elles ne permettant pas de reconnaître un seule espèce, ni même les genres." Dr. Gustave Mayr and Prof. Emery, however, who have occupied themselves somewhat more extensively with the ants of the United States, have gone to considerable pains to determine the species described by the Texan geologist. They have, indeed, succeeded in identifying some of the forms more or less accurately, but the bulk of Buckley's names still clogs our taxonomy and exasperates the student."

Regarding Buckley's *Formica festinata*, WHEELER (1902) noted that this was "... recognizable with certainty as a variety of *Camponotus fumidus*, ROG., of very common occurrence on the dry hill-slopes of Central Texas." *Camponotus fumidus* was described by ROGER (1863) from a major worker from Venezuela. The type specimen apparently is no longer extant (F. Koch, pers. comm.) and there is no certainty now of its identity. By 1925 *C. fumidus* had acquired 13 subspecies / varieties, ranging from northern South America to the southwestern United States and the Antilles, from Dominica to the Bahamas (EMERY 1925), even though there was never a clear concept of Roger's species. The situation has been further complicated by the existence of an additional related, if not synonymous, taxon, *C. picipes* (OLIVIER, 1792), with its own accumulation of subspecies and / or varieties, eight in all, occupying much the same range as that of the protean *C. fumidus*. As in the case of *C. fumidus*, there is no clear concept of *C. picipes* nor have type specimens, if they still exist, been examined in recent years but that is a problem beyond the purview of the present paper. SNELLING (1968) proposed that *C. festinatus* be elevated to full species, carrying with it those synonyms listed by CREIGHTON (1950), but including also *C. fragilis* PERGANDE, 1894. Two Antillean forms, *C. vittatus* FOREL, 1904, and *C. lucayanus* WHEELER, 1905, were also recognized as full species.

Because no type material of *C. festinatus*, the pivotal species in the complex, is known to exist, its identity is here stabilized by the designation of a neotype, described below.

### The United States species of the *C. festinatus* complex

*Camponotus absquatulator* sp.n.

*Camponotus festinatus* (BUCKLEY, 1866)

*Camponotus fragilis* PERGANDE, 1894, sp.rev.

*Camponotus microps* sp.n.

*Camponotus pudorosus* EMERY, 1925, stat.n.

*Camponotus vafer* WHEELER, 1910

*Camponotus festinatus* (BUCKLEY, 1866) (Figs. 1 - 8)

*Formica festinata* BUCKLEY, 1866: 164: w., q.

*Camponotus festinatus*: DALLA TORRE (1893: 231).

*Camponotus fumidus* var. *pubicornis* EMERY, 1893: 670: w.; synonymy by WHEELER (1910: 312).

*Camponotus fumidus* var. *festinatus*: WHEELER (1902: 22).

*Camponotus* (*Camponotus*) *fumidus* var. *festinatus*: WHEELER (1910: 312).

*Camponotus* (*Camponotus*) *fumidus* var. *spurcus* WHEELER, 1910: 315: w., q.; synonymy by CREIGHTON (1950: 376).

*Camponotus* (*Myrmoturba*) *fumidus* var. *festinatus*: WHEELER (1917: 561).

*Camponotus* (*Tanaemyrmex*) *fumidus* var. *festinatus*: EMERY (1925: 80); CREIGHTON (1950: 376).

*Camponotus* (*Tanaemyrmex*) *festinatus*: SNELLING (1968: 350); MACKAY & MACKAY (2002: 255).

**Neotype worker** by present designation, United States of America, Texas, Travis Co., Austin, 150 m (37.53° N, 97.74° W), 6.VIII.1954, leg. A.C. Cole, # T46, under stone (LACM). In case of destruction or loss of the neotype specimen, a replacement neotype can be designated from: a series of workers, same locality, 13. - 14.IX.1942, leg. W. F. Buren; series of workers and queens, Ozona (17 mi S), Crockett Co., 24.VII.1955, leg. A.C. Cole, # T117, in soil under several large stones (BMNH, LACM, MCZC, UCDC, USNM).

**Diagnosis.** Mandible of major worker microreticulate on basal half between scattered piligerous punctures; anterior half of malar area with numerous coarse elongate punctures; scape of major worker with a variable number of fully erect setae, but pubescence fully appressed, that of minor worker with fewer than 3 fine suberect setae (usually none) and pubescence fully appressed; both subcastes with suberect to erect setae along entire head margin in frontal view.

**Description of major worker** (n = 12). Measurements (mm): HL 2.75 - 3.00; HW 2.45 - 2.75; EL 0.60 - 0.70; SL 2.50 - 2.70; ML 3.55 - 3.85. Indices: CI 84 - 93; HFI 109 - 116; OI 22 - 24; SI 88 - 95.

Medium-sized species in the *C. festinatus* complex. Head (Fig. 1) wedge-shaped, broadest at or slightly above level of eyes, evenly tapering to base of mandibles. Mandible (Fig. 3) microreticulate basad, becoming smoother and shinier apicad, with scattered piligerous punctures, rarely with a few weak longitudinal rugae near base; masticatory margin with six teeth, the first five (counting from apex) acute; proximal tooth larger than preceding teeth and slightly off-set, acute to truncate or weakly bifid; subtended by an offset small tooth on inner basal margin (sometimes sufficiently strong that mandible appears to be seven-toothed). Head at least slightly longer than broad, sides weakly convex and divergent behind and broadly rounded into concave posterior (preoccipital) margin. EL about one-quarter of HL; in frontal view outer margin of eye separated from head margin by about  $0.50 \times EW$ ; ICD  $0.58 - 0.63 \times HW$ . Disc of clypeus distinctly subangulate along midline; anterior margin truncate, transverse to very weakly concave in middle. Scape long, its apex distinctly surpassing posterolateral angles of head; scape base subcylindrical. Frontal carinae separated anteriorly by about one-fifth HW, flaring out posteriorly to about one-third

HW. Entire head slightly shiny and coarsely microreticulate between sparse piligerous punctures; anterior half of malar area with coarser elongate punctures; gena slightly shiny below eye, coarsely microreticulate between mostly elliptical piligerous punctures.

Mesosomal dorsum moderately convex in profile; metanotum usually distinctly defined by anterior and posterior unimpressed lines (meso-metanotal line sometimes weakly impressed); dorsal face of propodeum broadly rounded into declivitous face and about one-third longer than declivitous face.

Petiole simple, scale-like in profile and summit distinctly convex in posterior view.

Legs relatively short, metatibia 2.75 - 3.20 mm long.

Body moderately shiny and weakly microreticulate; head duller and more strongly microreticulate; with sparse to scattered moderately coarse piligerous punctures; anterior malar area with conspicuous coarse elongate punctures.

Pilosity moderately abundant on dorsal surfaces of head and body, setae apically acute and yellowish; malar area and margins of head with numerous short standing setae, longest setae c. 0.20 mm long; underside of head with numerous standing setae, ranging from 0.13 - 0.30 mm long; side of pronotum with several standing setae above ventral margin; the following numbers of medium length to long standing setae present on indicated structures: scape shaft (15+), ventral margin of profemur (10 - 19), pronotum (18 - 26), mesonotum (9 - 14), propodeum (10 - 16), petiole (5 - 12), disc of gastral tergum I (14 - 18), premarginal row on gastral tergum I (11 - 14). Fine appressed pubescence absent, or nearly so, from most head and body surfaces (conspicuous only on scape shaft).

Body and appendages yellowish brown, head more brownish; gastral segments darker brownish, at least at base, sometimes largely brownish.

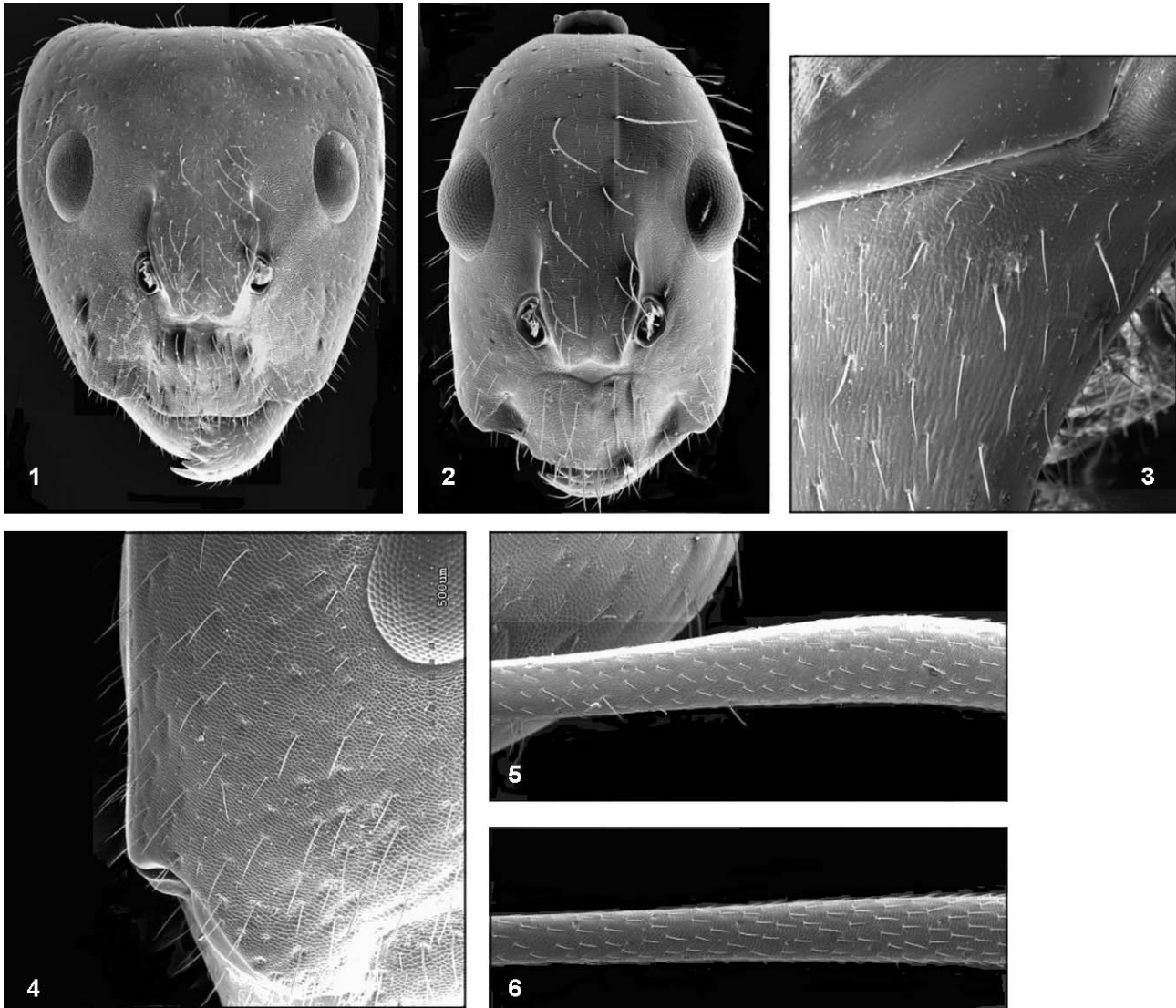
**Description of medium and small workers** (n = 20). Measurements (mm): HL 1.65 - 2.00; HW 1.05 - 1.40; EL 0.40 - 0.55; SL 2.20 - 2.45; ML 2.60 - 3.15. Indices: CI 61 - 70; HFI 137 - 235; OI 25 - 28; SI 121 - 133.

Mandible shiny and weakly microreticulate and with scattered piligerous punctures; masticatory margin with six or seven teeth, proximal tooth robust and subtruncate, remaining teeth acute. Head distinctly longer than broad, lateral margins subparallel anterior to eyes, slightly convex and narrower behind eyes, preoccipital margin transverse (Note: The head shape of the minor worker is grossly distorted in the figure - no. 346 - by MACKAY & MACKAY 2002). Eye situated behind midlength of head; EL about  $0.25 \times HL$ ; in frontal view outer margin extending slightly beyond margin of head; ICD  $0.60 - 0.70 \times HW$ . Clypeus and scape as in major worker, but anterior margin of clypeus consistently transverse. Frontal carinae separated anteriorly by about  $0.40 \times HW$ , widening posteriorly to about  $0.30 \times HW$ .

Mesosoma similar to major worker but propodeal profile more evenly rounded and metanotum not defined.

Head and body moderately shiny; head shinier than that of major worker and less conspicuously microreticulate, especially on malar and genal areas; malar area with scattered fine round punctures.

Pilosity about as in major; the following numbers of medium length to long brownish standing setae on the following structures: scape shaft (0 - 2), profemur (8 - 13),



Figs. 1 - 6: *Camponotus festinatus*. (1, 2) Frontal view of heads of major and minor worker, respectively; (3) base of mandible of major worker; (4) malar area of major worker; (5, 6) median portion of antennal scape of major and minor worker, respectively.

pronotum (11 - 15), mesonotum (4 - 7), propodeum (5 - 7), petiole (4 - 8), disc of gastral tergum I (6 - 10), premarginal row on gastral tergum I (6 - 10).

Head, body and appendages yellowish brown, gastral terga with varying degrees of darker brownish at base.

**Description of queen** (n = 3), measurements: HL 2.56 - 2.72; HW 2.00 - 2.31; EL 0.72 - 0.77; SL 2.36 - 2.72; ML 4.51 - 4.92. Indices: CI 78 - 90; HFI 120 - 146; OI 28; SI 92 - 104.

Head about as in major worker but less strongly narrowed anteriorly and preoccipital margin slightly convex. Eye margin slightly exceeding head margin; ICD -  $0.74 \times$  HW. IOD about 4.5 times and OOD about  $3.5 \times$  OD.

Pilosity about as in media and minor workers.

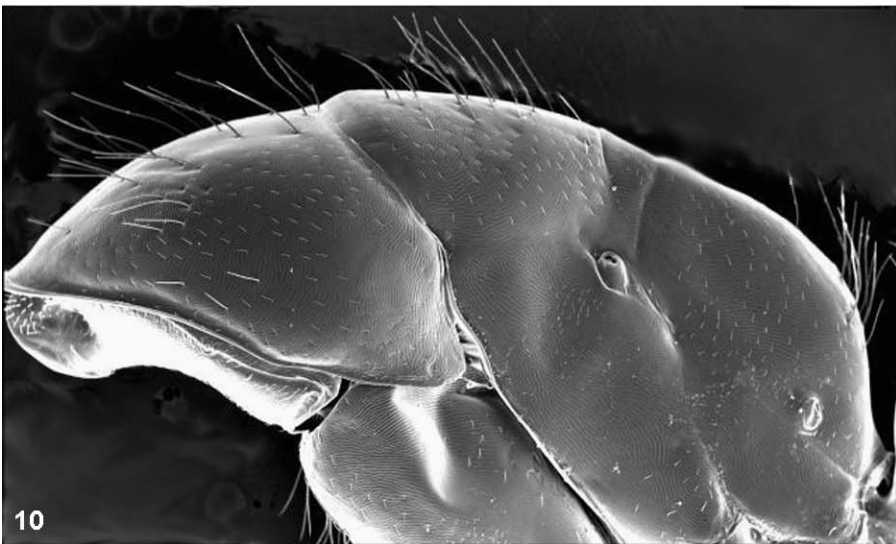
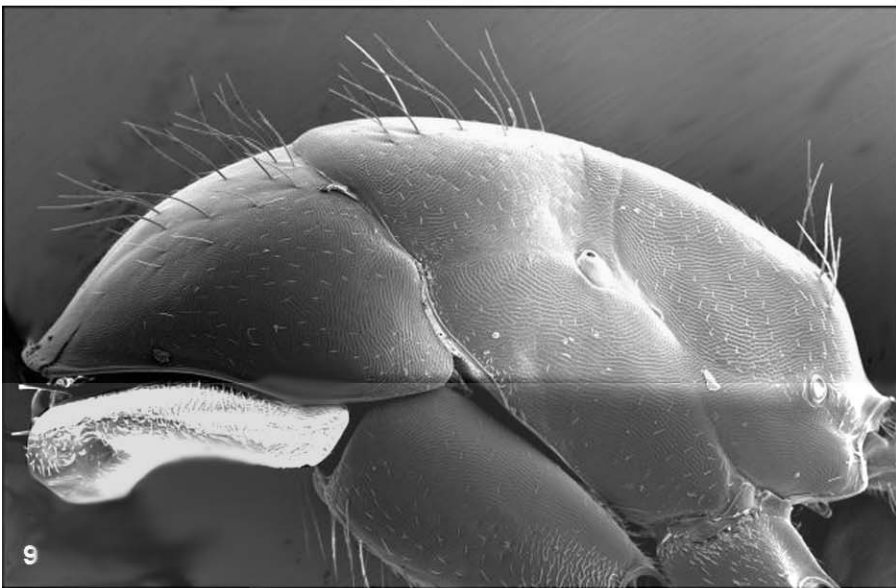
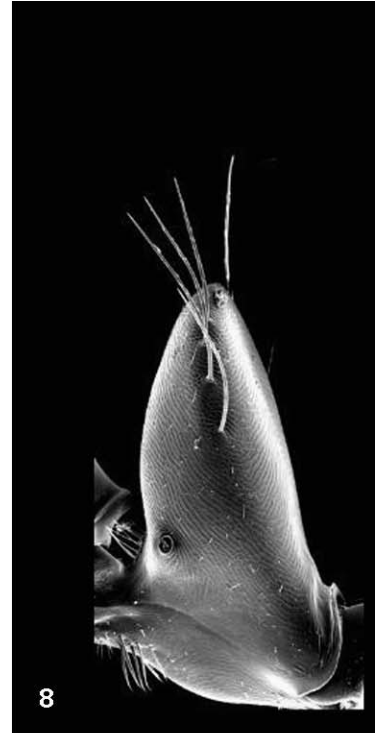
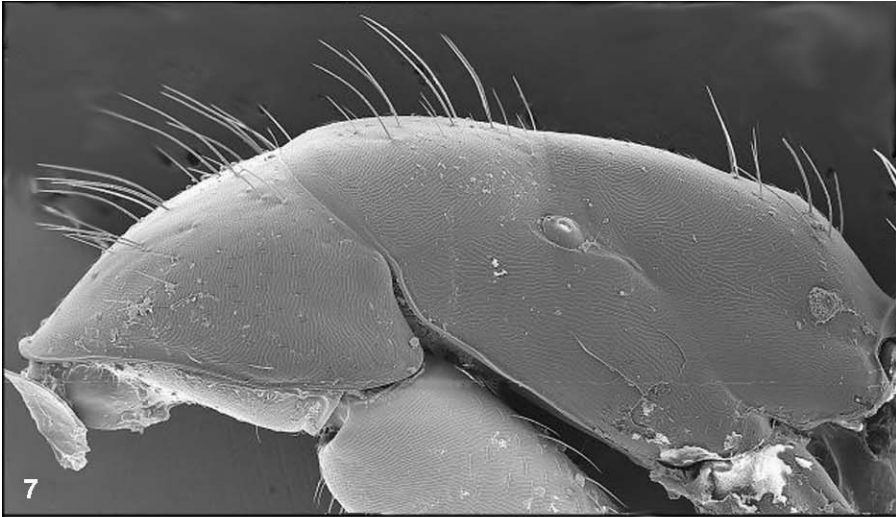
Color about as described for major workers, but gaster more extensively infuscated.

**Distribution.** Central Texas to the mountains of southern and central Arizona and adjacent States in northern Mexico. The extent of the southward distribution is unclear

at this time. I have seen samples from as far south as the State of Jalisco that might prove to be *C. festinatus* when more adequate material becomes available. Westernmost records of *C. festinatus* are from central Arizona: Maricopa Co. (Mazatzal Mts.), Pinal Co. (Queen Creek Canyon) and Yavapai Co. (Lynx Lake).

**Discussion.** *Camponotus festinatus* is a species primarily of oak woodlands. Nests are in soil, commonly beneath stones or other covering objects, most often on rocky hillsides.

The color of this species is subject to considerable variation. The basic pattern is as described above: a yellowish brown ant, with variable degrees of darker brownish infuscation, particularly on the head and gaster, each of which may be almost wholly brown. When the gaster is largely brown, there usually are distinct yellowish spots on lateral areas on the second and third terga as well as at the base of the first segment. Typically, too, the antennal scape and the tibiae are darker brownish. Specimens from the Chisos



Figs. 7 - 11: (7, 8) Mesosoma and petiole node in profile, respectively, of *C. festinatus*; (9) mesosoma in profile of *C. fragilis*; (10, 11) mesosoma and petiole node in profile, respectively of *C. vafer*.

Mountains in western Texas are much lighter in color than the types, with almost no brownish infuscation, and thus are similar to *C. fragilis*, characterized below.

Most similar in stature and color to *C. festinatus* is *C. pudorosus*, a species that ranges from the Mexican State of Hidalgo north to the mountains of southern Arizona. The two differ in the pilosity of the scape. In *C. pudorosus* there is a mixture of subdecumbent to erect setae that are quite variable in length with the shortest setae far more abundant. In contrast the scape of *C. festinatus* has scattered appressed fine pubescence and sparse longer erect setae in the major worker and queen, and few or no standing setae of any inclination in the media and minor workers.

The range of *C. festinatus* overlaps that of *C. microps*, described below, in the mountains of southern Arizona, but that species, as the name implies, has distinctly smaller eyes. Also generally sympatric is *C. vafer*, known from only a few collections in the mountains of southwestern New Mexico, southern Arizona and northeastern Sonora, Mexico. Unlike *C. festinatus* and other members of the *festinatus* complex, *C. vafer* nests in dead branches of live oaks, rather than in the ground. In *C. vafer* major workers and queens, the anterior margin of the clypeus is most often slightly incurved (transverse in *C. festinatus*) and in the minor workers there are usually 6 - 14 fully erect setae along the mesial and dorsal faces of the antennal scape (absent in most minor workers in any nest population in *C. festinatus*).

Two smaller species in this complex are found at lower elevations west of the range of *C. festinatus*: *C. fragilis* and *C. absquatulator* sp.n. The latter is limited to the Sonoran Desert portions of southern California. In major workers there are no erect setae along the head margins posterior to the anterior margin of the compound eyes. The setae on the malar area are shorter and sparser than in *C. festinatus*. Minor workers, too, lack marginal setae posterior to the anterior eye margins and often none along the outer margin of the malar area.

*Camponotus fragilis* is similar to *C. absquatulator* sp.n. in color and stature, but does possess erect setae along the entire head margin; in minor workers these setae may be sparse, but there are always at least 2 or 3 between the level of the eyes and the posterolateral angles of the head. Separation of *C. festinatus* and *C. fragilis* is no easy matter as the two are distressingly similar in virtually every feature. Furthermore, since *C. fragilis* is allopatric to *C. festinatus*, the two species hypothesis has not the benefit of the test of sympatry that so usefully distinguishes *C. festinatus* from such species as *C. microps*, *C. pudorosus*, and *C. vafer*. Comparative genetic and molecular studies, such as those that separate *C. festinatus* from its sympatric relatives, are not yet available. Until such data become available the distinctions between *C. festinatus* and *C. fragilis* will be a bit uncertain. For the present I have relied upon the larger size of *C. festinatus* and the presence of standing setae on the side of the pronotum above the ventral margin to distinguish between the two. The latter feature is limited to the major workers.

***Camponotus absquatulator* sp.n.** (Figs. 12 - 17)

**Holotype** (major worker). United States of America, California, Imperial County: 3 mi (4.8 km) E of Imperial,

-21 m, 4.V.1956, leg. R.R. Snelling, under wood on ground (LACM). **Paratypes.** 59 major and minor workers and 1 alate queen with same data (BMNH, LACM, MCZC, UCDC).

**Etymology.** From Latin, one who runs away, in allusion to the alacrity with which these ants run away when disturbed.

**Diagnosis.** Similar to *C. festinatus* but overall size smaller; differs from all other members of the *C. festinatus* complex by the lack of erect setae along the head margins posterior to level of anterior margin of the compound eyes in both major worker and queens; minor workers usually lack such setae along the entire head margin.

**Description of major worker** (n = 12). Measurements: HL 2.46 - 2.67; HW 2.26 - 2.51; EL 0.59 - 0.67; SL 2.00 - 2.21; ML 2.82 - 3.23. Indices: CI 92 - 96; HFI 94 - 98; OI 24 - 25; SI 81 - 86.

Medium-sized species in the *C. festinatus* complex. Head similar to that of *C. festinatus* but sometimes more rotund in frontal view (Fig. 12). Mandible (Fig. 14) shiny and weakly microreticulate throughout between scattered piligerous punctures; masticatory margin with six teeth, the first five acute and the proximal tooth bluntly rounded to truncate. Malar area with scattered round punctures, elongate punctures, if present, confined to near base of mandible. EL about  $0.33 \times$  HL in frontal view, outer eye margin separated from head margin by less than one-half eye width; ICD  $0.57 - 0.60 \times$  HW. Midline of clypeus weakly subangulate but more strongly so near posterior margin; anterior margin broadly transverse. Scape and frontal carinae as described for *C. festinatus*.

Mesosoma as described for *C. festinatus*, but only meso-metanotal line present across dorsum. Petiole and legs as described for *C. festinatus*, but metafemur not over 2.3 mm long.

Sculpture of head and body similar to *C. festinatus* but malar area with scattered round punctures only.

Pilosity similar to that of *C. festinatus* but head margins, posterior to anterior margin of eyes without erect setae; side of pronotum, near ventral margin, without erect hairs; the following numbers of medium to long yellowish setae present on indicated surfaces: dorsal face of scape shaft (3 - 8), ventral margin of profemur (5 - 8), pronotum (9 - 15), mesonotum (6 - 10), propodeum (4 - 7), petiole (6 - 8), disc of gastral tergum I (5 - 7), premarginal row on gastral tergum I (8 - 10). Fine appressed pubescence absent or nearly so, from all surfaces except sparse and difficult to see on scape shaft.

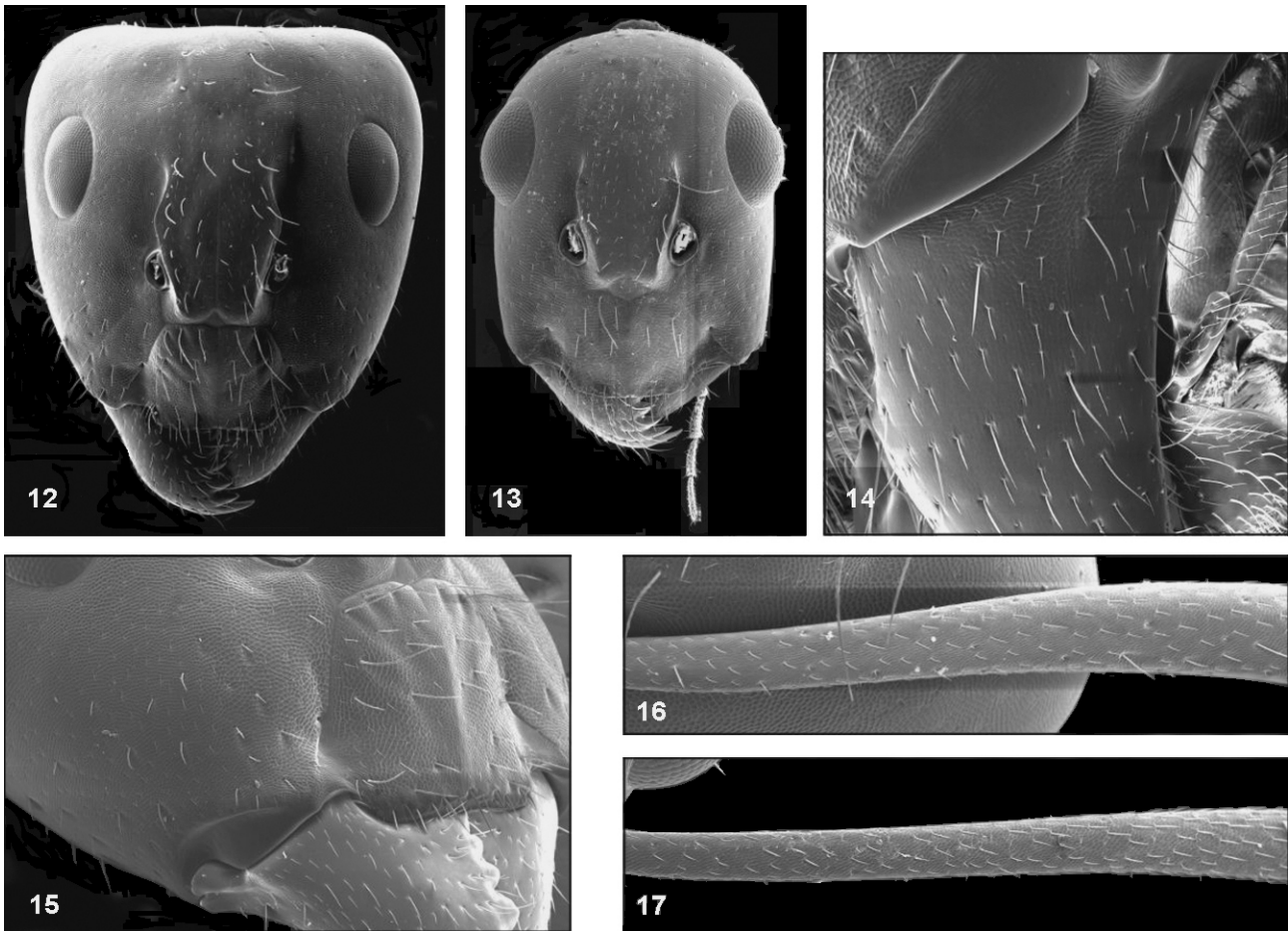
Color light yellowish brown; scape and tibiae darker; mandibles reddish; gastral segments sometimes with darker infuscation.

**Description of media and minor workers** (n = 21). Measurements: HL 1.54 - 1.64; HW 1.08 - 1.18; EL 0.46 - 0.49; SL 1.79 - 1.90; ML 2.26 - 2.36. Indices: CI 70 - 72; HFI 137 - 235; OI 30; SI 113 - 120.

Head shape about as in *C. festinatus*; ICD  $0.60 - 0.70 \times$  HW. Mesosoma about as described for *C. festinatus*.

Pilosity similar to *C. festinatus* but usually lacking short erect setae along head margins, rarely 1 - 3 on anterior malar area near mandible base. Standing yellowish setae present on indicated surfaces: dorsal face of scape shaft (0 - 2), ventral margin of profemur (2 - 5), pronotum (3 - 6), mesonotum (2 - 4), propodeum (2), petiole (3 - 6), disc of gastral tergum I (2 - 6), premarginal row on gastral tergum I (4 - 6).





Figs. 12 - 17: *Camponotus absquatulator*. (12, 13) Frontal view of heads of major and minor worker, respectively; (14) base of mandible of major worker; (15) malar area of major worker; (16, 17) median portion of antennal scape of major and minor worker, respectively.

Color yellowish, mandible, scape, all tarsi pale brownish and at least first gastral tergum with obscure marginal brownish band.

**Description of queen** (n = 3). Measurements: HL 2.36 - 2.51; HW 2.10 - 2.36; EL 0.67 - 0.77; SL 1.95 - 2.10; ML 3.95 - 4.15. Indices: CI 89 - 94; HFI 102 - 110; OI 28 - 33; SI 83 - 87.

Similar to queens of *C. festinatus* but smaller and with shorter scape and legs. In frontal view, outer margins of eyes do not exceed lateral margins of head. Outer head margins without erect setae behind level of anterior eye margins; malar area with short erect setae on anterior one-half or less. ICD 0.68 - 0.75 × HW; EL 0.68 - 0.75 × OMD; IOD 3.20 - 3.40 × OD; OOD 3.20 - 3.60 × OD.

**Distribution.** In addition to the type series I have examined specimens from the following localities. Mexico, Baja California: Cañon de Guadalupe, 350 m. United States of America, Arizona, Yuma Co.: Yuma. California, Imperial Co.: Bard, Brawley, Calipatria, El Centro, Holtville (8 mi E), Winterhaven. Riverside Co.: Blythe, Indian Wells, Palm Springs.

**Discussion.** This is one of the smaller species in the complex. The queens and major workers are readily distinguished from all others in the complex by the absence of erect setae behind the level of the anterior margin of the eyes. Those setae that are present are usually confined to

the anterior one-half of the malar area. In minor workers the malar area is commonly devoid of erect setae or with up to 3 on each side that are situated near the base of the mandible.

Alate queens have been collected at lights during the months of June and July. This species nests in soil and is nocturnal, in lowland habitats ranging from Saltbush Scrub to Creosote Scrub.

***Camponotus fragilis* PERGANDE, 1894 sp.rev.**  
(Figs. 9, 18 - 22)

*Camponotus fragilis* PERGANDE, 1894: 26: s., w.

*Camponotus fumidus* var. *fragilis*: EMERY (1895: 336).

*Camponotus (Camponotus) fumidus* var. *fragilis*: WHEELER (1910: 315).

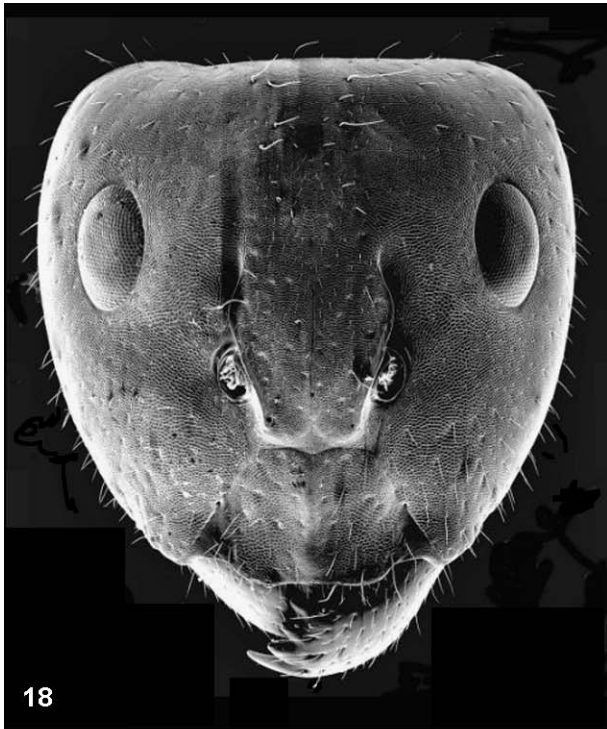
*Camponotus (Myrmoturba) fumidus* var. *fragilis*: WHEELER (1917: 561).

*Camponotus (Tanaemyrmex) fumidus* var. *fragilis*: EMERY (1925: 80).

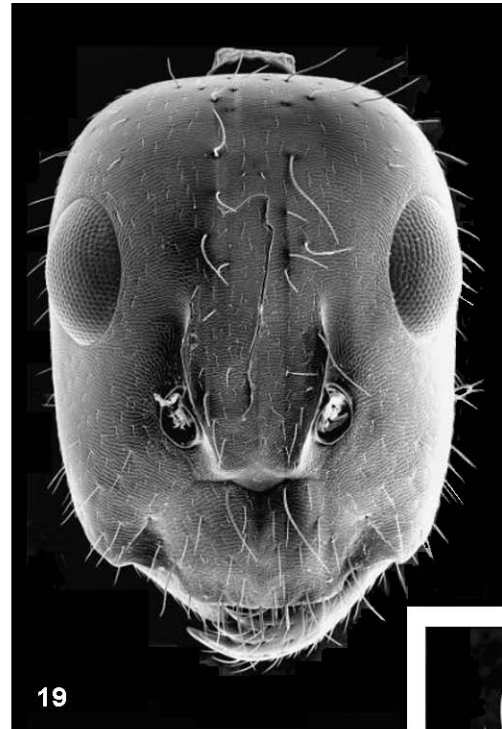
*Camponotus (Tanaemyrmex) festinatus*: SNELLING (1968: 351): erroneous synonymy.

**Lectotype**, by present designation, major worker. Mexico, Baja California Sur: San Fernando (label reads "San Fernando Mex.") (USNM). A **paralectotype** minor worker in very poor condition in CASC.

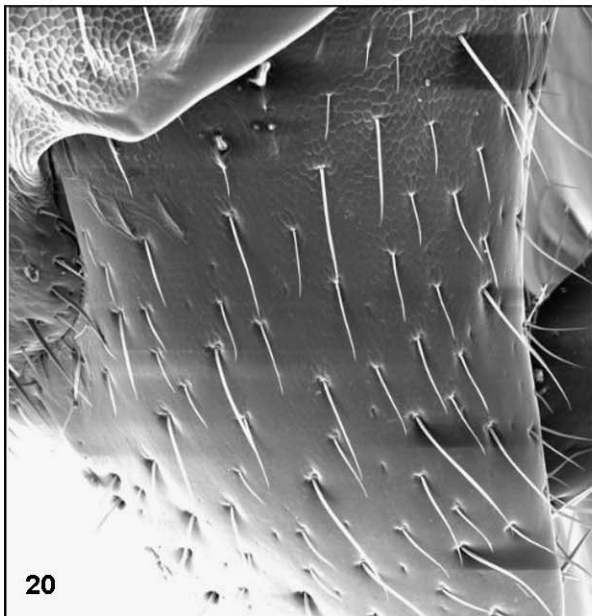
**Diagnosis.** Major worker similar to *C. absquatulator* in color and stature but erect setae present along entire head



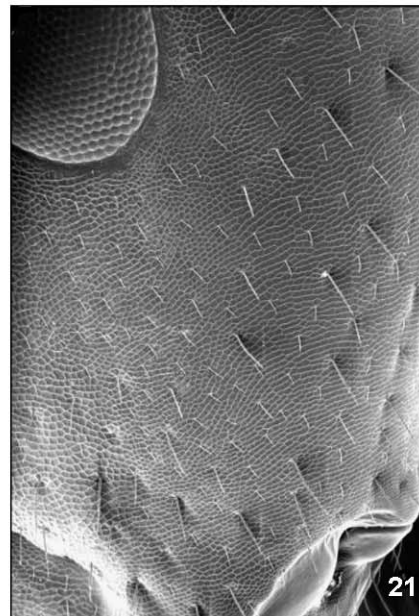
18



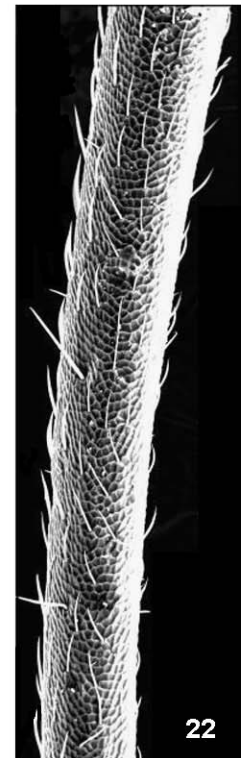
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Figs. 18 - 22: *Camponotus fragilis*. (18, 19) Frontal view of heads of major and minor worker, respectively; (20) base of mandible of major worker; (21) malar area of major worker; (22) median portion of antennal scape of minor worker.

margin; minor workers with at least a few setae along head margins; differs from *C. festinatus* by its smaller size and, in the major worker, by the lack of standing setae on the side of the pronotum.

**Description of major worker** (n = 12). Measurements: HL 2.25 - 2.70; HW 1.95 - 2.58; EL 0.50 - 0.60; SL 2.00 - 2.45; ML 3.10 - 3.45. Indices: CI 87 - 96; HFI 87 - 123; OI 21 - 25; SI 83 - 98.

Head shape about as in *C. festinatus* (Fig. 18). Mandible (Fig. 20) moderately shiny and weakly microreticulate between sparse, mostly round punctures; with six teeth, in-

nermost acute or subtruncate to weakly bifid; usually subtended by a small acute tooth on inner margin.

Cephalic sculpture about as in *C. festinatus* but a little finer; malar area with only scattered round punctures and longest hairs about 0.1 mm long and absent on posterior one-third to one-half.

Pilosity generally similar to *C. festinatus*; side of pronotum without standing setae above ventral margin. Standing yellowish setae present on indicated surfaces: dorsal face of scape shaft (7 - 11), ventral margin of profemur (5 - 9), pronotum (10 - 16), mesonotum (5 - 12), propodeum



(6 - 8), petiole (6 - 8), disc of gastral tergum I (10 - 12), premarginal row on gastral tergum I (14 - 16).

**Description of media and minor workers** (n = 12). Measurements: HL 1.20 - 1.75; HW 0.90 - 1.25; EL 0.40 - 0.45; SL 1.40 - 2.10; ML 1.85 - 2.60. Indices: CI 63 - 79; HFI 158 - 206; OI 27 - 45; SI 117 - 129.

Pilosity similar to *C. festinatus* with standing yellowish setae present on indicated surfaces: dorsal face of scape shaft (1 - 4), ventral margin of profemur (2 - 6), pronotum (4 - 10), mesonotum (2 - 6), propodeum (2 - 4), petiole (4 - 6), disc of gastral tergum I (6 - 10), premarginal row on gastral tergum I (6 - 8).

**Description of queen** (n = 7). Measurements: HL 2.20 - 2.35; HW 2.00 - 2.15; EL 0.65 - 0.70; HFL 2.20 - 2.45; SL 1.90 - 2.15; PW 1.80 - 1.95; ML 3.85 - 4.20. Indices: CI 89 - 91; HFI 109 - 119; OI 28 - 30; SI 86 - 93.

Similar to queens of *C. festinatus* but distinctly smaller (ML 3.85 - 4.20 vs. 4.51 - 4.92) and malar area with scattered obscure round to slightly elliptical punctures and longest setae about 0.10 mm long (vs. about 0.20 mm); ICD 0.67 - 0.71 × HW; EL 0.76 - 0.93 × OMD; IOD 2.85 - 3.17 and OOD 3.00 - 3.25 × OD. Differs from queens of *C. absquatulator* by presence of erect setae along entire head margin.

**Distribution.** *Camponotus fragilis* occurs over most of the Lower California peninsula as far north on the Gulf of California coast at least to Bahía de los Angeles and northwest into southern California via San Diego County. It is also present on most, if not all, the islands of the Gulf of California and in the State of Sonora and north into Arizona (Tempe, Maricopa Co., the easternmost record) in the United States; from Sonora it ranges south along the coast to Nayarit: specimens that I collected on the Tres Marias Islands apparently are referable to *C. fragilis*.

In California *C. fragilis* appears to be uncommon and is replaced in the lower desert of Imperial and Riverside Counties by *C. absquatulator*. It is present in chaparral habitat in San Diego County, north to Riverside County and is found at mid-elevation sites along the margins of the lower desert, extending north into the Mojave Desert at least as far as the Old Woman Mountains (1.2 km S Sunflower Springs, 945 m), San Bernardino County.

**Discussion.** In an earlier paper dealing with *C. festinatus* (SNELLING 1968) I relegated *C. fragilis*, among others, to the synonymy of *C. festinatus*. The study of much more material than was then available has convinced me that this was incorrect and so *C. fragilis* is here revived as a separate species.

*Camponotus fragilis* is similar to *C. festinatus* but smaller in all castes. The erect setae of the malar area of workers and queens are shorter (longest about 0.15 mm) and sparser, mostly separated by about the length of the setae. The malar setae of *C. festinatus* are up to 0.20 - 0.21 mm long and are separated by less than their lengths. The scape of the media and minor workers has a few widely separated and fully erect setae on the dorsal and / or mesial surfaces that are lacking in *C. festinatus*.

Those features that will distinguish between this species and *C. absquatulator* are discussed above under that species.

This nocturnal species nests in soil, most commonly under a covering object. Habitats include Creosote Scrub, Coastal Scrub, Chaparral, and Oak Woodland.

*Camponotus microps* sp.n. (Figs. 23 - 27)

**Holotype** (major worker). United States of America, Arizona, Cochise Co., Cave Creek Canyon, Southwest Research Station, 5400 ft. (1645 m), Chiricahua Mts., 10.IX. 1997, leg. S.P. Cover, # 4990, nest in fine sandy soil in mixed pine-oak forest (MCZC). **Paratypes.** 90 workers of all sizes, same data as types; Cave Creek Canyon, 7.2 km WSW Portal, 1680 m, 8.VIII.2001, leg. R.R. Snelling, # 01-178 (BMNH, LACM, MCZC, RAJC, UCDC, USNM).

**Etymology.** From Greek, small eyes.

**Diagnosis.** Differs from other members of the *C. festinatus* complex by the small eyes and, in major workers, the head less strongly narrowed anteriorly and mandibles coarsely and closely punctate but with weakly sculptured interspaces. Minor workers share with those of *C. festinatus* the absence of erect setae on the dorsal and mesial scape surfaces, but differ by the smaller eyes and the posteriorly more strongly narrowed head.

**Description of major worker** (n = 12). Measurements: HL 2.75 - 3.25; HW 2.50 - 3.10; EL 0.55 - 0.65; SL 1.95 - 2.20; ML 3.65 - 4.15. Indices: CI 90 - 97; HFI 88 - 96; OI 18 - 23; SI 67 - 75.

Microreticulation of head sufficiently strong that piligerous punctures are obscured and anterior malar area with few or no elongate piligerous punctures. Antennal scape relatively short, its apex extending, at most, only slightly beyond posterolateral corners of head.

Mesosoma and legs pale yellowish brown and head reddish brown. Basal segments of gaster largely light brown, with yellow across the base; in some specimens the second and third segments are largely brown with yellow lateral spots.

Pilosity about as described for *C. festinatus*; side of pronotum usually with 1 to several short standing setae near ventral margin. The following numbers of long standing (decumbent to fully erect) setae present on indicated structures: scape shaft (6 - 15), ventral margin of profemur (5 - 10), pronotal disc (20 - 30), mesonotum (6 - 20), propodeum (5 - 8), petiole (6 - 7), disc of gastral tergum I (6 - 8), premarginal band of gastral tergum I (7 - 13).

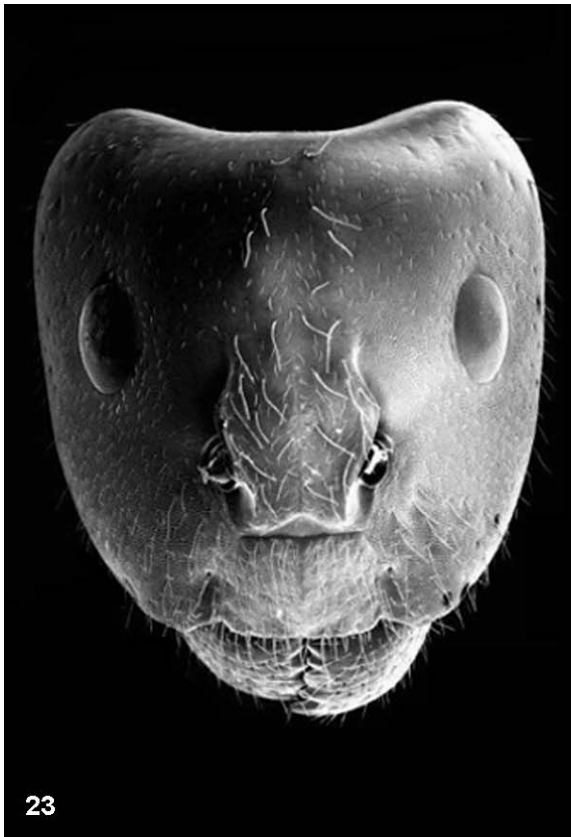
**Description of media and minor workers** (n = 12). Measurements: HL 1.60 - 1.90; HW 1.05 - 1.35; EL 0.45 - 0.50; SL 1.95 - 2.25; ML 2.45 - 3.00. Indices: CI 64 - 72; HFI 130 - 200; OI 25 - 28; SI 115 - 125.

Head and body yellow to yellowish brown with reddish mandibles and brown tarsi; tibiae yellow to brown, often bicolored.

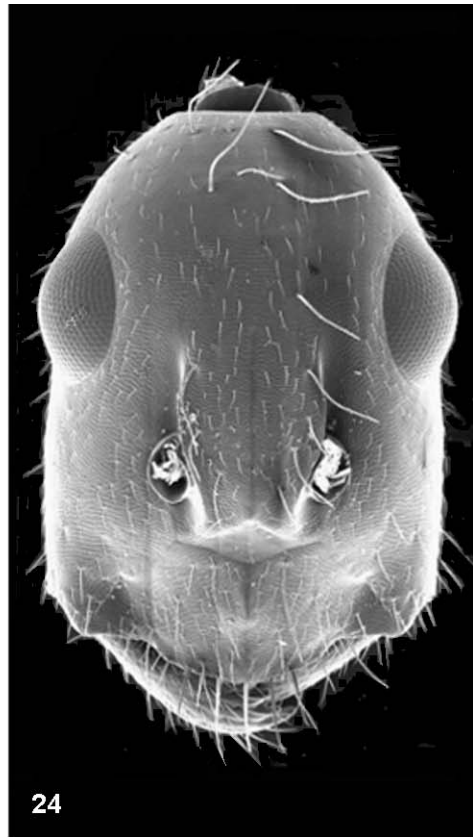
Pilosity about as described for *C. festinatus*. The following numbers of long standing (decumbent to fully erect) setae present on indicated structures: scape shaft (0 - 1), ventral margin of profemur (2 - 5), pronotal disc (4 - 8), mesonotum (1 - 4), propodeum (2 - 4), petiole (4 - 6), disc of gastral tergum I (4 - 7), premarginal band of gastral tergum I (6 - 8).

**Description of queen** (n = 1). Measurements: HL 2.50; HW 2.05; EL 0.65; SL 2.20; ML 4.40. Indices: CI 82; HFI 129; OI 26; SI 88.

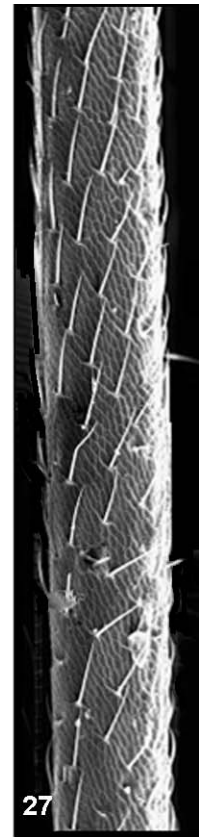
Similar to that of *C. festinatus*, but eyes smaller and scape short (CI 88 vs. 92 - 104); malar area finely microreticulate and with scattered fine obscure round punctures; longest setae c. 0.2 mm long. ICD 0.95 × HW; EL 0.62 × OMD; IOD and OOD each about 3.0 × OD. Pilosity of scape similar to that of minor / media workers.



23



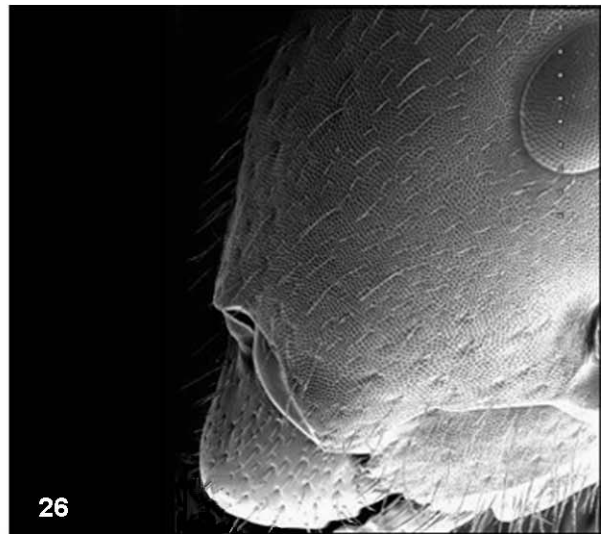
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Figs. 23 - 27: *Camponotus microps*. (23, 24) Frontal view of heads of major and minor worker, respectively; (25) base of mandible of major worker; (26) malar area of major worker; (27) median portion of antennal scape of minor worker.

Color similar to that of major workers.

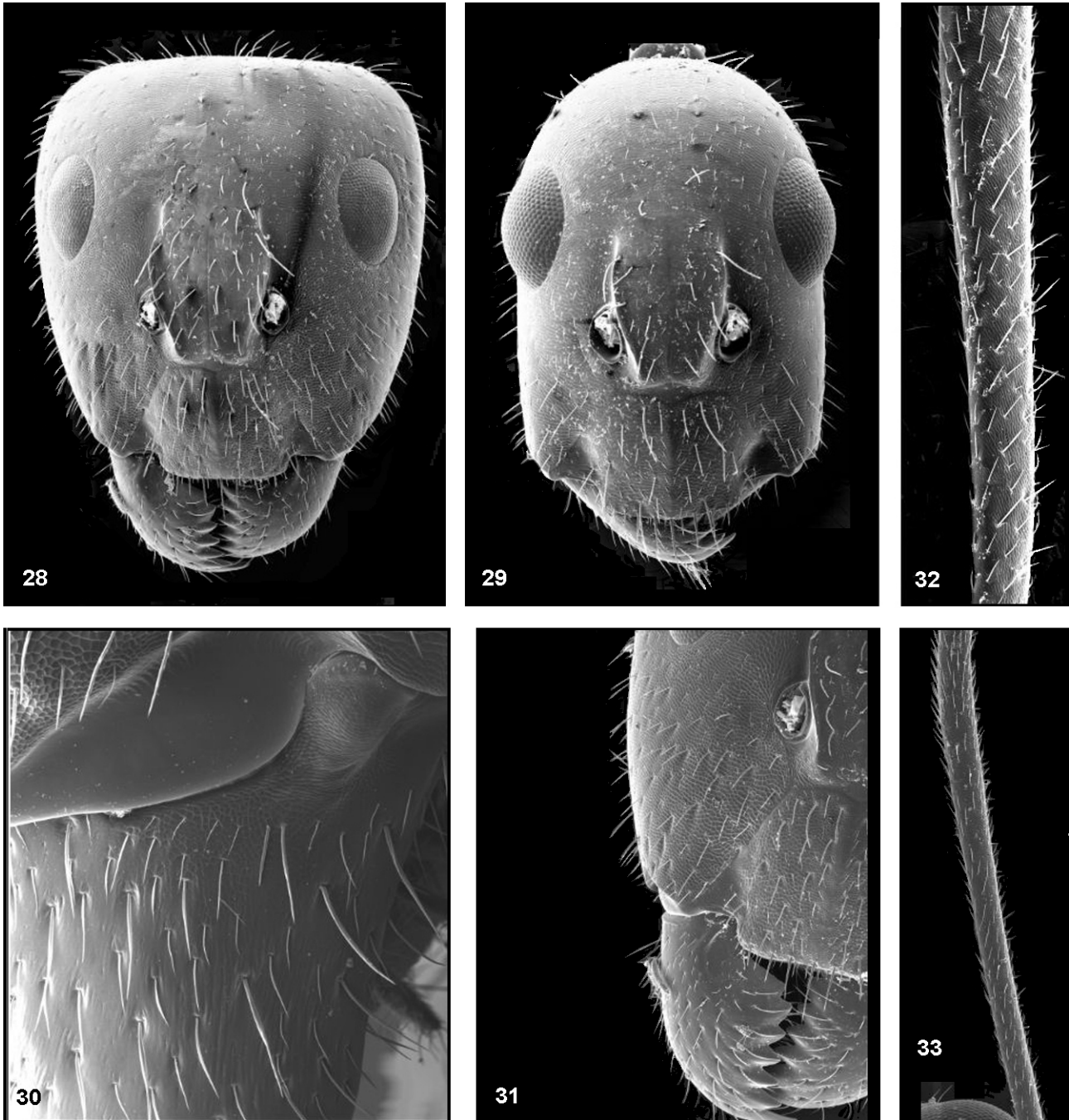
**Distribution.** This medium-size ground nesting species is presently known only from the Chiricahua Mountains in southeastern Arizona. It probably occurs also in other mountain ranges such as the Dragoon, Huachuca and Santa Rita Mountains in Arizona and the Peloncillo Mountains in southwestern New Mexico, as well as in adjacent ranges in northeastern Sonora, Mexico.

**Discussion.** The type locality is a woodland of mixed forest consisting of Chihuahua pine, Emory oak and juniper. Another collection from a nearby locality was in sim-

ilar woodland and also was from a nest in soil. Samples collected by S.P. Cover were from a nest in fine sandy soil in a grassy area and surmounted by a sand crater about 15 cm in diameter. The colony sample collected by the author was under a large stone in a grassy area.

***Camponotus pudorosus* EMERY, 1925 stat.n.**  
(teste W.P. Mackay) (Figs. 28 - 33)

*Camponotus (Tanaemyrmex) picipes* var. *pudorosus* EMERY, 1925: 81: First available use of *C. maculatus* ssp. *pici-*



Figs. 28 - 33: *Camponotus pudorosus*. (28, 29) Frontal view of heads of major and minor worker, respectively; (30) base of mandible of major worker; (31) malar area of major worker; (32, 33) median portion of antennal scape of major and minor worker, respectively.

*pes* var. *pudorosus* WHEELER, 1914: 57: s., w., q., m., unavailable name.

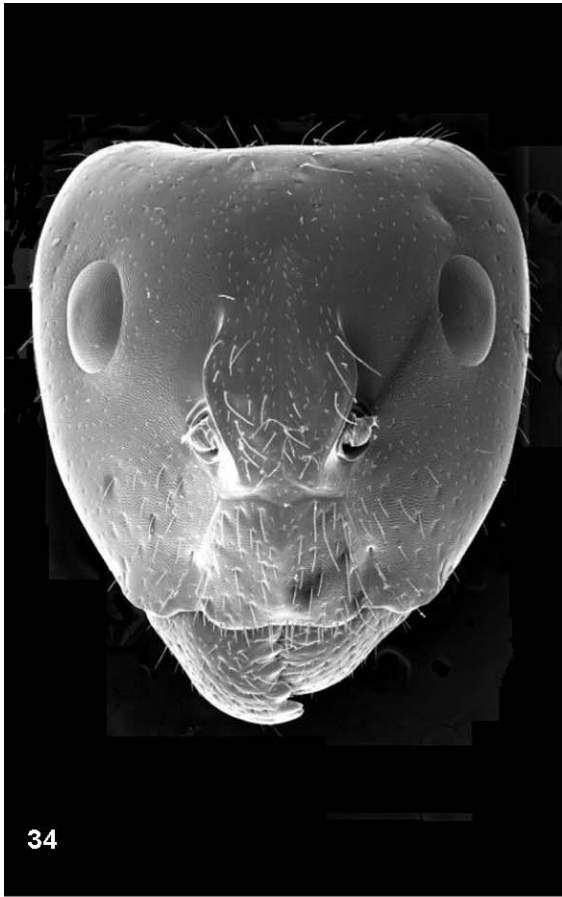
*Camponotus* nr. *festinatus* desert dark: GOODISMAN & HAHN (2005: 2186).

**Diagnosis.** Medium-sized species in the *C. festinatus* complex. Major worker mandible microrugose and slightly shiny between scattered piligerous punctures; antennal scape of major with abundant long subappressed to suberect setae along dorsal and mesial surfaces; antennal scape of minor worker with dense suberect short fine setae and numerous longer suberect coarser setae; erect to suberect setae present along entire length of head margin.

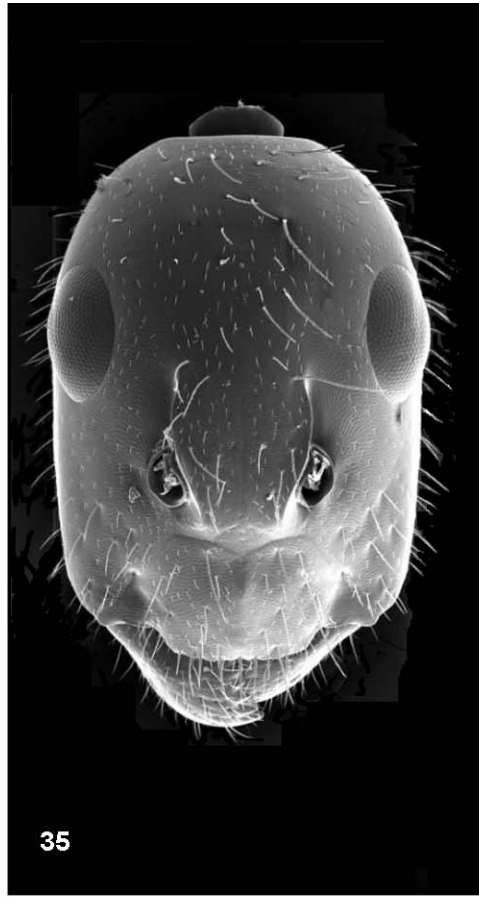
**Description of major worker** (n = 12). Measurements: HL 2.10 - 2.40; HW 1.85 - 2.15; EL 0.50 - 0.60; HFL 2.20 - 2.50; SL 2.10 - 2.25; PW 1.25 - 1.40; ML 2.95 - 3.30. Indices: CI 87 - 93; HFI 109 - 123; OI 24 - 26; SI 93 - 102.

Major workers agree generally with the description but are smaller and the head shape in frontal view differs (compare Figs. 1 and 28). EL 0.58 - 0.67 × OMD; ICD 0.59 - 0.64 × HW.

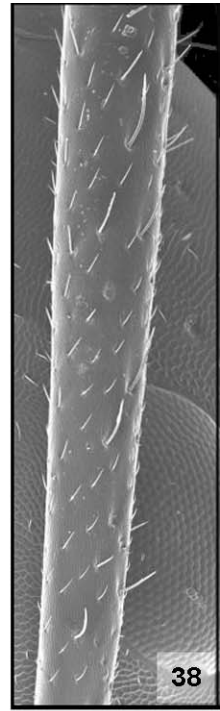
Pilosity about as described for *C. festinatus*; side of pronotum usually with 1 to several short standing setae near ventral margin. The following numbers of long standing (decumbent to fully erect) setae present on indicated struc-



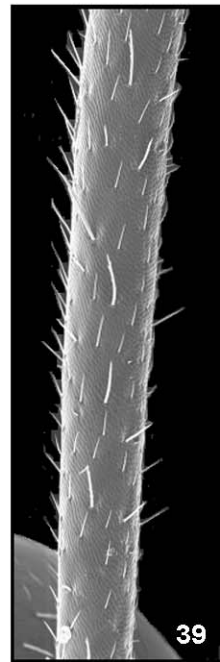
34



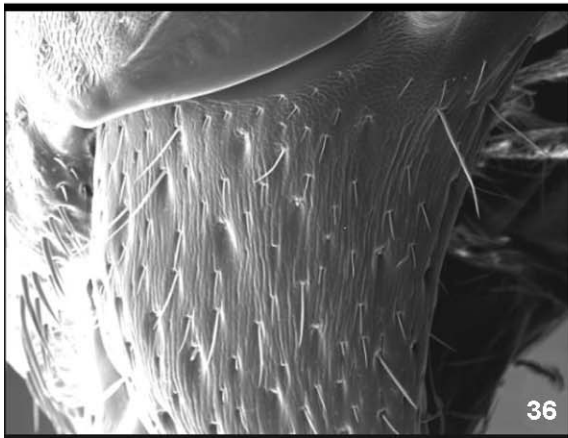
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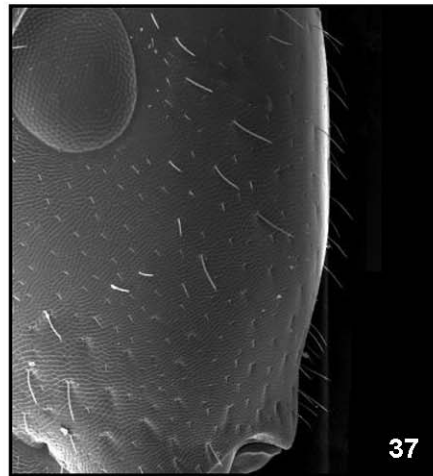
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Figs. 34 - 39: *Camponotus vafer*. (34, 35) Frontal view of heads of major and minor worker, respectively; (36) base of mandible of major worker; (37) malar area of major worker; (38, 39) median portion of antennal scape of major and minor worker, respectively.

tures: scape shaft (longest only, 11 - 21), ventral margin of profemur (9 - 12), pronotal disc (20 - 28), mesonotum (6 - 12), propodeum (5 - 6), petiole (4 - 8), disc of gastral tergum 1 (12 - 14), premarginal band of gastral tergum 1 (12 - 14).

**Description of minor worker** (n = 12). Measurements: HL 1.45 - 1.85; HW 0.95 - 1.30; EL 0.40 - 0.50; HFL 2.00 - 2.45; SL 1.95 - 2.25; PW 0.85 - 1.15; ML 2.35 - 2.90. Indices: CI 65 - 73; HFI 174 - 216; OI 26 - 29; SI 121 - 138.

Similar to minor workers of *C. festinatus* but with conspicuous decumbent to suberect pilosity along entire length of

scape. Also similar to minor workers of *C. vafer*, but the mandibles are only slightly shiny and are conspicuously finely sculptured, sometimes in the medias with very fine micro-rugulae. EL 0.71 - 0.83 × OMD; ICD 0.62 - 0.71 × HW.

Pilosity about as described for *C. festinatus*. The following numbers of long standing (decumbent to fully erect) setae present on indicated structures: scape shaft (longest only, 8 - 15), ventral margin of profemur (8 - 10), pronotal disc (16 - 22), mesonotum (6), propodeum (6 - 8), petiole (6), disc of gastral tergum 1 (6 - 8), premarginal band of gastral tergum 1 (8 - 10).

**Description of queen** (n = 3). Measurements: HL 2.20 - 2.55; HW 1.85 - 2.25; EL 0.60 - 0.70; HFL 2.25 - 2.85; SL 2.05 - 2.65; PW 1.80 - 2.15; ML 3.95 - 4.85. Indices: CI 84 - 89; HFI 115 - 121; OI 28 - 30; SI 84 - 93.

Similar to queens of *C. festinatus* but usually smaller and with notably setose scape (about as in minor / media workers). EL 0.82 - 0.93 × OMD; ICD 0.70 - 0.73 × HW; IOD 3.50 - 4.80 and OOD 3.80 - 4.10 × OD.

Color similar to major worker.

**Distribution.** Central Mexico north to Arizona and probably southwestern New Mexico. I have examined material from the Mexican states of Hidalgo, Jalisco and Michoacán. The only United States material that I have seen is all from Arizona: Cochise Co. (Chiricahua Mts.; Huachuca Mts.); Graham Co. (Hwy. 366, 12 mi SW junction with Hwy. 191); Pima Co. (Santa Catalina Mts.); Santa Cruz Co. (Pajarita Mts.; Santa Rita Mts.; 1.5 mi NE Ruby; 1 mi SE Peña Blanca Lake); Yavapai Co. (3 mi NW Peoples Valley).

**Discussion.** This ant was originally described by WHEELER (1914) as a variety of *C. maculatus* subsp. *picipes* (OLIVIER, 1792) and, thus, an unavailable quadrinomen. EMERY (1925) elevated *C. picipes* to species level and included *C. pudorosus* as a subspecies of *C. picipes* and the name is available from that date. The original material was collected at Guerrero Mill, Hidalgo, Mexico, and was said to consist of "numerous workers, a male and a female, from nests under stones"; syntypic specimens are in MCZC and USNM. *Camponotus picipes* was originally described from French Guiana and has acquired seven subspecies ranging from northern South America to Mexico and the Caribbean (KEMPF 1972). Unfortunately, there has never been any certainty as to the identity of *C. picipes*, nor has it been consistently interpreted. Mexican material that I have examined, identified as *C. picipes*, has included more than one species. W.P. Mackay, in his extensive, but unpublished, studies of the systematics of Neotropical *Camponotus*, has determined that *C. pudorosus* should be treated as a distinct species, separate from both *C. picipes* and *C. festinatus*. For purposes of this paper I have here followed his interpretation, although I have not examined the syntypes of *C. pudorosus*.

*Camponotus pudorosus* is similar to *C. festinatus* but somewhat smaller and, as noted by WHEELER (1914) with a shinier and less strongly sculptured head. These features were cited to distinguish *C. pudorosus* from what he regarded as typical *C. picipes* from the same locality; those "picipes" were, in part at least, what I here understand to be *C. festinatus*. Additionally, *C. pudorosus* differs from *C. festinatus* in the consistently more pilose antennal scape of both worker subcastes.

As is true of most members of this complex, *C. pudorosus* is a ground nesting species.

***Camponotus vafer* WHEELER, 1910** (Figs. 10 - 11, 34 - 39)

*Camponotus vafer* WHEELER, 1910: 315: s., w., q.; MACKAY & MACKAY (2002: 273).

*Camponotus (Myrmoturba) vafer*: FOREL (1914: 268).

*Camponotus (Camponotus) vafer*: EMERY (1925: 75).

*Camponotus (Tanaemyrmex) vafer*: CREIGHTON (1950: 381).

**Diagnosis.** Major workers and queens distinguished from other members of this complex by the usually broadly and weakly excised anterior clypeal margin and by the longitudinally microrugose mandible, merging into coarser

rugae near teeth; mandible of minor / media workers similar but frequently merely microreticulate for almost its entire length; scape of minor / media with abundant erect long and short setae.

**Description of major worker** (n = 12). Measurements: HL 2.80 - 3.50; HW 2.55 - 3.50; EL 0.65 - 0.75; HFL 2.65 - 3.25; SL 2.55 - 3.05; PW 1.65 - 2.05; ML 3.55 - 4.70. Indices: CI 91 - 100; HFI 90 - 112; OI 21 - 25; SI 82 - 93.

Head shape (Fig. 34) similar to that of *C. festinatus*. Mandible (Fig. 36) conspicuously roughened with well defined longitudinal microrugae that merge with coarser rugae near base of mandibular teeth and with abundant coarse elongate punctures. EL 0.45 - 0.54 × OMD; ICD 0.54 - 0.63 × HW.

Pilosity about as described for *C. festinatus*; side of pronotum usually with 1 to several short standing setae near ventral margin. The following numbers of long standing (decumbent to fully erect) setae present on indicated structures: scape shaft (10 - 14), ventral margin of profemur (6 - 7), pronotal disc (30 - 40), mesonotum (12 - 15), propodeum (8 - 17), petiole (10 - 16), disc of gastral tergum 1 (8 - 16), premarginal band of gastral tergum 1 (20 - 30).

**Description of media and minor workers** (n = 12). Measurements: HL 1.60 - 2.50; HW 1.05 - 2.10; EL 0.50 - 0.60; HFL 2.05 - 2.95; SL 2.05 - 2.75; PW 1.00 - 1.55; ML 2.55 - 3.75. Indices: CI 66 - 84; HFI 133 - 196; OI 24 - 31; SI 104 - 131.

Similar to these subcastes of *C. festinatus* but scape with abundant (usually 15+) erect setae and similar number of shorter setae; EL 0.55 - 0.77 × OMD; ICD 0.61 - 0.67 × HW.

Pilosity about as described for *C. festinatus*. The following numbers of long standing (decumbent to fully erect) setae present on indicated structures: scape shaft (20 - 36), ventral margin of profemur (7 - 8), pronotal disc (10 - 14), mesonotum (4 - 10), propodeum (4 - 11), petiole (6 - 10), disc of gastral tergum 1 (15 - 10), premarginal band of gastral tergum 1 (6 - 12).

**Description of queen** (n = 3). Measurements: HL 2.80 - 3.00; HW 2.55 - 2.80; EL 0.70 - 0.71; HFL 2.85 - 2.90; SL 2.65 - 2.75; PW 2.20 - 2.45; ML 4.90 - 5.10. Indices: CI 91 - 93; HFI 101 - 114; OI 24 - 27; SI 90 - 95.

Similar to queens to *C. festinatus* but with clypeal and mandibular features noted above, which will also serve to distinguish this from the remaining species in the complex. Outer eye margins failing to attain margins of head; EL 0.54 - 0.65 × OMD; ICD 0.69 - 0.71 × HW; IOD 2.87 - 3.36 and OOD 3.36 - 4.00 × OD.

**Distribution.** This species was originally described from specimens collected in the Huachuca Mountains, Cochise Co., Arizona; most of the syntypes are in the MCZC; a single major worker syntype is in the LACM. In addition to material from the Huachuca Mountains, I have examined Arizona samples from sites in Cochise Co. (Bisbee; Chiricahua Mts.), Pima Co. (Baboquivari Mts.), and Santa Cruz Co. (Pajarito Mts.; Santa Rita Mts.). *Camponotus vafer* has also been collected in the Peloncillo Mts., Hidalgo Co., New Mexico (MACKAY & MACKAY 2002). The range of this species undoubtedly includes northwestern Chihuahua and northeastern Sonora, Mexico.

**Discussion.** *Camponotus vafer* is most similar to *C. festinatus* and has been confused with that species. CREIGHTON (1950) distinguished between the two on the basis of

the broad and shallow clypeal excision, the 5- to 6-toothed mandible and the uniformly short gular hairs of *C. vafer*. MACKAY & MACKAY (2002) noted that all of these features were inconsistent and unreliable, based on their examination of specimens of "*C. festinatus*" from localities ranging from western Texas and northern Mexico to southeastern California. It seems certain that this wide-ranging selection of material included not only true *C. festinatus*, as here defined, but other species as well; e.g., *C. festinatus* is not known to occur in California and such samples might be either *C. fragilis* or *C. absquatulator* sp.n. My own examination of similarly wide-ranging samples revealed the existence of a mix of superficially similar species.

Those samples that seem, in my view, to represent *C. vafer* are distinguishable from *C. festinatus* by the following suite of characters: (1) antennal scape of minor workers with numerous erect to suberect setae (as well as some subdecumbent pubescence) vs. antennal scape lacking erect or suberect setae (rarely 1 or 2 present) in *C. festinatus* and all pubescence entirely appressed; (2) mandible of major worker dull, distinctly longitudinally microrugose on basal one-third or more, becoming microreticulate toward apex, but with some coarser rugae near teeth; (3) gena, below eye, shiny and weakly microreticulate vs. dull and sharply microreticulate in *C. festinatus*. Both of these species possess a number of standing setae on the side of the pronotum in the vicinity of the ventral margin, in addition to the usual scattered appressed pubescence.

The number of mandibular teeth is, as pointed out by the Mackays, variable and useless as a diagnostic feature.

Unlike other species in the *C. festinatus* group, *C. vafer* is arboreal, usually nesting in dead limbs of various oak species. A series of major and minor workers and alate queens in the USNM (Lot. No. 41-11267) was collected at Bisbee, Cochise Co., Ariz., and noted to have been "nesting in woodwork." Habitat for this species appears to be fairly consistent: lower montane forest, a mixture of oak, pine, and juniper.

#### Key to United States species, *Camponotus festinatus* complex

The following key will separate the species treated above and does not include the morphotypes utilized in the studies of GOODISMAN & HAHN (2005) and A.B. Lazarus & al. (unpubl.)

- 1 In frontal view, head broadest behind level of eyes and converging anteriorly to base of mandible; outer eye margin usually not extending beyond margin of head (major workers). ..... 2
- In frontal view, head margin behind level of eyes no broader than anterior to eyes and margins anterior to eyes subparallel; outer eye margin always extending distinctly beyond margin of head (media and minor workers). ..... 7
- 2 In frontal view, head with continuous fringe of standing hairs along lateral margins from base of mandible to posterolateral angles (Figs. 1, 18). ..... 3
- In frontal view, lateral margins of head with sparse standing hairs limited to malar area, between base of mandible and lower margin of eye (Fig. 12). ..... *C. absquatulator* sp.n.

- 3 Eyes, in frontal view, relatively long, OI always over 20 and usually over 22 (Figs. 1, 34); scape long, SI 81 or greater, usually over 83. .... 4
- Eyes, in frontal view, relatively short, OI 18 - 23; scape short, SI 67 - 75 (Fig. 23)... *C. microps* sp.n.
- 4 Distal one-half or more of mandible shiny, surface becoming microreticulate and duller basad (Figs. 3, 20, 30); petiole scale approximately wedge-shape (cuneate) in profile; ground nesting species. .... 5
- Entire mandible microreticulate and basal one-third or more longitudinally microrugose (Fig. 36); petiole scale approximately parallel-sided in profile; arboreal species nesting in dead limbs and branches of oaks (*Quercus* spp.). ..... *C. vafer*
- 5 Pubescence of antennal scape (Figs. 5, 22) and outer face of metatibia fully appressed. .... 6
- Pubescence of antennal scape decumbent to subdecumbent (Fig. 32), that of outer face of metatibia decumbent. .... *C. pudorosus*
- 6 Larger species, HW 2.45 - 2.75 mm; side of pronotum, above ventral margin, with 1 - 5 fully erect straight setae in addition to scattered prostrate pubescence (Figs. 7, 10). .... *C. festinatus*
- Smaller species, HW 1.95 - 2.50 mm; side of pronotum, above ventral margin, with scattered fine prostrate pubescence, but without erect setae (Fig. 9). .... *C. fragilis*
- 7 In frontal view, lateral margins of head with standing setae (sometimes sparse, but always present) (Figs. 2, 19, 24, 29); scape shaft usually with at least several standing setae. .... 8
- In frontal view, lateral margins of head without standing setae (Fig. 13); scape shaft without standing setae and pubescence fully appressed (Fig. 17). .... *C. absquatulator* sp.n.
- 8 Scape shaft with sparse to numerous fully erect long setae and much of pubescence suberect to erect (Figs. 33, 39). .... 9
- Scape shaft with few or no long erect setae and pubescence fully appressed (except sometimes near tip) (Figs. 6, 22, 27). .... 10
- 9 Larger species, HW 1.15 - 2.10 mm, usually over 1.65 mm; arboreal species nesting in dead branches and limbs of oaks (*Quercus* spp.). . *C. vafer*
- Smaller species, HW 0.95 - 1.30 mm, usually less than 1.13 mm; terrestrial species nesting in soil. .... *C. pudorosus*
- 10 Pubescence of scape shaft short, most hairs about 0.05 mm long and, in middle one-third of shaft, closely appressed to surface. .... 11
- Pubescence of scape shaft slightly longer, hairs about 0.05 - 0.06 mm long and, in middle one-third of shaft, at least some hairs decumbent or nearly so (i.e., elevated to about 5° or slightly more) (Fig. 27). .... *C. microps* sp.n.
- 11 Larger species, HW 1.05 - 1.45 mm, usually over 1.20 mm; central Texas west to southeast-



ern Arizona, adjacent northern Mexico; usually mesic habitats. .... *C. festinatus*

- Smaller species, HW 0.90 - 1.25 mm, usually less than 1.10 mm; deserts of central Arizona and adjacent Mexico to southern California and Lower California peninsula. .... *C. fragilis*

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### Zusammenfassung

Der taxonomische Status der sechs in den Vereinigten Staaten Amerikas vorkommenden Arten des *Camponotus festinatus* (BUCKLEY, 1866)-Komplexes wird behandelt. Für *C. festinatus* wird ein Neotypus festgelegt und die weiblichen Kasten werden beschrieben; die restlichen fünf Arten werden wiederbeschrieben, unter spezieller Bezugnahme auf *C. festinatus*. *Camponotus fragilis* PERGANDE, 1894 sp.rev. wird aus der Synonymie gehoben, *C. pudorosus* EMERY, 1925 stat.n. wird als selbständige Art anerkannt. Zwei neue Arten werden beschrieben: *C. absquatulator* sp.n. aus Kalifornien und *C. microps* sp.n. aus Arizona.

### References

BUCKLEY, S.B. 1866: Descriptions of new species of North American Formicidae. – Proceedings of the Entomological Society of Philadelphia 6: 152-172.

CREIGHTON, W.S. 1950: The ants of North America. – Bulletin of the Museum of Comparative Zoology at Harvard College 104: 1-585.

DALLA TORRE, C.G. DE. 1893: Catalogus Hymenopterorum, hucusque descriptorum systematicus et synonymicus. Vol. 7. Formicidae (Heterogyna). – W. Engelmann, Leipzig, 289 pp.

EMERY, C. 1893: Beiträge zur Kenntnis der nordamerikanischen Ameisenfauna. – Zoologische Jahrbücher. Abteilung für Systematik, Geographie und Biologie der Tiere 7: 633-682.

EMERY, C. 1895: Beiträge zur Kenntnis der nordamerikanischen Ameisenfauna. (Schluss.) – Zoologische Jahrbücher. Abteilung für Systematik, Geographie und Biologie der Tiere 8: 257-360.

EMERY, C. 1925: Hymenoptera. Fam. Formicidae. Subfam. Formicinae. – Genera Insectorum 183: 1-302.

FOREL, A. 1914: Formicides d'Afrique et d'Amerique nouveaux ou peu connus. – Bulletin de la Société Vaudoise des Sciences Naturelles 50: 211-288.

GOODISMAN, M.A.D. & HAHN, D.A. 2005: Breeding system, colony structure, and genetic differentiation in the *Camponotus festinatus* species complex of carpenter ants. – Evolution 59: 2185-2199.

KEMPF, W.W. 1972: Catálogo abreviado das Formigas da Região Neotropical (Hym. Formicidae). – Studia Entomologica 15: 3-344.

MACKAY, W. & MACKAY, E. 2002: The ants of New Mexico (Hymenoptera: Formicidae). – Edwin Mellen Press, Lewiston, New York, 398 pp.

PERGANDE, T. 1894: On a collection of Formicidae from Lower California and Sonora, Mexico. – Proceedings of the California Academy of Sciences (2) 4: 26-36.

ROGER, J. 1863: Einige neue exotische Ameisen-Gattungen und Arten. – Berliner Entomologische Zeitschrift 6: 233-254.

SNELLING, R.R. 1968: Studies on California ants. 4. Two species of *Camponotus* (Hymenoptera: Formicidae). – Proceedings of the Entomological Society of Washington 70: 350-358.

WHEELER, W.M. 1902: A consideration of S. B. Buckley's "North American Formicidae". – Transactions of the Texas Academy of Science 4: 17-31.

WHEELER, W.M. 1910: The North American ants of the genus *Camponotus* MAYR. – Annals of the New York Academy of Sciences 20: 295-354.

WHEELER, W.M. 1914: Ants collected by W. M. Mann in the State of Hidalgo, Mexico. – Journal of the New York Entomological Society 22: 37-61.

WHEELER, W.M. 1917: The mountain ants of western North America. – Proceedings of the American Academy of Arts and Sciences 52: 455-569.