

A Revision of the Honey Ants, Genus *Myrmecocystus*, First Supplement (Hymenoptera: Formicidae)

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Abstract.—A revision of the honey ants, genus *Myrmecocystus*, first supplement (Hymenoptera: Formicidae) by Roy. R. Snelling, *Bull. Southern California Acad. Sci.*, 81(2):69-86, 1982. New distribution data are given for ten western species. Two new species are described: *M. (Eremnocystus) arenarius* is described from all castes; the type locality is Blow Sand Mts., Churchill Co., Nevada. *M. (M.) christineae* is described from all castes from the Ivanpah Mts., San Bernardino Co., California. New keys to the species of subgenera *Eremnocystus* and *Myrmecocystus* s. str. are provided and the two new species are appropriately illustrated.

Introduction

My revision of the honey ant genus *Myrmecocystus* was published in 1976. Since then, I have acquired interesting new distribution records for some species. Enough material of two undescribed species, then known from only a few specimens, is now available that these can be added to the known species.

The descriptive format is the same as that of my revision and figures in parentheses are those appropriate to the holotype or allotype, respectively.

New Records

All records, except as otherwise noted, are based on specimens in LACM. Specimens were collected by the author (RRS) or the author and C. D. George (CDG) unless otherwise noted.

Myrmecocystus (Endiodioctes) intonsus Snelling

Mexico, *Baja California Sur*: 51 km W La Paz, 274 m elev., 26 Aug. 1977 (RRS, No. 77-54); Estacion Microondas "Ligui," 425 m. elev., 48 km S Loreto, 25 Aug. 1977 (RRS, No. 77-50).

Myrmecocystus (Endiodioctes) mendax Wheeler

U.S.A., *California, Imperial Co.*: Black Mtn. Rd., 1000' elev., 4 rd mi SE Hwy. 78, 5 May 1978 (RRS & CDG, No. 78-24). *Inyo Co.*: Willow Cr., 2400' elev., Inyo Mts., 17 Mar. 1976 (D. Giuliani); south Saline Range, 2500' elev., 22 Apr. 1974 (D. Giuliani). *Riverside Co.*: Hidden Spgs., 2100' elev., 24.5 rd mi WSW Wiley's Well, 25 Oct. 1978 (RRS, No. 78-135). *San Bernardino Co.*: Morningstar Mine Rd., 4200'-4260' elev., Ivanpah Mts., 9.5 mi NNE Cima, 14 Apr. 1977 (RRS & CDG, No. 77-12).

Remarks

This is the first record for *testaceus* in the eastern Mojave Desert of California and is far removed from other Southern California localities. The site is Joshua Tree Woodland.

Myrmecocystus (M.) ewarti Snelling

U.S.A., Nevada, Clark Co.: 6 mi E Searchlight, 24 Nov. 1969 (G. & J. Wheeler, Nev. 590, in the collection of the Wheelers).

Myrmecocystus (M.) pyramicus M. Smith

U.S.A., Nevada, Clark Co.: 3 mi W Cottonwood Cove, 1200' elev., 10 Dec. 1970 (G. & J. Wheeler, Nev. 1496, in the collection of the Wheelers).

Myrmecocystus (Eremnocystus) arenarius new species

Figures 1-6, 13, 15, 19, 21, 23

Diagnosis

Worker.—Scape, malar area and propodeum with abundant erect hairs; erect pronotal hairs abundant; pubescence of second tergum sparse to scattered. *Female* and *Male*.—Forewing without erect hairs on membrane.

Description

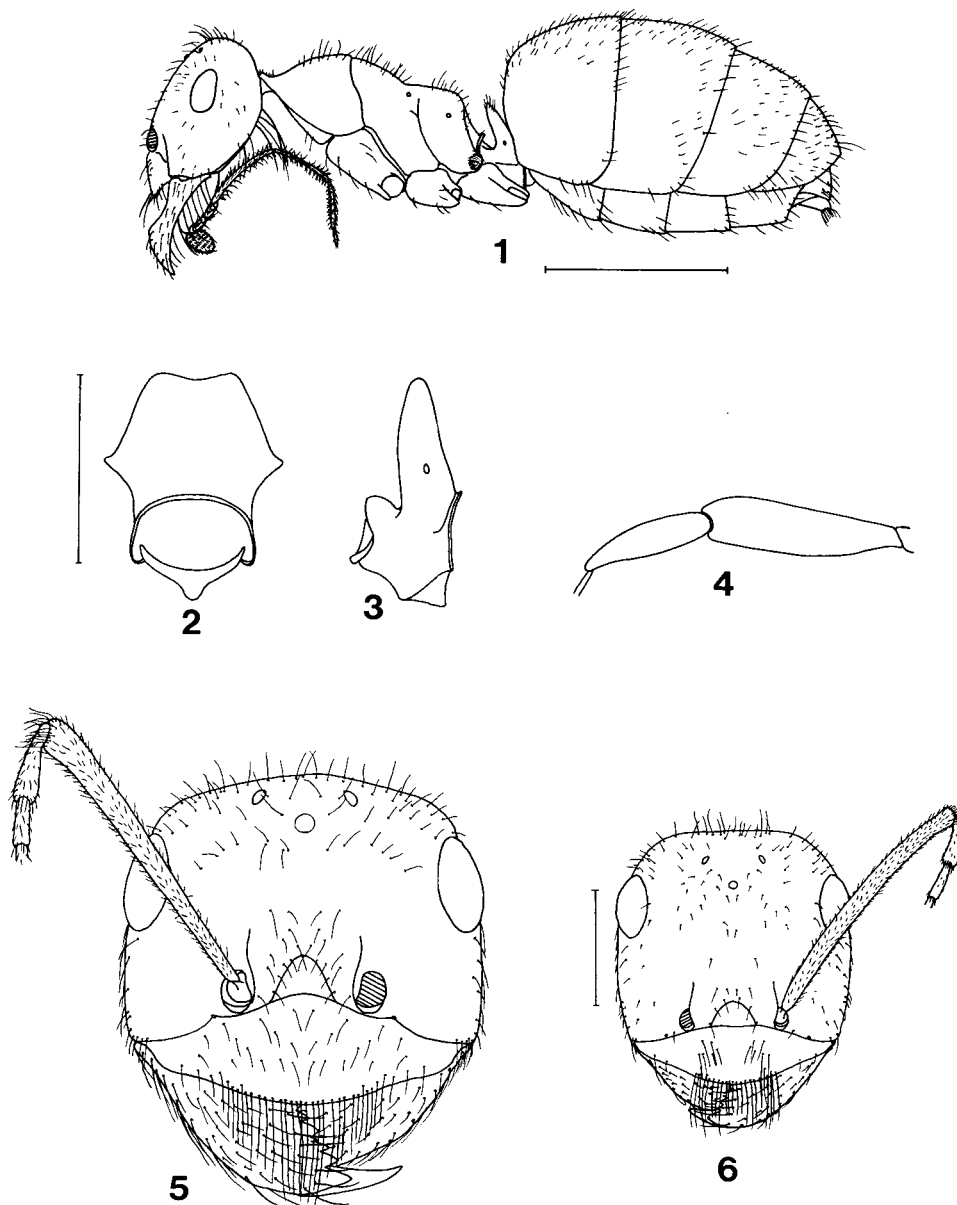
Worker.—Measurements: HL 0.65-1.02 (0.95); HW 0.58-0.90 (0.89); SL 0.66-1.07 (0.96); WL 0.83-1.40 (1.22); PW 0.42-0.63 (0.59).

Head: Longer than broad in all sizes, CI 105-119 (105); in full face view, malar margins nearly straight and convergent toward mandibles in smallest specimens, slightly convex in largest; occiput nearly flat in smallest workers, weakly convex in largest, sides broadly rounded; as long as, to a little shorter than, scape, SI 100-110 (101). Eye small to moderately large, EL 1.00-1.40 (1.31) \times first flagellomere; OMD 1.17-1.54 (1.29) \times EL. Mandible with seven teeth.

Thorax: Moderately robust, PW 0.43-0.52 (0.48) \times WL. Mesonotum, in profile, nearly straight in smallest workers, broadly rounded into a sloping posterior face in largest specimens. Basal face of propodeum, in profile, short and broadly rounded into posterior face in small specimens, distinct, long, and abruptly rounded into posterior face in largest specimens.

Petiole: In profile, compressed and narrowly cuneate; spiracles distinctly projecting in larger specimens; crest broadly concave, in posterior view, in large specimens, flat or weakly notched in small individuals.

Vestiture: Pubescence scattered on head; long and dense, but not concealing surface, on thorax and first gastric tergum. Second tergum with scattered pubescence, usually more conspicuous (especially in larger individuals) along base, midline and at sides of disc. Erect hairs numerous on head; malar area with 5-11 suberect hairs; scape with sparse erect hairs and numerous shorter, decumbent to subdecumbent hairs; all surfaces of femora and tibiae with numerous erect and suberect hairs. Promesonotum with numerous erect hairs, the longest more than 0.5 \times MOD; metanotum usually without erect hairs; dorsum of propodeum with 6 or more fine, short erect hairs. Petiolar scale with erect hairs on sides and crest. Terga with numerous discal hairs, becoming a little longer on succeeding segments.



Figs. 1-6. *Myrmecocystus arenarius*. 1, worker, lateral view, appressed pubescence not shown; scale = 1 mm. 2, 3, petiole of worker, posterior and lateral views; scale = 0.50 mm. 4, female, maxillary palp segments 4-6, vestiture not shown. 5, 6, female and worker head in frontal view, appressed pubescence not shown; scale = 0.50 mm.

Integument: Clypeus shiny, with scattered fine and coarse piligerous punctures; remainder of head subpolished, very weakly shagreened, with scattered piligerous punctures, frontal lobes virtually impunctate. Thoracic dorsum shiny, lightly shagreened. Gaster shiny, feebly shagreened.

Color: Medium to dark brown, appendages a little lighter; mandibles and apical part of clypeus yellowish brown, mandibular teeth dark red.

Female.—Measurements (mm): HL 1.36–1.38; HW 1.36–1.41; SL .36–.38; WL 2.51–2.78; PW 1.71–1.87.

Head: As broad as, or a little broader than, long, CI 95–100; in full face view, malar margin nearly straight or very weakly convex; distinctly longer than scape, SI 85–95. Eye small, EL 1.00–1.20 \times first flagellomere; OMD 1.00–1.25 \times EL. Mandible with seven teeth. Lateral ocelli slightly smaller than anterior ocellus, IOD 2.62–3.28 \times OD; OOD 3.50–4.14. \times OD. Fifth segment of maxillary palp broad at base, broadest near middle, distinctly narrowed distad; fourth segment narrowest at base, gradually broadened distad.

Thorax: Robust, PW 0.62–0.73 \times WL. Posterior half of mesoscutum flattened; scutellum sloping and flat or very gently convex in profile. Basal portion of propodeum, in profile, sloping and abruptly rounded onto declivous face.

Petiole: Strongly compressed in profile, summit thin; in frontal view, sides a little convergent above; median emargination broad, deep, angulate; from above about 3 \times wider than long.

Vestiture: Pubescence appressed, very scattered on head, most abundant (but still sparse) on lower malar area; appressed to subdecumbent on mesoscutum, scattered; longer, sparse, prostrate to suberect on sides of thorax, densest on pronotum and propodeum; appressed and scattered on tergal discs, becoming a little more abundant toward sides and apical margins.

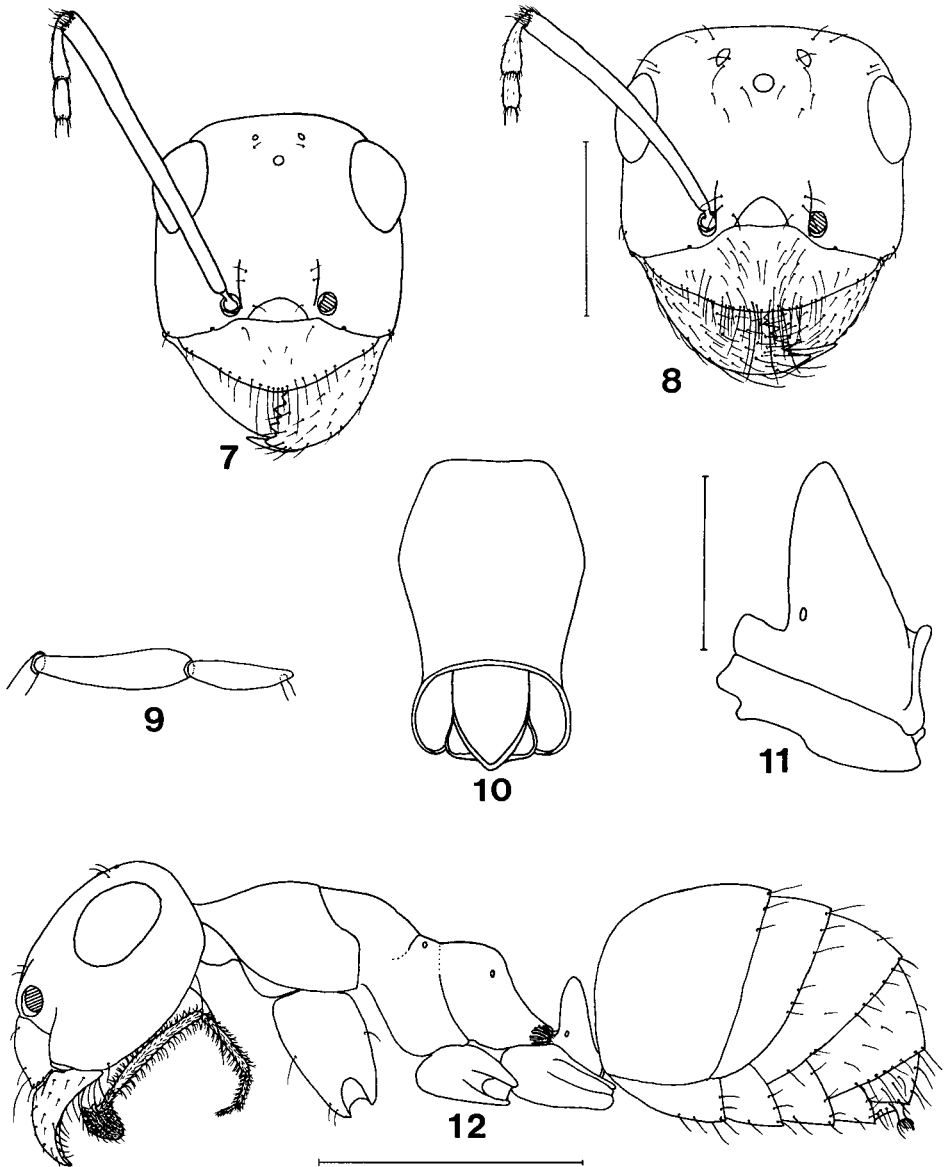
Scape with pubescence subdecumbent to suberect and with scattered fine, suberect hairs; femora and tibiae with abundant appressed to subdecumbent pubescence and numerous subdecumbent to erect hairs on all surfaces, least abundant on dorsal (extensor) femoral surfaces. Malar area, in frontal view, with 6–10 subdecumbent hairs; remaining frontal and dorsal head surface with rather sparse, short subdecumbent to erect hairs, longest hairs on occiput more than 0.5 \times MOD. Scutum with sparse suberect to erect hairs, mainly peripherally, longest no more than 0.5 \times MOD; scutellum with scattered suberect to erect hairs, longest more than MOD; pleura with scattered suberect to erect hairs, longest about 0.5 \times MOD; propodeum with sparse erect hairs across base and at sides of declivity. Petiolar scale with a few short, erect hairs on sides and across summit. All terga with sparse, suberect to erect hairs, becoming longer and coarser caudad, longest on disc of second segment no more than 0.5 \times MOD.

Membrane of forewing without obvious erect hairs at 45 \times ; forewing without fringe hairs and hindwing with a very few on basal half of posterior margin.

Integument: Shiny and very weakly, or not at all, shagreened on most areas, including gastric terga; metapleuron and propodeum conspicuously duller.

Head generally with scattered minute punctures; clypeus with a few fine punctures. Mesoscutum with scattered fine punctures, middle of disc nearly impunctate; minute punctures even more scattered. Scutellum with sparse, fine setigerous punctures. Anepisternum for the most part with sparse to scattered fine and minute punctures; katepisternum similar but with posterior and posterodorsal zones of dense punctures; metapleuron and propodeum densely and finely punctate. Tergal discs with sparse to scattered minute to ultraminate punctures.

Color: Medium brown, sides and propodeum darker; appendages light brown. Wings hyaline, veins and stigma yellowish brown.



Figs. 7-12. *Myrmecocystus christineae*. 7, 8, worker and female head in frontal view, appressed pubescence not shown; scale = 1.0 mm. 9, female, maxillary palp segments 4-5, vestiture not shown. 10, 11, petiole or worker, posterior and lateral views; scale = 0.25 mm. 12, worker, lateral view; appressed pubescence not shown; scale = 1.0 mm.

Male.—Measurements (mm): HL 0.60-0.64 (0.64); HW 0.54-0.60 (0.60); SL 0.58-0.64 (0.64); WL 1.15-1.33 (1.33); PW 0.76-0.88 (0.76).

Head: Slightly to distinctly longer than broad, CI 104-117 (106), as long as, or longer than, scape, SI 94-100. In frontal view, margins distinctly convergent toward mandibular bases; occiput broadly convex, lateral angles broadly rounded. Eye large, OMD 0.47-0.65 (0.53) × EL; lateral ocelli slightly larger than anterior,

IOD 3.20–4.00 (3.75) \times OD; OOD 2.75–3.25 (3.25) \times OD. Mandible with distinct preapical cleft and one or two small teeth on cutting margin.

Thorax: Stout, PW 0.57–0.70 (0.57) \times WL. Mesoscutum broad, vertical in front, posterior half flat or weakly concave; scutellum, in profile, with flat dorsal surface and abruptly sloping posterior face. Basal face of propodeum, in profile, narrow, convex and abruptly rounded into posterior face.

Petiole: Cuneate in profile, posterior face weakly convex, summit narrowly rounded; posterior view, crest straight or broadly and very shallowly concave.

Pilosity: Pubescence very fine, short, very scattered, most conspicuous on metapleuron and side of propodeum.

Scape with numerous very fine and short subdecumbent to suberect hairs; femora and tibiae with longer, coarser, sparse suberect hairs on all surfaces. Head and thorax with sparse to scattered subdecumbent to erect hairs, longest occipital hairs about 0.5 \times MOD. Gastric terga with sparse, subdecumbent to erect hairs, longest on disc of second segment no more than 0.5 \times MOD. Wings as in female.

Integument: Shiny and, at most, very weakly shagreened on most surfaces of head, thorax and gaster; metapleuron and basal face of propodeum moderately shiny, closely, though weakly, punctulate.

Color: Medium brown, occiput and thoracic dorsum a little darker, gaster a little paler. Appendages light brown. Wings hyaline, veins and stigma very pale brownish.

Terminalia: Figures 19, 21, 23.

Type material

Holotype worker, allotype and 211 worker, 8 female, 10 male paratypes: E end Blow Sand Mts., elev. 4600', (T 15N, R 30E), Churchill Co., NEVADA, 14 Mar. 1979 (R. C. Bechtel and R. W. Rust). Additional paratypes: 173 workers, 4 females, 11 males, same locality, 4 Apr. 1979 (R. C. Bechtel and R. L. Bradley). Holotype, allotype and most paratypes in LACM; paratypes in AMNH, MCZ, USNM and collection of G. C. & J. Wheeler.

Additional Localities

Nevada, Churchill Co.: Sand Mountain, elev. 4000', 1 July 1970 (G. C. & J. Wheeler, NEV. 1220); same locality, elev. 4200', 14 Mar. 1979 (R. C. Bechtel and R. W. Rust). *Washoe Co.:* 6 mi N Nixon, elev. 4200', 2 July 1977 (R. R. Snelling, G. C. & J. Wheeler; RRS No. 77-48, GJW No. NEV. 4191); same locality, 26 June 1965 (G. I. Stage); 2.8 mi W Wadsworth, 22 June 1963 (G. I. Stage).

Etymology

L., *arenarius* (pertaining to, or of, sand) because of the apparent preference of this ant for habitats of fine dune sand.

Distribution

At present known only from central Nevada, in areas of fine, drifting sand.

Discussion

The preeminent characteristic of this species is the great reduction of the appressed pubescence in all castes. In workers pubescence is abundant only on the dorsal

surface of the first gastric tergum. Moderately dense pubescence is present only on the metapleuron, the base of the propodeum and, to a lesser degree, on the propodeal sides of the females and males.

Another unusual feature of this ant is shared by the sexual forms and is, as far as known, unique within this subgenus. Typically, within *Eremnocystus*, the membranes of the wings are beset with numerous fine, very short, subdecumbent to erect white hairs. These hairs are readily discernable at a magnification of 45 \times . In other subgenera the membrane is dotted with what appear to be, at 45 \times , minute papillae. In fact, they are hairs, but this becomes apparent only at high magnifications (see figure 33 of my 1976 revision). The wing membrane of *M. arenarius* is as it is in these other subgenera and thus atypical for a species of *Eremnocystus*.

While it might, perhaps, be argued that this represents a breakdown of an important characteristic separating *Eremnocystus* from *Endiodioctes* in particular, I do not think this is the case. The presence of hairs on the wing membrane seems to be a primitive feature retained within *Eremnocystus* generally, but modified in *Endiodioctes*. In other characteristics *Endiodioctes* is clearly the least advanced of the several subgenera of *Myrmecocystus*.

Within *Eremnocystus*, *M. arenarius* is a species with a number of derived character states. Chief among these are the great reduction of appressed pubescence, the fine and very scattered punctation (especially in the sexual forms) and the compressed petiolar scale of the worker. The isolation of this species from others within *Eremnocystus* is also an important factor. Only *M. hammettensis* is even geographically near *M. arenarius* and that is one of the most pilose of the *Eremnocystus*. It is highly improbable that there has been any genetic interchange between the two.

Females of *M. arenarius* are most similar to those of *M. tenuinodis*, another species in which the worker petiolar scale is compressed. This species, like *M. arenarius*, exhibits a preference for nest sites in fine sand which is prone to drifting. A third species whose worker possesses a compressed petiolar scale is *M. lugubris*, the female of which is unknown. If the female of *M. lugubris* is found to be sufficiently like those of *M. arenarius* and *M. tenuinodis*, and I predict that this will be so, we will have a complex of three species aligned along a roughly north-south axis with *M. lugubris* occupying the middle portion.

As I envision this particular complex, the protospecies once occupied a continuous range from what is now western and central Nevada to the head of the Gulf of Mexico and partway down either side of the Gulf. This protospecies may have been not very different from the present *M. yuma*, a species not particularly similar to those of the *lugubris* complex but nearer them than any others. During the Tertiary the three desert regions became sharply differentiated from one another; the Great Basin became higher and cooler, the Mojave and Sonoran lower and hot. Protospecies populations became isolated from one another and each developed along its own peculiar line in the absence of genetic moderation from other populations.

Ecology

The Wheelers and I were able to study this species briefly one day at a station six miles north of Nixon. This is an area of fine, drift-prone sand along the east

side of Pyramid Lake. There was a sparse cover of *Salsola pestifer* and *Dalea polyadenia*. In one sector the annual, *Abronia turbinata*, was present and in bloom.

Two nests were situated in unstable sand with sparsely distributed *Salsola* and scattered *Dalea* plants. The third was in stabilized sand with denser cover, including *Abronia*. The only ant species common there was *Pogonomyrmex californicus* (Buckley). *Veromessor lariversi* M. Smith and *Conomyrma insana* (Buckley) were also present but uncommon.

Workers of *M. arenarius* were found foraging up to midmorning. Some were carrying miscellaneous fragments of other arthropods. A number of workers were also seen at nectaries of the *Salsola*. A single semireplete worker was recovered from one nest, but the unstable condition of the sand rendered deep excavation impractical.

The following key to species of *Eremnocystus* will replace that of my revision.

Key to Species of *Eremnocystus*

Workers

1. Antennal scape and dorsum of propodeum without fully erect hairs 2
 - Antennal scape, usually, and dorsum of propodeum, always, with some fully erect hairs (propodeal hairs may be short and inconspicuous in *M. perimeces*; this species has an unusually elongate head, CI 70-81) 3
2. Pronotum and mesonotum with at least eight conspicuous, fully erect white hairs; petiolar scale strongly compressed in profile, crest distinctly notched *lugubris* Wheeler
 - Pronotum and mesonotum each with no more than two fully erect hairs; petiolar scale not notably compressed, crest slightly concave or flat, but not conspicuously notched *creightoni* Snelling
3. Scape and/or tibiae, usually both, with conspicuous fully erect hairs; *or*, head moderately broad, CI 89 or more 4
 - Scape and tibia without erect hairs and head unusually elongate, CI 70-81 *perimeces* Snelling
4. Scape with conspicuous erect or semierect hairs; femora and tibiae with abundant erect hairs, some present on dorsal femoral surfaces; petiolar scale variable, but often compressed with summit distinctly notched 5
 - Scape with no erect hairs, except at apex; femora and tibiae with few erect hairs, none on dorsal femoral surface; petiolar scale thick in profile, crest flat or slightly convex *yuma* Wheeler
5. Scape with scattered erect and numerous suberect to subdecumbent hairs; malar area with fewer than 6 erect hairs in frontal view; if more, pubescence of second tergum much less dense than that of first 6
 - Scape with numerous fully erect hairs; malar area with 10+ erect hairs in frontal view *and* second tergum fully as densely pubescent as first *hammettensis* Cole
6. Pubescence of second tergum as dense as that of first 7
 - Pubescence of second tergum much sparser than that of first *arenarius* n. sp.
7. Appressed pubescence abundant on frons and third tergum; petiolar scale