

NEW ANTS FROM MINNESOTA, IOWA, AND WISCONSIN

WILLIAM F. BUREN

From the Department of Zoology and Entomology, Iowa State College

Received October 14, 1941

Iowa, Minnesota, and northern Wisconsin are regions which seem to have been neglected by American myrmecologists. Thus it is not surprising that new ants, especially parasitic species which tend to be rare, sporadic, or circumscribed in distribution, can be collected in these regions.

Holotypes and most of the paratypes are to remain in the author's collection. A few paratypes of each species will be deposited in the National Museum and the Iowa State College collection. There are also a few paratypes in the collection of Herbert T. Dalmat of New York City, who accompanied the writer on the collecting trip during which most of these species were taken.

*Formica reflexa*, n. sp.

WORKER

Length, 4.65-5.27 mm.

Head, excluding the mandibles, a little longer than broad, somewhat broader behind than in front, with convex posterior margin, evenly and broadly rounded posterior corners, and moderately convex sides. Mandibles 7-toothed. Maxillary palpi approximately .64 mm. long. Clypeus feebly carinate, subangularly produced in front. Apex of frontal area indistinct. Frontal carinae short, about  $1\frac{1}{2}$  times as long as the diameter of the antennal foramina, evenly diverging behind. Eyes hairy. Funicular joints 2-10 subequal in length, the penultimate never shorter than the second. Pro- and mesonotum moderately convex in profile, the middle of the mesonotum straight. Epinotum rather angulate in profile, the base and declivity nearly straight and subequal in length. Petiole small, anterior surface convex, the posterior surface less so; superior border unusually blunt, approaching *Polyergus* species in this respect; the sides and superior border at least slightly convex when seen from behind. Entire body more slender and less robust than *F. dakotensis*.

Head, legs, and gaster feebly shining, clypeus and thorax subopaque. Shagreening on head, thorax, and gaster fine and dense, concentrically set on the pro- and epinotum.

Erect hairs sparse; rather short on most parts of the body, particularly on the pro- and mesonotum where they are about .03-.05 mm. in length. An occasional hair slightly clavate. No erect hairs on the scapes, femora, or tibiae, few on the front and mesonotum, sparse on the dorsum of the gaster. Pubescence extraordinary, consisting of fine hairs almost as long as some of the erect hairs, often growing out from the surface suberectly but sharply reflexed in the middle so that the distal ends strike the surface. Reflexed pubescence most obvious on the gaster.

Pubescent hairs numerous but not dense, nowhere concealing the surface, the distance between the bases of adjacent hairs about .03 mm.

Head and thorax reddish brown, the vertex, occiput, pro- and mesonotum sometimes feebly infuscated. Gaster black to the naked eye, under magnification often deep brown with black posterior borders to the segments. Antennae nearly black, legs dark brown.

#### FEMALE

Length, 5.41-6.32 mm.

Head, excluding the mandibles, as broad as long (about 1.14 mm.), broader behind than in front, with the posterior border convex except in the middle where it is slightly excised, the posterior corners evenly rounded, and the sides nearly straight. Mandibles 7-toothed. Clypeus ecarinate or nearly so. Frontal area rather indistinct. Frontal carinae diverging behind; short, about  $1\frac{1}{2}$  times as long as the diameter of the antennal foramina. Funicular joints 2-10 subequal in length, the penultimate joint as long as or slightly longer than the second, and only slightly shorter than the fourth. Eyes hairy, little or no larger than in the worker. Thorax five-sixths as wide as the head, approximately .93 mm. across the wing insertions. In profile the pronotum and epinotum more sloping than in *F. dakotensis*. Petiole low and even blunter than that of the worker, the sides and superior border moderately convex when seen from behind. Wings about 5.5 mm. long. Whole body much more slender and less robust than *dakotensis*.

Entire body very shining, without shagreening, marked only by the punctures from which the pilosity and pubescence arise.

Erect hairs not very numerous on any part of the body, most abundant on the dorsum of the thorax, sparse on the head and gaster. Hairs on the dorsum of the thorax often slightly clavate. Pubescence unique, consisting of fine hair a little shorter than the erect hairs, growing out from the surface suberectly, but sharply reflexed in the middle so that the distal ends strike the surface. Reflexed pubescent hairs numerous but not dense on all body surfaces, the bases of adjacent hairs about .03 mm. apart. Pubescent hairs flexuous on the legs but usually not sharply reflexed.

In mature specimens, head deep blackish brown, most of the thorax dark brown, the scutellum nearly black, the epinotum lighter. Gaster black to the naked eye. Legs dark brown. Antennae black. In dorsal aspect, the insect has a dark, almost black appearance.

#### MALE

Length, 6.54-7.49 mm.

Head, excluding the mandibles, distinctly broader than long, the posterior border broadly rounded. Mandibles indistinctly 3-toothed. Eyes hairy. Funicular joints 2-10 gradually decreasing in length, the second about one-fourth again as long as the penultimate, and as long as the first. Whole body more slender and less robust than in *F. dakotensis*. Petiole low and blunt, the superior border straight or slightly convex when seen from behind.

Head and thorax subopaque, gaster feebly shining.

Erect hairs short, numerous on the dorsum of the thorax, much sparser on the head and gaster. Pubescent hairs long, straight, but usually sub-appressed to suberect so that it is difficult to distinguish between pilosity and pubescence. Pubescence moderately sparse, nowhere concealing the surface; denser, however, than on the worker and female.

Color black, legs brown.

Described from 53 virgin females (most of them partially callow), 41 males, and 129 workers taken from a small, obscure, roadside nest near Hibbing, Minn., August 13, 1941. This species was also found at Owatonna, Minn. (23 virgin females and 33 workers, August 17, 1941, and 10 workers, July 6, 1940); at Jenkins, Minn. (24 workers and 9 males, August 11, 1941, and 18 workers, July 10, 1940); and at Spirit Lake, Iowa (20 workers from four small nests, June 12, 1940, and 5 workers, July 15, 1940).

Differing from all other species of *Formica* known to the writer by having the pubescence reflexed and the petiole unusually blunt. Among the species of *Formica*, *reflexa* seems most closely related to *dakotensis* Emery. *F. reflexa* differs from this species mainly by having the sides of the head less convex, reflexed rather than straight pubescence, smaller size, and the petiole very blunt rather than cuneate in profile and convex above rather than truncate or excised when seen from behind.

*F. ferocula* is described by Wheeler as having a very blunt petiole. This may possibly be as blunt as that of *reflexa*. *F. ferocula* differs from *reflexa* by having the head as broad as long, the posterior border of the head feebly excised instead of convex, the first four funicular joints longer than the penultimate, the epinotum with a slightly convex base and distinctly concave declivity rather than with a straight base and declivity, the erect hairs numerous on parts of the thorax and absent on the posterior portions of the head, and by not having the pubescence reflexed. *F. ferocula* was thought by Wheeler to be allied to the *ciliata* group of species. Thus it probably is not closely related to *reflexa*.

Although the females of *reflexa* are very small and definitely microgynous, this species does not seem closely related to any of the species of the *microgyna* group. *F. reflexa* can be distinguished from all members of this group by the unusual shape of the petiole, the reflexed pubescence, the proportions of the funicular joints, and the very small, rather uniformly sized worker cast.

The very small, uniform size of the worker, unlike most species of the *rufa* group, and the small, blunt petiole (as if atrophied) seem to show a highly developed parasitism.

Of the seven nests that the writer has found, none were without numerous workers of the host species, *F. fusca subsericea*, the *subsericea* workers in all cases outnumbering the *reflexa* workers at least several to one. This immediately suggests permanent social parasitism of the dulotic type, like that of *Polyergus* species. That *reflexa*'s relationship with *subsericea* is not of the dulotic type is evidenced by the fact that *reflexa* lacks the clypeal notch characteristic of all species of *Formica* which engage in dulosis, and that the workers are much smaller, weaker,

and even more timid than their hosts. Upon opening their nests, the *reflexa* workers disappeared as quickly as possible, leaving the *subsericea* workers to defend the nests.

*F. reflexa* can hardly be a temporary social parasite. In this type of parasitism it is usually very difficult to find mixed colonies.

If *reflexa* is a permanent social parasite of the nondulotic type, the females should exhibit very strong inquiline characteristics, for it would be fatal to seek adoption in an incipient or depauperate colony as do all other parasitic *Formica* species. Instead, adoption must be secured in a flourishing colony which can furnish enough host workers to rear *reflexa* broods for at least two or three seasons. However, if the host queen is retained as in *Strongylognathus testaceus* of Europe, incipient nests could be chosen.

Much experimentation should be done with this species to determine its exact relationship with *F. subsericea*.

### *Formica fossiceps*, n. sp.

#### WORKER, MAXIMA

Length, 6.65–7.71 mm.

Head, excluding the mandibles, slightly longer than broad, narrower in front than behind, with feebly excised or straight posterior border and nearly straight sides. Clypeus evenly rounded in front, ecarinate or distinctly carinate only at the extreme front. Clypeal fossae strikingly deep; antennal fossae also rather deeply impressed. Maxillary palpi short. Apex of frontal area rounded. Frontal carinae diverging, about twice as long as the diameter of the antennal foramina. Frontal furrow indistinct, ending in a shallow pit level with the eyes. Eyes hairless. Scapes surpassing posterior lateral corners of the head by nearly two-fifths of their length. Funicular joints gradually decreasing in length toward the penultimate, the second approximately four-fifths as long as the first and about one-third again as long as the penultimate, the third slightly shorter than the second; joints 5–8 rather unusual in appearance, each narrow at the base but swollen to more than 1½ times the base width near the apex. To the naked eye these joints are somewhat bead-like.

Pro- and mesonotum not as convex as in *F. rufa obscuriventris*. Meso-epinotal depression not as deep. Epinotum in profile with subequal base and declivity, the base slightly convex, the declivity feebly concave. Petiole large, higher than the epinotum, in profile cuneate, the superior border very sharp. Seen from behind, the petiole broad, measuring up to .77 mm. wide, and strongly subangularly or convexly produced upward.

Head and legs moderately shining, gaster more shining but not as highly polished as that of the female, the shagreening on the gaster very fine and superficial. Thorax subopaque.

Erect hairs absent on most body surfaces, present on the dorsum of gaster near the apex, venter of gaster, venter of petiole, and coxae. Pubescence very short and sparse, especially on the head and gaster,

rather dense only on the base of gaster, petiole, epinotum, and appendages.

Head and thorax ferruginous, appendages brown, entire gaster deep black.

#### WORKER, MEDIA

Length, 5.23-6.62 mm.

Differing from the major in having the head straight or slightly convex behind, the clypeal fossae a little less deep, the basal funicular joints shorter in proportion to the penultimate, the middle joints less bead-like, and the head and thorax often infuscated.

#### WORKER, MINIMA

Length, 3.70-4.58 mm.

Differing from the major in having the head definitely longer than broad and slightly convex behind, the clypeus distinctly carinate, the clypeal fossae more normal in depth, funicular joints 2-10 more nearly subequal in length, and the middle joints not bead-like. Also differing in having the body a little less shining and the head and thorax heavily infuscated.

#### FEMALE

Length, 7.19-7.84 mm.

Although little shorter than the females of *F. rufa obscuriventris*, strikingly more slender and much less massive than this species.

Head, including the mandibles, triangular in shape, the outer borders of the mandibles nearly aligned with the sides of the head; excluding the mandibles, slightly longer than broad (about 1.38 mm. wide), one-third again as wide behind as in front, with straight posterior border and sides. Clypeus evenly rounded in front, ecarinate. Clypeal fossae extraordinarily deep, the middle part of the clypeus between them strongly convex in transverse section. Frontal carinae diverging, approximately twice as long as the diameter of the antennal foramina. Frontal furrow very short and indistinct, not reaching beyond the frontal carinae. Funiculi much as in the major worker, but joints 5-8 not as bead-like and the second joint only a little shorter than the first. Eyes hairless, a little larger than those of the worker. Thorax narrower than the head, about 1.2 mm. wide. Petiole large, cuneate in profile, with sharp superior border, sub-angularly produced upward when seen from behind.

Entire body, especially the gaster, glabrous and extremely smooth. Thorax a little less shining than the head and gaster. Shagreening on the gaster scarcely perceptible, the surface marked only by the very sparse, minute punctures from which the pubescence arises.

Pilosity entirely lacking on all dorsal regions of the body; some slender, scattered hairs on the venter of the gaster and coxae. Pubescence very fine, short, and sparse, about .01-.02 mm. in length, rather dense only on the base of the gaster and appendages, extremely sparse on the head.

Head and thorax light brownish red. Gaster entirely deep black except at the extreme base. Head lightly infuscated behind the eyes.

Mesonotum heavily infuscated in a median frontal spot and along the parapsidal sutures. Scutellum and metanotum black.

#### MALE

Length, 8.06 mm.

Head, excluding the mandibles, distinctly broader than long, much broader behind than in front. Mandibles feebly 3-toothed. Clypeal fossae very deep. Funicular joints 2-10 gradually decreasing in length, the penultimate a little over one-half as long as the second, the second one-fourth again as long as the first. Petiole in profile, with convex anterior and flat posterior surfaces; seen from behind, subrectangular, the superior border sinuate but nearly truncate, the sides almost straight.

Head and thorax mainly opaque, the declivity of the epinotum glabrous; gaster feebly shining.

Erect hairs nearly absent on the dorsal surfaces of the body, a few on the gula, profuse on the venter of the gaster toward the apex. Pubescence sparse, but longer and much denser than in the worker and female.

Color black, the antennae dark brown, legs light brown.

Described from 12 females, 93 workers, and 1 male taken from a nest in wooded pasture near Winterset, Iowa, June 27, 1941. This nest was located around the base of a bush, plant debris being used in the construction of a low dome. Immediately under this dome were the brood, workers, and sexual forms.

This species seems definitely related to *F. rufa* and its numerous subspecies and varieties. It differs from all of them, however, by the paucity of both pilosity and pubescence, the very shining surface, and the depth of the clypeal fossae. *F. rufa obscuriventris* seems to be most closely related in the structure of the clypeal fossae and the funiculi. *F. fossiceps* can be distinguished from *obscuriventris* by the smaller size of the female, the more shining surface of both female and worker, the deeper clypeal fossae, the more bead-like funicular joints, the ecarinate clypeus, and by the lack of pilosity on the dorsal surfaces of both female and worker. In addition *fossiceps* has a somewhat differently shaped head.

From *rufa integra*, an eastern North American form with very sparse pilosity, *fossiceps* can be differentiated by the much deeper clypeal fossae, the proportions of the funiculi, and the shining integument. From *rufa mucescens*, a Colorado form with females of about the same size, *fossiceps* can be distinguished by the shining rather than opaque integument, and very sparse rather than very dense pubescence. The writer has not seen specimens of *mucescens* and thus cannot make any statements regarding the depth of the clypeal fossae. *F. fossiceps* can be separated from *rufa integroides* varieties *haemorrhoidalis* and *ravida*, two Rocky Mountain forms without pilosity, by its much less robust queen, shining integument, very sparse pubescence, and by the unusual clypeal fossae and funicular joints.

*F. fossiceps* is not closely allied to any species of the *microgyna* group, all of which have much smaller females, are more or less pilose,

and have the clypeal fossae more normal in depth. Although *fossiceps* resembles *dakotensis* and its varieties in the smoothness of its integument, it is not closely related to the latter species as shown by the divergent shapes of the head and petiole.

*F. fossiceps* is probably a temporary social parasite of *F. fusca subsericea*.

### *Lasius (Acanthomyops) pubescens*, n. sp.

#### WORKER

Length, 3.35–4.06 mm.

Head, excluding the mandibles, as long as broad (about .88 mm.), with straight or feebly convex posterior border and moderately convex sides. Mandibles with 6 strong teeth and 1 or 2 indistinct denticuli, basal borders edentate. Front convex, the frontal furrow absent. Scapes surpassing the posterior lateral corners of the head by one-seventh of their length. Funiculi feebly incrassated, the penultimate joint slightly longer than broad; last joint broader than the penultimate, and a little longer than the ninth and tenth taken together. Eyes hairy, with about 45 facets. Maxillary palpi short, 3-jointed. Pro- and mesonotum moderately convex. Meso-epinotal depression shallow. Epinotum without distinct base or declivity, evenly rounded. Petiole small, narrow, with a transverse, truncate superior border which may be slightly excised but not notched, blunter than in *L. (A.) interjectus* and *L. (A.) claviger*.

Head, thorax, and gaster strongly shining except where somewhat obscured by the pubescence.

Erect hairs short and sparse, shorter and less flexuous than on *interjectus*, lacking, however, only on the scapes, tibiae, and middle and hind femora. Hairs scattered over the surface of the gaster as in *claviger*; more sparse than in *claviger*, however. Pubescence very dense for *Acanthomyops*. Pubescence a little more abundant on the head than on *interjectus*; sparser on the thorax than on the head, but, nevertheless, much more dense than on *interjectus*; dense on the gaster, somewhat concealing the surface.

Color varying from light to brownish yellow, the head never reddish.

#### FEMALE

Length, 4.79–5.18 mm.

Head, excluding the mandibles, a little longer than broad, with feebly excised posterior border and slightly convex sides. Mandibles 6-toothed, basal borders edentulous. Clypeus weakly subangulate in front. Frontal carinae short, scarcely distinct. Eyes hairy, small but quite convex, situated a little farther to the sides than in *interjectus*. Scapes thickened distally, surpassing the posterior lateral corners of the head by one-seventh of their length. Funiculi moderately incrassated, joints 2–9 as broad as or only slightly broader than long, the penultimate joint about as long as broad, the second joint slightly over one-half as broad as the penultimate. Maxillary palpi short, 3-jointed. Thorax distinctly less broad than the head; with about the same shape as *inter-*

*jectus*; the mesothorax a little less flattened dorsally. Petiole small, in profile triangular, with nearly straight anterior and posterior surfaces, the superior border blunt; seen from behind, narrow, the superior border imperceptibly notched and truncate. Femora and tibiae not flattened. Wings about 5.5 mm. long.

Thorax shining, head less so; gaster subopaque, the surface obscured by the dense pubescence.

Pilosity of about the same arrangement as in *interjectus*, but much sparser, much shorter and less flexuous. Hairs very few on gula, front, occiput, and petiole, none on the vertex. A few hairs unevenly distributed along the posterior borders of the gastric segments, a few also scattered over the surface of the gaster. Pubescence particularly dense on the gaster, less dense on the head, sparser on the dorsum of the thorax.

Color dark grayish brown, the appendages lighter.

Described from 4 females and 113 workers taken from a sandy, low mound nest in open woodlands near Jenkins, Minn., August 11, 1941. Since no males and but few females could be found, it is probable that most of the sexual forms had already left the nest.

*L. (A.) pubescens* belongs with the *interjectus* group of species as shown by the long scapes and feebly incrassated funiculi. However, it does not seem closely related to the typical *interjectus*, the queens differing considerably in size, color, pubescence, and pilosity. It may be more closely related to *interjectus mexicanus* which has a queen of equal size. Judging from Wheeler's description of the latter, the queen of *pubescens* can be distinguished definitely from that of *mexicanus* by its different color, shorter wings, and probably also by denser pubescence. The worker of *pubescens* can be distinguished from that of *mexicanus* by the dense pubescence and sparse pilosity. Both workers and females can be separated from those of *interjectus coloradensis* by the sparse rather than numerous erect hairs and dense rather than sparse pubescence. From the other species with very small females, *L. (A.) occidentalis* and *plumopilosus*, it differs in characters too numerous for consideration. *L. (A.) pubescens* can be distinguished from *L. (A.) parvula* M. R. Smith, a small species from Illinois, by its sparse, short pilosity, larger eyes, and dense pubescence.

This species may be parasitic on one of the varieties of *Lasius niger*.

#### ***Lasius (Acanthomyops) clavigeroides*, n. sp.**

##### **WORKER**

Length, 3.48–4.02 mm.

Head, excluding the mandibles, as broad as long, with straight or slightly convex posterior border and moderately convex sides. Mandibles 8-toothed, the basal-most tooth pointing posteriorly. Clypeus rounded or feebly subangulate in front. Frontal carinae scarcely diverging behind. Scapes incrassated distally, reaching the posterior lateral corners of the head. Funiculi incrassated, the penultimate joints a little broader than long. Eyes small, hairy, with about 30–35 facets. Maxillary palpi short,



3-jointed. Pro- and mesonotum moderately convex in profile, less so than in *claviger*. Base of epinotum in profile moderately convex, declivity straight; the base about three-fifths as long as the declivity. Petiole smaller and with a blunter superior border than *claviger*, in profile with imperceptibly convex anterior and posterior faces; when seen from behind, the petiole straight or faintly excised above but not notched as in *claviger*.

Entire body strongly shining but not quite as shining as *claviger*, the surface often concealed a little by the pubescence.

Erect hairs sparser, much shorter, and less flexuous than on *claviger*, nearly absent on gula, front, and femora; more abundant on the gaster than on other body surfaces. Pubescence moderately dense on the head, sparse on the thorax, varying from rather sparse to moderately dense on the gaster. Pubescence on all regions usually more profuse than on the corresponding regions of *claviger*.

Color varying from light to brownish yellow; the head never reddish.

#### FEMALE

Length, 5.67-6.23 mm.

Head, excluding the mandibles, insignificantly broader than long, with feebly excised posterior border and slightly convex sides. Mandibles 7-toothed, basal borders edentate. Clypeus subangularly produced in front. Eyes hairy, moderately convex. Scapes thickened distally, not quite reaching the posterior lateral corners of the head. Funiculi clavate, the penultimate joints about 1.4 times as broad as long; the second joint a little less than one-half as broad as the penultimate. Maxillary palpi short, 3-jointed. Thorax with the shape of *claviger*. Petiole small, in profile with flat anterior and posterior surfaces, the superior border blunt; seen from behind, narrow, the sides straight above, the superior border feebly convex, sinuate, or faintly notched. Femora and tibiae slightly flattened, the fore femora about three times, the middle and hind femora about four times, as long as broad. Wings about 6.3 mm. long.

Entire insect shining, but not glabrous like *claviger*, the shining surface somewhat hidden by the pubescence.

Erect hairs sparser, much shorter and less flexuous than on *claviger*; lacking the microscopic plumosity which characterizes the hairs of many *claviger* queens. No hairs on the front, very few or none on the vertex and occiput. Pubescence shorter and much denser than that of *claviger*, particularly on the head and gaster where it is dense enough to give a slight pruinose effect; sparser on the dorsum of the thorax.

Color dark blackish brown, appendages lighter. Veins and stigma of the wings pale brown.

#### MALE

Length, 3.93-4.71 mm.

Head, excluding the mandibles, a little broader than long, with moderately convex posterior border and sides, a little broader behind

than in front. Each mandible with only a strong apical tooth as in *claviger*. Scapes slightly surpassing the posterior lateral corners of the head. Eyes very convex, hairy, situated in the middle of the sides of the head. Maxillary palpi short, 3-jointed. Thorax slightly narrower than the head, not as robust in profile as *claviger*. Petiole small, the superior border not very sharp; in profile, with feebly concave anterior and feebly convex posterior faces. Wings about 4.6 mm. long.

Head and thorax weakly shining, gaster moderately so.

Erect hairs shorter and sparser than on *claviger*. Pubescence rather sparse, but denser than on *claviger*.

Color black; legs and funiculi lighter.

Described from 65 virgin females, 27 males, and 110 workers taken from a sandy, low mound nest in oak woods near Solon Springs, Wis., August 15, 1941.

*L. (A.) clavigeroides* seems to be very closely related to *L. (A.) claviger*. In the field the worker, female, and male appear like small replicas of the corresponding phases of *claviger*. The striking differences in pilosity and pubescence entitle *clavigeroides* to full specific rank, however. The female of *clavigeroides* can be distinguished from that of *claviger* by the very short, sparse pilosity, much denser pubescence, smaller petiole which is blunter above and only minutely notched if at all, less flattened legs, and smaller size. The worker of *clavigeroides* can be separated from that of *claviger* by its smaller size, much sparser, shorter pilosity, somewhat denser pubescence, blunter, unnotched petiole, and less convex sides of the head. *L. (A.) clavigeroides* differs from *claviger subglaber* by most of the above points. In addition the queens differ considerably in color.

*L. (A.) clavigeroides* workers can be distinguished from *L. (A.) parvula* by their larger size, shorter, sparser pilosity and somewhat shorter, more incrassated antennae. Queens and workers of *clavigeroides* and *pubescens* can be readily distinguished by their antennae.

*L. (A.) occidentalis* differs from *clavigeroides* by having the petiole very large, its superior border sharp and emarginate, and by having the head of the female long, rectangular, and narrower than the thorax. The pile is also more abundant than on *clavigeroides*.

This species is probably a temporary social parasite of one of the varieties of *Lasius niger*. However, *L. brevicornis* was also present in the type locality and may possibly act as the host.