

Number 316
July 31, 1979

CONTRIBUTIONS IN SCIENCE

NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY

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ARBOREAL AFRICAN ANTS
(Hymenoptera: Formicidae)

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Published by the NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY • 900 EXPOSITION BOULEVARD • LOS ANGELES, CALIFORNIA 90007

APHOMOMYRMEX AND A RELATED NEW GENUS OF ARBOREAL AFRICAN ANTS (Hymenoptera: Formicidae)¹

By Roy R. Snelling²

ABSTRACT: The African ant genus *Aphomomyrmex* is redescribed; it contains a single species, *A. afer*, with polymorphic workers; *A. murali* Forel is synonymized with *A. afer*. A related new genus, *Petalomyrmex*, is described and illustrated in all three castes. This ant is apparently an obligatory associate with the caesalpiniaceous tree *Leonardoxa africana*.

Aphomomyrmex was described by Emery (1895) for a single new species, *A. afer*, from Cameroon. A previously described Bornean ant, *Dimorphomyrmex andrei* Emery, tentatively placed in *Aphomomyrmex*, was removed to *Cladomyrma* by Wheeler (1920). *Pseudaphomomyrmex* was erected as a subgenus by Wheeler (1929) for the Philippine species *Aphomomyrmex emeryi* Ashmead. Later (1922) he raised *Pseudaphomomyrmex* to generic status. The ant is not well known and it seems best to leave it at this level for the present. Menozzi (1935) described *Neaphomus* as a Neotropical subgenus of *Aphomomyrmex*; this was treated as a junior synonym of *Myrmelachista* by Snelling and Hunt (1976).

Aphomomyrmex, then, is restricted to Africa as far as now known. In order that the related new genus, described below, may be adequately characterized, it is first necessary to re-examine *Aphomomyrmex*.

Aphomomyrmex Emery

Aphomomyrmex Emery 1899. Soc. Entomol. Belg. Ann. 4:493. Type species: *Aphomomyrmex afer* Emery 1899. Orig. design. Arnold 1920. S. Afr. Mus. Ann. 14:552-554; Wheeler 1922. Amer. Mus. Nat. Hist. Bull. 45:697; Emery 1925. *IN*, Wytzman, Gen. Insect. 183:44-45.

DIAGNOSIS: **WORKER:** Polymorphic; head rectangular; antenna nine-segmented, without distinct apical club; ocelli well below occipital margin. **FEMALE:** Antenna ten-segmented, without distinct apical club; head about one-third longer than wide, parallel-sided; frontal carinae separated by more than their length; atria of propodeal spiracle and metapleural gland large, nearly circular, latter without conspicuous guard hairs. **MALE:** Antenna ten-segmented, without distinct apical club; eye large, occupying most of side of head; ocelli large; frontal carinae obsolete; pygostyles present; mandible tridentate.

DESCRIPTION: **WORKER:** Polymorphic, HW of largest worker about twice that of smallest; head rectangular. Mandible with five or six teeth along apical margin; basal tooth indistinct

and greatly offset along basal margin. Maxillary palp five-segmented, labial palp three-segmented. Median lobe of clypeus broader than long, moderately convex longitudinally and transversely, basal margin below level of upper margin of antennal sockets; lateral margin confluent with antennal socket; apical margin of median lobe slightly projecting, subtruncate to weakly convex. Antennal scape not reaching occipital margin, broadened at apex, flagellum eight-segmented, only first and last segments longer than broad; gradually thickened apicad, without distinct club. Eye slightly higher than broad; placed slightly below middle of side of head; distance between eye and antennal socket slightly greater than distance between eye and head margin in frontal view. Ocelli present, distinct in large workers, minute in smallest workers, placed well below occipital margin in frontal view. Occipital margin broadly and weakly concave in largest workers, more narrowly and abruptly concave in smallest.

Mesosoma stout, about twice longer than wide, widest across pronotum; pronotum about twice wider than length along midline. Promesonotal suture distinct. Mesonotum, in dorsal view, wider than long; convex in profile and abruptly descending into metanotal depression. Metanotal spiracles slightly elevated; metapleural gland very large, atrium large, circular, not provided with guard hairs. Propodeum broader than long in dorsal view, sides gently convex; declivity flat in profile, about twice longer than basal face; spiracle large.

Profemur stout. Middle tarsal segments short, broader than long. Tarsal claws simple.

Node of petiole scaliform; spiracle minute, near base of scale. Acidopore with conspicuous fringe of long, curled hairs.

¹REVIEW COMMITTEE FOR THIS CONTRIBUTION:

A.C. COLE, JR.
C.L. HOGUE
G.C. WHEELER

²Entomology Section, Natural History Museum of Los Angeles County, 900 Exposition Boulevard, Los Angeles, California 90007.

FEMALE: Head distinctly longer than wide, with straight, subparallel sides and straight occipital margin in frontal view. Eye large, lateral. Ocelli large. Antenna about as in worker, but flagellum nine-segmented. Mandible as in worker but basal tooth larger and set further basad.

Mesosoma normal for alate forms, somewhat flattened in profile; mesonotum flattened, about as broad as long. Scutellum flattened and on same plane as mesonotum. Metanotum and propodeum, in profile, strongly oblique, latter without distinct basal face.

Legs as in worker.

Forewing with a single submarginal cell; vein *m-cu* absent; fringe hairs present except along apical margin. Hindwing with *cu-a* far basad of *r-m*; 1A ending at *cu-a*; fringe hairs long, present along posterior margin.

Node of petiole low, thick; from above, about twice wider than long.

Gaster somewhat elongate, acidopore as in worker.

MALE: Head, across eyes, distinctly broader than long. Eye massive, occupying most of side of head, but distance between eyes greater than eye width in frontal view. Ocelli enlarged, ocellular distance less than maximum diameter of anterior ocellus. Mandible with three widely spaced teeth, apical tooth much broader and longer. Scape more slender than that of female, flagellum ten-segmented.

Mesosoma, from above, about one-third longer than wide; in profile, about one-third longer than high. Mesonotum wider than long. Scutellum, in profile, convex. Propodeum about as in female.

Legs slender. Wings as in female.

Node of petiole, in profile, bluntly triangular; from above, about as wide as long.

Gaster robust. Pygostyles present. Subgenital plate deeply excised. Paramere conspicuously longer than basal width, apex acute; ventral lobe of aedeagus nearly straight; edentate, basal angle dentiform.

DISCUSSION: Emery based this genus primarily upon the type species, *A. afer*. *Dimorphomyrmex andrei*, tentatively placed here, was known only from females and its relationship to *Aphomomyrmex* was uncertain. Wheeler (1920) removed *andrei* to *Cladomyrma*. A single cotype of *C. andrei* has been available. There are several obvious differences between the *Cladomyrma* female and that of *Aphomomyrmex*. In *Cladomyrma* the head is quadrate, with the occiput arched well above the ocelli; the eyes are at the side of the head (rather than laterad on the frontal surface) and the lateral lobes of the clypeus extend below the margin of the median lobe. The mandible of *Cladomyrma* has four apical teeth; there is no tooth on the basal margin. The opening of the metapleural gland is partially closed. The petiolar spiracle is nearer the summit of the node than the base. It is impossible to reach a firm conclusion on the status of *Cladomyrma* with only a single female available, but it clearly cannot be included in *Aphomomyrmex*.

In addition to the type species of *Aphomomyrmex*, one other African form has been described, *A. muralti* Forel (1910) from Natal. I have examined the type of *A. muralti* and two other specimens from Cameroon which Forel believed conspecific with it. Also examined were four females and one worker of *A. afer*, all cotypes. Nontype material studied consists of one female, one worker and one male from Zaire, one female from Gabon and

one female from Cameroon. It is my opinion that these represent a single species.

Forel originally characterized *A. muralti* as being smaller, impunctate, shinier and less pubescent than *A. afer*. This is indeed true if the type of *A. muralti* is compared with two workers in the Forel collection which are conspicuously hairy and punctate and larger. It is not so clearly true if the type of *A. muralti* is compared with the worker cotype of *A. afer* in the Forel collection.

The two workers mentioned above are from "Cameroun (v. Muralt)." One label on the specimens identifies these as *A. afer* and, below that, another label identifies them as *A. muralti*. The two identification labels presumably indicate that Forel later believed his *A. afer* from Cameroon was indeed the same as his *A. muralti*. Since they are from Cameroon, they should be *A. afer* and they do differ from the *A. muralti* type in such a manner as to suggest that they are the source of the differences noted by Forel between the two species. The head widths of these two specimens are 0.83 and 0.84 mm. Both are conspicuously pubescent and with abundant fine, close punctures which are most noticeable on the head and the gastric terga. The type of *A. muralti* has a head width of 0.67 mm, the head and body are shiny, with only scattered punctures and very sparse pubescence. The cotype worker of *A. afer* has a head width of 0.81 mm. The head has numerous fine punctures, but the body is very sparsely punctate and the pubescence is scattered. Smallest is a single worker from Zaire, head width 0.47 mm. This specimen is virtually impunctate and apubescent, though the normal erect hairs are numerous and long.

It seems evident that there is a single, polymorphic species involved. The specimens available, few as they are, do present a continuum through the various morphs. As size increases, punctures become more abundant and more sharply defined. At the same time the appressed pubescence also increases. In my opinion, there are no essential differences between the type of *A. muralti* and the cotype of *A. afer*; those differences which do exist are correlated with size and are negated by other specimens available. Therefore, *A. muralti* = *A. afer* (new synonymy).

The available females (four cotypes plus three others noted above) are fairly uniform, except that one cotype has the punctures of the head and gaster very sparse, in sharp contrast to the dense fine punctation on these areas in the other cotypes. This is true also of one female from Zaire. I believe that this variation in the females supports my contention that *A. muralti* and *A. afer* are conspecific.

It is possible that the type of *A. muralti* is from Cameroon and not from Natal as stated by Forel. In the Forel collection are the two Cameroon workers collected by von Muralt. The type of *A. muralti* has the notation "Natal (v. Muralt)." but only on the identification label. That notation appears to have been made at a different time and with a different pen than the identification. It is not inconceivable that "Natal" is an error.

SPECIMENS EXAMINED: CAMEROON. 4♀, 1♂ (L. Conradt; BMNH, MNHG); 2♀, 1♂ (v. Muralt; MNHG); 1♀, Nkoe-Mvone, 5 Sept. 1968 (Collingwood; BMNH). GABON. 1♀, Makokou, Oct. 1972 (I. Lieberburg; MCZ). ZAIRE. 1♀, 50 km S Tahela, 26 July 1957 (E.S. Ross & R.E. Leech; MCZ); 1♀, 1♂, 24 mi NE Lubefu, 12 Aug. 1957 (E.S. Ross & R.E. Leech; MCZ). SOUTH AFRICA. 1♀, "Natal" (v. Muralt; MNHG).

PETALOMYRMEX NEW GENUS

DIAGNOSIS: WORKER: Monomorphic; head cordate; antenna nine-segmented, without distinct apical club; ocelli near top of head. **FEMALE:** Antenna ten-segmented; head cordate, as broad as to broader than long; frontal carinae separated by more than their length; openings of propodeal spiracle and metapleural gland circular, latter with a few long guard hairs. **MALE:** Antenna ten-segmented; eye large, occupying most of side of head; ocelli normal; frontal carinae obsolete; pygostyles absent; mandible six-toothed.

DESCRIPTION: WORKER: Monomorphic. Head cordate in frontal view. Apical margin of mandible oblique, with six distinct teeth, basal somewhat offset. Maxillary and labial palpi three-segmented. Median lobe of clypeus broader than long, entire apical margin of clypeus continuously gently convex; basal margin at about midpoint of antennal sockets, lateral margin confluent with antennal sockets. Antennal scape reaching occipital margin; flagellum eight-segmented, without distinct club, only first and last segments longer than broad. Eye oval, at about middle of side of head; distance between eye and antennal socket much greater than distance between eye and margin of head in frontal view. Ocelli small but distinct, placed little below occipital margin. Occipital lobes distinct.

Mesosoma much as in *Aphomyrmex*, but metanotum, in profile, distinctly convex and with spiracle minute, dorsal; opening of metapleural gland with a few long guard hairs.

Legs as in *Aphomyrmex*.

Petiole about as in *Aphomyrmex*, but spiracle about one-third of distance from base to summit of scale.

Head and body without appressed pubescence but with conspicuous erect hairs of varied length on all areas, including appendages.

FEMALE: Head about as in worker but occipital margin broadly concave so that head is not truly cordate. Mandible eight-toothed. Eye large, lateral, slightly below middle of side of head. Ocelli slightly enlarged, near occipital margin. Flagellum nine-segmented.

Mesosoma conspicuously flattened. Mesonotum flat, broader than long. Scutellum, metanotum and propodeum, in profile, continuously oblique.

Wings as in *Aphomyrmex*.

Node of petiole low and thick in profile, with spiracle near summit; from above about twice wider than long; summit, from behind, much wider than base, broadly concave.

Gaster somewhat elongate.

Pilosity as in worker.

MALE: Head, across eyes, distinctly wider than long. Eye massive, occupying most of side of head, interocular distance twice eye width in frontal view. Ocelli large, ocellocular distance about twice maximum diameter of anterior ocellus. Mandible four-toothed, preapical tooth often minute. Maxillary palp four-segmented, labial palp three-segmented.

Mesosoma similar to that of female, but proportionately a little broader. Legs slender. Wings as in female.

Petiole about as described for *Aphomyrmex*; spiracle near summit of node.

Gaster robust. Pygostyles absent. Subgenital plate deeply excised. Paramere much longer than basal width, apex narrowly rounded. Ventral lobe of aedeagus weakly convex along lower margin, margin irregular but not dentate, basal angle rounded.

Body and appendages with numerous suberect to erect hairs of varied length.

TYPE SPECIES: *Petalomyrmex phylax*, new species.

ETYMOLOGY: *Petalos* (Gr., flattened) + *myrmex* (Gr., ant).

DISCUSSION: This new genus appears to be closely allied to *Aphomyrmex*. The strongly cordate head of the worker will separate *Petalomyrmex* from *Aphomyrmex* and related genera. *Petalomyrmex* workers and females differ from those of *Aphomyrmex* by the reduced palpal segmentation and the worker caste is monomorphic rather than polymorphic. The strong dorso-ventral flattening of the mesosoma of the *Petalomyrmex* female and male is unusual and distinctive; it is reminiscent of the bizarre females of the Neotropical subgenus *Myrmostenus* of *Camponotus* and of certain species of *Myrmelachista*.

Petalomyrmex phylax NEW SPECIES

Figures 1-7

DIAGNOSIS: Same as for genus in all castes.

DESCRIPTION: HOLOTYPE WORKER: HL 0.55 mm; HW 0.56 mm; CI 102; SL 0.38 mm; SI 68; EL 0.13 mm; OI 23; PW 0.36 mm; WL 0.68 mm; TL 2.36 mm.

Head broadest near upper margin of eyes, strongly cordate in frontal view, width at mandibular base 0.61 x HW. Eye flattened, in frontal view not interrupting lateral head margin; OMD 1.4 x EL. Scape stout, not attaining occipital corner; flagellum gradually swollen, flagellomeres 2-5 broader than long, 6-7 about as long as broad, 8 almost twice longer than broad.

Mesosoma robust, PW 0.53 x WL. Pronotum, from above, about 1.75 wider than long; posterior margin concave. Mesonotum not fused to pronotum, a little wider than long; weakly convex in profile, sloping from pronotal margin to metanotum; mesometanotal suture impressed dorsally, absent on pleura. Metanotum, from above, short, broader posteriorly, sides slightly raised; metanotal-propodeal suture impressed dorsally and on upper third of side; metanotal spiracle absent. Propodeum, from above, broadened posteriorly; spiracular atrium fully visible, large; in profile, basal face convex and rounded into oblique, much longer posterior face, spiracle a little below juncture of faces.

Scale of petiole thick in profile, margins nearly parallel below level of spiracle, sharply convergent above to acute apex; spiracle at about midpoint; in posterior view, margins parallel below spiracle, convergent above, crest narrow and broadly emarginate; from above, about twice wider than long.

Gaster rather broad, a little longer than mesosoma in dorsal view.

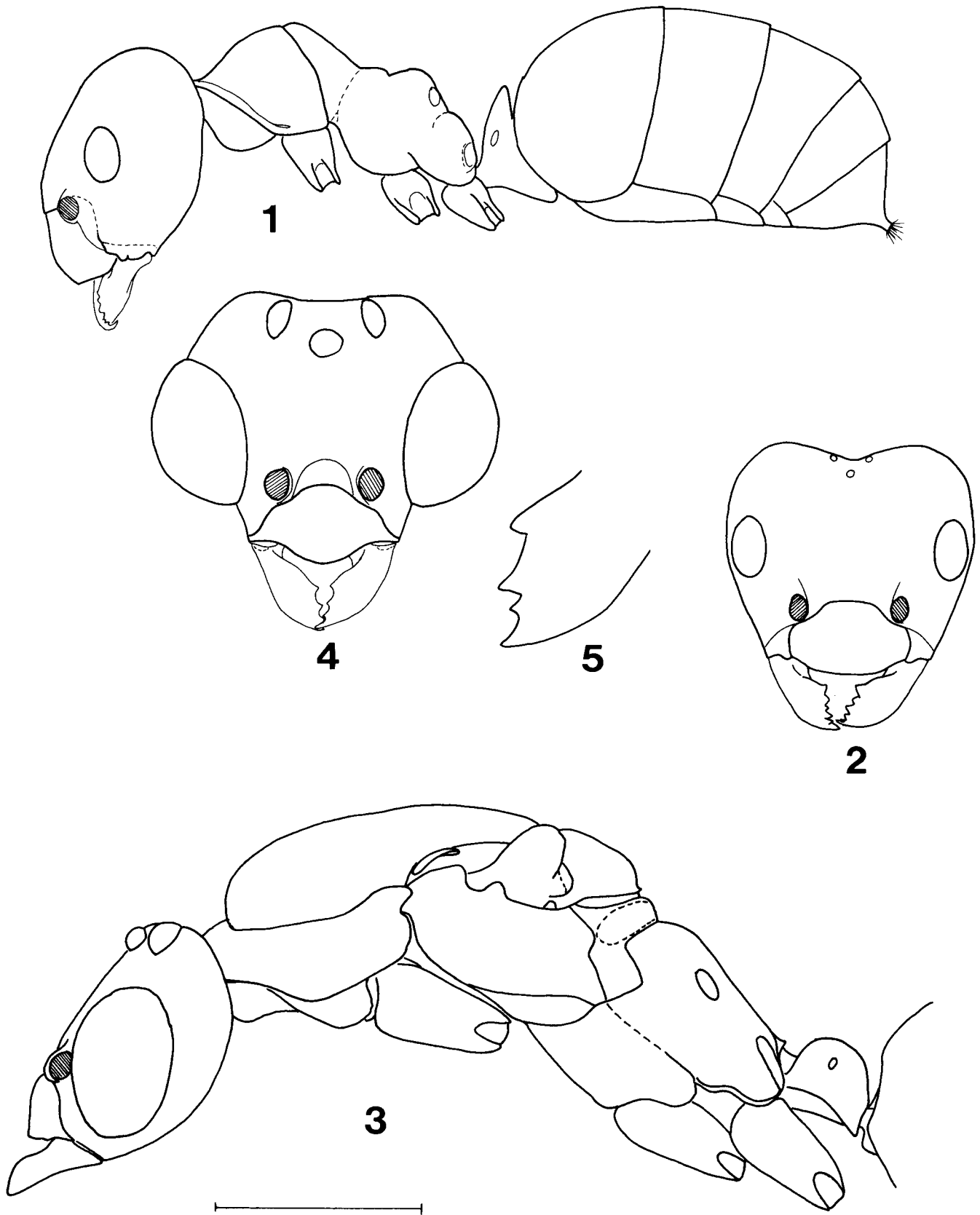
Integument smooth and shiny, without conspicuous coarse punctures except on clypeus and mandible.

Body and appendages with abundant erect hairs of very varied length, longest hairs on occiput and mesosomal dorsum exceeding EL. No obvious appressed pubescence.

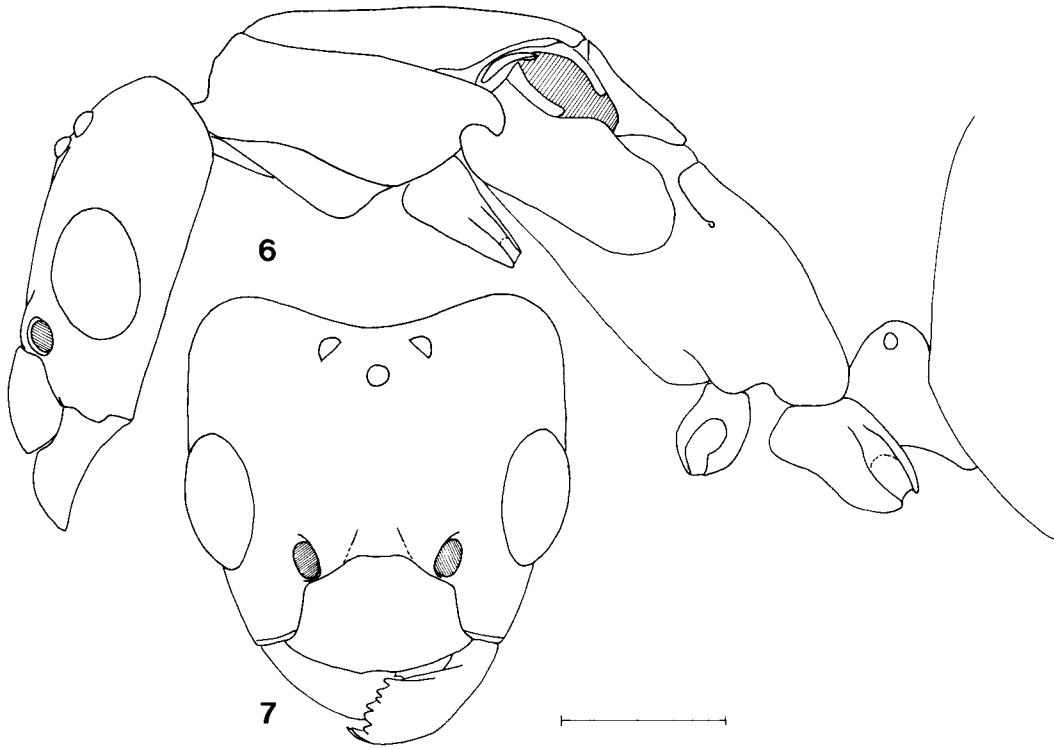
Reddish yellow, occiput and gaster brownish; mandibular teeth dark reddish.

PARATYPES: HL 0.47-0.55 mm; HW 0.49-0.59 mm; CI 100-109; SL 0.33-0.38 mm; SI 64-72; EL 0.12-0.14 mm; OI 23-28; PW 0.31-0.37 mm; WL 0.59-0.71 mm; TL 1.78-2.46 mm (54 measured).

PARATYPE FEMALES: HL 0.90-1.08 mm; HW 0.90-1.08 mm; CI 99-107; SL 0.31-0.37 mm; SI 56-60; EL 0.58-0.62 mm; OI 32-36; PW 1.03-1.23 mm; WL 1.81-2.10 mm; Wing length 4.6-6.0 mm (10 measured).



FIGURES 1-5. *Petalomyrmex phylax*. 1, Worker, profile. 2, Worker head, frontal view. 3, Male, head and mesosoma, profile. 4, Male, head, frontal view. 5, Male, apex of mandible, enlarged. Scale line = 0.5 mm.



FIGURES 6-7. *Petalomyrmex phylax*, Female. 6, head and mesosoma, profile. 7, head, frontal view. Scale line = 0.5 mm.

Head shape similar to that of worker, but eyes more bulging and interrupting side margin of head in frontal view; occipital margin, in frontal view, broadly concave; ocelli slightly below occipital margin, interocellar distance about twice diameter of anterior ocellus, ocellocular distance almost four times diameter of anterior ocellus. Head, in profile, strongly flattened, about 2.7 x longer than thick. OMD 0.55-0.68 times EL.

Mesosoma greatly flattened, angled about 45° at anterior margin of scutellum; thickness at metanotum about 0.36 x length from anterior margin of tegula to apex of metasternal lobe. Propodeal spiracle on posterior face, atrium large, circular.

Scale of petiole, in profile, low, thick, spiracle near summit; crest broadly, shallowly concave in posterior view; from above, about twice wider than long.

Gaster about as long as combined head and mesosoma, elongate-ovoid, three basal terga almost parallel-sided in dorsal view.

Pilosity about as described for worker, but hairs more abundant on cephalic dorsum and with conspicuous long hairs on gena (short, sparse hairs on gena of worker).

Color as in worker. Wings medium brown, veins and stigma dark brown.

ALLOTYPE MALE: HL 0.62 mm; HW 0.65 mm; CI 106; SL 0.44 mm; SI 66; EL 0.32 mm; OI 52; PW 0.85 mm; WL 1.45 mm; Wing length 4.2 mm.

Head somewhat flattened, eye large and strongly bulging in frontal view, OMD 0.2 x EL. Head margins strongly convergent above eye level, abruptly rounded onto nearly flat occiput. Interocellar distance and ocellocular distance about twice diameter of anterior ocellus.

Mesosoma flattened and angled about as in female, thickness at metanotum about 0.47 x length from anterior margin of tegula to apex of metasternal lobe.

Integument smooth and shiny, without conspicuous punctures.

Pilosity about as in female and worker, but cephalic hairs relatively a little shorter.

Color yellowish; occipital area and margins of gastric terga brownish. Wing light brownish, stigma medium brown, veins yellowish brown.

PARATYPE MALES: HL 0.59 mm; HW 0.62 mm; CI 104; SL 0.45 mm; SI 73; EL 0.32 mm; OI 54; PW 0.83-0.85 mm; SL 1.29-1.39 mm; Wing length 4.2 mm (2 measured).

TYPE MATERIAL: *Holotype worker*, *allotype male*, 394 worker, 19 female, 4 male paratypes: CAMEROON: near Lac Tissoongo, Douala-Edea Reserve (lat. 3°29'N, long. 9°50'E), about 5 km S of Sanaga River, about 15 km E of Mouanko, 15 July 1976 (D. McKey). Holotype, allotype and most paratypes in LACM; paratypes also in BMNH, MHNG, MCZ and collections of D. McKey and G.C. & J. Wheeler.

ETYMOLOGY: *phylax* (Gr., guardian), appropriate to this ant which protects leaves of the host plant, *Leonardoxa africana*.

DISCUSSION: Some aspects of the behavior and ecology of this ant are discussed by McKey, ms. Colonies are apparently polycalic and are situated within the internodes of the host plant. The worker ants patrol young leaves of the *Leonardoxa* plants and protect them from herbivores. Older leaves are not patrolled but are protected by chemicals within the leaves. Sustenance for the ants is derived largely from specialized food bodies on the plant.

One of the female specimens has a malformed head. The left

occipital corner is shaped about as it is in males, while the right approximates the condition of the female caste, but the occipital lobe is a little less pronounced. The right eye is 0.31 mm long and the left is 0.27 mm long; the right OMD is 0.58 x EL, the left OMD is 0.95 x EL. That for the right side is thus within the range for the female, but on the left the OMD/EL ratio is very different from that of either sex. Since the antennae and mandibles are typical of females, the specimen is apparently teratological rather than an intersex.

ACKNOWLEDGMENTS

Special thanks go to Mr. Doyle McKey for allowing me to study and describe this unusual ant. Important comparative material of related genera was sent by: C. Besuchet, Geneva Natural History Museum (MHNG); B. Bolton, British Museum (Natural History) (BMNH); E.O. Wilson, Museum of Comparative Zoology (MCZ).

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Accepted for publication September 21, 1978.