Zootaxa 1681: 37–46 (2008)
www.mapress.com/zootaxa/
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ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

New species of *Lordomyrma* (Hymenoptera: Formicidae) from Southeast Asia and Fiji

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Abstract

Two new species of *Lordomyrma* are described: *L. reticulata* **sp. nov.** from Malaysian Borneo and *L. vanua* **sp. nov.** from Fiji. The occurrence of the former in Borneo expands the range of this genus to include Southeast Asia and the description of a new Fijian *Lordomyrma* indicates that this genus remains to be fully sampled, even in regions where it is considered to be well known. Taken together, these two findings suggest that *Lordomyrma* occupies a less disjunct distribution and is more widely distributed than previously suspected. There is a need for further sampling to reveal both diversity and distribution in this cryptic genus.

Key words: Borneo, Fiji, Formicidae, Hymenoptera, Malaysia, Myrmicinae, new species, systematics, taxonomy

Introduction

The ant genus *Lordomyrma* is known principally from Melanesia and Australia, with the one exception to this otherwise circumscribed distribution being a single species from Japan (Table 1) (Santschi, 1941; Brown, 1952; Bolton, *et al.* 2006). This distinctly disjunct pattern prompted the current investigation of the possible presence of *Lordomyrma* in the intervening area or, alternatively, an explanation of its absence in Southeast Asia. Given the success of this genus on the western Pacific islands of Fiji, New Caledonia and New Guinea (Kugler, 1994; Sarnat, 2006; Wheeler, 1919), it was also expected to occur in Malaysia, the Philippines and Taiwan.

The published range of this genus belies the fact that dozens of undescribed *Lordomyrma* species currently await description, from countries including Malaysia, Indonesia, Philippines and New Caledonia (B. Bolton, pers. comm. and R.W. Taylor, in prep.). Although *Lordomyrma* had, in fact, been reported from Borneo (Brühl, *et al.*, 1998), prior to this publication, no *Lordomyrma* had been described from the area bounded by New Guinea to the south and Japan to the north (Fig. 1). One of the species described here, *Lordomyrma reticulata* **sp. nov.,** offers the first confirmed record of this genus in Southeast Asia.

The description of *L. reticulata* from Borneo expands the confirmed range limits of *Lordomyrma* and reduces the disjunction between northern and southern locality records. Also described in this paper is *L. vanua* **sp. nov.** from Fiji, an area where *Lordomyrma* is particularly well sampled (Sarnat, 2006). These two new species descriptions, one from an area previously considered to lack *Lordomyrma*, and one from a region where the genus is regarded as well known, emphasize that this genus has yet to be fully sampled throughout its range. It should not be surprising to learn that additional *Lordomyrma* remain to be described, as members of the genus are small and inconspicuous, maintain colonies of modest size and tend to be shy and retiring when disturbed. Most species are denizens of the leaf litter in wet forest habitat, but some are known to nest and forage arboreally (Sarnat, 2006). It is our hope that this publication will encourage further examination and revision of this biogeographically interesting ant genus.

Accepted by J. Longino: 17 Nov. 2007; published: 16 Jan. 2008

TABLE 1. Described *Lordomyrma* species and type localities.

	Species	Original Combination In	Type Locality
1	*L. caledonica* (André 1889)	Podomyrma	New Caledonia Nouméa
2	*L. cryptocera* Emery 1897	--	Papua New Guinea *West Sepik*: Lemien Forest near Berlinhafen [= Aitape]
3	*L. furcifera* Emery 1897	--	Papua New Guinea *West Sepik*: Lemien Forest near Berlinhafen [= Aitape]
4	*L. accuminata* Stitz 1912	--	Papua New Guinea "New Guinea" Kaiserin-Augustafluss Expedition [Sepik River]
5	*L. rouxi* (Emery 1914)	Promeranoplus	New Caledonia Tchalabel
6	*L. sarasini* (Emery 1914)	Prodicraspis	New Caledonia Mt. Ignambi
7	*L. leae* Wheeler 1919	--	Australia *New South Wales*: Lord Howe Island
8	*L. punctiventris* Wheeler 1919	--	Australia *Queensland*: Kuranda
9	*L. epinotalis* Mann 1919	Rogeria	Solomon Islands *Isabel*: Fulakora
10	*L. levifrons* (Mann 1921)	Rogeria	Fiji *Viti Levu*: Nadarivatu
11	*L. polita* (Mann 1921)	Rogeria	Fiji *Viti Levu*: Nadarivatu
12	*L. rugosa* (Mann 1921)	Rogeria	Fiji *Viti Levu*: Nadarivatu
13	*L. striatella* (Mann 1921)	Rogeria	Fiji *Kadavu*: Vanua Ava
14	*L. tortuosa* (Mann 1921)	Rogeria	Fiji Ovalau
15	*L. crawleyi* Menozzi 1923	--	Indonesia *Papua*: Humboldt Bay
16	*L. stoneri* (Mann 1925)	Rogeria	Fiji *Viti Levu*: Tamavua
17	*L. infundibuli* Donisthorpe 1940	--	Indonesia *Papua*: Jutefa Bay [near Jayapura]
18	*L. azumai* (Santsch 1941)	Rogeria	Japan *Osaka*: Minoo
19	*L. nigra* Donisthorpe 1941	--	Indonesia *Irian Jaya Barat*: Waigeu
20	*L. bensoni* Donisthorpe 1949	--	Indonesia *Papua*: Maffin Bay
21	*L. curvata* Sarnat 2006	--	Fiji *Vanua Levu*: Kasavu village
22	*L. desupra* Sarnat 2006	--	Fiji *Viti Levu*: Monasavu Rd.

.....to be continued.

TABLE 1. (continued)

	Species	Original Combination In	Type Locality
23	*L. sukuna* Sarnat 2006	--	Fiji *Viti Levu*: Mt. Naqaranibuluti
24	*L. vuda* Sarnat 2006	--	Fiji *Viti Levu*: Koroyanitu National Park
25	*L. reticulata* Lucky & Sarnat 2007	sp. nov.	Malaysia (Borneo) *Sabah*: Danum Valley
26	L. *vanua* Lucky & Sarnat 2007	sp. nov.	Fiji *Vanua Levu*: Mt. Delaikoro

Material and methods

Images: The base map for depicting species distributions was created using the program Versamap™. Specimens were photographed with a JVC KY-F75U digital camera mounted on a Leica MZ16 dissecting scope. Images were assembled using the Syncroscopy Auto-Montage Pro® software package.

Measurements: The imaging equipment mentioned above was used to record measurements of *L. vanua* at 40x–70x magnification. Specimens of *L. retiulata* were examined with a Leica MZ12.5 dissecting microscope at magnifications ranging from 5.4x–63x. Standardized measurements were recorded using a dual-axis Nikon micrometer wired to a digital readout. All measurements and indices were recorded to the nearest 0.001mm and are reported as ranges, in mm.

Measurements and indices follow Sarnat (2006) and are defined as follows: Head Width (HW): maximum width of head not including the eyes; Head Length (HL): maximum length of head from the posterior margin to the tip of the anterior clypeal margin measured along the midline; Eye Length (EL): maximum diameter of compound eye in oblique view; Scape Length (SL): length of first antennal segment excluding the radicle; Metafemur Length (MFL): length of metafemur measured along its long axis in dorsal view; Total Length (TL): maximum length of specimen measured from the tip of the mandibles to the tip of the gaster, not including sting; Propodeal Spine Length (PSL): maximum length of propodeal spine measured from the middle of propodeal spiracle to the tip of the spine; Forecoxa (= procoxa) Width (FCW): maximum width of forecoxa measured parallel to dorsal margin; Petiole Height (PH): maximum height of petiole measured from base to summit of node at right angles to the petiole length; Pronotum Width (PW): maximum width of pronotum measured in dorsal view; Dorsal Petiole Width (DPW): maximum width of petiole in dorsal view; Cephalic Index (CI): HW/HL; Scape Index (SI): SL/HW; Relative Eye Length Index (REL): EL/HL; Propodeal Spine Length Index (PSLI): PSL/FCW; Metafemur Length Index (MFLI): MFL/HW; Dorsal Petiole Width Index (DPWI): PW/FCW.

Lordomyrma reticulata Lucky and Sarnat, sp .nov.

(Figs. 1–3)

Description. *Worker.* HL 0.78–0.81, HW 0.75–0.79, TL 3.47–3.92, CI 0.94–0.99, SI 0.72–0.75, REL 0.19–0.20, PSLI 1.14–1.36, MFLI 0.89–0.99, DPWI 1.00–1.13 (7 measured).

Head subquadrate, longer than wide, with sides of head evenly convex. Posterior margin evenly convex in full face view and posterolateral corners gently rounded. Clypeus convex, bearing a pair of strong carinae that converge centrally and diverge anteriorly and posteriorly, forming an hourglass shape. Antennal scrobe broad and strongly impressed, bordered entirely by a distinct raised ridge. Scape not extending beyond posterior

margin of head. Promesonotum in profile rounded and domelike. Metanotal groove strongly impressed. Declivitous face of propodeum concave. Dorsal face of propodeum in profile flat to slightly convex. Propodeal spines strong, triangular and straight, though slightly downcurved in profile and divergent distally in dorsal view. Propodeal lobes stout and triangular. In lateral view, peduncle of petiole thick. Petiolar node in dorsal view as broad as long. Petiole taller than long, with anterior face slightly concave and dorsal face convex. Both anterior and posterior faces of postpetiole convex, postpetiole shorter than petiole, highest point anterior to midpoint and ventral side possessing two transverse ridges with setae emerging between them.

Head and mesosoma covered in a raised, closely-packed rugoreticulum with honeycomb-like regularity. Sculpture of posterior margin of head rugoreticulate. Mandibles striate. Clypeus rugose. Rugoreticulae on median portion of face continue onto frontal lobes. Scrobe delicately rugose with a few weak carinae near antennal insertion. Scape finely sculptured, venter with cavity for reception of funiculus. Forecoxae delicately rugoreticulate, finer than head and body sculpture, similar to surface texture of scrobe. All other coxae and legs finely sculptured. Venters of femora excavated to receive tibiae. Anepisternum, katepisternum, metapleuron, and pronotum coarsely rugoreticulate, but with less regular intersections than on head. In dorsal view declivity of pronotum smooth and shining with a few weak lateral striae. Petiole and postpetiole strongly rugoreticulate above and on sides, but more delicately sculptured ventrally. Petiole excavated ventrally. Gaster rugoreticulate both dorsally and ventrally, but with shallower sculpture than on mesosoma and head, and becoming finer towards the posterior margin of each gastral tergite.

Eyes hairless and small, longer than wide. Pilosity on head longer than length of eye. Standing pilosity pale yellow, common on most of body. Color of head, body and gaster reddish-brown, appendages only slightly paler than body.

Type Material. *Holotype*. Worker, MALAYSIA: Sabah: Danum Valley, 5°01'N 117°49'E 14.ix.2006 (NBT C88S4-1, CASENT#0012191) (Thornton, *et al.*). *Paratype*. Three workers, same data as holotype (CASENT#0012192-0012194); two workers, same data as holotype, except NBT C88S4-4 (CASENT#0012195, 0012196); one worker, same data as holotype, except NBT C88S4-2 (CASENT#0012197).

All seven workers were obtained from leaf litter in lowland dipterocarp rain forest in Sabah, Malaysia, in a selectively logged tract adjacent to the Danum Valley Conservation Area (Coupe 88). Sifted litter samples were extracted using Mini-Winkler extractors by Noel B. Tawatao (NBT) with permission of the Danum Valley Field Centre. Holotype and three paratypes have been deposited at Universiti Malaysia Sabah. One paratype is deposited at each of the following locations: the Australian National Insect Collection in Canberra, the Harvard Museum of Comparative Zoology and the California Academy of Sciences.

Etymology. The name *reticulata* refers to the cuticular sculpture on this species, which forms deep reticulations on the head, mesosoma and gaster.

Discussion. *Lordomyrma reticulata* can be recognized by the deep and regular reticulating sculpture on the head and mesosoma, which becomes shallower on the gaster both dorsally and ventrally. The clypeus is distinctly rugose and convex, with a pair of strong carinae that converge centrally and diverge anteriorly and posteriorly, forming an hourglass shape. The sculpture of the broadly impressed scrobe and of the forecoxae is finely rugoreticulate. Scapes and legs are shallowly sculptured rather than smooth and shining. The undersides of the femora, petiole and scapes bear longitudinal concavities, presumably for reception of retracted limbs. Pilosity on head and body is pale and erect to suberect.

Of all described congeners *L. reticulata* most closely resembles the Japanese *L. azumai* (Santschi), which is also heavily sculptured in a regularly intersecting rugoreticulate pattern on head, alitrunk and gaster. *Lordomyrma reticulata* is distinguished by the shape of the petiole, as the peduncle is clearly shorter than the length of the node whereas *L. azumai* presents a distinctly elongate peduncle. Among other undescribed *Lordomyrma* known to occur in Borneo *L. reticulata* would appear to be distinguished by the combination of sculpturation on the forecoxae, the regular rugoreticulations on the gaster and pale yellow standing pilosity common on most of the body (R.W. Taylor, pers.comm.).

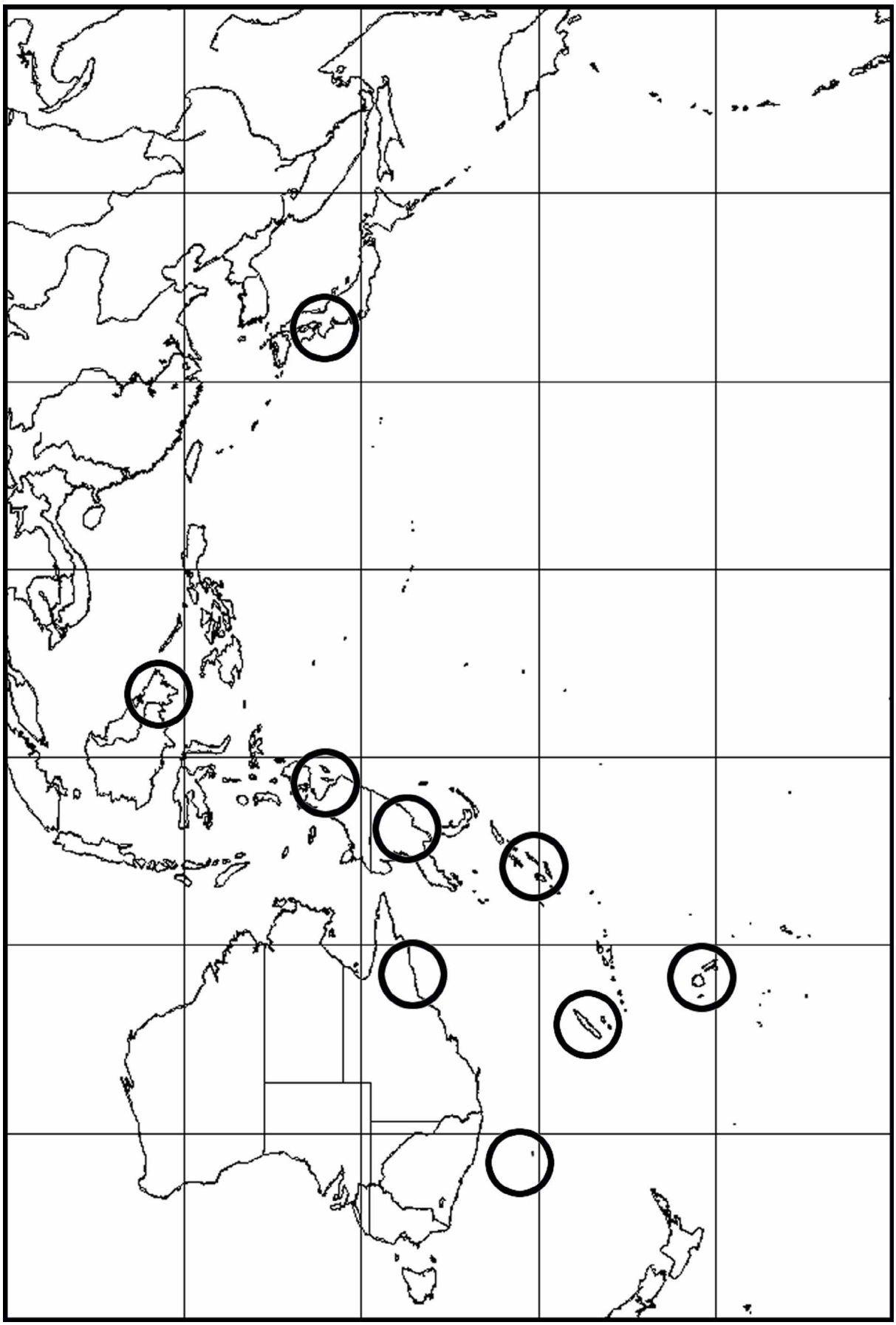

FIGURE 1. Distribution of described *Lordomyrma* species.

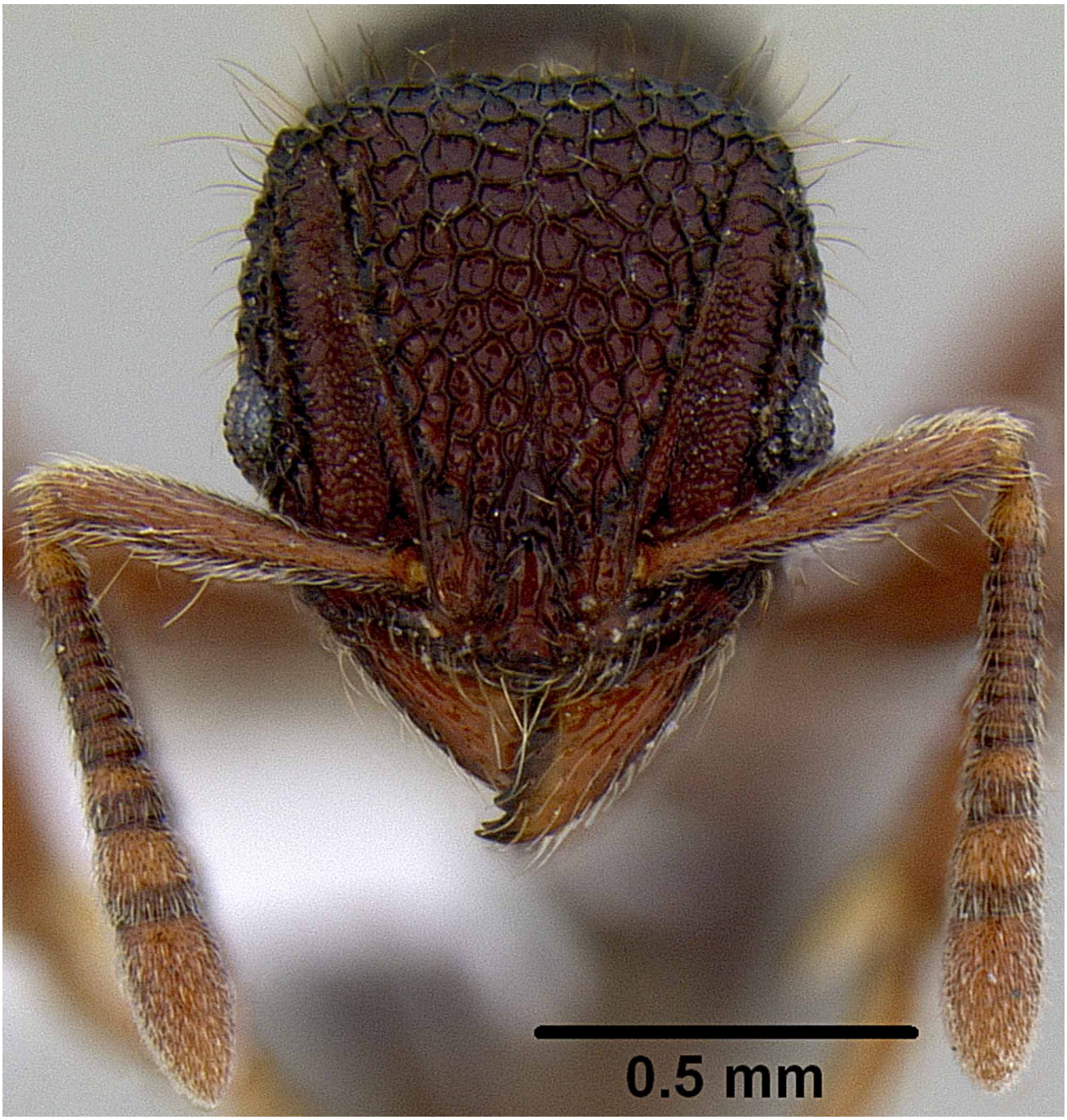

FIGURE 2. *Lordomyrma reticulata*, head.

***Lordomyrma vanua* Lucky and Sarnat, sp. nov.**
(Figs. 1, 4, 5)

Description. *Worker.* HL 1.03–1.19, HW 0.92–1.08, TL 4.78–5.27, CI 0.90–0.92, SI 0.65–0.83, REL 0.17–0.21, MFLI 1.02–1.06, DPWI 2.38–2.40 (3 measured).

A large shiny black species with deep, widely spaced longitudinal rugae on head and mesosoma. In full face view, posterior margin of head evenly convex with gently rounded corners. Clypeus bearing one pair of weak carinae. Frontal carinae strongly produced, extending beyond posterior level of eye before integrating into dorsolateral rugoreticulum. Antennal scrobe lightly impressed, overlain by arcuate rugae near antennal inser-

tions. In profile promesonotum large and dome-like. Propodeal spines strong, straight to upcurved and divergent. Propodeal lobes strong and tooth-like. Petiole subtriangular; in lateral view anterior face of node weakly concave and gently sloped, posterior face convex and gently sloped, weakly acuminate apex occurring at anterior angle of node. Postpetiole with anterior and dorsal faces evenly convex, apex occurring anterior to midline.

FIGURE 3. *Lordomyrma reticulata*, profile.

Mandibles smooth and shining with sparse, setigerous foveolae. Entire head overlain by thick, widely spaced rugae that become reticulated posteriorly. Frontal lobes with two pair of carinae in addition to the frontal carinae. Promesonotum smooth and shining anteriodorsaly transitioning into thick widely-spaced rugae posteriorly. In dorsal view, propodeum smooth and shining without a distinct transverse carina proximal to the metanotal groove. Forecoxae smooth and shining. Sides of mesonotum, metapleuron and propodeum overlain by coarse, widely-spaced rugae. Petiole and postpetiole coarsely rugoreticulate. Gaster smooth and shining.

All dorsal surfaces with long suberect to erect acuminate yellowish hairs. Head, mesosoma and gaster black, appendages lighter.

Type material. *Holotype***.** Worker, Mt. Delaikoro, 3.7km E Dogoru Village, Macuata Province, Vanua Levu, Fiji, 16°34.515'S 179°18.983'E, 699m, 31.viii.2006, sifted litter (E. P. Economo #62.08) (Fiji National Insect Collection, Suva). *Paratypes*. 1 worker, same data as holotype (National Museum of Natural History, Washington D.C.).

Other Material Examined. Vanua Levu: Fiji Ndelaikoro [= Delaikoro], 500m, 24.xi.1977, litter and wood (G. Kuschel 77/124).

Etymology. The name vanua is a taken from the Fijian word for land, and for the only island where the species is currently known to occur, Vanua Levu, and is here used as a noun in apposition.

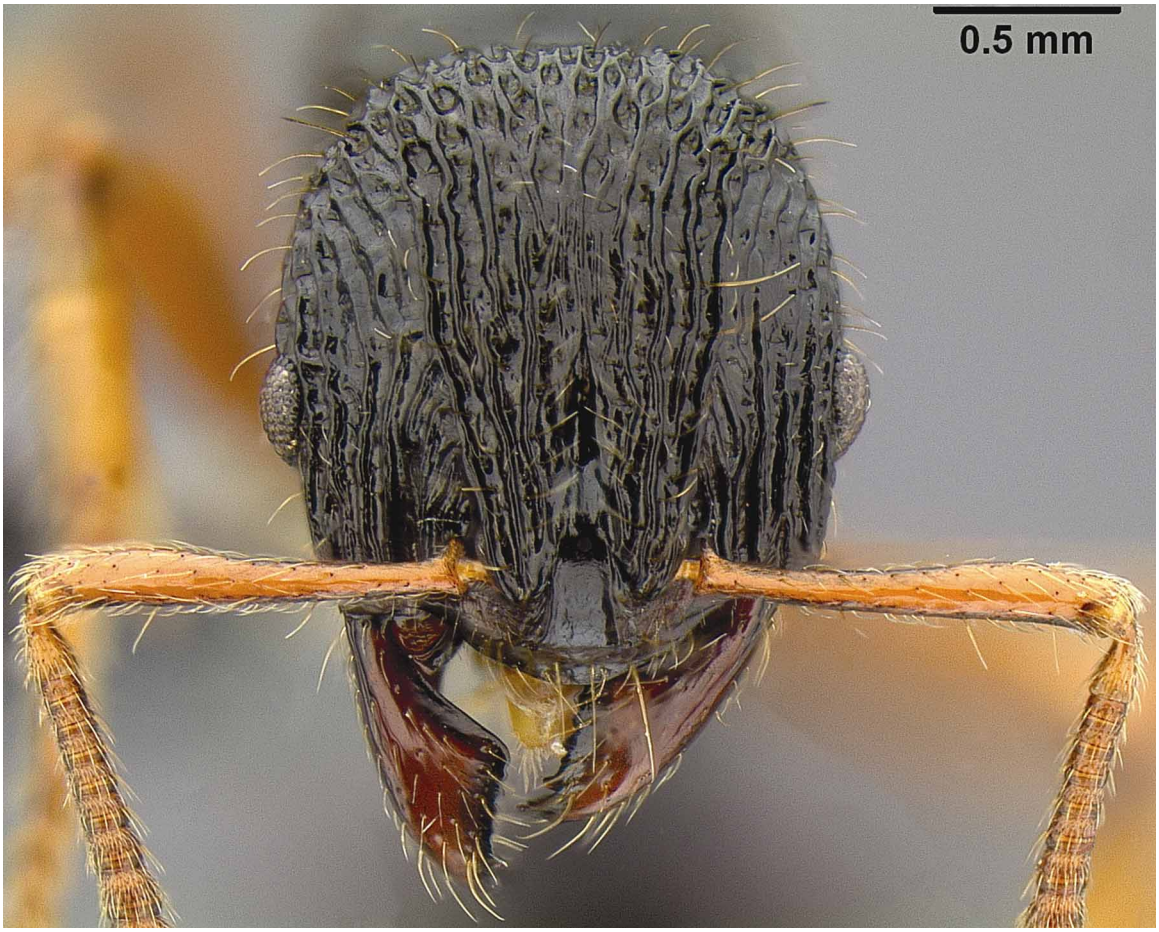

FIGURE 4. *Lordomyrma vanua*, head.

Discussion. *Lordomyrma vanua*, with its heavily rugose head and mesosoma, is similar to *L. rugosa* (Mann), but can be distinguished by its smooth forecoxae, smooth propodeal declivity, smooth anteriodorsal region of the promesonotum, broader and more widely-spaced rugae, and larger size. The other species with which *L. vanua* might be confused is *L. striatella* (Mann), from which it can be separated by its weaker antenna scrobe, broader and more widely spaced rugae, more well developed propodeal spines, more robust petiole and larger size.

Despite its morphological resemblance to *L. rugosa*, molecular phylogenetic analyses place *L. vanua* as a closer relative to species such as *L. tortuosa* (Mann), *L. striatella* and *L. vuda* (Sarnat) (Lucky and Sarnat, unpubl. data). Thus far, *L. vanua* has been collected only twice, both times from the litter of Mt. Delaikoro on Vanua Levu.

Acknowledgments

Many thanks to Noel B. Tawatao of UMS and Evan P. Economo for specimen loans. We are grateful to Bob Taylor for generously sharing insight and expertise on the genus *Lordomyrma,* and to Phil Ward for helpful comments on the manuscript.

FIGURE 5. *Lordomyrma vanua*, profile.

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