

masticatory margin of mandibles approximately vertical or weakly oblique; basal tooth a small to minute denticle or angle, much smaller than t_3 (four teeth present).

MESOSOMA: Promesonotum shining and mainly smooth, vestigial striolae, if present, confined to lower anterior mesopleuron; (viewed in profile) promesonotum broadly convex anteriorly, convexity reduced posteriorly; promesonotal setae greater than twelve; standing promesonotal setae a mixture of well-spaced, distinctly longer, erect and semi-erect setae which are curved distally and often paired, interspersed with much shorter, incurved, decumbent setae; appressed promesonotal setulae very sparse or absent. Metanotal groove strongly impressed, with distinct transverse costulae. Propodeum shining and smooth, with a few weak striolae on metapleuron; propodeal dorsum convex; propodeum smoothly rounded or with indistinct angle; standing propodeal setae consisting of one prominent pair anteriorly and a less prominent pair posteriorly, smaller, decumbent setae few or absent; appressed propodeal setulae very sparse or absent; propodeal spiracle nearer metanotal groove than declivitous face of propodeum to equidistant from metanotal groove and declivitous face of propodeum. Vestibule of propodeal spiracle absent or not visible. Propodeal lobes present as rounded flanges to present as vestigial flanges or small strips of cuticle only.

PETIOLE AND POSTPETIOLE: Petiolar spiracle lateral and situated within anterior sector of petiolar node; node (viewed in profile) conical, vertex tapered, or, conical, vertex rounded; appearance of node shining and smooth throughout; ratio of greatest node breadth (viewed from front) to greatest node width (viewed in profile) between 4:3 and 3:4; anteroventral petiolar process absent or vestigial; ventral petiolar lobe present; height ratio of petiole to postpetiole between 3:2 and 4:3; height-length ratio of postpetiole between 4:3 and 3:4; postpetiole shining and smooth; postpetiolar sternite without anterior lip or carina, or this structure vestigial.

GASTER: Pilosity of first gastral tergite consisting of well-spaced, erect and semi-erect setae interspersed with a few appressed setulae.

GENERAL CHARACTERS: Color yellow to brown. Worker caste monomorphic.

HOLOTYPE MEASUREMENTS: HML 1.14 HL 0.43 HW 0.35 CeI 80 SL 0.35 SI 101 PW 0.22.

OTHER WORKER MEASUREMENTS: HML 1.01–1.29 HL 0.40–0.48 HW 0.32–0.38 CeI 76–84 SL 0.31–0.38 SI 88–106 PW 0.21–0.25 (n=7).

REMARKS.— *Monomorium denticulus* is the only member of the otherwise exclusively Afrotropical *M. schultzei* species complex represented in Madagascar. This ant is smaller than *M. schultzei* and is separable from other members of the complex by virtue of its shallow metanotal groove with short cross-ribs, its pinhole-like propodeal spiracle and its distinct clypeal denticles. The elongate mesosoma bears a superficial resemblance to that of *M. exiguum*. This yellow or brown species is distributed in a surprising variety of habitats in three provinces in Madagascar, but colonies appear to be very rare, being represented by a handful of workers. These have been collected in pitfall traps or from sifted litter in *Uapaca* woodland, tropical dry forest, spiny forest and rainforest.

Monomorium exiguum Forel

Figs. 18, 51–52.

Monomorium exiguum Forel 1894a:85. Syntype ♀'s (lectotype here designated), ETHIOPIA: (locality on label now illegible, but given as 'Südabessinien' in Bolton 1987) (MHNG) [examined].

Monomorium (Martia) exiguum Forel 1913b:351.

Monomorium (Lampromyrmex) exiguum Forel: Wheeler W.M. 1922:876.

Monomorium (Mitara) exiguum var. *bulawayensis* [sic] Forel 1913c:217. Syntype ♀'s (lectotype here designated), ZIMBABWE: Bulawayo (MHNG) [examined].

Monomorium (Lampromyrmex) exiguum bulawayensis Forel: Wheeler, W.M. 1922:876. Syn. under *Monomorium exiguum* Forel: Bolton 1987:388.

Monomorium (Mitara) faurei Santschi 1915: 260, fig. 10 (♀). Syntype ♀'s (lectotype here designated), GABON (MHNG) [examined].

Monomorium (Lampromyrmex) faurei Santschi: Wheeler, W.M. 1922:876. Syn. under *Monomorium exiguum* Forel: Bolton 1987:388.

Monomorium (Mitara) exiguum r. *flavescens* Forel 1916:418. Syntype ♀'s, DEMOCRATIC REPUBLIC OF CONGO: St. Gabriel, Stanleyville (MHNG) [examined].

Monomorium (Lampromyrmex) exiguum flavescens Forel: Wheeler, W.M. 1922:876. Syn. under *Monomorium exiguum* Forel: Bolton 1987:388.

Monomorium minutissimum Santschi 1937:225, figs. 27, 28. Syntype ♀ (lectotype here designated), ANGOLA, Ebanga Rd. (NHMB) [examined]. syn. n. Syn. under *Monomorium mictile* Forel: Bolton 1987:388.

MATERIAL EXAMINED.— *M. exiguum*: LECTOTYPE: ♀, Ethiopia, Ilg (MHNG). In view of the variability, particularly in color, that led researchers to erect new 'varieties' for this species, a lectotype has been chosen for *M. exiguum* that fixes the species name for populations with dark, longer-headed specimens that have the characteristics mentioned in the original description. This particular specimen has been glued in the normal way, dorsal surface uppermost. PARALECTOTYPE: ♀, same data as lectotype, here designated for a specimen that has been pointed on the same pin as the lectotype and glued on its back. This specimen has been repinned with photocopies of the original labels (MHNG). *M. exiguum bulawayense* (corrected ending): LECTOTYPE: ♀, Zimbabwe, Arnold (MHNG). The lectotype fixes this name for populations with dark, shorter headed specimens as mentioned in the description for *M. exiguum bulawayense*. The carded lectotype specimen is the one glued on the RHS of the card (the head of the LHS specimen is damaged). PARALECTOTYPE: ♀, same data as lectotype (MHNG). (No effort has been made to separate the fragile, carded lectotype and paralectotype.). *M. faurei*: LECTOTYPE: ♀, Gabon, F. Faure, 1914 (NHMB Reg. No. 203). The lectotype fixes the name for populations of *M. exiguum* with a slightly bicolored appearance (i.e., yellowish-brown head and gastral apex and yellowish mesosoma, nodes, appendages and gastral base. The sides of the gaster in this form are often infuscated). The carded lectotype is the single specimen on the top card rectangle on a pin holding three rectangles. PARALECTOTYPES: (i) Four carded workers, same data as the lectotype (bottom two rectangles) (NHMB). (ii) One worker and two detached worker heads mounted between two cover clips, these held by a pinned slip of cardboard, 'Guinea fr.' [Guinea], Mamou, Silvestri (NHMB). *M. exiguum flavescens*: LECTOTYPE: ♀, Democratic Republic of Congo: St. Gabriel, Stanleyville, Kohl (MHNG). The lectotype fixes the name for populations with relatively pale workers with a strongly constricted mesosoma as mentioned in the description of *M. exiguum flavescens*. PARALECTOTYPE: (i) One worker, same data as lectotype (MHNG). This paralectotype has been removed from the same pin as the lectotype and repinned with photocopies of the original labels. (ii) Two workers, same data as the lectotype (MHNG). *M. minutissimum*: LECTOTYPE: ♀, Angola, Ebanga Rd., A. Monard, 16.xi.1932 (NHMB – Reg. No. 207). The lectotype fixes the name for populations of this taxon, which appears to be essentially the same as *M. faurei*, though said by Santschi to have a more deeply incised metanotal groove. The lectotype is headless. (NB. This specimen is described as a 'holotype' by Bolton (1987), but Santschi clearly examined more than one specimen as is indicated by the range of body length given in his description. However, no other syntype specimens are known to still exist.)

OTHER MATERIAL EXAMINED: **Prov. Antananarivo:** Rés Ambohitantely, 24.1 km 59 NE Ankazobe 17–22.iv.2001 Rabeson *et al.* (1 ♀); Ambohitantely, 20.9 km 72 NE Ankazobe 17–22.iv.2001 Rabeson *et al.* (4 ♀). **Prov. Antsiranana:** Montagne Française, 7.2 km 142 SE Diego Suarez 22–28.ii.2001 Fisher *et al.* (1 ♀); Résérve Ambre, 3.5 km 235 SW Sakaramy 26–31.i.2001 Fisher *et al.* (1 ♀); Rés. Spéc. Ankarana, 22.9 km 224 SW Anivorano Nord 10–16.ii.2001 Fisher *et al.* (1 ♀) 6–20.iii.2001 R. Harin Hala (6 ♂). **Prov. Fianarantsoa:** 28 km SSW Ambositra, Ankazomivady 9.i.1998 (4 ♀, 1 ♀), 11.i.1998 (3 ♀), 14.i.1998 (1 ♀) B.L. Fisher. **Prov. Mahajanga:** P. N. Ankarafantsika, Ampijoroa, 40 km 306 NW Andranofasika 26–31.iii.2001 Fisher *et al.* (2 ♀); P. N. Ankarafantsika, Ampijoroa, 5.4 km 331 NW Andranofasika 26–31.iii.2001 Rabeson *et al.* (26 ♀, 1 ♀); P. N. Ankarafantsika, Ankoririka, 10.6 km 13 NE Tsaramandroso 9–14.iv.2001 Rabeson *et al.* (9 ♀); P. N. Tsingy de Bemaraha, 3.4 km 93 E Bekopaka 6–10.xi.2001 Fisher *et al.* (5 ♂); P. N. Tsingy de Bemaraha, 10.6 km 123 ESE Antsalova 16–20.xi.2001 Fisher *et al.* (4 ♀). **Prov. Toamasina:** SF Tampolo, 10 km NNE Fenoarivo Atn. 10.iv.1997 B.L. Fisher (1 ♀). **Prov. Toliara:** Beza-Mahafaly, 27 km E Betioky 23.iv.1997 B.L. Fisher (49 ♀, 7 ♀); Cap Sainte Marie, 12.3 km 262 W Marovato 11–15.ii.2002 Fisher *et al.* (6 ♀); Cap Sainte

Marie, 14.9 km 261 W Marovato 13–19.ii.2002 Fisher *et al.* (3♀); Forêt Mahavelo, Isantoria Riv., 5.5 km 37 NE Ifotaka 31.i.2002 Fisher *et al.* (59♀, 7♀); Forêt de Petriky, 12.5 km W 272 Tolagnaro 22.xi.1998 B.L. Fisher (3♀); Mahafaly Plateau, 6.2 km 74 ENE Itampolo 25.ii.2002 Fisher *et al.* (7♂); P. N. Kirindy Mite, 16.3 km 127 SE Belo sur Mer 6–10.xii.2001 Fisher *et al.* (3♀); P. N. Andohahela, 1.7 km 61 ENE Tsimelahy 16–20.i.2002 Fisher *et al.* (40♀, 7♀); 2.7 km WNW Ste Luce, 9–11.xii.1998 B.L. Fisher (1♀); Vohibasia Forest, 59 km NE Sakaraha 13 i. 1996 B.L. Fisher (6♀).

WORKER DESCRIPTION.— **HEAD:** Head rectangular, vertex planar or weakly concave; frons shining and smooth except for piliferous pits; pilosity of frons a mixture of well-spaced, distinctly longer erect and semi-erect setae interspersed with shorter decumbent setae or setulae. Eye moderate, eye width 1–1.5× greatest width of antennal scape; (in full-face view) eyes set below midpoint of head capsule; (viewed in profile) eyes set around midline of head capsule; eye elliptical, curvature of inner eye margin may be more pronounced than that of its outer margin. Antennal segments 11; antennal club three-segmented. Clypeal carinae weakly to strongly defined; anteromedian clypeal margin straight; paraclypeal setae moderately long and fine, curved; posteromedian clypeal margin approximately level with antennal fossae. Anterior tentorial pits situated nearer antennal fossae than mandibular insertions. Frontal lobes straight, parallel. Psammophore absent. Palp formula 2,2. Mandibular teeth three, plus minute, basal denticle or angle; mandibles with sub-parallel inner and outer margins, smooth (except for piliferous pits); masticatory margin of mandibles approximately vertical or weakly oblique; basal tooth a small to minute denticle or angle, much smaller than t3 (four teeth present).

MESOSOMA: Promesonotum shining and mainly smooth, vestigial striolae, if present, confined to lower anterior mesopleuron; (viewed in profile) anterior promesonotum smoothly rounded, thereafter more-or-less flattened; promesonotum on same plane as propodeum, promesonotal setae seven to twelve; standing promesonotal setae a mixture of well-spaced, distinctly longer, erect and semi-erect setae which are curved distally and often paired, interspersed with much shorter, incurved, decumbent setae; appressed promesonotal setulae few, mainly on sides of promesonotum. Metanotal groove strongly impressed, with distinct transverse costulae, or, metanotal groove vestigial. Propodeum shining and smooth, with a few weak striolae on metapleuron; propodeal dorsum convex; propodeum always smoothly rounded; standing propodeal setae consisting of one prominent pair anteriorly, with other shorter setae very sparse or absent; appressed propodeal setulae very sparse or absent; propodeal spiracle equidistant from metanotal groove and declivitous face of propodeum. Vestibule of propodeal spiracle absent or not visible. Propodeal lobes present as vestigial flanges or small strips of cuticle only.

PETIOLE AND POSTPETIOLE: Petiolar spiracle lateral and situated within anterior sector of petiolar node; node (viewed in profile) conical, vertex tapered; appearance of node shining and smooth throughout; ratio of greatest node breadth (viewed from front) to greatest node width (viewed in profile) about 1:1; anteroventral petiolar process absent or vestigial; ventral petiolar lobe present; height ratio of petiole to postpetiole between 3:2 and 4:3; height–length ratio of postpetiole about 1:1; postpetiole shining and smooth; postpetiolar sternite without anterior lip or carina, or this structure vestigial.

GASTER: Pilosity of first gastral tergite consisting of well-spaced, erect and semi-erect setae interspersed with a few appressed setulae.

GENERAL CHARACTERS: Color variable, pale yellow to brown. Worker caste monomorphic.

LECTOTYPE WORKER MEASUREMENTS (*M. exiguum*): HML 0.93 HL 0.36 HW 0.28 CeI 78 SL 0.22 SI 79 PW 0.18.

LECTOTYPE WORKER MEASUREMENTS (*M. exiguum bulawayense*): HML 1.00 HL 0.39 HW 0.32 CeI 81 SL 0.26 SI 83 PW 0.20.

LECTOTYPE WORKER MEASUREMENTS (*M. faurei*): HML 0.88 HL 0.35 HW 0.29 CeI 83 SL 0.22 SI 76 PW 0.18.

LECTOTYPE WORKER MEASUREMENTS (*M. exiguum flavescens*): HML 0.89 HL 0.36 HW 0.30 CeI 82 SL 0.22 SI 75 PW 0.18.

LECTOTYPE WORKER MEASUREMENTS (*M. minutissimum*): No measurements taken as lectotype is headless.

OTHER WORKER MEASUREMENTS (non-types): HML 0.79–0.97; HL 0.33–0.39 HW 0.26–0.29 CeI 73–81 SL 0.22–0.26 SI 81–93 PW 0.16–0.20 (n=20).

QUEEN DESCRIPTION.— **HEAD:** Head rectangular; vertex weakly concave or planar; frons shining and smooth except for piliferous pits; pilosity of frons a mixture of well-spaced, distinctly longer erect and semi-erect setae interspersed with shorter setae or setulae, which are decumbent or appressed, longer setae thickest on vertex. Eye elliptical, margin sometimes shallowly concave; (in full-face view) eyes set at about midpoint of head capsule; (viewed in profile) eyes set posteriad of midline of head capsule.

MESOSOMA: Anterior mesoscutum smoothly rounded, thereafter more-or-less flattened; pronotum, mesoscutum and mesopleuron shining and mainly smooth, vestigial striolae, if present, confined to anterior katepisternum; length-width ratio of mesoscutum and scutellum combined between 2:1 and 3:2; axillae contiguous, or nearly so; standing pronotal/mesoscutal setae a mixture of well-spaced, distinctly longer, erect and semi-erect setae which are curved distally, interspersed with much shorter, incurved, decumbent setae; appressed pronotal, mesoscutal and mesopleural setulae few, mainly on sides of pronotum and mesopleuron. Propodeum shining and smooth, with a few weak striolae on metapleuron; propodeum smoothly rounded or with indistinct angle; propodeal dorsum convex; standing propodeal setae consisting of up to a dozen or more longer erect and shorter sub-erect setae; appressed propodeal setulae very sparse or absent; propodeal spiracle nearer metanotal groove than declivitous face of propodeum; propodeal lobes present as vestigial flanges only, or absent.

WING: Wing not seen (queens dealated).

PETIOLE AND POSTPETIOLE: Petiolar spiracle lateral and situated slightly anterior of petiolar node; node (viewed in profile) cuneate, vertex tapered; appearance of node shining, with vestigial sculpture; ratio of greatest node breadth (viewed from front) to greatest node width (viewed in profile) between 2:1 and 1:1; anteroventral petiolar process present as a thin flange tapering posteriad; height ratio of petiole to postpetiole between 4:3 and 1:1; height-length ratio of postpetiole between 4:3 and 1:1; postpetiole shining and weakly striolate posteriad; postpetiole shining and smooth; postpetiolar sternite without anterior lip or carina, or this structure vestigial (NB. May be confused with rear margin of postpetiolar sternite, which does project as a spur, length of sternite being much reduced).

GASTER: Pilosity of first gastral tergite consisting of well-spaced, erect and semi-erect setae interspersed with a few appressed setulae.

GENERAL CHARACTERS: Color yellowish-brown. Brachypterous alates not seen. Ergatoid or worker-female intercastes seen.

QUEEN MEASUREMENTS: HML 1.55–2.00 HL 0.45–0.55 HW 0.39–0.54 CeI 83–98 SL 0.34–0.42 SI 75–90 PW 0.28–0.55 (n=19).

MALE DESCRIPTION.— **HEAD:** (In full-face view) head width-mesosoma width ratio between 1:1 and 3:4; frons finely micropunctate. Compound eyes protuberant and elliptical tending to elongate; margin of compound eye clearly separated from posterior margin of clypeus. Ocelli turreted. Ratio of length of first funicular segment of antenna to second funicular segment between 1:1 and 3:4. Maximum number of mandibular teeth and denticles three.

MESOSOMA: Mesoscutum broadly convex; pronotum and mesoscutum shining and mainly smooth, vestigial striolae, if present, confined to lower anterior mesopleuron; parapsidal furrows vestigial or absent; notauli absent; axillae widely separated (i.e., by width of at least one axilla), axilla fused with scutellum to narrowly separated (i.e., less than width of one axilla).

WING: Wing veins predominantly depigmented, with distal segments reduced to vestigial lines; vein m-cu absent; vein cu-a absent.

PETIOLE AND POSTPETIOLE: Petiolar spiracle lateral and situated slightly anterior of petiolar node; node (viewed in profile) conical, vertex tapered, appearance of node shining and smooth; ratio of greatest node breadth (viewed from front) to greatest node width (viewed in profile) between 4:3 and 1:1; anteroventral petiolar process absent or vestigial; height ratio of petiole to postpetiole between 1:1 and 3:4; height-length ratio of postpetiole between 2:1 and 4:3; postpetiole shining, with vestigial sculpture.

GASTER: Pilosity of first gastral tergite consisting of well-spaced, semi-erect setae interspersed with a few appressed setulae.

GENERAL CHARACTERS: Color light to medium brown, appendages pure brown to off-white.

MALE MEASUREMENTS: HML 1.37–1.96 HL 0.41–0.51 HW 0.42–0.48 CeI 102–116 SL 0.10–0.19 SI 24–34 PW 0.44–0.66 (n=11).

REMARKS.— *Monomorium exiguum* ranges throughout Madagascar, but is most abundant in Toliara Province, where it is often among the most commonly collected *Monomorium* in sifted litter samples. Interestingly, the paler '*flavescens*' and '*bulawayense*' forms also occur in Madagascar, along with *M. exiguum* sensu stricto. In the taxon *faurei* the head is darker than the mesosoma, and the gaster is pale with darker infuscation on its basal half, as well as on the sides of the first gastral tergite. This variant, too, is quite common on Madagascar. *Monomorium exiguum* workers from Madagascar tend to have a slightly more tapered petiolar node than their counterparts on the African mainland.

Based on comparative type material I have seen, *Monomorium exiguum* is part of a complex that includes, at least, the exclusively African *Monomorium mictile* Forel, *Monomorium rosae* Santschi and *Monomorium taedium* Bolton. An 11-segmented antenna, an elongate and flattened head capsule, weakly developed clypeal carinae, a dorsally rather flattened rather than evenly convex propodeum and the low, strongly conical form of the petiole are common to all of these taxa. *Monomorium rosae* is placed in a different complex by Bolton (1987) on the basis of the appearance of the worker postpetiole, but in actual fact, the shape of the postpetiole in larger, darker specimens of *Monomorium exiguum* approaches that of *M. rosae*, if it is not identical. The degree of obliqueness seen in the posterior face of the postpetiole appears to be proportional to the size of the worker, rather than a distinct feature at the species level, let alone the species-complex level, in all three species mentioned above.

The distinction between the above four species, if indeed it truly exists, is minimal. In appearance the workers form a continuum, with the bright yellow *M. mictile* being the smallest species and the very dark *M. rosae* the largest. To give just one instance, the relevant measurements supplied by Bolton (1987) for *M. exiguum* (40 specimens) and *M. rosae* (12 specimens) certainly give this reviser pause for thought! With *M. exiguum* in regular font, *M. rosae* in bold, these read: TL (i.e., total length); 1.5–1.7/**1.6–2.0** HL 0.36–0.42/**0.42–0.50**, HW 0.28–0.32/**0.33–0.40** CI (=CeI) 74–80/**76–82** SL 0.22–0.27/**0.28–0.35** SI 74–84/**85–94** PW 0.17–0.21/**0.21–0.25** AL (i.e., mesosoma length) 0.36–0.44/**0.42–0.56**. Apart from the larger size, the only real difference that I can discern between a *M. rosae* Santschi syntype from the Democratic Republic of Congo and large, brown specimens of *M. exiguum* I have seen from Madagascar is the presence of faint sculpture on the lower mesopleuron in *M. rosae*. Fresh *M. rosae* material, which I have not seen, is said by

Bolton to be 'blackish-brown to black'.

Monomorium mictile is separated from *M. exiguum* by Bolton (1987) on the basis of the presence or absence of erect infrahumeral setae. These are supposedly absent in *M. mictile* and long and erect in *M. exiguum*. In fact the setae are present, but short and appressed in *M. mictile*. This particular character does not seem to be useful as a means of separating similar species in the *M. monomorium* species group, at least in Madagascar. Where hundreds or even thousands of workers are available for examination, I have noticed variability in the number, length and alignment of the promesonotal setae, including differences in the length and alignment of the infrahumeral setae. This phenomenon may not be recognizable where only a few, isolated specimens are available for study. For now, I would allow for the separation of *M. mictile* from *M. exiguum*, as all Malagasy specimens I have seen of the latter have erect or semi-erect infrahumeral setae (albeit of different lengths). The same applies to *Monomorium taedium*, for which I have seen three paratype workers. Apart from their somewhat larger size (HW = 0.34 mm) and lack of erect infrahumeral setae they look exactly like brown *M. exiguum*. Interestingly, the postpetiole of the paratype specimens of *M. taedium* is quite globose, as in smaller *M. exiguum*.

As well as six syntypes of *M. mictile*, I have also examined 15 syntype workers of the form *Monomorium exiguum mictile* 'sudanicum' and the lectotype worker of *Monomorium minutissimus*, both of which taxa Bolton regarded as conspecific with *M. mictile*. The 'sudanicum' workers are certainly the same species as the *M. mictile* syntypes and share the same uniform, bright yellow coloration, but I differ with Bolton on the identity of the headless lectotype worker of *M. minutissimum*. Leaving aside the absence of the head (which was said by Santschi to be yellowish-brown like the gaster), the morphology of this specimen is identical with that of the *M. faurei* type material, and has the typical coloration of this form of *M. exiguum*. I therefore consider this taxon to be a junior synonym of *M. exiguum* rather than *M. mictile*. (NB. Because of the way the ant is glued on its side to its rectangle, the infrahumeral setae are not readily apparent, and may have been destroyed during the mounting process.)