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Taxonomy of the cerapachyine ant genera *Simopone* Forel, *Vicinopone* gen. n. and *Tanipone* gen. n. (Hymenoptera: Formicidae)

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Abstract

Taxonomic studies of three cerapachyine ant genera are presented: the Old World tropical *Simopone* Forel, the Afrotropical *Vicinopone* gen. n. and the Malagasy endemic genus *Tanipone* gen. n. *Vicinopone* is a monotypic genus, the sole species of which (*conciliatrix*) was formerly included in *Simopone*. Ten species of *Tanipone* are recognised (*aglandula, aversa, cognata, hirsuta, maculata, pilosa, scelesta, subpilosa, varia, zona*), all of which are newly described here. The number of species of *Simopone* is increased from 15 to 38 by the description of 9 new Afrotropical species (*amana, brunnea, dryas, latiscapa, miniflava, occulta, persculpta, rabula, vepres*), 13 new Madagascan species (*consimilis, dignita, dux, elegans, fera, inculta, merita, nonnihil, rex, sicaria, silens, trita, victrix*), and the resurrection of one name (*wilburi*) from synonymy. Modern diagnoses of the genera are included, together with newly designed keys to the Afrotropical and Malagasy species.

Key words: Taxonomy, Cerapachyinae, *Simopone*, *Vicinopone*, *Tanipone*, Afrotropical Malagasy, diagnoses, keys to species.

Introduction

This study presents taxonomic revisions of three genera, all currently referred to Cerapachyinae, tribe Cerapachyini (*sensu* Bolton, 2003). The largest by far, with 38 species, is *Simopone*, which is primarily arboreal and widely distributed in the Old World tropics, with the majority of species in Madagascar (16) and sub-Saharan Africa (18). It

has previously been revised by Brown (1975) but his work was mainly conducted to establish the limits of genera, meaning that his treatment of species was superficial. He recognised 13 species altogether and presented a key to the seven Afrotropical species that he considered valid. The number of species in *Simopone* was raised to 15 by Kutter (1976, 1977) and has remained as such to the present day. One of the African species described by Brown (1975), *S. conciliatrix*, has proved so different from all the others in the genus that it is transferred to its own monotypic genus, *Vicinopone*, in this study. The third genus treated here, *Tanipone*, is a Malagasy endemic with ten species, none of which has been previously described.

Because of the rarity of collections of *Simopone*, the genus has scarcely made an appearance in any modern molecular-based phylogenetic study. *S. fulvopilosus* was included by Brady (2003) where it appeared as sister to all other cerapachyines plus all the "army ant" genera. This is difficult to accept and is certainly based on a misidentification as the only specimen of *fulvopilosus* detected in the course of the present revision has been its holotype. *S. marleyi* appeared in the surveys by Brady, *et al*. (2006) and Ward & Brady (2009), where it was neatly grouped with species of *Cerapachys* and *Sphinctomyrmex*. The *marleyi* specimens in these works originated in Hamish Roberton's (SAMC) excellent series from KwaZulu-Natal, which contained workers, queens and males. In the slightly earlier morphology-based dorylomorph phylogeny of Brady & Ward (2005), *Simopone* again appeared, in their fig. 1, as sister to all other cerapachyines plus all the "army ant" genera, an unexpected repeat of the Brady (2003) conclusion. Brady & Ward (2005) were, however, very suspicious of this result. They pointed out that *Simopone* was the most incompletely known genus in their survey and added that, "One might take the view that our knowledge of this genus is so incomplete as to be misleading", a statement with which we concur.

Simopone species are almost entirely arboreal, but on occasion foraging workers are found on the ground or in rotten logs. Prey records are extremely sparse for this genus. They consist only of *Crematogaster* brood by *S. vepres*, and the brood of *Terataner* by *S. sicaria*, both recorded here for the first time. Nevertheless, these two records support the general supposition by Brown (1975) that most or all members of tribe Cerapachyini prey on other ants, or more probably the brood of other ants, but actual records are extremely rare; for instance, a list presented in Hölldobler & Wilson (1990: 559) contained only a couple of entries.

Species of *Tanipone* are predominantly terrestrial to subarboreal, being found as ground foragers in leaf litter, under stones, in rotten stumps and in rotten logs. Just as commonly workers have been captured on low vegetation, in living and dead stems above the ground and in rot pockets in tree trunks. No prey records exist for *Tanipone*, nor do they for *Vicinopone*, all discoveries of which have been on trees.

Abbreviations of depositories

AFRC	Afribugs Collection, Wolmer, Pretoria North, South Africa
AMNH	American Museum of Natural History, New York, New York, U.S.A.
BMNH	The Natural History Museum, London (= British Museum, Natural History), U.K.
BPBM	Bernice P. Bishop Museum, Honolulu, Hawaii, U.S.A.
CASC	California Academy of Sciences, San Francisco, California, U.S.A.
IAES	Institute of Agro-Environmental Sciences, Tsukuba, Japan
IEUB	Istituto di Entomologia, Universita degli Studi, Bologna, Italy
LACM	Natural History Museum of Los Angeles County, California, U.S.A.
MCZC	Museum of Comparative Zoology, Cambridge, Mass. U.S.A.
MHNG	Muséum d'Histoire Naturelle, Genève, Switzerland
MRAC	Musée Royal de l'Afrique Centrale, Tervuren, Belgium
MSNG	Museo Civico di Storia Naturale "Giacomo Doria", Genova, Italy
NHMB	Naturhistorisches Museum, Basel, Switzerland
SAMC	Iziko Museums of Cape Town (= South African Museum), South Africa
UASK	Ukrainian Academy of Sciences, Kiev, Ukraine
UCDC	University of California, Davis, California, U.S.A.

Standard measurements and indices

Measurements were taken using an optical micrometer, to the nearest 0.01 mm, on a Wild M5 microscope. All measurements are expressed in millimetres.

Measurements

Head Length (HL). The length of the head capsule excluding the mandibles; measured in full-face view in a straight line from the mid-point of the anterior clypeal margin or from a line that spans the anteriormost points of the frontal lobes (depending on which projects farthest forward) to the level of a line that spans the posterior corners of the head capsule. In species with a strongly reflexed true anterior clypeal margin (*i.e.* the clypeo-labral junction) the measurement is taken from the midpoint of the apparent margin as seen in full-face view.

Head Width (HW). The maximum width of the head immediately behind the eyes, measured in full-face view.

Scape Length (SL). The maximum straight-line length of the scape, excluding the basal constriction or neck that occurs just distal of the condylar bulb.

Scape Width (SW). The maximum width of the scape, usually at its apex.

Frontal Carina Width (FcW). The distance across the maximum separation of the frontal lobes or frontal carinae (whichever is greatest), measured in full-face view.

Eye Length (EL). In profile, the maximum measurable length of the compound eye.

Eye Width (EW). In profile, the maximum measurable width of the compound eye, perpendicular to EL.

Eye Size (ES). In the *schoutedeni* group, EL+EW, divided by 2.

Pronotal Width (PW). The maximum width of the pronotum in dorsal view.

Weber's Length of Mesosoma (WL). The diagonal length of the mesosoma in profile, from the angle at which the pronotum meets the cervix to the posterior basal angle of the metapleuron.

Abdominal Segment II (petiole) Width (AIIW). The maximum width of abdominal segment II (petiole), measured in dorsal view but omitting laterally projecting teeth when such occur at the posterolateral corners.

Abdominal Segment II (petiole) Length (AIIL). The maximum length of abdominal segment II (petiole), measured in dorsal view and including longitudinal projections of the posterolateral corners where such occur.

Abdominal Segment III Width (AIIIW). The maximum width of abdominal segment III (postpetiole), measured in dorsal view.

Abdominal Segment III Length (AIIIL). The maximum length of abdominal segment III (postpetiole), measured in dorsal view.

Abdominal Segment IV Width (AIVW). The maximum width of abdominal segment IV (first gastral), measured in dorsal view.

Abdominal Segment IV Length (AIVL). The maximum length of the posttergite of abdominal segment IV (first gastral), measured in dorsal view, omitting the pretergite.

Metafemur Length (MFL). The maximum straight-line length of the metafemur.

Indices and ratios

Cephalic Index (CI). HW divided by HL, × 100.

Scape Index (SI). SL divided by HW, × 100.

Eye Position Ratio (EP). In full-face view, the distance from a horizontal line that intersects the mid-point of the anterior clypeal margin, or from a line that spans the anteriormost points of the frontal lobes (depending on which projects farthest forward), to the level of a line that spans the anterior margins of the eyes, divided by the horizontal distance from a line that spans the posterior margins of the eyes to one that spans the posterior corners of the head.

Other ratios that are routinely used in the species rank taxonomy include: EL/HW, AIIW/AIIL, AIIIW/AIIIL.

Images

Digital colour images were created using a JVC KY-75 digital camera and Syncroscopy Auto-Montage (v. 5.0) software. Scale bars are omitted from the images because comprehensive measurements are provided for each species.

Shared characters of Cerapachyini

All three genera treated here fall into tribe Cerapachyini of the subfamily Cerapachyinae, as it is currently constituted, which is a member of the broader dorylomorph group of ant subfamilies (Bolton, 1990a, 1990b, 2003; Brady & Ward, 2005). Because of this the three genera treated here, together with all others in the tribe, share a suite of characters, the most important of which are listed below. As these characters are common to all genera of the tribe they are not duplicated in the diagnoses of the individual genera that are revised here.

1 Prementum not visible when mouthparts are fully retracted; prementum is concealed behind the labrum and lateral outgrowths of the maxillae that meet medially (worker, queen, male).

2 Antennal sockets very close to anterior margin of head; sockets horizontal, in the plane of the transverse axis of the head (worker, queen, male).

3 Promesonotal suture fused across the dorsum, the pronotum not capable of movement relative to the mesonotum; the suture-line itself usually very feeble to absent (worker, some queens).

4 Metacoxal cavities fully closed, without a suture in the annulus (worker, queen, male).

5 Metapleural gland orifice concealed beneath a ventrally directed cuticular flap or flange (worker, queen).

6 Propodeal spiracle low down on side of sclerite (worker, queen, male).

7 Propodeal lobes present (worker, queen, male).

8 Jugal lobe absent from hindwing (alate queen, male).

9 AII (petiole) sessile or subsessile (worker, queen, male).

10 AII (petiole) without tergosternal fusion; AIII (postpetiole) with complete tergosternal fusion; AIV presclerites may be fused but postsclerites always free (worker, queen, male).

11 Helcium attached at about midheight of anterior face of AIII (worker, queen, male).

12 Sternite of helcium large, bulging ventrally and visible in profile (worker, queen, male).

13 AIV with strongly developed presclerites (worker, queen, male).

14 Stridulitrum absent from pretergite of AIV (worker, queen).

15 Spiracles of AV–AVII exposed, visible without distension or dissection of the abdomen (worker, queen, male).

16 Pygidium large, flattened dorsally and equipped with marginal denticles, at least in part (worker, queen).

17 Sting large, functional (worker, queen).

18 Cerci (pygostyles) absent (male).

19 Genitalia completely retractile (male).

20 Hypopygium (subgenital plate) bidentate to biaculeate (male).

Shared characters of the genera *Simopone, Vicinopone* and *Tanipone*

As well as the 20 features that are exhibited by all members of Cerapachyini, listed above, the three genera included in this revision also share the following suite of seven characters in the worker caste. This combination of characters offers a definition that includes the three genera treated here but excludes other regional cerapachyines. None of the characters is claimed as synapomorphic for the three, or for any two of the three.

1 Pretarsal claws with a single preapical tooth, at least on the metatarsus.

2 Mesotibial spurs absent (at most a setiform vestige may remain that cannot be distinguished by light microscopy from other setae at the tibial apex).

3 Metatibial spur single, pectinate.

4 Eyes present and conspicuous, always large (EL/HW 0.30–0.53).

5 Apical antennomere subcylindrical, not inflated and bulbous.

6 Ventrolateral margin of head without a continuous longitudinal carina that commences close to anterior margin below the mandible and extends the entire length of the head to the posterior margin (a carina is present posterolaterally that usually extends onto the ventral surface).

7 Frontal lobes widely separated by the relatively broad clypeus; frontal lobes not or only slightly elevated laterally on each side of the clypeus (never closely approximated and vertical).

Key to Malagasy and Afrotropical Cerapachyini genera (workers)

1 Without the combination of all seven characters noted above; in particular the mesotibia always with at least one conspicuous spur and pretarsal claws of the metatarsus lack preapical teeth 2
- With the combination of all seven characters noted above; in particular mesotibia always lacks spurs and at least the metatarsal pretarsal claws possess a preapical tooth 3
2 Abdomen with conspicuous girdling constrictions between AIV and AV, between AV and AVI, and between AVI and AVII; in each case the constricted portion formed of the presclerites of the more posterior segment. (Afrotropical) . . . . . **Genus *SPHINCTOMYRMEX***
- Abdomen without girdling constrictions between AIV and AV, between AV and AVI, and between AVI and AVII. (Afrotropical, Malagasy) . . . . . **Genus *CERAPACHYS***
3 Antenna with 12 segments. Longitudinal glandular groove absent from basal half of ventral surface of metabasitarsus. Tergite of AII (petiole) not marginate laterally in dorsal view. A vertical posterior surface present on the head above the occipital foramen. With head in ventrolateral view the posterolateral marginal carina extends across the ventral surface to the midline. 4
- Antenna with 11 segments. Longitudinal glandular groove present on basal half of ventral surface of metabasitarsus. Tergite of AII (petiole) marginate laterally in dorsal view. No vertical posterior surface present on the head above the occipital foramen, instead the vertex slopes evenly down to the foramen. With head in ventrolateral view the posterolateral marginal carina does not extend across the ventral surface to the midline. (Afrotropical, Malagasy) . . . . . **Genus *SIMOPONE***
4 Ocelli absent. Eyes anterior: posterior margin of eye in front of midlength of head. Palp formula 3,2, the maxillary palp very short; when extended along the ventral surface of the head the apex of the maxillary palp does not reach the posterior margin of the buccal cavity. In dorsal view tergite of AIII (postpetiole) distinctly smaller than tergite of AIV. Posterior half of tergite of AIII without a pair of depressed glandular patches. (Afrotropical) . . . . . **Genus *VICINOPONE***
- Ocelli present. Eyes posterior: posterior margin of eye well behind midlength of head. Palp formula 6,4, the maxillary palp very long; when extended along the ventral surface of the head the apex of the maxillary palp reaches beyond the level of the posterior margin of the eye. In dorsal view tergites of AIII (postpetiole) and AIV subequal in size. Posterior half of tergite of AIII usually with a pair of depressed glandular patches that are associated with a pale marginal transverse strip or a pair of pale patches. (Malagasy). . . . . **Genus *TANIPONE***

Genus *Simopone*

Simopone Forel
Simopone Forel, 1891: 139. Type-species: *Simopone grandidieri* Forel, 1891: 141, by monotypy.

DIAGNOSIS OF WORKER

Predominantly arboreal cerapachyine ants (workers occasionally found foraging on ground or in rotten wood). Workers of most (perhaps all) species exhibit considerable size variation. With the shared characters of Cerapachyini listed above and also with the following combination of characters. Two undoubted apomorphies of the genus are in *italics*.

1 Palp formula 6,4 or 5,3. Maxillary palp of moderate length: with mouthparts retracted the apex of the maxillary palp, when extended back on underside of head, does not reach beyond the level of the posterior margin of the eye.

2 Mandibles triangular, either edentate, bluntly denticulate, or with small, low, blunt crenulations at least on the basal half; mandibles without a basal groove and without a basal pit.

3 Antenna with 11 segments, gradually incrassate apically; apical antennomere large but subcylindrical, not swollen and bulbous, its maximum width generally no greater than that of the preapical segment.

4 Scape short (SI 33–56); when laid straight back in full-face view the scape apex merely reaches the level of the anterior margin of the eye or slightly beyond.

5 Eyes large (EL/HW 0.30–0.53), located from slightly in front of, to distinctly behind, the midlength of the head.

6 Ocelli present; usually distinct but may be small, inconspicuous and flush with the surface of the head.

7 Clypeus broad and more or less flat across; broadly inserted between frontal lobes.

8 Frontal lobes and carinae present; frontal lobes at most only weakly elevated and in full-face view conceal at least the inner margins of the antennal sockets; frontal carinae usually extend back to at least the level of the anterior margins of the eyes; frontal carinae never abruptly truncated posteriorly and never terminated immediately behind the frontal lobes.

9 Parafrontal ridges variably developed, sometimes absent.

10 *Head capsule without a differentiated vertical posterior surface above the occipital foramen; instead the vertex slopes evenly down to the upper margin of the occipital foramen, which is visible in full-face view.*

11 Head capsule, in ventral or ventrolateral view, with a carina that extends down the posterolateral margin and onto the ventral surface, where it terminates or fades out well before meeting the ventral midline; this carina is anterior to, and separate from, that which borders the occipital foramen.

12 Mesosoma dorsally with at least a transverse vestige of promesonotal suture; metanotal groove usually absent, although sometimes vestigially present to obvious.

13 Pronotum in dorsal view bluntly angulate to carinate anteriorly between anterior surface and dorsum; propodeum rounded to carinate between dorsum and declivity.

14 Mesosoma laterally usually with an impression or pit near the metapleural-propodeal junction, on approximately the same level as the propodeal spiracle.

15 Midpoint of metanotal groove (or midpoint of dorsum at that level if groove absent) with a pit or impression.

16 Mesotibia without spurs.

17 Metatibia with a single, pectinate spur.

18 Metatibial gland absent (at least no external orifice or indication is present).

19 *Metabasitarsus ventrally with a longitudinal glandular groove that occupies at least the basal half of the tarsomere length.*

20 Pretarsal claws of all legs with a single preapical tooth on the inner surface of each claw.

21 Propodeal lobe in profile broad-based, bluntly triangular or rounded apically.

22 AII (petiole) flattened or shallowly convex dorsally; angulate to marginate laterally in dorsal view; often with a longitudinal carina on the side above the level of the spiracle.

23 AIII broadly postpetiolate, more voluminous than AII (petiole) but usually smaller than AIV.

24 Prora of AIII a simple curved cuticular rim or carina that separates the anterior face of the poststernite from its lateral and ventral surfaces.

25 Pretergite of AIV in dorsal view strongly constricted with respect to posttergite of AIV.

26 Cinctus of AIV smooth, without cross-ribs.

27 Tergite of AIV without a pair of subovate glandular patches on the posterior half.

28 Pygidium variable in structure at its apex: either apical margin evenly curved and equipped with a row of 4–6 minute denticles; or apex with one or two pairs of somewhat enlarged teeth that are flanked by smaller teeth; or apex with a short but stout, bifid cuticular fork that is much more strongly developed than any other teeth on the margin.

Comments on worker characters

Numbers correspond to character numbers above.

1 Palp formula 6,4 was established by dissection in workers of *conradti*, *dux*, *nonnihil*, *rex*, *sicaria*, *silens*, *trita* and *wilburi*, and by *in situ* counts of everted mouthparts in *grandis*, *latiscapa*, *marleyi*, *miniflava* and *persculpta*. Palp formula 5,3 was established by dissection in *elegans* and *grandidieri*. In some other species the palp formula could be estimated even though the mouthparts were retracted (*e.g.* PF 6,4 in *annettae*, *brunnea*, *dryas*) but in some, and especially in specimens mounted flat on card, the mouthparts were obscured and PF could not be counted.

3 In most species all funicular segments except the apical are conspicuously broader than long, but in *laevissima* and some extralimital species of the *grandidieri* group segments 4–6 appear at least as long as broad.

4 SI range includes all directly measured Afrotropical and Malagasy species. Among the extralimital species, *chapmani* has SI 33 (holotype measured), *bakeri* has SI 37 (MCZC gyne measured), *oculata* has SI *ca* 42 (estimated from Radchenko, 1993: 46, fig. 5) and *gressitti* has SI *ca* 41 (estimated from Taylor, 1965: 4, fig. 2).

5 In the *schoutedeni* group many conspicuous short setae arise between the ommatidia of the eye. Elsewhere in the genus such setae are much more sparse and usually indistinct, but in most species a few can be detected at high magnification.

7 In most members of the *emeryi* group the clypeus is very obviously strongly reflexed, so that the true anterior clypeal margin, at the clypeo-labral junction, is considerably below and behind the apparent anterior clypeal margin as seen in full-face view. The lateral portions of the clypeus, in front of the antennal sockets, tend to be flattened or evenly rounded in members of the *grandidieri* group, the *schoutedeni* group, and in *grandis* and *persculpta* of the *emeryi* group. In the remainder of the *emeryi* group the margin is produced anteriorly as a rounded lobe or short, blunt triangle in front of each socket, but these projections are reduced in *trita* and *silens*.

9 Parafrontal ridges (*sensu* Wilson, 1964, Borowiec, 2009; = genal carinae *sensu* Bolton, 2003) are usually distinctly present in the *grandidieri* group and the *schoutedeni* group, where they appear as fine carinae that extend back almost to the eye. In the *emeryi* group their development is more variable. They may be entirely absent or represented only by a slight tumulus immediately behind the clypeus (*e.g. conradti*, *marleyi, rex, silens*), or weakly present but short and inconspicuous (*e.g. dignita, latiscapa, merita, persculpta, victrix*). They are never extended backwards to near the anterior margin of the eye.

11 In direct contrast to the situation in *Simopone*, in both other genera treated here, *Tanipone* and *Vicinopone*, the carina extends to the ventral midline.

12 Promesonotal suture is sometimes vestigial or mostly absent from the dorsum (*elegans, grandidieri*), or it may be merely a weak impression or a fine, slightly incised line (*consimilis, dignita, emeryi, marleyi*); most often its track is indicated by a row of short cuticular ribs or linked punctures across the dorsum, which may be conspicuous or very faint (*conradti, laevissima, latiscapa, rex* and the *schoutedeni* group). The metanotal groove is sometimes absent, but often it is represented by a weak to vestigial transverse line (*conradti, grandis, inculta, latiscapa, rex*); only very rarely is it obviously, though shallowly, impressed (*chapmani, laevissima*).

13 Anterodorsally the pronotum may be merely angulate between its anterior and dorsal surfaces (*rex*, *silens*) but in most it is distinctly marginate to carinate. However, the pronotal dorsum never rounds broadly and evenly into its anterior surface.

14 This impression or pit perhaps represents the last visible trace of the metapleural spiracle on the surface of the mesosoma. It is quite conspicuous in the majority of species but is small and indistinct, or even absent, in the Afrotropical *laevissima* and the Malagasy species *elegans*, *emeryi, fera, grandidieri*, *merita* and *nonnihil*.

15 The median pit is usually distinct but may be small and inconspicuous in *conradti* and *grandis*, and may be difficult to distinguish from the predominant sculpture in those species of the *schoutedeni* group that have dense foveolate punctures on the dorsal mesosoma.

16 Apex of the mesotibia usually has one to several setae that are roughly aligned in the direction of the long axis of the shaft. It is probable that one of these represents the last vestige of a spur.

18 The metatibia, at the base of the pectinate spur, usually shows a small translucent patch of cuticle, or a small cuticular vesicle. This appears to be associated with the articulation of the spur and is not part of a metatibial gland structure. In large, strongly sclerotised species such as *rex* and *silens*, the small translucent patch is usually not apparent.

19 The ventral metabasitarsal groove is conspicuous in all species. It varies from a narrow slit to a broad trench that occupies well over half the width of the tarsomere and is often filled with white to yellowish flocculent material. Elsewhere in Formicidae a similar groove is exhibited only by *Paraponera* (Paraponerinae), *Myrmecia* and *Nothomyrmecia* (Myrmeciinae), and *Tetraponera* and *Myrcidris* (Pseudomyrmecinae) (summarised in Bolton, 2003).

20 The preapical tooth on each pretarsal claw is conspicuous on all legs in larger species, but may be small and more difficult to see in small species, especially on the forelegs, but is always present.

22 Tergite of abdominal segment AII (petiole) shows a wide range of structures. Transverse carinae may be present anterodorsally, posterodorsally, or both, where the dorsum meets the anterior and posterior surfaces. The lateral surface of AII often has a curved longitudinal carina that extends its length. This carina is located below the dorsolateral margination but above the level of the spiracle. In the *grandidieri* group it is sometimes short and confined to the area in front of and above the spiracle (*elegans*, *grandidieri*) but it is entirely absent in *bakeri*, *chapmani* and *laevissima*. In the *emeryi* group it is usually present but is weak in *conradti* and *marleyi*, and absent in *dignita, dux, sicaria* and *victrix*. In the *schoutedeni* group it is universally present and generally strongly developed. The posterior corners of AII are frequently extended into lobes or teeth that project posteriorly or laterally.

24 In a few species, for instance *grandidieri*, *laevissima* and some members of the *schoutedeni* group, the prora is only feebly developed ventrally.

25 In dorsal view the maximum width of the pretergite of AIV is 0.52–0.69 × the maximum width of the posttergite of the segment. The ratio in *Vicinopone* falls within the same range (0.62–0.64) but the pretergites of *Tanipone* species are relatively much wider, 0.76–0.89. This ratio has not yet been investigated in other cerapachyine genera.

28 Pygidial armament varies among the three species groups recognised within the genus. In the *grandidieri* group the posterior pygidial margin is lined with an arc of small, usually peg-like denticles that are all approximately the same size, without an enlarged pair apically. In the *schoutedeni* group the posteromedian pair or two pairs of denticles on the arc are somewhat enlarged, immediately above the sting. In the *emeryi* group the margin of the pygidium is produced posteriorly into a short but stout cuticular fork that is very obviously larger and more strongly developed than any marginal denticle.

DIAGNOSIS OF QUEEN (GYNE)

Known queens are entirely worker-like except that the mesosoma has a full complement of flight sclerites. Therefore all the worker characters listed above, except for numbers 12 and 15, are duplicated here. Queens are known for the Afrotropical species *annettae, conradti, latiscapa, marleyi, matthiasi, miniflava, persculpta, wilburi,* and for the extralimital species *bakeri*; most specimens are dealate. No queen recognisable by external morphology has been seen in any Malagasy species, the queens of which are suspected to be remarkably ergatoid, or perhaps even replaced by gamergates, but proof of this must await dissection of reproductive systems to assess the presence of spermathecae and enlarged ovaries. For venation, see discussion of character 15 under males.

DIAGNOSIS OF MALE

Of the Malagasy species males are known for *dux, mayri, nonnihil, rex, silens* and seven unassociated forms of the *emeryi* group, and also for *grandidieri* of the *grandidieri* group. The males of two species are known from the Afrotropical region, *marleyi* and an unassociated male of the *schoutedeni* group. No males have been recorded for any of the extralimital taxa.

1 Palp formula 6,4 or 5,3.

2 Mandibles triangular and edentate, masticatory margins straight to shallowly concave, meeting at full closure.

3 Antenna 12-segmented, filiform; funicular segments 3 to apex longer than broad; apical segment the longest, tapering apically and not swollen, longer than funicular segment 11 but no broader.

4 Eyes large and very conspicuous.

5 Ocelli present.

6 Frontal lobes and frontal carinae present and strongly developed; lobes somewhat elevated on each side of the relatively broad clypeus but concealing at least the inner margins of the antennal sockets in full-face view.

7 Head capsule, in ventral or ventrolateral view, with a carina that extends down the posterolateral margin and onto the ventral surface, where it terminates or fades out well before meeting the ventral midline.

8 Pronotum slightly to very conspicuously visible in dorsal view.

9 Notauli present.

10 Parapsidal grooves present.

11 Propodeal lobes present and conspicuous.

12 Mesotibia without spurs.

13 Metatibia with a single, pectinate spur.

14 Pretarsal claws each with a preapical small tooth.

15 Venation as discussed below.

16 Prora present as a transverse cuticular flange.

17 AIII postpetiolate, with AIV > AIII > AII.

18 Pygidium with posterior margin not denticulate.

Comments on male characters

Too few males are known to give as detailed a diagnosis as the workers, but the listed characters should serve to successfully isolate *Simopone* males from other cerapachyines. Numbers below correspond to character numbers above.

1 PF 6,4 has been confirmed by dissection or *in situ* count in *dux*, *marleyi*, *rex*, *silens* and three unassociated Malagasy species; PF 5,3 was confirmed by *in situ* count of *grandidieri*.

3 In all males except the one from the *schoutedeni* group the length of funicular segment 4 is equal to or > 3 > 2 > 1; in the *schoutedeni* group male funiculus segment 4 is about equal to 3, and 2 is about equal to 1, with 1 and 2 shorter than 3 and 4. The scape in all known Malagasy species of the *emeryi* group has a flange-like or broadly tooth-like prominence apically, in front of the insertion of the first funicular segment. This is not developed in *marleyi*, *grandidieri*, or the *schoutedeni* group male.

4 In the *schoutedeni* group male the short, bristly setae that arise between the ommatidia, which are so obvious in workers and queens, are absent.

8 Two quite distinct degrees of pronotal exposure are exhibited. In all the known Malagasy males the pronotum, in dorsal view, merely forms a narrow collar in front of the mesoscutum, as is also the case in *Tanipone*. But in the Afrotropical *marleyi* and in the unassociated male of the *schoutedeni* group the visible pronotum forms an extensive, transverse sclerite in front of the mesosocutum. The midline length of the pronotum (its narrowest point) is 0.25 (*marleyi*)–0.35 × the midline length of the mesoscutum. By contrast, in Malagasy males the pronotum is only 0.10–0.15 × the mesoscutum midline length.

15 Wing venation is best represented in larger males, such as those of *mayri*, *rex* and *silens*. Diagnostically, on the forewing the pterostigma is large and pigmented, usually strongly so; C is absent; R1·f3 is a short stub or absent distal of the pterostigma; 2rs-m is absent; Rs·f2-3 is faint, sometimes spectral, detached basally from Rs+M so that its base floats freely in the membrane; 2r-rs and Rs·f4-5 are usually weakly developed and sometimes very faint indeed, and the latter does not distinctly meet the wing margin; 2r-rs may occasionally be absent; 1m-cu is usually present but may be very faint; cu-a arises from M+Cu (before it splits into M·f1 and Cu·f1); M fades out distally. In smaller males and in the only known alate queen (*annettae*) the forewing venation shows reduction from this pattern until the wing is veinless from a point well proximal of the pterostigma to the margin except for Sc+R1, linked to the pterostigma. On the hindwing rs-m is always absent.

Synoptic list of world species of *Simopone*

emeryi **group**

conradti Emery, 1899. Ivory Coast, Nigeria, Cameroun, Gabon, Central African Republic, Democratic Republic of Congo, Uganda, Kenya.

consimilis Bolton & Fisher **sp. n.** Madagascar.

dignita Bolton & Fisher **sp. n.** Madagascar.

dux Bolton & Fisher **sp. n.** Madagascar.

emeryi Forel, 1892. Madagascar.

fera Bolton & Fisher **sp. n.** Madagascar.

grandis Santschi, 1923. Cameroun, Democratic Republic of Congo.

inculta Bolton & Fisher **sp. n.** Madagascar.

latiscapa Bolton & Fisher **sp. n.** Sierra Leone, Ghana, Gabon.

marleyi Arnold, 1915. South Africa.

matthiasi Kutter, 1977. Cameroun.

mayri Emery, 1911. Madagascar.

= *satagia* Bolton, 1995 **syn. n.** Unnecessary replacement name.

merita Bolton & Fisher **sp. n.** Madagascar.

nonnihil Bolton & Fisher **sp. n.** Madagascar.

persculpta Bolton & Fisher **sp. n.** Kenya, Tanzania, Mozambique, South Africa.

rex Bolton & Fisher **sp. n.** Madagascar.

sicaria Bolton & Fisher **sp. n.** Madagascar.
silens Bolton & Fisher **sp. n.** Madagascar.
trita Bolton & Fisher **sp. n.** Madagascar.
victrix Bolton & Fisher **sp. n.** Madagascar.

grandidieri **group**
bakeri Menozzi, 1926. Singapore.
chapmani Taylor, 1966. Philippines.
elegans Bolton & Fisher **sp. n.** Madagascar.
grandidieri Forel, 1891. Madagascar.
gressitti Taylor, 1965. New Guinea.
laevissima Arnold, 1954. Uganda.
oculata Radchenko, 1993. Vietnam.

schoutedeni **group**
amana Bolton & Fisher **sp. n.** Gabon.
annettae Kutter, 1976. Ghana, Cameroun, Gabon, Central African Republic, Democratic Republic of Congo.
brunnea Bolton & Fisher **sp. n.** Gabon, Democratic Republic of Congo.
dryas Bolton & Fisher **sp. n.** Kenya.
fulvinodis Santschi, 1923. Democratic Republic of Congo.
miniflava Bolton & Fisher **sp. n.** Gabon.
occulta Bolton & Fisher **sp. n.** Gabon.
rabula Bolton & Fisher **sp. n.** Tanzania.
schoutedeni Santschi, 1923. Democratic Republic of Congo.
vepres Bolton & Fisher **sp. n.** Ghana.
wilburi Weber, 1949 **stat. rev.** Cameroun, Gabon, Democratic Republic of Congo.

Species excluded from *Simopone*

Cerapachys huode (Terayama, 2009) **comb. n.** Taiwan.

Species groups of *Simopone*

The world fauna of *Simopone* can be divided into three distinct species groups based on the characters noted below. The largest of these is the *emeryi* group, distributed throughout sub-Saharan Africa and Madagascar. It currently contains 20 species, of which 14 are Madagascan and 6 African. No single species is known to occur in both regions and species in this group tend to be large and powerfully built. The *schoutedeni* group, with 11 species, is peculiarly Afrotropical and consists of relatively small, uncommon species. The *grandidieri* group, though the smallest in terms of number of species (7), is by far the most widely distributed, with 1 Afrotropical, 1 Oriental, 2 Malagasy and 3 Malesian representatives.

Characters of *emeryi* species group (workers)

1 Palp formula 6,4 (*conradti, dux, grandis, latiscapa, marleyi, nonnihil, persculpta, rex, sicaria, silens, trita*).
2 Mandibles sculptured, even if only feebly so.
3 With head in profile the parafrontal ridge fails to reach the anterior margin of the eye (*i.e.* it is confined to the area immediately behind the clypeus), or may be absent.
4 Mesopleuron without an impressed transverse sulcus that divides it into anepisternum and katepisternum.
5 Propodeal spiracle is roughly circular to distinctly elliptical.
6 Pygidium with a distinct cuticular apical fork of two short, stout teeth.

7 Generally relatively large species, worker HW 0.74–2.18.

It is interesting to speculate on the function of the pygidial fork. Its function could be to brace the apex of the abdomen against the cuticle of a victim immediately prior to stinging, and thus prevent the apex from sliding over the surface. Or it may act as a guide and brace for the sting when it is in use. From its position immediately above the sting it may serve to prevent lateral movement or slippage of the sting during insertion.

Characters of *grandidieri* species group (workers)

1 Palp formula 5,3 (*elegans, grandidieri*).

2 With head in profile the parafrontal ridge almost reaches the anterior margin of the eye (*i.e.* it is not confined to the area immediately behind the clypeus).

3 Outer margins of frontal carinae diverge from the line of the frontal lobes at their point of junction.

4 A distinct, impressed transverse sulcus is present on the mesopleuron that conspicuously divides the sclerite into an upper anepisternum and a lower katepisternum; this sulcus is continuous posteriorly with the sulcus that separates the mesopleuron from the metapleuron.

5 Propodeal spiracle is subcircular.

6 Propodeal dorsum and declivity are separated by an angle or blunt carina.

7 Anterior and dorsal surfaces of AII (petiole) are separated by a transverse carina.

8 Apex of pygidium is not hypertrophied and not isolated; dorsum of apex equipped with 4–6 small teeth.

9 Generally medium-sized species, worker HW 0.58–0.97.

Pilosity is sparse on dorsum except at apex of abdomen: sides of head between posterior clypeal margin and posterior corner lack setae; typically the dorsal mesosoma is without setae except for one at each pronotal humeral angle; tergite of abdominal segment IV at most with a basal pair and an apical pair only (reduced pilosity does not apply to *bakeri*, one of the extralimital species that belong to this group).

Characters of *schoutedeni* species group (workers)

1 Palp formula 6,4 (*annettae, brunnea, dryas, miniflava, wilburi*).

2 Mandibles unsculptured, smooth with scattered small pits.

3 With head in profile the parafrontal ridge reaches, or almost reaches, the anterior margin of the eye (*i.e.* it is not confined to the area immediately behind the clypeus).

4 Eyes with numerous short but conspicuous setae that arise between the ommatidia.

5 A distinct, impressed transverse sulcus is present on the mesopleuron that conspicuously divides the sclerite into an upper anepisternum and a lower katepisternum; this sulcus is continuous posteriorly with the sulcus that separates the mesopleuron from the metapleuron.

6 Promesonotal suture is represented across the dorsum by a line of minute cuticular ribs or a line of adjacent punctures; line of suture is conspicuous to faint. Metanotal groove is at most a very faint, almost effaced line, but usually is entirely absent.

7 Propodeal spiracle circular or very nearly so.

8 Anteroventral process of AII (petiole) in profile consists of a short lamina that has a roughly oval fenestra near its midlength; the posteroventral corner of the process is dentiform or short-spiniform.

9 Pygidium with a small, insignificant apical fork of two or four teeth that are usually only slightly larger than the other marginal denticles.

10 Generally relatively small species, worker HW 0.46–0.80.

In addition, all examined specimens of this group, except for a couple of workers of *wilburi*, have a small patch of pale, thin cuticle on the side of the pronotum. The patch is roughly oval to crudely elongate-triangular and is located on the anterior half of the sclerite, usually just below its mid-height. No trace of this patch occurs in any species of the *grandidieri* group that has been seen. Most members of the *emeryi* group have no equivalent of this patch, but something that may be similar can be seen in *grandis*, and some specimens of Malagasy species have a reddish spot on the cuticle in a similar position, but this seems variable within species.

Each of the eleven species assigned to this Afrotropical endemic group is represented by very few specimens; in several cases only single specimens are known. This tends to make the assessment of species limits rather difficult, because normal variations in sculpture, shapes of particular body parts, size-related variation, and so on are impossible to assess. However, in *wilburi* 12 specimens, including a queen, are known from five different localities, the longest series of which contains six workers. In this series some size-variation is apparent, but the morphology remains consistent. Similarly, the five workers known of *annettae*, from four localities, are also quite uniform. These consistencies, compared and contrasted to the different morphological modifications seen in other specimens, are taken as the template by which the species-rank taxonomy of the group is currently arranged. It may be that some of the species currently represented only by singletons will eventually be found to show size-related variation, so the taxonomy will need re-assessment when longer series, and particularly nest-series, have been accumulated.

Key to world species groups (workers)

1 Mesopleuron with a well defined and conspicuous transverse sulcus that divides it into anepisternum and katepisternum. Pygidium without a stout cuticular apical fork above the sting 2

\- Mesopleuron without a transverse sulcus, the sclerite not divided into anepisternum and katepisternum. Pygidium with a stout cuticular apical fork above the sting. (Afrotropical, Malagasy) . . . . . ***emeryi*** group

2 Apex of pygidium margined by a row of denticles that are all approximately the same size. Anteroventral process of AII (petiole) not a lamina and without a fenestra. Outer margins of frontal carinae diverge from the line of the frontal lobes at their point of junction. Palp formula 5,3 where known. Setae on dorsal surfaces of mesosoma and abdomen usually sparse or absent. (Afrotropical, Malagasy, Oriental, Malesian) . . . . . ***grandidieri*** group

\- Apex of pygidium margined by a row of denticles, the median pair of which is enlarged. Anteroventral process of AII (petiole) a short lamina, with a fenestra. Outer margins of frontal carinae converge from the line of the frontal lobes at their point of junction. Palp formula 6,4 where known. Setae on dorsal surfaces of mesosoma and abdomen abundant. (Afrotropical) . . . . . ***schoutedeni*** group

Afrotropical fauna of *Simopone*

Currently 18 species have been recorded from the Afrotropical region. This includes all 11 species of the *schoutedeni* group, 6 species of the *emeryi* group and a single species of the *grandidieri* group.

Key to workers of Afrotropical species of *Simopone*

S. matthiasi and *miniflava* are known only from queens; see key to queens below.

1 Mesopleuron entire, without a distinctly incised transverse sulcus that crosses the entire sclerite and is continuous with, and as strongly developed as, the sulcus between mesopleuron and metapleuron. Dorsal apex of pygidium with a conspicuous, stoutly bifid cuticular fork above the sting 2

\- Mesopleuron divided into upper and lower sections by a distinctly incised transverse sulcus that crosses the entire sclerite; posteriorly the sulcus continuous with, and as strongly developed as, the sulcus between mesopleuron and metapleuron. Dorsal apex of pygidium at most with an inconspicuous pair of somewhat enlarged marginal teeth above the sting. 6

2 Dorsal surfaces of tergites AII (petiole) and AIII (postpetiole), densely and conspicuously longitudinally costulate at least in the median third of their widths; tergite of AIV densely microreticulate to reticulate-punctate only, strongly contrasting with the sculpture of the two preceding segments. Anterior clypeal margin in dorsal view with a median prominence, not evenly shallowly convex or flat across its width. Eyes located more anteriorly, EP < 1.00. (Ivory Coast, Nigeria, Cameroun, Gabon, Central African Republic, Democratic Republic of Congo, Uganda, Kenya) . . . . . ***conradti***

\- Dorsal surfaces of tergites AII (petiole) and AIII (postpetiole) without longitudinal costulae; sculpture of tergite of AIV basically the same as the two preceding tergites, differing only in density or intensity. Anterior clypeal margin in dorsal view evenly shallowly convex to more or less straight across its width, without a median prominence. Eyes located more posteriorly, EP > 1.00 3

3 With head tilted slightly back from full-face view the clypeo-labral junction is not reflexed and is located almost immediately below the apparent anterior clypeal margin. Scape in dorsal view less flattened; SW/SL 0.42–0.48. Dorsal and lateral surfaces of mesosoma, and abdominal tergites AII and AIII, are conspicuously blanketed with fine, dense, microreticulate to reticulate-punctate ground sculpture 4

\- With head tilted slightly back from full-face view the clypeo-labral junction is strongly reflexed and is located considerably behind the apparent anterior clypeal margin. Scape in dorsal view more flattened; SW/SL 0.69–0.81. Dorsal surfaces of mesosoma and abdominal tergites AII and AIII either smooth with scattered punctures, or at most with the spaces between the

punctures with inconspicuous, minute, superficial microreticulate patterning 5

4 Dorsum of head between frontal carinae, and back between the eyes, with fine longitudinal costulate sculpture that is superimposed upon the reticulate-punctate ground sculpture. Dorsum of mesosoma with numerous setae on pronotum, mesonotum and propodeum. Anterior half of clypeus with a median longitudinal carina that extends to the anterior margin. Larger species with head relatively broad, HW 1.44–1.62, SL 0.74–0.90, MFL 1.54–1.76, CI 83–87. (Cameroun, Democratic Republic of Congo) . . . . . ***grandis***

- Dorsum of head between eyes densely reticulate-punctate with a few larger shallow punctures, without longitudinal costulate sculpture. Dorsum of mesosoma only with 1–2 pairs of setae near the humeral angles, 1–2 pairs on anterior mesonotum and 1–2 pairs at propodeal declivity. Anterior half of clypeus without a median longitudinal carina. Smaller species with head relatively narrow, HW 1.18–1.36, SL 0.57–0.70, MFL 1.10–1.30, CI 71–76. (Kenya, Tanzania, Mozambique, South Africa) . . . . . ***persculpta***

5 Scape in dorsal view strikingly flattened and extremely broad, SW/SL 0.79–0.81; scape much lighter in colour than the head capsule. Side of pronotum, just above base of anterior coxa, without a translucent fenestra of extremely thin cuticle. Dorsal surfaces of tergites AII, AIII and AIV with abundant long, curved, decumbent setae. Dorsal (outer) surfaces of mesotibiae and metatibiae with numerous long, curved, freely projecting setae that are suberect to erect and almost as long as the tibial width. Head capsule and body black. Larger species, HW 1.32–1.48. (Sierra Leone, Ghana, Gabon) . . . . . ***latiscapa***

- Scape in dorsal view slightly flattened but not extremely broad, SW/SL 0.69–0.71; scape the same colour as the head capsule. Side of pronotum, just above base of anterior coxa, with a translucent fenestra of extremely thin cuticle. Dorsal surfaces of tergites AII, AIII and AIV with sparse, short decumbent setae. Dorsal (outer) surfaces of mesotibiae and metatibiae with a few short decumbent setae that are only a fraction as long as the tibial width. Head capsule and body yellow, except for pygidium, hypopygium and pretergite of AIV, which are dark brown. Smaller species, HW 0.93–1.07. (South Africa) . . . . . ***marleyi***

6 With head in profile a short, narrow but deep scrobe present between antennal socket and anterior margin of eye. Metapleuron traversed by a strong sulcus that appears as a direct continuation of the transverse mesopleural sulcus. Tergite of AII longer than AIII. Tergite of AII relatively broad with respect to the pronotum, AIIW/PW 1.14. Tergite of AIV relatively broader, AIVW/AIVL 1.42. Frontal carinae very broad in full-face view, FcW/HW 0.62. Eyes located far back on head, EP 1.90. Scape very short, SI 35. Larger species, HW 0.97, PW 0.78, AIIW 0.89. (Uganda) . . . . . ***laevissima***

- With head in profile a broad, shallow antennal fossa is present, but there is no narrow deep scrobe between antennal socket and anterior margin of eye. Metapleuron without a transverse strong sulcus that appears as a direct continuation of the transverse mesopleural sulcus. Tergite of AII shorter than AIII. Tergite of AII relatively narrow with respect to the pronotum, AIIW/PW 0.93–1.07. Tergite of AIV relatively narrower, AIVW/AIVL 0.94–1.20. Frontal carinae narrower in full-face view, FcW/HW 0.28–0.45. Eyes located farther forward on head, EP 0.68–1.06. Scape relatively longer, SI 42–54. Smaller species, HW 0.46–0.80, PW 0.34–0.61, AIIW 0.34–0.62. 7

7 In profile the head capsule and mesosoma dark brown, tergites and sternites of AII and AIII dull yellow, tergites and sternites of AIV and AV black; the yellow colour of AII and AIII contrasting strongly with the remainder of the body. Standing setae sparse, on dorsum of head restricted to a single pair near the level of the posterior margins of the eyes, on dorsum of mesosoma restricted to a single pair at the pronotal humeri, on tergites of AIII and AIV restricted to a sparse row at the apex of each segment. (Democratic Republic of Congo) . . . . . ***fulvinodis***

- In profile the head capsule, mesosoma and AII to AV either brown or black; tergites and sternites of AII and AIII not yellow, not contrasting with the remainder of the body. Standing setae short but numerous on dorsum of head, dorsum of mesosoma and all surfaces of the tergites of AIII and AIV 8

8 AIII (postpetiole) relatively long and narrow, AIIIW/AIIIL 0.82. Eye located relatively farther forward on head, EP 0.68. (Kenya) . . . . . ***dryas***

- AIII (postpetiole) relatively short and broad, AIIIW/AIIIL 0.92–1.05. Eye located relatively farther back on head, EP 0.76–1.06 9

9 With the head in full-face view the outer margins of the eyes are strongly convex and distinctly project far beyond the outlines of the sides of the head; sides of head completely concealed in at least the median third of the eye length. Eyes larger, ES 0.30–0.35. With AII in dorsal view the width of the posterior margin distinctly greater than the width of the anterior margin 10

- With the head in full-face view the outer margins of the eyes are shallowly convex and fail to reach, or at most just barely interrupt, the outlines of the sides of the head at the midlength of eye; sides of head visible for most or all of the eye length. Eyes smaller, ES 0.21–0.28. If midlength of outer margin of eye just breaks the outline of the side then with AII in dorsal view the width of the posterior margin of AII is the same as the width of the anterior margin, or only fractionally greater 11

10 Mesosoma black. Cephalic dorsum between eyes with distinct ground sculpture between punctures that usually appears as very fine, dense, longitudinal costulae or striolae. AII and AIII in dorsal view both relatively narrower, AIIW/AIIL 0.93–0.98, AIIIW/AIIIL 0.94–1.00. (Cameroun, Gabon, Democratic Republic of Congo) . . . . . ***wilburi***

- Mesosoma glossy brown. Cephalic dorsum between eyes either without ground sculpture between punctures, or at most with feeble, patchy, unorganised microsculpture that is not arranged longitudinally. AII and AIII in dorsal view both relatively broader, AIIW/AIIL 1.02–1.06, AIIIW/AIIIL 1.08–1.09. (Ghana) . . . . . ***vepres***

11 Punctures on disc of tergite AIII (postpetiole) minute, pinprick-like and widely separated; diameters of most or all the punctures obviously less than the distances that separate them. Head and body uniformly medium to dark brown. (Gabon, Democratic Republic of Congo) . . . . . ***brunnea***

- Punctures on disc of tergite AIII (postpetiole) large and conspicuous, foveolate and close together; diameters of most or all the punctures greater than distances that separate them, or the punctures adjacent. Head and body uniformly black. 12

12 Mesofemora and metafemora brown, mesotibiae and metatibiae yellow, the two colours contrasting. Slightly larger species, HW 0.67–0.80, SL 0.32–0.34, PW 0.51–0.61. In dorsal view the width across the anterior margin of AII (petiole) is equal to

the width across the posterior margin, or very nearly so. 13
- Mesofemora, metafemora, mesotibiae and metatibiae all approximately the same colour, the femora and tibiae not contrasting. Slightly smaller species, HW 0.49–0.59, SL 0.22–0.28, PW 0.38–0.45; but if HW 0.55 or more, SL 0.25 or more and PW 0.40 or more, then in dorsal view the width across the anterior margin of AII (petiole) is usually obviously less than the width across the posterior margin. 14

13 In dorsal view AII longer than broad (AIIW/AIIL 0.94), the sides straight and parallel. Smaller species with slightly larger eyes, HW 0.67, AIIW 0.49, AIIIW 0.71; EL/HW 0.48; minimum distance between eyes 0.32. (Democratic Republic of Congo) . . . . . ***schoutedeni***
- In dorsal view AII broader than long (AIIW/AIIL 1.07), the sides weakly convex. Larger species with slightly smaller eyes, HW 0.80, AIIW 0.62, AIIIW 0.71; EL/HW 0.39; minimum distance between eyes 0.41. (Tanzania) . . . . . ***rabula***

14 AII (petiole) in dorsal view slightly broader than long, AIIW/AIIL 1.03–1.07. (Ghana, Cameroun, Gabon, Central African Republic, Democratic Republic of Congo) . . . . . ***annettae***
- AII (petiole) in dorsal view slightly longer than broad, AIIW/AIIL 0.92–0.98 15

15 With AII (petiole) in dorsal view the width across the anterior margin is almost exactly the same as across the posterior margin. Dorsum of head between eyes with traces of superficial ground sculpture in places but without longitudinal striolae. Head slightly narrower and eyes located somewhat more anteriorly, CI 63, EP 0.76. (Gabon) . . . . . ***occulta***
- With AII (petiole) in dorsal view the width across the anterior margin is notably less than across the posterior margin. Dorsum of head between eyes with longitudinal finely striolate sculpture present. Head slightly broader and eyes located somewhat more posteriorly, CI 68, EP 0.92. (Gabon) . . . . . ***amana***

Key to queens of Afrotropical species of *Simopone*

Queens are unknown for *amana, brunnea, dryas, fulvinodis, grandis, laevissima, occulta, rabula, schoutedeni, vepres*.

1 Dorsal surfaces of AIII and AIV with standing setae very sparse, at most with a transverse row at the extreme apex of each; without suberect to subdecumbent curved setae on the anterior halves of each sclerite. 2
- Dorsal surfaces of AIII and AIV with numerous to abundant suberect to subdecumbent curved standing setae, many of which arise on the anterior halves of the sclerites 4

2 Head and body entirely yellow except for pygidium and presclerites of AIV, which are dark brown. (South Africa) . . ***marleyi***
- Head and body not entirely yellow, pygidium and presclerites of AIV not strikingly darker than remainde. 3

3 At least the median third of the dorsum of AII and AIII strongly longitudinally costulate. Head relatively long and narrow, CI 62–66. Pygidium with a strong apical fork that is separated by a long diastema from a flared portion of the margin that bears 8–9 marginal teeth, the first four of which are considerably more peglike than the remainder. Full adult colour uniform black. (Ivory Coast, Nigeria, Cameroun, Gabon, Central African Republic, Democratic Republic of Congo, Uganda, Kenya). . . . . ***conradti***
- Entire dorsal surface of AII and AIII punctate, without race of longitudinal costulae. Head relatively short and broad, CI 81. Pygidium with a short apical fork, each prong of which consists of two teeth that are fused basally; lateral pygidial margin anterior of the fork with only two teeth. Full adult colour uniform light brown. (Cameroun) . . . . . ***matthiasi***

4 Distinctly larger species, HW > 1.30 (HW 1.35–1.37 in known specimens) 5
- Distinctly smaller species, HW < 0.80 (HW 0.57–0.74 in known specimens). 6

5 Clypeo-labral junction strongly reflexed, considerably behind the apparent anterior clypeal margin. Scape in dorsal view extremely flattened and very broad, SW/SL 0.77. Tergites of AIII and AIV smooth and shining, with scattered punctures. (Sierra Leone, Ghana, Gabon). . . . . ***latiscapa***
- Clypeo-labral junction not reflexed, almost immediately below the apparent anterior clypeal margin. Scape in dorsal view much less flattened, not strikingly broad, SW/SL 0.52. Tergites of AIII and AIV very densely and strikingly microreticulate, AIII tergite also with numerous larger punctures. (Kenya, Tanzania, Mozambique, South Africa). . . . . ***persculpta***

6 Full adult colour of head, mesosoma, AII and AIII yellow. Dorsum of head between eyes almost entirely smooth, with a few very shallow broad punctures but without distinct ground sculpture between them. Dorsum of AII almost entirely smooth. (Gabon) . . . . . ***miniflava***
- Full adult colour of head, mesosoma, AII and AIII dark brown to black. Dorsum of head between eyes with conpicuous broad shallow punctures, between which there is distinct costulate or microreticulate ground sculpture. Dorsum of AII with distinct broad, foveolate punctures 7

7 With the head in full-face view the outer margins of the eyes strongly convex and distinctly projecting far beyond the outlines of the sides of the head; sides of head completely concealed in distinctly more than the median third of the eye length. (Cameroun, Gabon, Democratic Republic of Congo). . . . . ***wilburi***
- With the head in full-face view the outer margins of the eyes shallowly convex and failing to reach, or at eye midlength just barely touching, the outlines of the sides of the head; sides of head visible for most or all of the eye length. (Ghana, Cameroun, Gabon, Central African Republic, Democratic Republic of Congo) . . . . . ***annettae***

Simopone amana Bolton & Fisher **sp. n.**

HOLOTYPE WORKER. HL 0.78, HW 0.53, SL 0.24, EL 0.28, PW 0.38, AIIW 0.38, AIIL 0.40, AIIIW 0.48, AIIIL 0.48, WL 0.89, MFL 0.40, CI 68, SI 45, EL/HW 0.53, EP 0.92, AIIW/AIIL 0.95, AIIIW/AIIIL 1.00.

With head in full-face view the outlines of the outer margins of the eyes just fail to interrupt the outlines of the sides of the head. ES 0.25 and width of head across broadest part of eyes 0.52. Frontal carinae extend back to level of anterior margins of eyes and are weakly divergent posteriorly. Cephalic dorsum with scattered broad, shallow punctures. Conspicuous ground sculpture is present between the eyes that appears as longitudinal fine striolae; this ground sculpture fades out behind the level of the eyes. Leading edge of scape with a few setae, inclined toward the scape apex. Sides of head below and behind eyes with projecting short setae, inclined anteriorly. Cephalic dorsum with numerous short, curved setae and with a few pairs of longer setae present; longest setae occur on the frontal carinae and above the eye. Ventral surface of head with short setae. Mesosoma in dorsal view narrowest across the mesonotum (maximum width 0.38), broadest across the propodeum (maximum width 0.40). Anterior margin of pronotum weakly marginate. Propodeum with a fine weak carina between dorsum and declivity. Entire dorsum of mesosoma with widely spaced broad, shallow punctures that are most widely spaced on the pronotum. Mesopleuron with a few punctures and a distinct transverse sulcus. Propodeal declivity smooth except for a narrow band of disorganised superficial sculpture immediately below the dorsal carina. In profile, dorsal surfaces of mesosoma and all abdominal tergites with numerous posteriorly curved setae. Standing setae present on middle and hind tibiae. AII (petiole) in dorsal view with a weak transverse carina both anteriorly and posteriorly; sides very shallowly convex, almost straight, gradually divergent posteriorly so that the width across the anterior margin is noticeably less than across the posterior margin. Dorsum of AII with large, shallow punctures. Tergite of AIII with similar but more crowded punctures, so that some are adjacent; diameters of punctures always greater than the distances between them. AII slightly longer than broad, AIII as long as broad, AIV distinctly broader than long (width 0.54, length 0.47; AIVW/AIVL 1.15). Head capsule and body blackish brown to black; scapes and funiculi light brown; femora and tibiae brown.

Holotype worker, **Gabon**: La Makandé, Forêt des Abeilles, i-ii.1999 (*A. Dejean*) (BMNH).

See notes under *schoutedeni*.

Simopone annettae **Kutter**
(Figs 1–3)

Simopone annettae Kutter, 1976: 273, figs 1–8. Holotype queen (alate), CAMEROUN: Fo-Tabe (9° 35’ östl. Länge, 5° 31’ nördl. Breite), 11.i.1937 (*H. Kutter*) (NHMB) [examined].

PUTATIVE WORKER (not previously described). HL 0.79–0.86, HW 0.50–0.59, SL 0.23–0.28, EL 0.26–0.30, PW 0.39–0.45, AIIW 0.38–0.46, AIIL 0.37–0.44, AIIIW 0.45–0.56, AIIIL 0.46–0.56, WL 0.90–1.04, MFL 0.40–0.46, CI 65–69, SI 43–48, EL/HW 0.48–0.51, EP 0.90–1.00, AIIW/AIIL 1.03–1.07, AIIIW/AIIIL 0.96–1.02 (5 measured).

With head in full-face view the outlines of the outer margins of the eyes fractionally fail to interrupt, or at most just interrupt, the outlines of the sides of the head at their midlength. ES 0.23–0.26 and width of head across broadest part of eyes 0.52–0.58. Frontal carinae extend back to level of anterior margins of eyes and are weakly divergent posteriorly. Cephalic dorsum with scattered broad, shallow punctures. Conspicuous ground sculpture is present between the eyes, organised into roughly longitudinal fine costulae or striolae between the punctures; ground sculpture fades out behind the level of the eyes. Leading edge of scape with a few setae, inclined toward the scape apex. Sides of head below and behind eyes with projecting short setae, inclined anteriorly. Cephalic dorsum with numerous short, curved setae and with a few pairs of longer setae present; longest setae occur on the frontal carinae and above the eye. Ventral surface of head with short setae. Mesosoma in dorsal view narrowest across the mesonotum (maximum width 0.37–0.46), broadest across the propodeum (maximum width 0.39–0.48). Anterior margin of pronotum weakly marginate. Propodeum with a fine weak carina between dorsum and declivity. Entire dorsum of mesosoma with widely spaced broad, shallow punctures. Mesopleuron with a few punctures and a dis-

tinct transverse sulcus. Propodeal declivity smooth except for a narrow band of disorganised superficial sculpture immediately below the dorsal carina. In profile, dorsal surfaces of mesosoma and all abdominal tergites with numerous posteriorly curved setae. Standing setae present on middle and hind tibiae. AII (petiole) in dorsal view with a weak transverse carina both anteriorly and posteriorly, the sides convex, broadest behind the midlength; the width across the anterior margin is somewhat less than across the posterior margin. Dorsum of AII with large, shallow punctures whose diameters are mostly equal to or greater than the distances that separate them. On tergite

FIGURES 1–3. Lateral, full face and dorsal view of body. *Simopone annettae* worker CASENT0004507.

of AIII the punctures are of similar size but slightly more crowded, so that some are adjacent. AII broader than long, AIII about as broad as long, AIV distinctly broader than long (width 0.44–0.60, length 0.47–0.54; AIVW/AIVL 1.19–1.24). Head capsule and body black; scapes and funiculi light brown; femora and tibiae brown.

QUEEN (alate gyne). Answers the description of the worker and is about the same size, but winged and with a full complement of flight sclerites. HL 0.90, HW 0.61, SL 0.29, EL 0.30, PW 0.49, AIIW 0.47, AIIL 0.45, AIIIW 0.56, AIIIL 0.63, CI 68, SI 48, EL/HW 0.49, EP 1.18, AIIW/AIIL 1.04, AIIIW/AIIIL 0.89; mesoscutum maximum width 0.52, mesoscutum maximum length 0.32.

S. annettae was originally described from a single alate queen. The workers described above form the closest possible match to the holotype and are tentatively described here as the workers of the species. See notes under *schoutedeni*.

Material examined. **Ghana**: Afwerase (*P. Room*). **Cameroun**: Fo-Tabe (*H. Kutter*). **Gabon**: Prov. Ogooue-Maritime, Res. Monts Doudou, NW Doussala (*B.L. Fisher*); Res. Monts Doudou, NW Doussala (*S. van Noort*). **Central African Republic**: P.N. Dzanga-Ndoki, Lidjombo (*B.L. Fisher*). **Democratic Republic of Congo**: Yangambi, rive Lubilu (*Raignier & van Boven*).

***Simopone brunnea* Bolton & Fisher sp. n.**
(Figs 4–6)

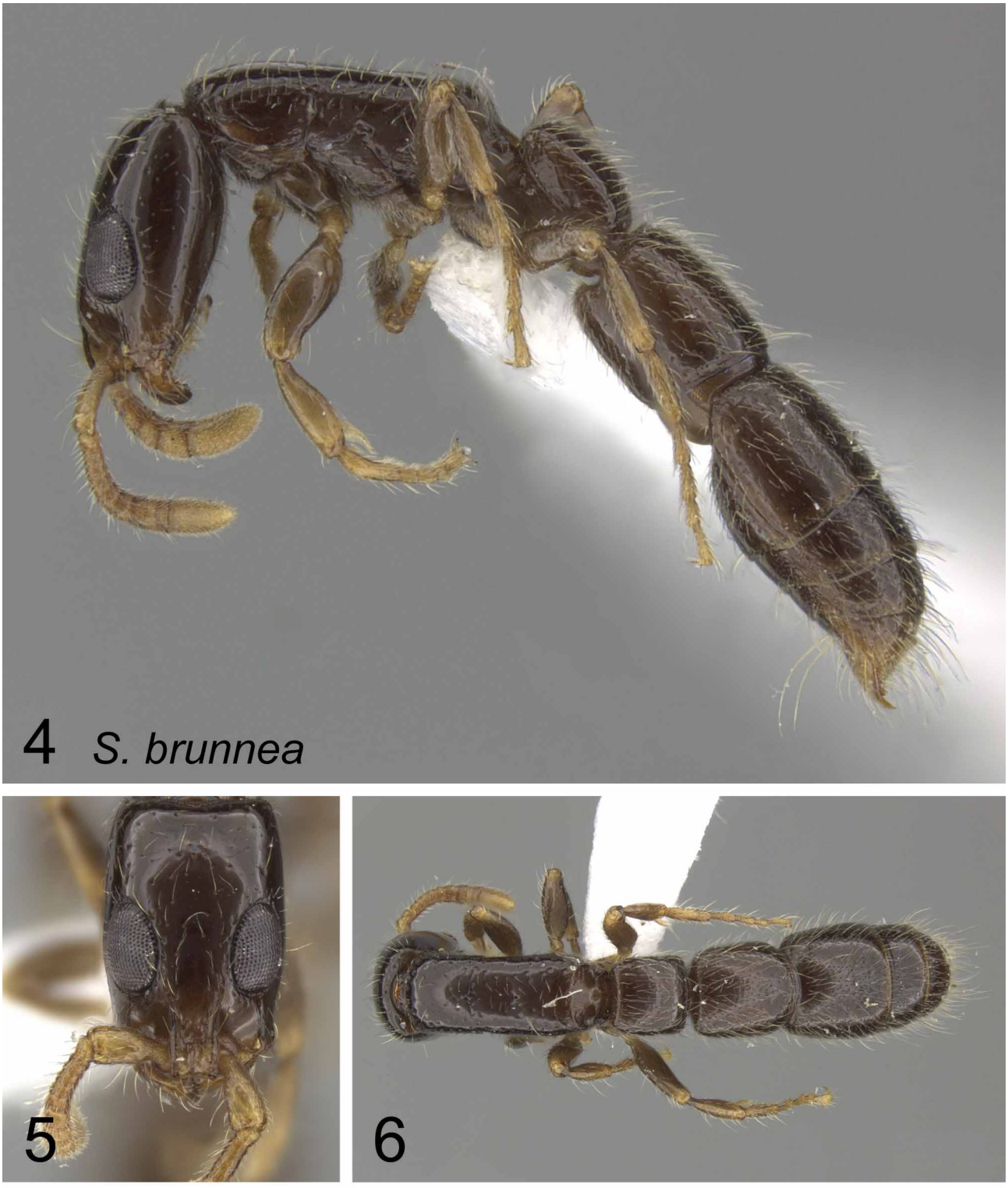
HOLOTYPE WORKER. HL 0.74, HW 0.46, SL 0.22, EL 0.24, PW 0.34, AIIW 0.34, AIIL 0.36, AIIIW 0.41, AIIIL 0.44, WL 0.86, MFL 0.35, CI 62, SI 48, EL/HW 0.52, EP 0.79, AIIW/AIIL 0.94, AIIIW/AIIIL 0.93.

With head in full-face view the midpoints of the outer margins of the eyes do not interrupt the outlines of the sides of the head. ES 0.20 and minimum distance between eyes 0.18. Frontal lobes raised away from level of clypeus. Frontal carinae extend back to level of anterior margins of eyes and are weakly divergent posteriorly. Cephalic dorsum mostly glossy, with scattered broad, shallow punctures and vestiges of weak longitudinal ground sculpture between the eyes. Leading edge of scape with a few setae, inclined toward the scape apex. Sides of head below and behind eyes with very few, short, inconspicuous projecting setae, inclined anteriorly. Cephalic dorsum with a pair of longer setae close to level of posterior margins of eyes and with a few shorter, curved setae near the posterior margin (some abrasion may have occurred). Mesosoma in dorsal view narrowest across the mesonotum (maximum width 0.34), broadest across the propodeum (maximum width 0.36). Anterior margin of pronotum with a weak transverse carina; promesonotal suture only feebly marked. Propodeum with a fine weak carina between dorsum and declivity. Entire dorsum of mesosoma with widely scattered broad, shallow punctures. Mesopleuron almost smooth, with just 1–2 punctures and a distinct transverse sulcus. In profile, dorsal surfaces of mesosoma and all abdominal tergites with short, posteriorly curved setae that are subdecumbent to decumbent. Middle and hind tibiae with 1–2 standing setae. AII (petiole) in dorsal view with a weak transverse carina both anteriorly and posteriorly; sides of AII extremely feebly convex, almost straight, and very weakly divergent posteriorly so that the width across the anterior margin is slightly less than across the posterior margin. Dorsum of AII with very sparse, minute punctures only. On tergite of AIII the punctures are also minute and very widely spaced, so that the distances between them are much greater then their diameters. AII fractionally longer than broad, AIII longer than broad, AIV slightly broader than long. Head capsule and entire body glossy dark brown; antennae and legs somewhat lighter.

Holotype worker, **Gabon**: Prov. Ogoové-Maritime, Rés. Monts Doudou, 24.3 km 307° NW Doussala, 350 m., 6–7.iii.2000, Malaise trap, GA00M38, coastal lowland rainforest, forest margin along river, CASENT0004504 (*S. van Noort*) (CASC).

Tentatively included as *brunnea* are two other specimens. The first has the same data as the holotype but is dated 10-11.iii.2000 (CASENT 0004506). It is somewhat larger than the holotype, HL 0.80, HW 0.51, SL 0.24, EL 0.26, PW 0.38, AIIW 0.38, AIIL 0.39, AIIIW 0.45, AIIIL 0.49, WL 0.90, MFL 0.40, CI 64, SI 47, EL/HW 0.51, EP 0.76, AIIW/AIIL 0.98, AIIIW/AIIIL 0.92. This specimen is almost blackish brown and the punctures on tergite AIII are somewhat larger than in the holotype, though not as large, nor appearing foveolate, as is the case elsewhere in the group. Both this specimen and the holotype were discovered in Malaise traps in coastal lowland rainforest. It is assumed that both these workers represent a single species as it is unlikely, but not impossible, that two almost identical species would be found in the same locality, under the same circumstances, just a few days apart. The sec-

ond specimen is the now lost worker from the Democratic Republic of Congo, noted below. This resembles the holotype very closely and is similar in size and sculpture, but lighter brown. HL 0.72, HW 0.47, SL 0.22, EL 0.22, PW 0.34, AIIW 0.34, AIIL 0.34, AIIIW 0.42, AIIIL 0.44, WL 0.84, MFL 0.34, CI 65, SI 47, EL/HW 0.47, EP 0.79, AIIW/AIIL 1.00, AIIIW/AIIIL 0.95. Both are retained as *brunnea* here, until more material accumulates and some idea of the natural variation of the species can be determined. See also the notes under the determination of the *schoutedeni* group and the notes under *schoutedeni*, below.



FIGURES 4–6. Lateral, full face and dorsal view of body. *Simopone brunnea* worker CASENT0004504.

Note. The specimen initially labelled as holotype for this species was lost in the post before the manuscript was submitted. Its full data, in case the specimen should eventually be recovered, is: Democratic Republic of Congo ("Congo Belge" on label): Epulu, 4.1.1949 (*J.C. Bradley*) ANTWEB. CASENT0173050 (property of MCZC). The specimen is damaged: right funiculus is missing, right eye is crushed into the head capsule, with a fracture behind it, and tergite of AIV is split longitudinally. Because the disappearance occurred before the manuscript was completed, holotype status was transferred to the CASC specimen noted above.

Non-paratypic material examined. **Gabon**: Prov. Ogoové-Maritime, Rés. Monts Doudou, NW Doussala (*S. van Noort*); **Democratic Republic of Congo**: Epulu (*J.C. Bradley*).

Simopone conradti **Emery**

(Figs 7–9)

Simopone conradti Emery, 1899a: 475. Holotype worker, CAMEROUN: Lolodorf, iii.95 (*L. Conradt*) (MSNG) [examined] (see note).

NOTE. In the MSNG collection are two specimens of *conradti* collected by Conradt in Cameroun; both are labelled "typus". But at the end of the original description Emery (1899a) states that his examined material is "un exemplaire", so obviously one of these is the holotype and the other has no type status. Both specimens match the original description except for size, which Emery gives as "5½ mill." By direct measurement the total length of one specimen is 6.6, the other 8.2; the smaller specimen is recognised here as the holotype.

WORKER. HL 1.28–1.80, HW 0.78–1.10, SL 0.34–0.48, EL 0.34–0.50, PW 0.59–0.84, AIIW 0.57–0.84, AIIL 0.63–0.89, AIIIW 0.66–1.03, AIIIL 0.78–1.08, WL 1.46–2.00, MFL 0.64–1.00, CI 59–62, SI 42–46, EL/HW 0.44–0.46, EP 0.85–0.95, AIIW/AIIL 0.90–0.98, AIIIW/AIIIL 0.85–0.97 (9 measured).

Clypeus strongly reflexed so that the clypeo-labral junction is conspicuously below and far behind the anteriormost point of the apparent anterior margin; the latter with a projecting rounded to bluntly triangular median tooth or prominence, the margin not transverse, not evenly convex. Frontal carinae extend back to the level of the anterior margins of the eyes. Eyes located just in front of the cephalic midlength, EP < 1.00; in full-face view outer margins of eyes do not interrupt the outlines of the sides. Scape flattened apically but not extremely broad, SW/SL 0.50–0.57. Leading edge of scape with 1–3 very short inconspicuous setae present. Sides of head below and behind eyes without projecting setae; cephalic dorsum with a single pair of standing setae, at about level of midlength of eye. Cephalic dorsum with dense superficial microreticulate ground sculpture, upon which are scattered punctures; between the eyes also with very fine, dense, longitudinal striolae or costulae that tend to diminish or fade out posteriorly. In dorsal view pronotum with a conspicuous anterior carina; humeri not sharply angulate; promesonotal suture with small cuticular ribs. Metanotal groove vestigial to absent. Propodeum with a very weak ridge between dorsum and declivity, which continues down the sides of the declivity. Entire dorsum of mesosoma with sculpture similar to that on the head, but the longitudinal fine costulate component best developed on the pronotum and tending to fade out posteriorly; on the propodeum it may even be absent. Sides of mesosoma microreticulate. Dorsum of mesosoma with a single pair of setae, located at the pronotal humeri. AII (petiole) with a mere angle or extremely weak transverse ridge between anterior and dorsal surfaces. Posteriorly AII without trace of a carina; instead the dorsum of the tergite forms an uninterrupted curve down to the posterior foramen. At least the median third of AII dorsally with distinct longitudinal costulate sculpture. In dorsal view the sides of AII terminate in acute posterior angles, which in some (but not all) specimens are slightly produced posterolaterally at their apices. Anteroventral process of AII a short cuticular flange with an acute, dentiform apex. Dorsum of AIII marginate laterally for at least the anterior quarter of the length, mid-dorsally with distinct longitudinal costulae at least on the median third, this sculpture contrasting strongly with the dorsum of AIV, which is extremely densely microreticulate to reticulate punctate and with numerous small pits. Tergites of AII and AIII in dorsal view longer than broad, AIV distinctly broader than long; maximum width of AIV 0.84–1.26, maximum length 0.70–1.00. Abdominal tergites AII to AV without setae of any form, but pubescence is distinct on AIII–AV. Setae absent from shafts of femora and tibiae of middle and hind legs but one or two minute setae may occur at their extreme apices. Pygidial fork stout, the pygidial margins on each side with a row of 6–10 spiniform denticles. Full adult colour of head and body black; on the head the scapes dull yellow and contrasting strongly with the head capsule.

FIGURES 7–9. Lateral, full face and dorsal view of body. *Simopone conradti* worker CASENT0178214.

QUEEN (dealate gyne; not previously described). HL 1.52–1.76, HW 0.94–1.16, SL 0.38–0.52, EL 0.38–0.48, PW 0.74–0.91, AIIW 0.69–0.89, AIIL 0.74–0.91, AIIIW 0.82–1.02, AIIIL 0.96–1.17, AIVW 1.01–1.27, AIVL 0.84–1.04, WL 2.14, MFL 0.82–1.04, CI 62–66, SI 40–45, SW/SL 0.52–0.57, EL/HW 0.40–0.42, EP 0.90–0.93, AIIW/AIIL 0.93–0.98, AIIIW/AIIIL 0.85–0.87 (2 measured).

Matching the description and general shape of the worker but the mesosoma with a full complement of flight sclerites.

The presence of a median clypeal prominence, coupled with the very distinctive sculpture on the tergites of AII–AIV, laterally marginate anterior portion of AIII and almost complete lack of dorsal setae, make *conradti* immediately recognisable.

Material examined. **Ivory Coast**: Lamto, Toumodi, For. de Plateau, 1974 (*W. Gotwald*). **Nigeria**: Ibadan, and Ibadan IITA, 1987 (*J. Noyes*). **Cameroun**: no loc. (*L. Conradt*); Lolodorf (*L. Conradt*) **Gabon**: Prov. Ogoové-Maritime, Rés. des Monts Doudou, NW Doussala, 2000 (*S. van Noort*). **Central African Republic**: P.N. Dzanga-Ndoki, Mabéa Bai, NE Bayanga, 2001 (*B.L. Fisher*). **Democratic Republic of Congo**: Kinshasa, 1985 (*A. Dejean*). **Uganda**: Kibale Nat. Park, Kanyawara, Makerere Univ. Biol. Field Station (*S. van Noort*). **Kenya**: Kakamega Forest, Busumbuli, 2002 (*W. Freund*).

***Simopone dryas* Bolton & Fisher sp. n.**
(Figs 10–12)

HOLOTYPE WORKER. HL 0.89, HW 0.57, SL 0.26, EL 0.24, PW 0.44, AIIW 0.43, AIIL 0.44, AIIIW 0.49, AIIIL 0.60, WL 1.00, MFL 0.48, CI 64, SI 46, EL/HW 0.42, EP 0.68, AIIW/AIIL 0.98, AIIIW/AIIIL 0.82.

With head in full-face view the midpoints of the outer margins of the eyes just touch the outlines of the sides of the head. Eyes located relatively far in front of midlength of head, EP 0.68. ES 0.21 and width of head across broadest part of eyes 0.55; minimum distance between eyes 0.24. Frontal carinae extend back to level of anterior margins of eyes and are weakly divergent posteriorly. Cephalic dorsum with scattered broad, shallow punctures. Sparse weak longitudinal ground sculpture also present in places between the eyes, but this fades out and vanishes behind the level of the posterior margins of the eyes. Leading edge of scape with a few setae, inclined toward the scape apex. Sides of head below and behind eyes with projecting short setae, inclined anteriorly. Cephalic dorsum with numerous curved setae. Mesosoma in dorsal view narrowest across the mesonotum (maximum width 0.40), broadest across the propodeum (maximum width 0.44). Pronotum marginate anteriorly; promesonotal suture almost effaced. Propodeum with a fine weak carina between dorsum and declivity. Entire dorsum of mesosoma with broad, shallow punctures that are irregularly spaced. Mesopleuron almost smooth, with just 1–2 punctures and a distinct transverse sulcus. In profile, dorsal surfaces of mesosoma and all abdominal tergites with numerous short, posteriorly curved setae that are subdecumbent to decumbent and densest on AII and AIII. Standing short setae are sparsely present on middle and hind tibiae. AII (petiole) in dorsal view with a weak transverse carina both anteriorly and posteriorly; sides almost parallel, only extremely feebly convex, the width across the anterior margin is almost the same as across the posterior margin. Dorsum of AII with scattered, shallow punctures; tergite of AIII with similar but more densely crowded punctures. On the tergite of AIV punctures are smaller than on AIII but are about of equal density. AII and AIII longer than broad, AIII distinctly so; AIV slightly broader than long (width 0.58, length 0.56). Head capsule and body blackish brown to black; scapes and funiculi dull yellow; legs yellowish brown to light brown, the femora slightly darker than the tibiae.

Holotype worker, **Kenya**: Kakamega Distr., Isecheno, Kakamega Forest, 0.24°N, 34.86°E, 1600 m, 22.iv.2003, #03-109, equatorial rainforest: in live stem of plant [the word “plant” is overwritten by a partially legible entry “…..caena”, perhaps *Dracaena*], ANTWEB. CASENT0178216 (*R.R. Snelling*) (LACM).

This small species has relatively small eyes that are located farther forward on the head capsule than any other known member of the *schoutedeni* group. See notes under *schoutedeni*.

FIGURES 10–12. Lateral, full face and dorsal view of body. *Simopone dryas* holotype worker CASENT0178216.

Simopone fulvinodis **Santschi**

Simopone fulvinodis Santschi, 1923: 262, fig. 1d. Holotype worker, DEMOCRATIC REPUBLIC OF CONGO: Kidada, Kitobola, 14–18.ix.1922 (*H. Schouteden*) (MRAC) [examined].

WORKER. HL 0.86, HW 0.64, SL 0.28, EL 0.28, PW 0.48, AIIW 0.44, AIIL 0.46, AIIIW 0.52, AIIIL 0.59, WL 1.08, MFL 0.52, CI 74, SI 44, EL/HW 0.44, EP 0.88, AIIW/AIIL 0.96, AIIIW/AIIIL 0.88.

With head in full-face view the midpoints of the outer margins of the eyes just graze the outlines of the sides of the head. ES 0.26 and width of head across broadest part of eyes 0.62. Frontal carinae extend back to level of ante-

rior margins of eyes and are weakly divergent posteriorly. Cephalic dorsum with broad, shallow punctures and with weak longitudinal ground sculpture also present between the eyes. Leading edge of scape without setae, but this may be the result of abrasion. Sides of head below and behind eyes without projecting short setae. Cephalic dorsum with a pair of curved setae, located close to level of posterior margins of eyes. Mesosoma in dorsal view narrowest at pro-mesonotal junction (width 0.45), broadest across the propodeum (maximum width 0.50). Anterior margin of pronotum weakly carinate. Propodeum with a fine weak carina between dorsum and declivity. Entire dorsum of mesosoma with broad, shallow punctures, slightly denser on the mesonotum and propodeum than on the pronotum. Mesopleuron with a few shallow punctures and a distinct transverse sulcus. In profile, dorsal surfaces of mesosoma and all abdominal tergites without numerous obvious setae; instead, on the mesosoma there is a single standing pair at the pronotal humeri and tergites of AIII and AIV have a row of short, elevated setae across the posterior margin (the possibility of abrasion must be considered). Standing setae are absent from the middle and hind femora and tibiae. AII (petiole) in dorsal view with a transverse carina both anteriorly and posteriorly; a series of 5–6 short, inconspicuous cuticular ribs extends anteriorly on the median portion of the posterior carina. Sides of AII in dorsal view are extremely feebly convex, almost straight, and gradually diverge posteriorly so that the width across the anterior margin is slightly less than across the posterior margin. Dorsum of AII and AIII with very shallow punctures. On AIV punctures are smaller and not well defined. AII and AIII longer than broad, AIV broader than long (width 0.63, length 0.56). In profile the head capsule and mesosoma dark brown; scapes and funiculi dull yellow; AII and AIII dull yellow, AII darker anteriorly; AIV and AV black; femora light brown; tibiae and tarsi dull yellow.

The striking colour pattern of *fulvinodis*, still known only from its holotype, renders the species immediately recognisable, not just in the *schoutedeni* group but throughout the genus. The pilosity of *fulvinodis* is very reduced by comparison with other members of the group, but the possibility that the holotype may have suffered some abrasion must be borne in mind. See notes under *schoutedeni*.

Material examined. **Democratic Republic of Congo**: Kidada, Kitobola (*H. Schouteden*).

Simopone grandis **Santschi**

(Figs 13–15)

Simopone grandis Santschi, 1923: 259. Syntype workers, DEMOCRATIC REPUBLIC OF CONGO: Kunungu, 2.iv.1921 (*H. Schouteden*) (MRAC, NHMB) [NHMB syntype examined].

WORKER. HL 1.74–1.86, HW 1.44–1.62, SL 0.74–0.90, EL 0.55–0.60, PW 1.02–1.18, AIIW 0.96–1.06, AIIL 1.02–1.16, AIIIW 1.22–1.35, AIIIL 1.24–1.35, WL 2.26–2.42, MFL 1.54–1.76, CI 83–87, SI 51–56, EL/HW 0.37–0.38, EP 1.86–2.00, AIIW/AIIL 0.91–0.94, AIIIW/AIIIL 0.98–1.00 (2 measured).

Anterior half of clypeus with a median longitudinal carina that extends to the clypeo-labral junction. Clypeus relatively shallowly downcurved anteriorly so that the clypeo-labral junction is not strongly reflexed but almost exactly below the anteriormost point of the apparent anterior margin. In full-face view the frontal lobes broad on each side of the clypeus, only very feebly elevated. Frontal carinae extend back almost to the level of the anterior margins of the eyes, but are feeble for most of their length and consist of an angle between antennal fossa and dorsum rather than a distinct carina. Eyes located well behind the cephalic midlength, EP > 1.50; in full-face view outer margins of eyes clearly interrupt the outlines of the sides. Leading edge of scape with 1–3 projecting setae present, SW/SL 0.42–0.47. Sides of head below and behind eyes with projecting setae present; cephalic dorsum with numerous standing long setae. Mandibles with superficial shagreenate to microreticulate sculpture and also with scattered weak punctures. Cephalic dorsum, from between frontal carinae to at least the level of the posterior margins of the eyes, very finely longitudinally costulate and with fine dense reticulate-punctate ground sculpture. Costulae tend to fade out behind level of posterior ocelli. In dorsal view pronotum with a sharply raised anterior carina and with a few short longitudinal cuticular ribs immediately behind the carina; humeri not sharply angulate; promesonotal suture with a few weak ribs or striolae that tend to be confused with the ground sculpture. Metanotal groove vestigial to absent. Propodeal declivity meets sides and dorsum in a continuous weak carina, much weaker than the pronotal carina. Entire dorsum of mesosoma with superficial fine, dense, microreticulate to reticulate-punctate ground sculpture, upon which there are a few broad, shallow punctures. Fine longitudinal costulae present at least posterolaterally on pronotal dorsum, which may be more extensive and extend onto anterior mesonotum. All dorsal surfaces of mesosoma with numerous standing setae. AII (petiole) with a transverse, weak anterior

carina, but posteriorly the dorsum slopes down to the foramen, with a trace of a transverse ridge immediately above the foramen. In dorsal view the sides of AII convex, broadest at about the midlength then converging posteriorly; posterior corners produced into a small, triangular outcurved tooth on each side. Anteroventral process of AII a recurved hook or spur. AII slightly longer than broad, AIII about as broad as long, AIV much larger (maximum width 1.62–1.84, maximum length 1.24–1.40) and distinctly much broader than long. Tergites of AII, AIII and AIV with the same microreticulate to finely reticulate-punctate ground sculpture as the mesosoma; AII and AIII also with scattered but conspicuous broad shallow punctures. Abdominal tergites from AII to apex with numerous standing long setae; sternites from AIII to apex also with standing setae. Femora and tibiae of middle and hind legs

FIGURES 13–15. Lateral, full face and dorsal view of body. *Simopone grandis* worker CASENT0173047.

with projecting setae present. Pygidial fork short and stout, the pygidial margins on each side with a row of 5–7 spiniform denticles. Full adult colour of head and body black.

Apparently known from only two collections, with a total of just three specimens, this large species is very conspicuous and should not be confused with any other Afrotropical form. The Banga specimen noted below (in MCZC) was discussed by Brown (1975). It is larger than the examined syntype and differs somewhat from the syntype in its sculpture. The longitudinal costulae of the pronotum are more strongly developed in the Banga specimen, more extensive, and also occur on the anterior mesonotum. In contrast, the mesopleuron in the Banga specimen is almost smooth, whereas in the syntype it is microreticulate, with superimposed fine longitudinal rugulae that also extend onto the metapleuron. These variations may be a function of overall size, but as so few specimens are known it is impossible to be definite. For the present the variation is regarded as without taxonomic significance at species-rank because otherwise the two share a common morphology.

Material examined. **Democratic Republic of Congo**: Kunungu (*H. Schouteden*); Banga (*J. Bequaert*).

Simopone laevissima Arnold

Simopone laevissima Arnold, 1954: 291, figs 1, 1a. Holotype worker, UGANDA: nr Kampala, Dedewe Forest, 4.v.1952, lake shore, on trunk of palm (*G. Arnold*) (SAMC) [examined].

WORKER. HL 1.24, HW 0.97, SL 0.34, EL 0.36, PW 0.78, AIIW 0.89, AIIL 0.94, AIIIW 0.94, AIIIL 0.81, WL 1.60, MFL 0.68, CI 78, SI 35, EL/HW 0.37, EP 1.90, AIIW/AIIL 0.95, AIIIW/AIIIL 1.16.

Clypeus relatively shallowly longitudinally convex, without a median carina; clypeo-labral junction anterior, not strongly reflexed below and behind the evenly convex anterior clypeal margin. Frontal lobes and carinae broad across, not elevated, continuously divergent from front to back, without a constriction at junction of lobe and carina; carinae extend back beyond the level of the anterior margins of the eyes. Eyes located well behind the cephalic midlength, EP > 1.00; in full-face view outer margins of eyes just interrupt the outlines of the sides. Sides of head shallowly convex behind the eyes, shallowly concave in front of them. Scape short (SI 35) but quite broad apically, SW/SL 0.50. Leading edge of scape with 1–2 short setae that are inclined toward the apex. Head in profile with a short, narrow, deep scrobe that extends from antennal socket to anterior margin of eye. Cephalic dorsum with two short setae on each frontal carina but only a single pair of long erect setae, located close to level of posterior margin of eye. Mandibles smooth with scattered small pits. Cephalic dorsum with scattered small punctures, here and there with a vague vestige of superficial, almost effaced, ground sculpture. Mesopleuron with a strong transverse sulcus that also extends across the entire width of the metapleuron, continuing the same line; mesopleural-metapleural sulcus also strongly developed. Mesopleural-mesonotal suture conspicuous in profile and also visible in dorsal view. Pronotum, mesonotum and propodeum each with 1–2 pairs of standing setae (may be some abrasion). In dorsal view both the promesonotal suture and the metanotal groove present but shallow; pronotum with a sharp anterior carina and acute humeri, the sides feebly convergent posteriorly; sides of mesonotum feebly concave. Pronotum relatively narrow with respect to AII, AIIW/PW 1.14. Dorsum of propodeum meets the declivity through a narrowly rounded angle, without a carina between the two surfaces. AII (petiole) with a strong anterior carina; in dorsal view the sides almost straight and markedly divergent posteriorly. Posterior corners of AII narrowly but bluntly rounded on each side of the broadly concave posterior margin, the corners not extended into laterally directed teeth. Anteroventral process of AII merely a small, insignificant tooth. AII longer than broad but AIII obviously broader than long, the latter with a shallowly convex anterior margin and sides that are almost straight and almost parallel. Uniquely among Afrotropical species AII is longer than AIII. Abdominal tergites, from AII to apex, with numerous standing long setae, the longest of which on AII and AIII are *ca* 0.60. Outline of pygidium in profile rounded downward near its base so that most of the outline is a very steep slope, almost vertical. Apex of pygidium obscured by glue but apparently without a strong pygidial fork. Mesosoma and abdominal tergites from AII to apex with small, scattered punctures on a smooth surface. Mesofemur and metafemur short, markedly incrassate medially in both dorsal and lateral views. Mesotibia and metatibia very slender basally, becoming much broader from about the midlength; metatibia in posterior view *ca* 0.06 near base, *ca* 0.17 at broadest. Shiny jet-black species, the appendages lighter.

Palp formula could not be assessed as the holotype, the only known specimen, is mounted flat on a card rectangle. *S. laevissima* is the only known member of the *grandidieri* group in the Afrotropical region, and as such is very

easily distinguished from all other species by the characters of its species group and those in the key. In addition, the pronotal width of *laevissima*, with respect to AIIW, is the narrowest in the Afrotropical and Malagasy regions, with AIIW/PW 1.14. In all other Afrotropical species the combined range of AIIW/PW is 0.89–1.07, and for Malagasy species the combined range is 0.88–1.04.

Material examined. **Uganda**: Dedewe Forest, near Kampala (*G. Arnold*).

***Simopone latiscapa* Bolton & Fisher sp. n.**
(Figs 16–18)

WORKER (holotype in parentheses). HL 1.80–1.96 (1.96), HW 1.32–1.48 (1.46), SL 0.62–0.70 (0.68), EL 0.54–0.62 (0.60), PW 1.00–1.14 (1.12), AIIW 0.94–1.09 (1.09), AIIL 0.90–1.03 (1.03), AIIIW 1.16–1.35 (1.35), AIIIL 1.03–1.20 (1.20), WL 2.00–2.30 (2.30), MFL 1.04–1.20 (1.20), CI 73–76 (74), SI 47 (47), EL/HW 0.41–0.42 (0.41), EP 1.82–1.91 (1.91), AIIW/AIIL 1.04–1.06 (1.06), AIIIW/AIIIL 1.13–1.14 (1.13) (3 measured).

Clypeus strongly reflexed so that the clypeo-labral junction is conspicuously below and far behind the anteriormost point of the apparent anterior margin. In full-face view the frontal lobes only feebly elevated on each side of the clypeus. Frontal carinae extend back almost or just to the level of the anterior margins of the eyes. Eyes located well behind the cephalic midlength, EP > 1.50; in full-face view outer margins of eyes just fail to break the outlines of the sides at their midlengths. Sides of head behind eyes shallowly convex, in front of eyes distinctly concave. Scape enormously flattened and extremely broad, SW/SL 0.79–0.81, appearing disproportionately massive in full-face view. Leading edge of scape with inclined projecting setae present, and leading edge abruptly narrowed basally to allow scape to move relative to the frontal lobes. Sides of head below and behind eyes with projecting short setae present; cephalic dorsum with standing setae present. Cephalic dorsum glossy, with scattered punctures, the surface between the punctures with minute and faint microreticular patterning. In dorsal view pronotum with a conspicuous anterior carina that is reinforced posteriorly by a number of short, longitudinal cuticular ribs; humeri not sharply angulate; promesonotal suture with short cuticular ribs. Metanotal groove vestigial to absent. Entire dorsum of mesosoma sculptured as the head but the superficial microreticulation fainter and tending to fade out posteriorly. Dorsal surfaces of mesosoma with numerous curved setae that vary from suberect to almost decumbent. AII (petiole) without a distinct transverse anterior carina, instead with an accentuated angle where anterior and dorsal surfaces meet; posteriorly with a very weak carina. In dorsal view the sides of AII shallowly convex, broadest at about the midlength then converging posteriorly; posterior corners produced into a small, bluntly triangular outcurved prominence on each side. Anteroventral process of AII a recurved hook or spur. AII in dorsal view about as long as broad, AIII and AIV distinctly broader than long; maximum width of AIV 1.40–1.60, maximum length 1.04–1.28. Abdominal tergites, from AII to apex, with numerous curved setae that are mostly subdecumbent to decumbent; more elevated on posterior margin of each tergite; sternites from AIII to apex also with setae. Femora and tibiae of middle and hind legs with numerous, very conspicuous, elevated setae. Pygidial fork short and stout, the pygidial margins on each side with a row of 9–10 spiniform denticles. Full adult colour of head and body black.

QUEEN (dealate gyne). HL 1.72–1.76, HW 1.27–1.34, SL 0.60–0.63, EL 0.52–0.56, PW 1.08–1.14, AIIW 0.94–0.96, AIIL 0.86–0.88, AIIIW 1.20–1.25, AIIIL 1.12, AIVW 1.42–1.44, AIVL 1.08–1.16, WL 2.26, MFL 1.08, CI 74–76, SI 47, SW/SL 0.73–0.76, EL/HW 0.41–0.42, EP 1.75, AIIW/AIIL 1.06–1.12, AIIIW/AIIIL 1.08–1.12 (2 measured). Matching the description and general shape of the worker but the mesosoma with a full complement of flight sclerites.

Holotype worker, **Ghana**: Tafo, K2, 12.ii.1974 (*C. Campbell*) (BMNH).

This spectacular species is immediately identified by its enormously hypertrophied antennal scapes in both worker and queen. It is known from only three workers and two queens; the Leston series from Ghana (BMNH) consists of one of each and the other queen, from Sierra Leone, was captured after it had flown into a house, though it was dealate when discovered.

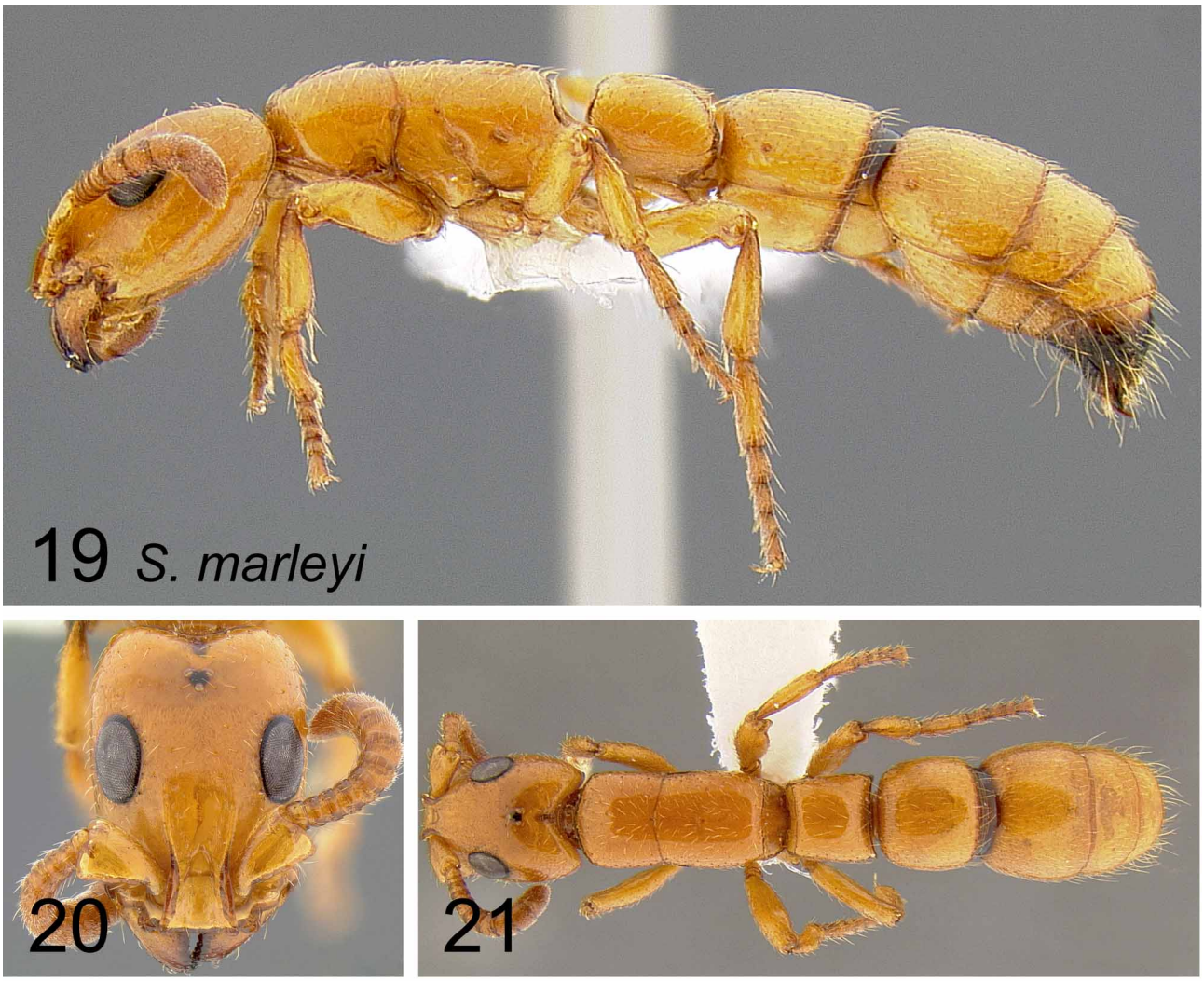
Non-paratypic material examined. **Sierra Leone**: Njala, 22.ii.1927 (*E. Hargreaves*). **Ghana**: Tafo, 12.vii.1966 (*D. Leston*). **Gabon**: Prov Woleu-Ntem, ESE Minvoul, CASENT 0004517 (*B.L. Fisher*).

FIGURES 16–18. Lateral, full face and dorsal view of body. *Simopone latiscapa* worker CASENT0004517.

***Simopone marleyi* Arnold**
(Figs 19–21)

Simopone marleyi Arnold, 1915: 20. Syntype workers, SOUTH AFRICA: Durban, Stella Bush, 1.vi.1914 (*H.W.B. Marley*) (SAMC) [examined].

WORKER. HL 1.48–1.58, HW 0.93–1.07, SL 0.40–0.46, EL 0.38–0.42, PW 0.71–0.82, AIIW 0.64–0.74, AIIL 0.65–0.72, AIIIW 0.82–0.93, AIIIL 0.76–0.88, WL 1.55–1.76, MFL 0.74–0.80, CI 63–68, SI 42–45, EL/HW 0.38–0.42, EP 1.11–1.25, AIIW/AIIL 0.97–1.06, AIIIW/AIIIL 0.97–1.08 (5 measured).



FIGURES 19–21. Lateral, full face and dorsal view of body. *Simopone marleyi* worker CASENT0106075.

Clypeus strongly reflexed so that the clypeo-labral junction is conspicuously below and far behind the anteriormost point of the apparent anterior margin. In full-face view the frontal lobes/carinae broadest anteriorly; flared outwards apically and forming a pair of rounded, anteriorly prominent small lobes whose apices project distinctly farther forward than the apparent anterior clypeal margin between them. Lateral portions of clypeus also with a prominent lobe on each side, in full-face view located in front of the antennal sockets, lateral to and on a slightly lower level than the apical lobes of the frontal lobes. Frontal carinae extend back to the level of the anterior margins of the eyes. Eyes located close to the cephalic midlength, EP 1.11–1.25; in full-face view outer margins of eyes do not interrupt the outlines of the sides. Scape flattened apically but not extremely broad, SW/SL 0.63–0.69. Leading edge of scape with 1–2 short inconspicuous setae present. Sides of head below and behind eyes with a few very short, anteriorly curved setae present; cephalic dorsum with a few short, subdecumbent to decumbent inconspicuous setae present. Cephalic dorsum with faint, weak superficial microreticulate ground sculpture, upon which are scattered a few punctures. In dorsal view pronotum with a conspicuous anterior carina; humeri not sharply angulate; promesonotal suture an incised line, without distinct cross-ribs. Metanotal groove vestigial to absent. Side of pronotum, just above base of anterior coxa, with a conspicuous translucent fenestra of extremely thin cuticle. Propodeum with a weaker carina between dorsum and declivity, which continues down the sides of the declivity. Entire dorsum of mesosoma sculptured as the head but the superficial microreticulation may be extremely faint, no

more than surface patterning. Dorsal surfaces of mesosoma with short setae that are decumbent to appressed. AII (petiole) with a very weak transverse ridge between anterior and dorsal surfaces; posteriorly with a somewhat stronger ridge or weak carina. In dorsal view the sides of AII are divergent from front to rear, broadest at or just before the posterior angles, the latter acute and sometimes slightly produced laterally. Anteroventral process of AII a short cuticular flange that may be dentiform apically; not a slender recurved hook or spur. AII in dorsal view about as long as broad, AIII usually fractionally broader than long, and AIV distinctly broader than long; maximum width of AIV 0.97–1.14, maximum length 0.76–0.88. Abdominal tergites, from AII to apex, without distinct elevated setae except at their apices; most setae very short and almost appressed, with the appearance of appressed long pubescence. Femora and tibiae of middle and hind legs with very sparse, short, strongly inclined setae, almost hairless. Pygidial fork short and stout, the pygidial margins on each side with a row of 6–7 denticles. Full adult colour of head and body clear yellow, pretergites of AIV and posterior halves of pygidium and hypopogyium dark brown.

QUEEN (dealate gyne; not previously described). HL 1.52–1.54, HW 1.02, SL 0.44, EL 0.40–0.41, PW 0.86–0.87, AIIW 0.67–0.72, AIIL 0.70–0.71, AIIIW 0.89–0.92, AIIIL 0.84–0.86, AIVW 1.08–1.14, AIVL 0.88–0.92, WL 1.74–1.82, MFL 0.80–0.82, CI 66–67, SI 43, SW/SL 0.70, EL/HW 0.39–0.40, EP 1.22–1.25, AIIW/AIIL 0.96–1.01, AIIIW/AIIIL 1.06–1.07 (2 measured). Matching the description and general shape of the worker but the mesosoma with a full complement of flight sclerites.

This beautiful South African species is unlikely to be confused with any other in the region. The morphology of the clypeus and frontal lobes is unique among the Afrotropical species, and this, coupled with its size and the clear yellow colour of nearly the entire head and body, renders the species unmistakable. The series collected by Robertson (SAMC, BMNH), mentioned below, contains workers, queens and males. This is the only Afrotropical species for which a worker-associated male is known.

Material examined. **South Africa**: Durban, Stella Bush, 1914 (*H.W.B. Marley*); Natal, Mkuze Game Res., 1986, C242 (*H.G. Robertson*).

Simopone matthiasi Kutter

Simopone matthiasi Kutter, 1977: 173, figs 1–6. Holotype queen (dealate), CAMEROUN: Buea, 6.iii.1937, no. 2078, “in meinen Hosen” (*H. Kutter*) (NHMB) [examined].

QUEEN (dealate gyne). HL 1.01, HW 0.82, SL 0.34, EL 0.35, PW 0.65, AIIW 0.54, AIIL 0.48, AIIIW 0.68, AIIIL 0.69, WL 1.42, MFL 0.66, CI 81, SI 41, EL/HW 0.43, EP 1.20, AIIW/AIIL 1.13, AIIIW/AIIIL 0.99.

Visible anterior margin of clypeus is convex, anterior to and above the clypeo-labral junction, so that the latter is slightly but obviously reflexed. Frontal carinae short, not extending back beyond the level of the posterior point of the frontal triangle, their apices markedly in front of the level of the anterior margins of the eyes; between apex of frontal carina and eye with a line determined by a change of sculpture: antennal fossa much less strongly sculptured than dorsum. Clypeus broad and flat across, the frontal lobes form narrow, convex, subtranslucent flanges on each side. Eyes located at about the cephalic midlength, EP 1.20; in full-face view outer margins of eyes just touch the outlines of the sides; they do not conspicuously interrupt the outlines. Scape with SW/SL 0.47. Leading edge of scape without projecting setae (may be abraded). Cephalic dorsum with a single short seta located just behind level of midlength of eye, and a second, slightly longer, seta at the posterior margin (both missing from left-hand side of holotype). Sides of head in full-face view without projecting setae. Mandibles smooth with scattered small pits. Cephalic dorsum, from level of apices of frontal carinae to level of posterior margins of eyes, with fine and very dense reticulate-punctate sculpture, and also with scattered minute costulae, mainly longitudinal, that appear to be formed by the alignment of puncture margins. Pronotum with a single pair of short setae, close to the humeri; mesosoma otherwise without conspicuous setae. In dorsal view pronotum without a sharp anterior carina and the humeri rounded, not sharply angled. Width of mesonotum across tegulae 0.72; mesoscutum with maximum width 0.66, maximum length 0.48. Dorsum of pronotum, mesoscutum and propodeum punctate, the punctures crowded but with narrow spaces between them; not reticulate. Faint traces of superficial ground sculpture may be present between the punctures. Declivity of propodeum meets the sides and the dorsum in a continuous low carina; declivity with faint superficial reticular patterning, not smooth. Dorsum of AII (petiole) angulate anteriorly, extremely weakly carinate posteriorly; the sides weakly convex and broadest at about the midlength. Posterior corners of AII

angulate but not produced into laterally directed teeth; the posterior margin approximately transverse. Anteroventral process of AII a recurved cuticular hook, the space between the apex and base of the hook filled with a cuticular lamella. AII broader than long, AIII about as broad as long, AIV broader than long (width 0.88, length 0.74). Abdominal tergites AII, AIII and AIV with conspicuous pubescence but without standing setae except for a sparse row of short setae on the posterior margins of AIII and AIV; these tergites densely punctate. Pygidial fork short and blunt; lateral margin anterior to fork with only 2–3 small teeth, the first of which is fused to the base of the fork. Middle and hind femora and tibiae with pubescence but without standing setae on any surface. Full adult colour of head and body uniform light brown.

Known only from the very distinctive holotype queen; no workers whose morphology even approaches that of the queen have been discovered.

Material examined: **Cameroun**: Buea (*H. Kutter*).

***Simopone miniflava* Bolton & Fisher sp. n.**
(Figs 22–24)

HOLOTYPE QUEEN (dealate gyne). HL 0.84, HW 0.56, SL 0.27, EL 0.28, PW 0.45, AIIW 0.42, AIIL 0.44, AIIIW 0.52, AIIIL 0.58, WL 1.14, MFL 0.48, CI 67, SI 48, EL/HW 0.50, EP 1.07, AIIW/AIIL 0.95, AIIIW/AIIIL 0.90.

With head in full-face view the midpoints of the outer margins of the eyes distinctly interrupt the outlines of the sides of the head. ES 0.25 and width of head across broadest part of eyes 0.58; minimum distance between eyes 0.26. Frontal carinae extend back to level of anterior margins of eyes and are weakly divergent posteriorly. Cephalic dorsum with extremely sparse scattered vestiges of shallow punctures; without trace of longitudinal ground sculpture. Leading edge of scape with a few setae, inclined toward the scape apex. Sides of head below and behind eyes with projecting short setae, inclined anteriorly. Cephalic dorsum with numerous short, curved setae and also with two much longer, posteriorly curved setae above each eye. Ventral surface of head with numerous short setae. Mesosoma in dorsal view with mesoscutum 0.45 maximum width, 0.33 maximum length. Anterior margin of pronotum without a defined carina; the junction of anterior and dorsal surfaces marked by a blunt angle and a weak, broken margination that appears to consist of the anterior edges of a line of shallow punctures. Propodeum with an angle between dorsum and declivity, without a carina, but a low carina present on each side of declivity. Entire dorsum of mesosoma with very sparse broad shallow punctures, without ground sculpture between them. Mesopleuron without a transverse sulcus. Propodeal declivity smooth. In profile, dorsal surfaces of mesosoma and abdominal tergites AII and AIII with numerous short curved setae. Standing setae are present on middle and hind femora and tibiae. AII (petiole) in dorsal view with a weak transverse carina both anteriorly and posteriorly. Sides of AII straight and parallel for most of their length, slightly narrowed immediately behind the anterior carina; width across AII is constant for most of its length. Dorsum of AII with weak vestiges of punctures, mostly smooth. On AIII the punctures are better defined than on AII but are widely separated; without ground sculpture on either segment. Abdominal segments behind AIII missing. AII and AIII longer than broad. Head, body and appendages entirely yellow, scapes and funiculi not contrasting with the head capsule. The only traces of darker colour occur as a small patch between the ocelli, around the flight sclerites and on the helcium.

Holotype queen, **Gabon**: Ogoové-Maritime, Réserve des Monts Doudou, 25.2 km 304° NW Doussala, 2°13.63’S, 10°23.67’E, 600 m, 16.iii.2000, sweep GA00-S123, coastal lowland rainforest, undergrowth, low canopy in forest (*S. van Noort*) (CASC).

Holotype is badly damaged, with abdominal segments after AIII missing.

This small, uniformly yellow species is quite different from any other in the group. The combination of its colour, complete lack of cephalic ground sculpture, and mostly parallel-sided AII and dimensions render it immediately recognisable. Coupled with this, the lack of a distinct mesopleural transverse sulcus is unique among the few known queens of the *schoutedeni* group. See notes under *schoutedeni*.

FIGURES 22–24. Lateral, full face and dorsal view of body. *Simopone miniflava* holotype queen CASENT0260386.

***Simopone occulta* Bolton & Fisher sp. n.**
(Figs 25–27)

HOLOTYPE WORKER. HL 0.78, HW 0.49, SL 0.22, EL 0.24, PW 0.37, AIIW 0.36, AIIL 0.39, AIIIW 0.44, AIIIL 0.48, WL 0.94, MFL 0.38, CI 63, SI 45, EL/HW 0.49, EP 0.76, AIIW/AIIL 0.92, AIIIW/AIIIL 0.92.

With head in full-face view the outlines of the outer margins of the eyes very nearly touch the outlines of the sides of the head. ES 0.25 and width of head across broadest part of eyes 0.49. Cephalic dorsum with scattered broad, shallow punctures. Ground sculpture almost effaced between the eyes, here and there with vestiges but without longitudinal fine striolae. Leading edge of scape with a few setae, inclined toward the scape apex. Sides of head

below and behind eyes with projecting short setae, inclined anteriorly. Cephalic dorsum with a number of short setae and with a few pairs of longer setae present on the frontal carinae and above the eye. Ventral surface of head with short setae. Mesosoma in dorsal view narrowest across the mesonotum (maximum width 0.38), broadest across the propodeum (maximum width 0.39). Anterior margin of pronotum weakly marginate. Propodeal carina between dorsum and declivity extremely feebly developed, almost effaced. Entire dorsum of mesosoma with widely spaced broad, shallow punctures that are most widely spaced on the pronotum. Mesopleuron with a few punctures and a distinct transverse sulcus. In profile, dorsal surfaces of mesosoma and all abdominal tergites with numerous posteriorly curved setae. Standing setae present on middle and hind tibiae. AII (petiole) in dorsal view with a weak transverse carina both anteriorly and posteriorly; sides almost straight so that the width across the anterior margin is almost exactly the same as across the posterior margin. Dorsum of AII with scattered, shallow punctures. Tergite of AIII with more crowded punctures, so that some are adjacent; diameters of punctures always greater than the distances between them. AII and AIII longer than broad, AIV broader than long (width 0.54, length 0.47; AIVW/AIVL 1.15). Head capsule and body blackish brown to black; scapes and funiculi light brown; femora and tibiae brown.

FIGURES 25–27. Lateral, full face and dorsal view of body. *Simopone occulta* holotype worker CASENT0004519.

Holotype worker, **Gabon**: Prov. Ogooue-Maritime, Res. Monts Doudou, 25.2 km 304° NW Doussala, 2°13.6'S, 10°23.7'E, 14.iii.2000, 640 m. 2246(25), CASENT0004519, beating low vegetation, rainforest (*B.L. Fisher*) (CASC).

This small species appears closely related to *amana*, but its eyes are located farther forward on the head and there is no dense, longitudinal striolate ground sculpture between the eyes. See notes under *schoutedeni*.

***Simopone persculpta* Bolton & Fisher sp. n.**
(Figs 28–30)

WORKER (holotype in parentheses). HL 1.66–1.80 (1.66), HW 1.18–1.36 (1.18), SL 0.57–0.70 (0.57), EL 0.48–0.52 (0.48), PW 0.89–1.00 (0.89), AIIW 0.84–0.98 (0.84), AIIL 0.96–1.04 (0.96), AIIIW 1.06–1.17 (1.06), AIIIL 1.18–1.23 (1.18), WL 2.08–2.20 (2.08), MFL 1.10–1.30 (1.10), CI 71–76 (71), SI 48–51 (48), EL/HW 0.37–0.41 (0.41), EP 1.50–1.73 (1.52), AIIW/AIIL 0.88–0.94 (0.88), AIIIW/AIIIL 0.90–0.95 (0.90) (4 measured).

Clypeus relatively shallowly downcurved anteriorly so that the clypeo-labral junction is not strongly reflexed but almost exactly below the anteriormost point of the apparent anterior margin. In full-face view the frontal lobes broad on each side of the clypeus, only very feebly elevated. Frontal carinae extend back to the level of the anterior margins of the eyes. Eyes located well behind the cephalic midlength, EP at least 1.50; in full-face view outer margins of eyes just touch, or very slightly break, the outlines of the sides at their midlengths. Leading edge of scape with inclined projecting setae present, SW/SL 0.46–0.48. Sides of head below and behind eyes with a few (2–4) projecting setae present, but these seem easily lost by abrasion; cephalic dorsum with standing setae present, mostly behind the level of the eyes. Mandibles with superficial shagreenate to microreticulate sculpture and also with scattered weak punctures. Entire cephalic dorsum finely and extremely densely reticulate-punctulate to microreticulate, without longitudinal costulae but with scattered larger, shallow punctures whose bases are also reticulate-punctulate. Reticulate-punctulate to microreticulate ground sculpture also duplicated on sides and ventral surface of head. In dorsal view pronotum with a narrow anterior carina; humeri not sharply angulate; promesonotal suture with minute weak cuticular ribs that are largely confused with the dense ground sculpture. Metanotal groove vestigial to absent. Propodeal declivity meets sides and dorsum in a poorly defined, low, continuous ridge. Entire dorsum and sides of mesosoma sculptured as the head but with a few larger punctures. Dorsal surfaces of mesosoma with sparse standing setae; pronotum anteriorly with 1–3 pairs, mesonotum anteriorly with 0–2 pairs, propodeum posteriorly with 1–2 pairs. AII (petiole) with a weak transverse anterior carina, and another posteriorly, just above the foramen. In dorsal view the sides of AII shallowly convex, broadest at about the midlength then converging posteriorly; posterior corners produced into a small, triangular outcurved tooth on each side. Anteroventral process of AII a recurved hook or spur. AII and AIII both slightly longer than broad, AIV much larger (maximum width 1.30–1.50, maximum length 1.14–1.20) and distinctly broader than long. Tergites of AII, AIII and AIV microreticulate to finely reticulate-punctate; AII and AIII also with shallow punctures, usually more conspicuous on AIII. Abdominal tergites, from AII to apex, with standing long, curved setae; sternites from AIII to apex also with standing setae. Femora and tibiae of middle and hind legs with very sparse short scattered setae. Pygidial fork short and stout, the pygidial margins on each side with a row of 7 spiniform denticles. Full adult colour of head and body dark brown to black.

QUEEN (a single dealate gyne from Tanzania, in SAMC). Slightly larger than any worker examined, HL 1.88, HW 1.40, SL 0.70, EL 0.53, PW 1.11, AIIW 0.97, AIIL 1.08, AIIIW 1.22, AIIIL 1.35, AIVW 1.56, AIVL 1.38, WL 2.56, MFL 1.28, CI 74, SI 50, SW/SL 0.45, EL/HW 0.38, EP 1.52, AIIW/AIIL 0.90, AIIIW/AIIIL 0.90. Matching the description and general shape of the worker but the mesosoma with a full complement of flight sclerites and more numerous setae.

Holotype worker, **Kenya**: Mombasa area, 1969 no. 93, CIE A4271, on *Lynometra webberi* (no collector's name) (BMNH).

Paratype. One worker with same data as holotype; specimen broken and mounted in two parts (BMNH).

This very striking species appears to be closely related to *grandis* because of the shapes of the clypeus and petiole, and the position of the eyes. They are easily distinguished by the characters given in the key and by their very different sculpture.

FIGURES 28–30. Lateral, full face and dorsal view of body. *Simopone persculpta* worker CASENT0173049.

Note. The specimen initially labelled as holotype for this species, and illustrated in this paper, was lost in the post before the manuscript was submitted. Its full data, in case the specimen should eventually be recovered, is: Mozambique: Inhaca Island, near research station, 1 m, 26°2’9’’S, 32°54’17’’E, 21.vi.1992, secondary forest on vegetation, 0.60w; ANTWEB CASENT 0173049 (*G.D. Alpert*) (property of MCZC). Because the disappearance occurred before the manuscript was completed, holotype status was transferred to the BMNH specimen noted above.

Non-paratypic material examined. **Tanzania**: above Kisiwani on Nakombo River, 15.v.1996 (*H.G. Robertson & D. Mafunde*). **Mozambique**: Inhaca Island (*G.D. Alpert*). **South Africa**: Natal, N. of Richard’s Bay, 1991 (*A. de Kock & J.D. Majer*).

***Simopone rabula* Bolton & Fisher sp. n.**

HOLOTYPE WORKER. HL 1.10, HW 0.80, SL 0.34, EL 0.31, PW 0.61, AIIW 0.62, AIIL 0.58, AIIIW 0.71, AIIIL 0.73, WL 1.40, MFL 0.60, CI 73, SI 43, EL/HW 0.39, EP 0.86, AIIW/AIIL 1.07, AIIIW/AIIIL 0.97.

With head in full-face view the midpoints of the outer margins of the eyes just fail to break the outlines of the sides of the head. ES 0.28 and width of head across broadest part of eyes 0.79; minimum distance between eyes 0.41. Frontal lobes shallowly elevated away from level of clypeus. Cephalic dorsum with scattered broad, shallow punctures. Weak longitudinal ground sculpture also present between the eyes, but this fades out and vanishes behind the level of the posterior margins of the eyes. Leading edge of scape with a few setae, inclined toward the scape apex. Sides of head below and behind eyes with projecting short setae, inclined anteriorly. Cephalic dorsum with numerous short, curved setae that are mostly subdecumbent to decumbent, curved anteriorly near the posterior margin. Ventral surface of head with numerous short setae. Mesosoma in dorsal view narrowest across the mesonotum (maximum width 0.61), broadest across the propodeum (maximum width 0.67). Anterior margin of pronotum marginate to weakly carinate. Propodeum with a fine weak carina between dorsum and declivity. Entire dorsum of mesosoma with broad, shallow punctures, denser on the mesonotum and propodeum than on the pronotum. Mesopleuron almost smooth, with just 1–2 punctures and a distinct transverse sulcus. Propodeal declivity with a band of weak sculpture immediately below the carina. In profile, dorsal surfaces of mesosoma and all abdominal tergites with numerous short, posteriorly curved setae that are subdecumbent to decumbent and densest on AIII and AIV. Standing setae are sparsely present on dorsal surfaces of middle and hind tibiae. AII (petiole) in dorsal view broader than long, its anterior and dorsal surfaces meeting in an angle but without a distinct carina; with a weak transverse ridge and impression posteriorly. Sides of AII shallowly convex in dorsal view, broadest near the mid-length, the width across the anterior margin slightly less than across the posterior margin. Dorsum of AII with large, shallow punctures whose diameters are mostly greater than the distances that separate them. On AIII the punctures are slightly smaller than on AII but are even more crowded. On AIV punctures are even smaller but are still crowded, with their diameters at least equal to the distances between them. AIII longer than broad, AIV broader than long (width 0.82, length 0.74). Head capsule and body black; scapes and funiculi dull yellow; coxae and femora brown; tibiae and tarsi yellow.

Holotype worker, **Tanzania**: Mkomazi Game Reserve, 3°57.43’S, 37°46.12’E, 10.i.1996, tree canopy fogging, 3/49, *Drypetes parvifolia*, SAM-HYM-C024490 (*G. McGavin*) (SAMC).

Closely related to *schoutedeni* and separated from it by the characters given in the key. In general, *rabula* is a larger species than *schoutedeni* but has smaller eyes and a distinctly broader AII (broader than long) in which the sides are weakly convex, rather than straight. In addition, in perfect full-face view the midpoints of the outer margins of the eyes just interrupt the outlines of the sides of the head in *schoutedeni*, whereas in *rabula* they fail to do so.

***Simopone schoutedeni* Santschi**

Simopone schoutedeni Santschi, 1923: 260, figs 1a–c. Holotype worker, DEMOCRATIC REPUBLIC OF CONGO: Kamai-embi près Luebo, 17.ix.1921 (*H. Schouteden*) (MRAC) [examined].

WORKER. HL 0.98, HW 0.67, SL 0.32, EL 0.32, PW 0.51, AIIW 0.49, AIIL 0.52, AIIIW 0.60, AIIIL 0.64, WL 1.14, MFL 0.52, CI 68, SI 48, EL/HW 0.48, EP 1.00, AIIW/AIIL 0.94, AIIIW/AIIIL 0.94.

With head in full-face view the midpoints of the outer margins of the eyes just interrupt the outlines of the sides of the head. ES 0.28 and width of head across broadest part of eyes 0.68; minimum distance between eyes 0.32. Frontal lobes almost flat, only minutely raised away from level of clypeus. Frontal carinae extend back to level of anterior margins of eyes and are weakly divergent posteriorly. Cephalic dorsum with scattered broad, shallow punctures. Weak longitudinal ground sculpture also present between the eyes, but this fades out and vanishes behind the level of the posterior margins of the eyes. Leading edge of scape with a few setae, inclined toward the scape apex. Sides of head below and behind eyes with projecting short setae, inclined anteriorly. Cephalic dorsum with numerous short, curved setae that are mostly subdecumbent to decumbent, curved anteriorly near the posterior margin. Ventral surface of head with numerous short setae. Mesosoma in dorsal view narrowest across the mesonotum (maximum width 0.48), broadest across the propodeum (maximum width 0.54). Anterior margin of pronotum

marginate rather than sharply carinate; the junction of anterior and dorsal surfaces marked by an angle and change of sculpture rather than a sharp carina. Propodeum with a fine weak carina between dorsum and declivity. Entire dorsum of mesosoma with broad, shallow punctures, denser on the mesonotum and propodeum than on the pronotum. Mesopleuron almost smooth, with just 1–2 punctures and a distinct transverse sulcus. Propodeal declivity appears smooth but is difficult to see because the anterior surface of AII is very close to it. In profile, dorsal surfaces of mesosoma and all abdominal tergites with numerous short, posteriorly curved setae that are subdecumbent to decumbent and densest on AIII and AIV. Standing setae are visible on right profemur and left mesotibia of holotype (obscured elsewhere on legs by glue and poor mounting). AII (petiole) in dorsal view longer than broad, with a weak transverse carina both anteriorly and posteriorly, the sides straight and parallel so that the width across the anterior margin the same as across the posterior margin. Dorsum of AII with large, shallow punctures whose diameters are greater than the distances that separate them. On AIII the punctures are slightly smaller than on AII but are even more crowded. On AIV punctures are even smaller but are still crowded, with their diameters greater than the distances between them. AIII longer than broad, AIV broader than long (width 0.68, length 0.62). Head capsule and body black; scapes and funiculi dull yellow; coxae and femora brown; tibiae and tarsi yellow.

Still known only from the holotype, *schoutedeni* is most likely to be confused with *rabula*, but this species differs in a number of critical characters, as mentioned under *rabula* above. Elsewhere in the group, *schoutedeni* may be confused with *wilburi* and *vepres*, because the size and prominence of its eyes (ES 0.28) are intermediate between these two larger-eyed species (ES 0.31–0.35) and the remainder of the group, in which the eyes are smaller (ES 0.20–0.26), and generally just fail to break the outline of the side of the head in full-face view. However, in *schoutedeni* the sides of AII (petiole), in dorsal view, are remarkably straight and parallel so that the width of the segment across its anterior carina is the same as across its posterior carina. In both *vepres* and *wilburi* the sides of AII in dorsal view are convex and diverge posteriorly, so that the width of the segment across its anterior carina is distinctly less than across its posterior carina.

The eleven species currently included in the *schoutedeni* group are best separated by the characters in the key, but at least one alternative system may be used. Seven of the eleven species have fine ground sculpture on the head between the eyes that is arranged into minute, irregular, roughly parallel longitudinal striolae or costulae, usually right across the interocular space. These minute costulae run between, and sometimes through, the broad shallow foveolate punctures that also occur in this area. Of the seven, *fulvinodis* is immediately isolated by its unique colour pattern and *dryas* by its long, narrow AIII and its small, relatively anteriorly located eyes. Of the remaining five species in this complex, *schoutedeni* is the only one to exhibit AII with parallel straight sides in dorsal view, so that the anterior and posterior widths of AII are almost exactly the same. In *amana*, *annettae* and *wilburi* the anterior width of AII is less than the posterior width, often obviously so, and all three are smaller than *schoutedeni*. *S. wilburi* has larger, more prominent eyes than *amana* and *annettae*, and *annettae* has AII broader than long, whereas in *wilburi* and *amana* AII is longer than broad.

The other four species lack conspicuous longitudinally arranged ground sculpture between the eyes, but small patches of disorganised microsculpture may be present, and even one or two tiny, isolated longitudinal striolae may occur. Of these, *miniflava* is quickly isolated by its uniformly yellow colour and *brunnea* has the punctures on the tergite of AIII reduced to widely separated pin-pricks, rather than the closely packed foveolate punctures that are more characteristic of the group. *S. vepres* is larger than *occulta* (*e.g.* HW 0.69 versus 0.49) and has larger, more prominent eyes. In addition, AII in *vepres* is broader posteriorly than anteriorly, whereas in *occulta* the two widths are almost exactly the same.

Material examined. **Democratic Republic of Congo**: Kamaiembi near Luebo (*H. Schouteden*).

Simopone vepres Bolton & Fisher sp. n.

HOLOTYPE WORKER (paratype in parentheses). HL 0.96 (0.96), HW 0.69 (0.69), SL 0.34 (0.34), EL 0.34 (0.34), PW 0.54 (0.52), AIIW 0.53 (0.49), AIIL 0.50 (0.48), AIIIW 0.65 (0.61), AIIIL 0.60 (0.56), WL 1.18 (1.16), MFL 0.59 (0.60), CI 72 (72), SI 49 (49), EL/HW 0.49 (0.49), EP 0.97 (0.95), AIIW/AIIL 1.06 (1.02), AIIIW/AIIIL 1.08 (1.09) (2 measured).

With head in full-face view the outlines of the outer margins of the eyes conspicuously project beyond the outlines of the sides of the head through at least the median third of their lengths. ES 0.31 and width of head across

broadest part of eyes 0.70–0.72; minimum distance between eyes 0.32–0.33. Frontal carinae extend back to level of anterior margins of eyes and are weakly divergent posteriorly. Cephalic dorsum with scattered broad, shallow punctures. Between the eyes, ground sculpture is virtually absent in the holotype; the surface is more or less smooth between the punctures. Cephalic ground sculpture is more obvious between the eyes of the paratype but very weak and superficial, not organised into obvious longitudinal costulae between the punctures. Leading edge of scape with a few setae, inclined toward the scape apex. Sides of head below and behind eyes with projecting short setae, inclined anteriorly. Cephalic dorsum with numerous short, curved setae and with a few pairs of longer setae present; longest setae occur on the frontal carinae and above the eye. Ventral surface of head with short setae. Mesosoma in dorsal view narrowest across the mesonotum (maximum width 0.49–0.51), broadest across the propodeum (maximum width 0.56–0.58). Anterior margin of pronotum weakly, finely carinate. Propodeum with a fine weak carina between dorsum and declivity. Entire dorsum of mesosoma with widely spaced broad, shallow punctures, somewhat less dense on pronotum than elsewhere. Mesopleuron almost smooth, with a few punctures and a distinct transverse sulcus. Propodeal declivity smooth except for a narrow band of superficial sculpture immediately below the dorsal carina. In profile, dorsal surfaces of mesosoma and all abdominal tergites with numerous posteriorly curved setae. Standing setae are sparsely present on middle and hind tibiae. AII (petiole) in dorsal view with a weak transverse carina both anteriorly and posteriorly, the sides convex and divergent posteriorly, broadest just behind the midlength; the width across the anterior margin is less than across the posterior margin. Dorsum of AII with large, shallow punctures whose diameters are usually equal to or greater than the distances that separate them. On tergite of AIII the punctures are of similar size and distribution. AII and AIII both broader than long, AIV distinctly broader than long (width 0.68–0.71, length 0.58–0.60; AIVW/AIVL 1.17–1.18). Head capsule and body glossy brown; scapes and funiculi dull yellow; femora light brown, much lighter than mesosoma; tibiae and tarsi yellow.

Holotype worker (upper specimen of two on pin), **Ghana**: Tafo, K2, 26.v.1976, nest in rotten cherelles; prey = brood of *Crematogaster* (*C. Campbell*) (BMNH).

Paratype. One worker mounted below holotype, AIII to apex detached and glued separately on same card triangle (BMNH).

Known only from two specimens, this relatively large-eyed species is close to *wilburi* but separated from it by the characters given in the key. See notes under *schoutedeni*.

Simopone wilburi Weber stat. rev.

(Figs 31–33)

Simopone wilburi Weber, 1949: 7, figs 6, 7. Holotype worker, DEMOCRATIC REPUBLIC OF CONGO ("B. Congo" on data label): Ituri F., Beni-Irumu, 17 mi. north of Beni, 24.ii.1948, #2119 (*N.A. Weber*) (AMNH) [examined]. **Stat. rev.** [Previously junior synonym of *schoutedeni*: Brown, 1975: 36.]

WORKER. HL 0.94–1.08, HW 0.64–0.75, SL 0.32–0.40, EL 0.34–0.40, PW 0.47–0.55, AIIW 0.48–0.55, AIIL 0.49–0.58, AIIIW 0.57–0.67, AIIIL 0.58–0.72, WL 1.14–1.36, MFL 0.58–0.69, CI 67–71, SI 50–54, EL/HW 0.51–0.53, EP 0.86–1.00, AIIW/AIIL 0.93–0.98, AIIIW/AIIIL 0.94–1.00 (7 measured).

With head in full-face view the outlines of the outer margins of the eyes conspicuously project beyond the outlines of the sides of the head through at least the median third of their lengths. ES 0.30–0.35 and width of head across broadest part of eyes 0.67–0.76; minimum distance between eyes 0.28–0.36. Frontal carinae extend back to level of anterior margins of eyes and are weakly divergent posteriorly. Cephalic dorsum with scattered broad, shallow punctures. Ground sculpture is present between the eyes, organised into roughly longitudinal fine costulae or striolae between the punctures; ground sculpture fades out behind the level of the eyes. Leading edge of scape with a few setae, inclined toward the scape apex. Sides of head below and behind eyes with projecting short setae, inclined anteriorly. Cephalic dorsum with numerous short, curved setae and with a few pairs of longer setae present; longest setae occur on the frontal carinae and above the eye. Ventral surface of head with short setae. Mesosoma in dorsal view narrowest across the mesonotum (maximum width 0.46–0.54), broadest across the propodeum (maximum width 0.51–0.62). Anterior margin of pronotum weakly, finely carinate. Propodeum with a fine weak carina between dorsum and declivity. Entire dorsum of mesosoma with widely spaced broad, shallow punctures, somewhat less dense on pronotum than elsewhere. Mesopleuron with a few punctures and a distinct transverse sul-

cus. Propodeal declivity smooth except for a narrow band of disorganised superficial sculpture immediately below the dorsal carina. In profile, dorsal surfaces of mesosoma and all abdominal tergites with numerous posteriorly curved setae. Standing setae are sparsely present on middle and hind tibiae. AII (petiole) in dorsal view with a weak transverse carina both anteriorly and posteriorly, the sides convex and divergent posteriorly, broadest just behind the midlength; the width across the anterior margin is less than across the posterior margin. Dorsum of AII with large, shallow punctures whose diameters are usually equal to or greater than the distances that separate them. On tergite of AIII the punctures are of similar size and distribution. AII and AIII both usually slightly longer than broad, AIV distinctly broader than long (width 0.68–0.78, length 0.56–0.73; AIVW/AIVL 1.07–1.20). Head capsule and body black; scapes and funiculi dull yellow; femora brown; tibiae and tarsi yellow.

QUEEN (dealate gyne; not previously described). Answers the description of the worker. About the same size as the largest worker but with a full complement of flight sclerites. HL 1.08, HW 0.74, SL 0.39, EL 0.37, PW 0.56, AIIW 0.54, AIIL 0.58, AIIIW 0.70, AIIIL 0.75, WL 1.44, MFL 0.70, CI 69, SI 53, EL/HW 0.50, EP 0.90, AIIW/AIIL 0.93, AIIIW/AIIIL 0.93; mesoscutum maximum width 0.64, maximum length 0.40.

FIGURES 31–33. Lateral, full face and dorsal view of body. *Simopone wilburi* worker CASENT0004516.

Closely related to *vepres* but separated by the characters in the key. In addition, in the little material available, EL/HW tends to be a little lower in *vepres*. *S. wilburi* is known to be size-variable in the worker, an observation that may apply throughout the *schoutedeni* group. A short series of six *wilburi* workers from near Minvoul, in Gabon (CASC) produced both the largest and smallest examples of the species noted above (*e.g.* HW 0.94–1.08), the latter the same size as the holotype; all others fell between these extremes, but of course it is not known if these include the actual minimum and maximum sizes possible. See also the notes under *schoutedeni*.

Brown (1975) synonymised *wilburi* under *schoutedeni*, and indeed the two do seem very closely related. But direct comparison of the holotypes of the two shows distinct differences in the size of the eyes and in the shape of AII. These features were consistent in all specimens assigned to *wilburi* here, and consistently different from the holotype of *schoutedeni*, still the only known specimen of that species. *S. wilburi* is therefore removed from synonymy and reinstated at species-rank.

Material examined. **Cameroun**: Minko Meyos, S of Yaoundé (*J.L. Mercier*). **Gabon**: Prov. Ogooué-Maritime, Res. Monts Doudou, NW Doussala (*B.L. Fisher*); Prov. Woleu-Ntem, ESE Minvoul (*B.L. Fisher*), two short series. **Democratic Republic of Congo**: Ituri For., Beni-Irumu, N of Beni (*N.A. Weber*).

Malagasy fauna of *Simopone*

Currently 16 species have been recorded from the Malagasy region, all confined to Madagascar. This total includes 14 species of the *emeryi* group and two species of the *grandidieri* group.

Key to workers of Malagasy species of *Simopone*

Workers remain unknown in *mayri*; see key to males, below.

1 Mesopleuron with a sharply incised transverse sulcus present across the entire sclerite; posteriorly the sulcus continuous with, and as strongly developed as, the sulcus between mesopleuron and metapleuron. Dorsal apex of pygidium with a row of 4 small teeth above the sting, without a stoutly bifid cuticular fork. Palp formula 5,3 2

\- Mesopleuron entire, without a transverse sulcus across the entire sclerite that is continuous with, and as strongly developed as, the sulcus between mesopleuron and metapleuron. Dorsal apex of pygidium with a stoutly bifid cuticular fork above the sting, without a short row of 4 small teeth. Palp formula 6,4 3

2 Leading edge of scape with 2–3 projecting setae that are inclined toward the scape apex. Dorsum of head between the eyes covered with conspicuous microreticulate ground sculpture, upon which scattered larger punctures are superimposed. Eye located slightly more anteriorly on head, EP 0.74–0.84 . . . . . ***elegans***

\- Leading edge of scape without projecting setae. Dorsum of head between the eyes with scattered small punctures on a pruinose to extremely weakly shagreenate surface, without distinct microreticulate ground sculpture. Eye located slightly more anteriorly on head, EP 0.80–1.00 . . . . . ***grandidieri***

3 In profile the tergites of AII (petiole), AIII and AIV each with abundant setae that arise over the entire surface of each sclerite; the setae are curved or inclined posteriorly and are somewhat elevated, suberect to subdecumbent, never appressed. Sternites of AIII and AIV with similar setae present but often less dense than on the corresponding tergites. Pubescence on tergite of AIV, if present, is long and setiform, elevated, never appressed. In full-face view the sides of the head, from clypeus to posterior corner, with numerous to abundant curved, freely projecting setae present 4

\- In profile the tergites of AII (petiole), AIII and AIV are not covered with abundant elevated setae that arise over the entire surface of each sclerite; these tergites usually entirely lack setae but sometimes a transverse row is present at the extreme posterior margin. Sternites of AIII and AIV usually with elevated setae present that have no counterparts on the corresponding tergite. Appressed pubescence is usually present on tergite of AIV; may be sparse and inconspicuous but in some is dense and very obvious. In full-face view the sides of the head, from clypeus to posterior corner, either entirely lack projecting setae, or at most curved, nearly appressed pubescence is present. 8

4 AII (petiole) in dorsal view with posterolateral corners unevenly bluntly rounded to obtusely angulate, without sharply projecting angles, never produced into a projecting blunt triangular tooth on each side. Lateral surface of AII, below the dorsolateral margin and above the level of the spiracle, usually with a longitudinal ridge or carina that extends the length of the sclerite. Frontal carinae converge posteriorly and terminate in front of the level of the anterior margins of the eyes. 5

\- AII (petiole) in dorsal view with posterolateral corners at least forming sharply projecting angles, more usually produced into a projecting triangular tooth on each side. Lateral surface of AII, below the dorsolateral margin and above the level of the spiracle, without a longitudinal ridge or carina that extends the length of the sclerite. Frontal carinae diverge posteriorly and terminate close to or at the level of the anterior margins of the eyes 6

5 With head tilted slightly back from full-face view, so that the anterior margin is clearly visible, the lateral portions of the clypeus, immediately in front of the antennal sockets, are narrow, evenly rounded, and do not project farther forward than the midpoint of the clypeus. Propodeal declivity usually with very fine longitudinal striolae that radiate upwards from the foramen

in which AII (petiole) is inserted. . . . . ***silens***

- With head tilted slightly back from full-face view, so that the anterior margin is clearly visible, the lateral portions of the clypeus, immediately in front of the antennal sockets, form prominent broad blunt triangles that project farther forward than the midpoint of the clypeus. Propodeal declivity without longitudinal striolae that radiate upwards from the foramen in which AII (petiole) is inserted . . . . . ***rex***

6 Normally exposed portions of tergites AV and AVI with abundant small punctures that cover the entire surface. AII (petiole) in dorsal view usually very obviously broader than long, AIIW/AIIL 1.14–1.30 . . . . . ***victrix***

- Normally exposed portions tergites AV and AVI mostly smooth; scattered larger punctures are present from which setae arise, and the spaces between these have a few widely spaced, extremely minute, punctulae present. AII (petiole) in dorsal view at most only slightly broader than long, AIIW/AIIL 0.95–1.14 7

7 In profile the dorsal outline of the pronotum forms a distinctly domed or humped convexity that is conspicuously differentiated from the remainder of the dorsal mesosoma; highest point of the convexity is markedly anterior to the promesonotal suture. Eye averages slightly smaller, EL/HW 0.31–0.37 . . . . . ***dux***

- In profile the dorsal outline of the pronotum is shallowly, evenly convex, not domed or humped, so that the line of the pronotal dorsum is more or less continuous with the line of the remainder of the mesosoma. Eye averages slightly larger, EL/HW 0.36–0.42 . . . . . ***sicaria***

8 Leading edge of scape without projecting setae; apical margin of scape, adjacent to first funicular segment, usually with 1–2 short setae that more or less continue the line of the long axis. 9

- Leading edge of scape with 1–3 projecting strong setae that are curved or inclined toward the scape apex; apical margin of scape, adjacent to first funicular segment, usually with 1–2 short setae that more or less continue the line of the long axis . . 10

9 In full-face view the midpoint of the anterior clypeal margin, between the frontal lobes, projects forward as a bluntly triangular tubercle, so that the margin is not evenly transverse. Sternite of AIII with conspicuous dense grey pubescence that obscures the surface of the sclerite. Dorsum of head between eyes blanketed by very dense fine longitudinal striolae; shallow punctures are also present that are obviously secondary to the dense striolate sculpture . . . . . ***inculta***

- In full-face view the midpoint of the anterior clypeal margin, between the frontal lobes, does not project forward as a triangular tubercle, so that the margin is evenly transverse. Sternite of AIII almost devoid of pubescence; what little is present is minute and extremely sparse so that the glossy surface of the sclerite is plainly visible. Dorsum of head between eyes predominantly punctate; surface sculpture between the punctures weak and faint, secondary to the punctate component. . . . . ***fera***

10 Tergite of AII (petiole) in dorsal view with the posterior corners produced into a bluntly triangular tooth on each side, the tooth directed outwards posterolaterally from the line of the side of the tergite; AII usually distinctly broader than long, AIIW/AIIL 1.05–1.18. 11

- Tergite of AII (petiole) in dorsal view with the posterior corners not produced into a bluntly triangular, posterolaterally projecting tooth on each side; AII at most as broad as long, AIIW/AIIL 0.88–1.01 12

11 Lateral surface of AII, below the dorsolateral margin and above the level of the spiracle, with a longitudinal carina that extends the length of the sclerite. Tergite of AII (petiole) carinate between its dorsal and anterior surfaces; the carina takes the form of a low transverse crest that extends across the entire width of the sclerite . . . . . ***trita***

- Lateral surface of AII, below the dorsolateral margin and above the level of the spiracle, without a longitudinal carina that extends the length of the sclerite. Tergite of AII (petiole) not carinate between its dorsal and anterior surfaces; the two surfaces are separated by a narrowly rounded angle across the entire width but there is no trace of a transverse carina . . . . . ***dignita***

12 With mesosoma in dorsal view its maximum width is conspicuously across the midlength of the mesonotum. Eyes situated relatively more anteriorly, EP 0.81–0.85. AII relatively long, AIIW/AIIL 0.88–0.89 . . . . . ***consimilis***

- With mesosoma in dorsal view its maximum width is conspicuously across the midlength of the propodeum. Eyes situated relatively more posteriorly, EP 0.90–1.08. AII relatively short, AIIW/AIIL 0.92–1.01. 13

13 Punctate sculpture on pronotal dorsum strikingly more dense than that on mesonotum; the latter, especially medially, with extensive smooth areas . . . . . ***merita***

- Punctate sculpture on pronotal dorsum about equally as dense as that on mesonotum 14

14 Dorsum of propodeum separated from declivity by an angle that extends right across the dorsum, but without a transverse carina. On dorsum of head striolate or reticulate sculpture, between the punctures, is absent or restricted to the area between the frontal carinae and sometimes a small patch immediately above each eye; such sculpture always absent from median area of dorsum between the eyes. . . . . ***emeryi***

- Dorsum of propodeum separated from declivity by a low transverse carina that is distinct on its lateral thirds but usually interrupted medially. On dorsum of head striolate or reticulate sculpture, between the punctures, occurs between the frontal carinae and across the entire dorsum between the eyes . . . . . ***nonnihil***

Malagasy species of *Simopone*

Simopone consimilis Bolton & Fisher sp. n.

(Figs 34–36)

HOLOTYPE AND PARATYPE WORKER. HL 1.60–1.68, HW 1.06–1.16, SL 0.48–0.52, EL 0.45–0.48, PW 0.83–0.88, AIIW 0.76–0.84, AIIL 0.86–0.94, AIIIW 0.91–1.02, AIIIL 1.03–1.06, WL 1.70–1.82, MFL 0.94–1.02, CI 66–69, SI 45, EL/HW 0.41–0.42, EP 0.81–0.85, AIIW/AIIL 0.88–0.89, AIIIW/AIIIL 0.88–0.96 (2 measured).

FIGURES 34–36. Lateral, full face and dorsal view of body. *Simopone consimilis* holotype worker CASENT0077387.

In full-face view anteriormost points of frontal lobes do not project beyond the level of the anterior clypeal margin. Eyes located in front of cephalic midlength (EP 0.81–0.85). Leading edge of scape with 2–3 projecting setae that are inclined toward the scape apex. In full-face view sides of head without projecting setae and in profile cephalic dorsum without standing setae; setae distinct on ventral surface of head. Cephalic dorsum between eyes

with scattered punctures upon a smooth surface, without trace of striolate ground sculpture between punctures. In dorsal view the pronotum with a transverse carina anteriorly. Propodeal dorsum meets declivity through a bluntly rounded angle, without trace of a carina. Promesonotal suture very weakly indicated; metanotal groove absent. Mesosoma in dorsal view with sides evenly shallowly convex from front to back, broadest across mesonotum, narrowing to pronotal humeri and propodeal apex. Punctate sculpture on pronotal and mesonotal dorsa of about the same density, without a very obvious reduction in density on the mesonotum. Pronotum with a single pair of setae close to the humeri (abraded in holotype, visible in paratype); mesonotum and propodeum without setae. Dorsal (outer) surfaces of mesotibiae and metatibiae without projecting setae. Dorsal surface of AII (petiole) meets anterior surface in a low transverse carina. Posteriorly the dorsum of AII rounds evenly down to the foramen, without a carina. In dorsal view the posterior corners of AII are rounded dorsally and angulate ventrally. In dorsal view AII longer than broad; AIII longer than broad in the holotype but almost as broad as long in the paratype; AIV broader than long. Abdominal tergites from AII to AV without setae, but setae sparsely present on sternite of AIII, and very obvious on sternites of AIV and AV. Pubescence extremely dilute on sternite of AIII, almost absent. Abdominal tergites AII to AIV sculptured only with small punctures. Full adult colour black, appendages and clypeus lighter.

Holotype worker (upper of two on pin), **Madagascar**: Prov. Antsiranana, Forêt Binara, 9.1 km 233° SW Daraina, 650-800 m, 13°15.8'S, 49°36.2'E, 3-7.xii.2003, BLF9870, CASENT0077387, on low vegetation, rainforest (*B.L. Fisher*) (CASC).

Paratype. One worker (lower specimen on pin) with same data (CASC).

This is the only Malagasy species in which the mesosoma is broadest across the mesonotum in dorsal view. In all others the mesonotum is narrower than at least the propodeum, and usually also narrower than the pronotum. See the comparative notes under *emeryi*.

***Simopone dignita* Bolton & Fisher sp. n.**
(Figs 37–39)

WORKER (holotype in parentheses). HL 1.44–1.82 (1.60), HW 1.00–1.34 (1.18), SL 0.40–0.57 (0.50), EL 0.39–0.48 (0.44), PW 0.80–1.11 (0.99), AIIW 0.80–1.06 (0.97), AIIL 0.76–0.92 (0.85), AIIIW 0.91–1.26 (1.09), AIIIL 0.90–1.16 (1.02), WL 1.58–2.16 (1.92), MFL 0.80–1.18 (1.02), CI 69–74 (74), SI 39–43 (42), EL/HW 0.35–0.39 (0.37), EP 1.10–1.24 (1.24), AIIW/AIIL 1.05–1.16 (1.14), AIIIW/AIIIL 1.01–1.17 (1.07) (8 measured).

In full-face view anteriormost points of frontal lobes are about level with the midpoint of the shallowly convex to transverse anterior clypeal margin. Eyes located behind the cephalic midlength (EP 1.10–1.24). Leading edge of scape with at least one projecting seta that is curved or inclined toward the scape apex. In full-face view sides of head in front of eyes usually without projecting short setae, but one or two may occur; behind eyes only with minute pubescence that is appressed or very nearly so. In profile frontal carinae with relatively long setae and cephalic dorsum with 2–3 standing short setae above the eye, and usually also with a very few decumbent setae that are located more posteriorly. Cephalic dorsum between eyes densely but shallowly punctate, the punctures adjacent or nearly so. Anterior and dorsal surfaces of pronotum separated by an angle or weak margination, but without a strongly defined carina. Propodeal dorsum meets declivity through a blunt angle, without a transverse carina. Promesonotal suture weakly impressed; metanotal groove vestigial to absent. Mesosoma in dorsal view not distinctly constricted at the mesonotum; mesosoma narrowest across pronotum, mesonotum the same width or fractionally broader, broadest across propodeum (in holotype PW 0.99, maximum width across mesonotum 1.00, maximum width across propodeum 1.06). Dorsum of mesosoma densely finely punctate everywhere. Mesosoma with a short seta close to the pronotal humeri (very easily abraded away); mesosoma otherwise without setae but entire dorsum with appressed pubescence. Dorsal (outer) surfaces of mesotibiae and metatibiae mostly with a projecting seta present close to their apices; often with another close to the midlength. Dorsal surface of AII (petiole) meets anterior surface in a narrowly rounded angle, without a transverse carina. Posteriorly the dorsum of AII lacks a sharp carina but a weak ridge is present above the foramen. In dorsal view the posterior corners of AII are extended into small but stout triangular teeth that project posterolaterally. Lateral surface of AII, below the dorsolateral margin and above the level of the spiracle, without a longitudinal ridge or carina that extends the length of the sclerite. In dorsal view AII and AIII distinctly broader than long; AIV also broader than long. Abdominal tergite AII at most with one or two setae posteriorly, but AIII and AIV each with a fringe of setae along the extreme apical

margin; the setae curved towards the midline and the central ones crossing over. All three tergites also with greyish appressed pubescence. Setae distinct on sternites of AIII and AIV. Abdominal tergites AII to AIV sculptured only with small punctures. Full adult colour black, appendages blackish brown to black; clypeus usually slightly lighter in shade than remainder of head capsule.

FIGURES 37–39. Lateral, full face and dorsal view of body. *Simopone dignita* worker CASENT0493183.

Holotype worker, **Madagascar**: Prov. Mahajanga, PN Namoroka, 17.8 km 329° WNW Vilanandro, 100 m, 16°22.6'S, 45°16.6'E, 8-12.xi.2002, BLF6561, CASENT0009816, ex dead branch above ground, tropical dry forest (*B.L. Fisher*) (CASC).

Paratypes. 3 workers with same data as holotype but CASENT0489939; 3 workers with same data but CASENT0489940 (bottom worker on pin with AII to apex detached and mounted separately); 3 workers with same data but CASENT0489941 (CASC).

See notes under *trita*.

Non-paratypic material examined. **Madagascar**: ENE Morondava, Kirindy Forest (*G.D. Alpert*); Kirindy, NE Morondava (*B.L. Fisher*); Prov. Mahajanga, PN Namoroka, WNW Vilanandro (*B.L. Fisher*); Prov. Antsiranana, Forêt Antsahabe, Daraina (*B.L. Fisher*).

Simopone dux Bolton & Fisher sp. n.

(Figs 40–42)

WORKER (holotype in parentheses). HL 1.76–2.16 (2.00), HW 1.28–1.78 (1.56), SL 0.62–0.80 (0.72), EL 0.48–0.60 (0.52), PW 1.02–1.35 (1.22), AIIW 0.94–1.26 (1.12), AIIL 0.94–1.12 (1.06), AIIIW 1.17–1.60 (1.42), AIIIL 1.12–1.48 (1.34), WL 2.06–2.60 (2.40), MFL 1.29–1.56 (1.50), CI 73–87 (78), SI 44–48 (46), EL/HW 0.31–0.37 (0.33), EP 1.42–1.70 (1.45), AIIW/AIIL 1.00–1.14 (1.06), AIIIW/AIIIL 1.02–1.13 (1.06) (7 measured).

In full-face view anteriormost points of frontal lobes are very slightly posterior to the level of the midpoint of the shallowly convex anterior clypeal margin. With head tilted slightly back from full-face view the clypeal margin in front of each antennal socket is rounded and prominent and projects very slightly farther forward than the midpoint of the anterior clypeal margin. Frontal carinae in full-face view diverging posteriorly and terminating at about the level of the anterior margins of the eyes. Eyes located behind the cephalic midlength (EP 1.42–1.70). Leading edge of scape with conspicuous projecting setae. In full-face view entire side of head with projecting long setae that are curved anteriorly. In profile entire dorsum of head, and ventral surface, with abundant curved standing setae. Cephalic dorsum between eyes with sparse foveolate punctures on a glossy surface. Anterior and dorsal surfaces of pronotum separated by a weak margination or very feeble carina. In profile the dorsal outline of the pronotum distinctly humped or swollen, the highest point conspicuously in front of the promesonotal suture and the outline distinctly sloping down to the suture. Propodeal dorsum curves evenly into the declivity, without a blunt angle or transverse carina. Promesonotal suture weakly impressed; metanotal groove faint to absent but median pit conspicuous. Mesosoma in dorsal view narrowest across mesonotum (in holotype PW 1.22, width across mesonotum at its midlength 1.02, maximum width across propodeum 1.18). Dorsum of mesosoma with scattered small punctures. Entire mesosoma dorsally with numerous standing setae. Dorsal (outer) surfaces of mesotibiae and metatibiae with standing setae that are curved or inclined toward the apex. Dorsal surface of AII (petiole) meets anterior surface in an angle or a weak transverse carina. Posteriorly the dorsum of AII lacks a carina but a weak transverse impression is usually present above the foramen. In dorsal view the posterior corners of AII extend into projecting sharp angles or small triangular teeth that project laterally or posterolaterally. Lateral surface of AII, below the dorsolateral margin and above the level of the spiracle, without a longitudinal ridge or carina that extends the length of the sclerite. In dorsal view AII and AIII vary from as long as broad to very slightly broader than long; AIV is broader than long. Abdominal tergites AII to AIV with numerous setae that are directed posteriorly and are mostly suberect to subdecumbent. Curved setae numerous and distinct on sternites of AIII and AIV. Abdominal tergites AII to AVI sculptured only with sparse punctures that are mostly minute. Full adult colour black, appendages blackish brown to black; clypeus varies from black to red. In profile sides of body often entirely black but a reddish spot may occur on side of AIII and AIV, and in the type-series a conspicuous red spot is also present on the side of the pronotum.

Holotype worker (top specimen of three on pin), **Madagascar**: 45 km S Ambalavao, 22°13'S, 47°01'E, 785 m, 24.ix.1993, BLF691, CASENT0004549, on low vegn., rainforest (*B.L. Fisher*) (CASC).

Paratypes. 2 workers mounted below holotype on same pin (CASC).

This species is closely related to *sicaria*, but in that species the pronotal dorsal outline, in profile, is more or less evenly curved from front to back and the eye averages larger, as noted in the key. Apart from that, the punctate sculpture of the cephalic dorsum is somewhat more dense, and the individual foveolate punctures average larger in *sicaria* than in *dux*. In *dux*, roughly on the line between the median ocellus and the anteriormost point of the eye,

relatively large foveolate punctures are sparse and tend to be widely spaced; the distances between the punctures averages a puncture diameter and is sometimes more. On the same line in *sicaria* the foveolate punctures are larger and closer together; the distance between them averages less than a puncture diameter and some are adjacent. See also the notes under *rex*. The male of this species is known, see under Malagasy males, below.

Non-paratypic material examined. **Madagascar**: Prov. Toliara, Forêt Ivohibe (*B.L. Fisher*); PN Ranomafana, Vatoharanana, SW Ranomafana (*B.L. Fisher*); NW Enakara, Rés. Andohahela (*B.L. Fisher*); RS Marotandrano (*B.L. Fisher*).

FIGURES 40–42. Lateral, full face and dorsal view of body. *Simopone dux* holotype worker CASENT0004549.

***Simopone elegans* Bolton & Fisher sp. n.**
(Figs 43–45)

WORKER (holotype in parentheses). HL 0.88–1.24 (1.01), HW 0.58–0.88 (0.70), SL 0.21–0.34 (0.27), EL 0.27–0.34 (0.32), PW 0.46–0.70 (0.57), AIIW 0.48–0.68 (0.54), AIIL 0.54–0.80 (0.62), AIIIW 0.53–0.68 (0.62), AIIIL

0.54–0.75 (0.62), WL 1.04–1.44 (1.20), MFL 0.46–0.66 (0.55), CI 65–71 (69), SI 36–43 (39), EL/HW 0.39–0.47 (0.46), EP 0.74–0.84 (0.77), AIIW/AIIL 0.84–0.90 (0.87), AIIIW/AIIIL 0.90–1.00 (1.00) (10 measured).

Very similar to *grandidieri* and generally matching the description of that species, but differing as follows.

FIGURES 43-45. Lateral, full face and dorsal view of body. *Simopone elegans* worker CASENT0499354.

Leading edge of scape with one or two projecting setae that are inclined toward the scape apex. Cephalic dorsum to level of posterior margins of eyes with sharply defined microreticulate ground sculpture between larger foveolate punctures. Eye tends to be slightly farther forward in *elegans* (EP 0.74–0.84) than in *grandidieri* (EP 0.80–1.00). In full-face view sides of head often, but not always, with a very few short, projecting setae. Mesotibiae and metatibiae usually without standing setae, but one or two may be present (for instance, one is present on left mesotibia of holotype). AII longer than broad in dorsal view; AIII as broad as long to slightly longer than broad. Tergites AII to AIV usually with 1–2 pairs of setae anteriorly and sometimes 1–2 pairs near posterior margin of

each segment, but numbers are variable and some abrasion is suspected. In the type-series sternites of AII–AIV have no setae, or at most have 1–2 short setae close to the posterior margins; setae on these segments are generally more apparent in the non-paratypic material. Dorsum of mesosoma usually retains at least traces of microreticulate ground sculpture, but this is generally more feebly developed than on the head between the eyes.

Holotype worker (top specimen of three on pin), **Madagascar**: Prov. Mahajanga, P.N. Baie de Baly, 12.4 km 337° NNW Soalala, 10 m, 16°00.6'S, 45°15.9'E, 26-30.xi.2002, BLF#6890, ex dead twig above ground, tropical dry forest, CASENT0492213 (*B.L. Fisher et al.*) (CASC).

Paratypes. Two workers mounted on same pin below holotype; two workers with same data but CASENT0492214 (CASC).

S. elegans exhibits the same size-related variation that is shown by *grandidieri*. Within the type-series HW varies from 0.58 to 0.74 and CI from 66 to 71.

Non-paratypic material examined. **Madagascar**: Prov. Antsiranana, Forêt Anlabe, ENE Daraina (*B.L. Fisher*); Antsiranana, Mgne Français, Pic Anosiravo, SE Diego Suarez (*B.L. Fisher*).

Simopone emeryi **Forel**

(Figs 46–48)

Simopone (Cerapachys) emeryi Forel, 1892: 247. Holotype worker, MADAGASCAR: data label on holotype states, "Nosibé, Village de l'Imerina (*Sikora*)"; published locality data states, "Environs de la ville d'Anosibé (province des Bezanozano), à trois journées à l'est-sud-est d'Antananarivo (*Sikora*)" (MHNG) [examined].

WORKER. HL 1.32–1.56, HW 0.87–1.14, SL 0.38–0.48, EL 0.35–0.43, PW 0.66–0.86, AIIW 0.61–0.78, AIIL 0.66–0.80, AIIIW 0.72–0.90, AIIIL 0.81–0.97, WL 1.50–1.76, MFL 0.76–0.93, CI 66–74, SI 41–44, EL/HW 0.36–0.40, EP 0.96–1.08, AIIW/AIIL 0.92–1.00, AIIIW/AIIIL 0.89–0.94 (6 measured).

In full-face view anteriormost points of frontal lobes project slightly beyond the level of the anterior clypeal margin. Eyes located very close to the cephalic midlength (EP 0.96–1.08). Leading edge of scape with 1–2 projecting setae that are inclined toward the scape apex. In full-face view sides of head without projecting setae and in profile cephalic dorsum without standing setae. Cephalic dorsum between eyes without striolate ground sculpture between punctures, or at most with a small patch above each eye. In dorsal view the pronotum with a transverse carina anteriorly. Propodeal dorsum meets declivity through a blunt angle, without trace of a carina. Promesonotal suture weakly impressed; metanotal groove vestigial to absent. Mesosoma in dorsal view narrowest across mesonotum, broadest across propodeum. Density of punctate sculpture on pronotal and mesonotal dorsa about the same, without a very obvious reduction in density on the mesonotum. Pronotum with a single pair of setae close to the humeri; mesonotum and propodeum without setae. Mesopleuron without a transverse sulcus but area of katepisternum sculptured, of anepisternum smooth. Dorsal (outer) surfaces of mesotibiae and metatibiae without projecting setae. Dorsal surface of AII (petiole) meets anterior surface through an angle, but there is no transverse carina. Posteriorly the dorsum of AII lacks a sharp carina, but usually a weak ridge is present immediately above the foramen. In dorsal view the posterior corners of AII are rounded, without posteriorly or laterally projecting sharp angles or teeth. In dorsal view AII as long as broad to slightly longer than broad; AIII slightly longer than broad; AIV broader than long. Abdominal tergites from AII to AIV without setae, but setae sparsely present on sternite of AIII, and very obvious on sternite of AIV. Abdominal tergites AII to AIV sculptured only with small punctures. Full adult colour black, appendages and clypeus somewhat lighter.

Within the Malagasy fauna of the *emeryi* group there is a complex of six species (*consimilis, emeryi, fera, inculta, merita, nonnihil*) distinguished by the following combination of characters.

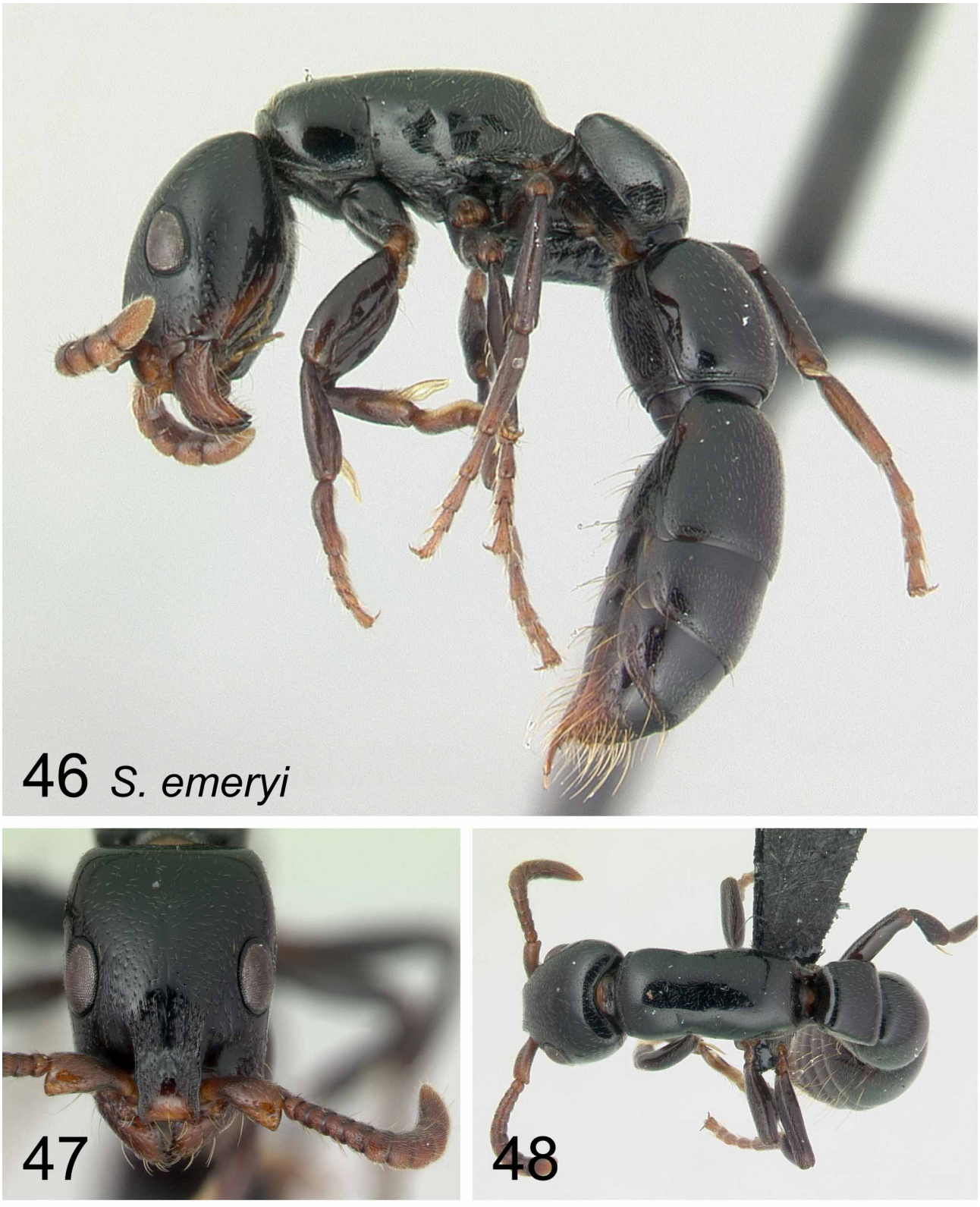
1 Complete absence of setae on the tergites of AII to AIV (and frequently also absent from AV), while setae are retained on sternites of AIII and AIV.

2 AII in dorsal view is usually slightly longer than broad, at most about as broad as long (AIIW/AIIL 0.88–1.03).

3 Posterior corners of AII, in dorsal view, do not project into laterally directed triangular teeth.

4 Dorsum of mesosoma entirely lacks pubescence, or at most pubescence is extremely dilute and inconspicuous.

5 There is a tendency for the apices of the frontal lobes to project anteriorly, so that their apices are distinctly anterior to the level of the anterior clypeal margin (not in *consimilis* or *merita*).



FIGURES 46–48. Lateral, full face and dorsal view of body. *Simopone emeryi* worker CASENT0487286.

Within this complex reduction in setae is taken to extremes in *fera* and *inculta*, where standing setae are absent from the leading edges of the scapes, from the cephalic dorsum above the eyes and from the pronotal humeri, sites where they are usually present in the other species. In addition to this, setae are restricted to the posterior margins of the sternites of AIII and AIV, and the degree of projection of the frontal lobes beyond the level of the anterior clypeal margin is very pronounced. Of the final four, *consimilis* is unique as it is the only known species in which

the sides of the mesosoma, in dorsal view, are evenly shallowly convex along their entire length, so that the mesosoma is broadest across about the midlength of the mesonotum. In *nonnihil* the propodeal declivity is bluntly carinate laterally and the carina extends across the junction of the propodeal dorsum and declivity, but is usually interrupted mid-dorsally. Also in this species the frontal lobes distinctly project farther forward than the anterior margin of the clypeus and the cephalic dorsum between the eyes has dense, longitudinal striolate-punctulate ground sculpture. In both *emeryi* and *merita* the propodeal dorsum meets the declivity through a narrow but rounded angle, without a carina, and in both species the anteriormost points of the frontal carinae are roughly level with the anterior clypeal margin, not conspicuously projecting beyond it. *S. merita* has strong longitudinal ground sculpture right across the head between the eyes and has punctate sculpture on the mesonotum that is very reduced, much less dense and intense than on the pronotum. By comparison, *emeryi* lacks longitudinal ground sculpture between the eyes, or at most has a small patch above each eye, and has punctate sculpture on the mesonotum equal in density and intensity to that on the pronotum.

Material examined. **Madagascar**: Nosibé, Village de l'Imerina (*Sikora*); Prov. Antsiranana, P.N. Marojejy, NNE Andapa (*B.L. Fisher*).

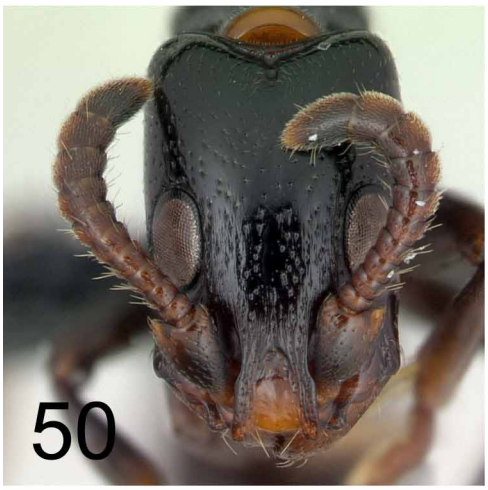
***Simopone fera* Bolton & Fisher sp. n.**
(Figs 49–51)

WORKER (holotype in parentheses). HL 1.38–1.72 (1.72), HW 0.81–1.10 (1.10), SL 0.36–0.48 (0.48), EL 0.36–0.44 (0.44), PW 0.64–0.86 (0.86), AIIW 0.62–0.84 (0.84), AIIL 0.68–0.86 (0.86), AIIIW 0.76–1.02 (1.02), AIIIL 0.86–1.00 (1.00), WL 1.34–1.70 (1.70), MFL 0.66–0.86 (0.86), CI 59–66 (64), SI 40–44 (44), EL/HW 0.40–0.44 (0.40), EP 0.87–1.00 (0.93), AIIW/AIIL 0.91–0.99 (0.98), AIIIW/AIIIL 0.97–1.05 (1.02) (7 measured).

In full-face view anteriormost points of frontal lobes project far forward as a pair of lobes that extend considerably beyond the level of the anterior clypeal margin. Anterior clypeal margin between these lobes transverse or nearly so, without a convex median tumulus. Eyes located at or just in front of cephalic midlength (EP 0.87–1.00). Leading edge of scape without projecting setae. In full-face view sides of head from just behind clypeus to posterior corners without projecting setae. In profile cephalic dorsum without standing setae; setae present on ventral surface of head. Cephalic dorsum between eyes punctate, spaces between punctures with very weak, superficial punctulate-striolate ground sculpture. Behind the level of the eyes the ground sculpture fades out posteriorly. In dorsal view the pronotum with a transverse carina anteriorly. Propodeal dorsum meets declivity through a narrowly rounded angle, without a sharp carina. Promesonotal suture distinct, evenly shallowly convex medially; metanotal groove almost effaced but median pit present. Mesosoma in dorsal view with mesonotum fractionally narrower than propodeum. Density of punctate sculpture on pronotal dorsum about the same as on mesonotal dorsum. Entire dorsum of mesosoma without setae, even the humeral setae absent. Dorsal (outer) surfaces of mesotibiae and metatibiae without projecting setae, or at most with one, very close to the apex. Dorsal surface of AII (petiole) meets anterior surface in a narrowly rounded angle, without a transverse carina. Posteriorly the dorsum of AII rounds into the posterior surface, at most with an inconspicuous low ridge above the foramen. In dorsal view the posterior corners of AII are narrowly rounded and project very slightly posteriorly. In dorsal view AII slightly longer than broad; AIII usually very slightly broader than long but in smallest specimens very slightly longer than broad. Dorsal surfaces of abdominal tergites AII to AIV without setae; sternites of AIII and AIV with a few setae at their posterior margins. Abdominal tergites AII to AIV sculptured only with small punctures. Sternite of AIII with pubescence so sparse as to be almost absent, the surface of the sclerite glossy. Full adult colour black; appendages and clypeus slightly lighter.

Holotype worker, **Madagascar**: Prov. Antsiranana, Forêt Binara, 7.5 km 230° SW Daraina, 375 m, 13°15.3'S, 49°37.0'E, 1-4.xii.2003, BLF9639, CASENT0496983, tropic. dry forest, ex dead twig (*B.L. Fisher*) (CASC).

Paratypes. 3 workers with same data as holotype but CASENT0496984; 3 workers with same data but CASENT0496985 (CASC). See the comparative notes under *emeryi*.

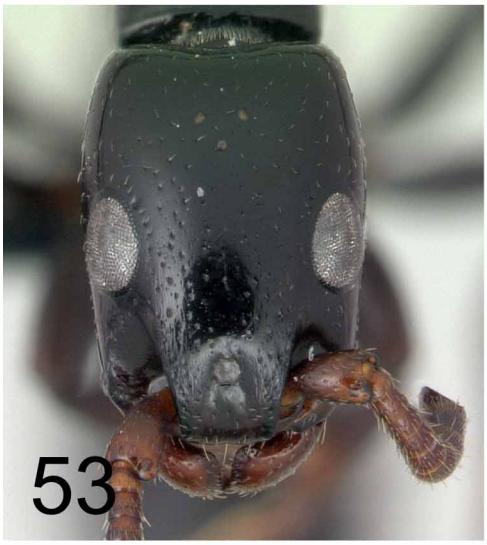


FIGURES 49–51. Lateral, full face and dorsal view of body. *Simopone fera* paratype worker CASENT0496984.

***Simopone grandidieri* Forel**
(Figs 52–54)

Simopone grandidieri Forel, 1891: 141, pl. 4, fig. 8. Holotype worker, MADAGASCAR: data label on holotype states, "Madagascar central"; published locality data states, "Imerina (*Sikora*)" (MHNG) [examined].

WORKER. HL 0.83–1.30, HW 0.53–0.92, SL 0.22–0.36, EL 0.26–0.37, PW 0.40–0.68, AIIW 0.42–0.66, AIIL 0.52–0.77, AIIIW 0.48–0.77, AIIIL 0.58–0.86, WL 1.00–1.60, MFL 0.45–0.74, CI 60–75, SI 35–42, EL/HW 0.40–0.49, EP 0.80–1.00, AIIW/AIIL 0.79–0.87, AIIIW/AIIIL 0.80–0.99 (11 measured).



FIGURES 52–54. Lateral, full face and dorsal view of body. *Simopone grandidieri* worker CASENT0486659.

Palp formula 5,3. Clypeus broadly downcurved anteriorly, more or less vertical above clypeo-labral junction, the latter not strongly reflexed. Frontal carinae widely separated, FcW/HW 0.45–0.54. Eyes located at or just in front of the cephalic midlength, EP 1.00 or less. Antennal fossa broad and in profile extends almost to the anterior margin of the eye but does not form a narrow longitudinal scrobe. Leading edge of scape without projecting setae. In full-face view sides of head without setae. Cephalic dorsum with only a single pair of standing setae, located close to level of posterior margin of eye. Cephalic dorsum with scattered punctures upon a surface that is usually

merely pruinose, at most extremely feebly shagreenate but without organised microreticulate ground sculpture. Mesopleuron with a conspicuous transverse sulcus. Pronotum with a single pair of setae, near the humeri; mesonotum and propodeum usually without setae but the former may have a single small pair. In dorsal view the pronotum with a weak transverse carina anteriorly and the propodeum with a poorly defined, low, blunt carina between dorsum and declivity; promesonotal suture feebly present, may be almost effaced, metanotal groove vestigial to absent. Mesotibiae and metatibiae without setae. AII (petiole) with a distinct, strong anterior transverse carina but posteriorly the dorsum rounds evenly down to the foramen, without trace of a carina; in dorsal view the sides of AII diverge posteriorly. Lateral surface of AII tergite with a carina that curves down from the anterior margin and terminates just behind the level of the spiracle. Posterior corners of AII are rounded and do not extend into laterally or posteriorly directed teeth. AII and AIII longer than broad in dorsal view, but AIII only slightly so; AIV broader than long. Sides of AIII in dorsal view usually parallel, but often slightly convex in larger workers. Abdominal tergites from AII to AV often without setae, but each may have a maximum of two pairs. Sternites of AIII to AV with setae present, small and sparse on AIII but more obvious posteriorly. Sternites of AIV and AV always distinctly more setose than their tergites. Dorsal surfaces of mesosoma and abdominal tergites from AII to AIV with sculpture similar to head, but the punctures more sparse and usually smaller than on the head. Full adult colour black, sometimes with extremely weak bluish reflections.

This is the first species ever described in *Simopone* and one of only two species of the *grandidieri* group known from Madagascar. Differentiation from the second species, *elegans*, is noted there. These two species are separated from the remainder of the regional fauna by the characters given in the group diagnoses and the key to species groups.

The workers of *grandidieri* appear to show size-related variation, perhaps the most obvious example of which is the narrowing of the head as head size decreases. The smallest workers (HW 0.53–0.61) have relatively longer, narrower heads (CI 60–65) than the largest workers (HW 0.78 or more, CI 69–75).

Despite the disparity of locality data between the specimen label and the published information, it is certain that both refer to the same specimen. This is because Forel had only a single specimen to work from and the drawing he made of it, his pl. 4, fig. 8, shows that it was mounted with AII depressed and with a break between AII and AIII, a feature exactly matched by the specimen recorded above as the holotype. The male of this species is known, see under Malagasy males, below.

Material examined. **Madagascar**: Imerina (*Sikora*); ESE Ranomafana, nr Ifanadiana (*P.S. Ward*); Ranomafana Nat. Park (*G.D. Alpert*); RS Kalambatritra, Ampanihy (*B.L. Fisher*); Antsiranana, Betaolana Forest (*B.L. Fisher*); Antsiranana, Makirovana Forest (*B.L. Fisher*); Prov. Fianarantsoa, Forêt Antsirakambiaty (*B.L. Fisher*).

Simopone inculta Bolton & Fisher sp. n.

(Figs 55–57)

HOLOTYPE WORKER. HL 1.84, HW 1.15, SL 0.50, EL 0.45, PW 0.97, AIIW 0.95, AIIL 0.92, AIIIW 1.10, AIIIL 1.08, WL 1.94, MFL 1.04, CI 63, SI 43, EL/HW 0.39, EP 1.00, AIIW/AIIL 1.03, AIIIW/AIIIL 1.02.

In full-face view anteriormost points of frontal lobes project far forward as a pair of lobes that extend considerably beyond the level of the anterior clypeal margin. Midpoint of anterior clypeal margin with a small convex tumulus, so that the margin is not evenly transverse or evenly convex across. Eyes located close to cephalic midlength (EP 1.00). Leading edge of scape without projecting setae. In full-face view sides of head from just behind clypeus to posterior corners without projecting setae. In profile cephalic dorsum without standing setae; setae distinct anteriorly on ventral surface of head. Cephalic dorsum between eyes punctate and with dense, longitudinally arranged, fine punctulate-striolate ground sculpture. Behind the level of the eyes the ground sculpture diminishes in intensity. In dorsal view the pronotum with a transverse carina anteriorly. Propodeal dorsum meets declivity through a narrowly rounded angle, without a carina. Promesonotal suture distinct, broadly V-shaped medially; metanotal groove faint but median pit conspicuous. Mesosoma in dorsal view with mesonotum fractionally narrower than pronotum; propodeum about the same width as mesonotum. Density of punctate sculpture on pronotal dorsum about the same as on mesonotal dorsum. Entire dorsum of mesosoma without setae. Dorsal (outer) surfaces of mesotibiae and metatibiae without projecting setae. Dorsal surface of AII (petiole) meets anterior surface in a narrowly rounded angle, without a transverse carina. Posteriorly the dorsum of AII rounds into the posterior sur-

face, with an inconspicuous low ridge above the foramen. In dorsal view the posterior corners of AII are bluntly rounded and project slightly posteriorly. In dorsal view AII and AIII about as long as broad. Dorsal surfaces of abdominal tergites AII to AIV without setae, but setae present posteriorly on sternites of AIII and AIV. Abdominal tergites AII to AIV sculptured only with small punctures. Sternite of AIII with conspicuous, dense, grey pubescence that obscures the surface of the sclerite. Full adult colour black; appendages and clypeus slightly lighter.

FIGURES 55–57. Lateral, full face and dorsal view of body. *Simopone inculta* holotype worker CASENT0410475.

Holotype worker, **Madagascar**: Prov. Antsiranana, Montagne Français, 7.2 km 142° SE Diego Suarez, 180 m, 12°19'S, 49°20'E, 22-28.ii.2001, BLF3152, CASENT0410475 (*B.L. Fisher*) (CASC).

There are no pronotal humeral setae on the single known specimen of *inculta*, which may imply that they have been abraded away. But it should be noted that there are also no humeral setae on any of the seven specimens that make up the type-series of the closely related *fera*. The latter species shows considerable size-variation and this probably should also be expected in *inculta*. See the comparative notes under *emeryi*.

Simopone mayri Emery

Simopone ? mayri Emery, 1911: 16. Syntype males, MADAGASCAR: Baia di Antongil, 1897–98 (*A. Mocquerys*) (MSNG) [examined]. [Originally incorrectly described as males of *Cerapachys mayri* Forel, 1892: 244, by Emery, 1899b: 264; misidentification.]

Simopone satagia Bolton, 1995: 383. Unnecessary replacement name for *mayri* Forel, *sensu* Emery, 1899b: 264 (misidentification). **Syn. n.**

This species was described from a couple of large Madagascan males that were originally thought by Emery (1899b) to be the males of *Cerapachys mayri*, a species previously described from workers by Forel (1892). Emery (1911) realised that he had probably placed them in the wrong genus, and transferred them to *Simopone* but indicated his reservations about this choice with a question mark in his 1911 citation. From the description alone, it is impossible to tell what the correct generic combination should be, as characters critical at genus-rank were all omitted. Examination of the two specimens has revealed that all the genus-rank characters of male *Simopone* are present in combination and the inclusion of *mayri* in *Simopone* is confirmed. However, these males have yet to be matched to any worker-based species as the syntypes of *mayri* differ from all other male samples, worker-associated or isolated, that are currently available. All that can be said at the moment is that *S. mayri* is a member of the *emeryi* group and appears to be related to *rex*, but differs by the characters given in the provisional key to males (below).

Simopone merita Bolton & Fisher sp. n.

(Figs 58–60)

HOLOTYPE WORKER. HL 1.64, HW 1.11, SL 0.52, EL 0.43, PW 0.88, AIIW 0.84, AIIL 0.83, AIIIW 0.95, AIIIL 1.00, WL 1.74, MFL 0.93, CI 68, SI 47, EL/HW 0.39, EP 0.96, AIIW/AIIL 1.01, AIIIW/AIIIL 0.95.

In full-face view anteriormost points of frontal lobes do not conspicuously project beyond the level of the anterior clypeal margin. Eyes located close to cephalic midlength (EP 0.96). Leading edge of scape with 3–4 projecting long setae that are inclined toward the scape apex. In full-face view sides of head from level of eyes to clypeus with a few laterally projecting setae that arise from close to the vetrolateral margin of the head; sides behind eyes without projecting setae. In profile cephalic dorsum with two inconspicuous standing short setae that arise just above the eye; setae distinct on ventral surface of head. Cephalic dorsum between eyes densely punctate and with dense, longitudinally arranged, roughly striolate ground sculpture. Behind the eyes the ground sculpture fades out, but anteriorly it extends forward between the frontal carinae. In dorsal view the pronotum with a transverse carina anteriorly. Propodeal dorsum meets declivity through a narrowly rounded angle, without trace of a carina. Promesonotal suture shallow but distinct, metanotal groove vestigial to absent. Mesosoma in dorsal view with mesonotum slightly narrower than both pronotum and propodeum. Punctate sculpture on pronotal dorsum much more dense than on mesonotal dorsum; punctures on central area of mesonotum especially sparse so that the vast majority of the surface appears smooth. Pronotum with a single pair of setae close to the humeri; mesonotum and propodeum without setae. Dorsal (outer) surfaces of mesotibiae and metatibiae with one or two projecting setae near their apices. Dorsal surface of AII (petiole) meets anterior surface in a narrowly rounded angle, without a transverse carina. Posteriorly the dorsum of AII has a low transverse ridge above the foramen. In dorsal view the posterior corners of AII are bluntly angulate but do not project as teeth. In dorsal view AII about as long as broad; AIII slightly longer than broad. Dorsal surfaces of abdominal tergites AII to AIV without setae, but setae present on sternites of AIII and AIV. Grey pubescence conspicuous on sternite of AIII. Abdominal tergites AII to AIV sculptured only with small punctures. Full adult colour black; appendages and clypeus lighter, and with a dull red spot on the side of the pronotum and on the side of the tergite of AIII.

Holotype worker, **Madagascar**: 9.2 km WSW Befingotra, Res. Anjanaharibe-Sud, 14°45'S, 49°28'E, 1280 m, 13–12 (sic).xi.1994, BLF1155-4, CASENT0004543, Malaise trap, montane rainforest (*B.L. Fisher*) (CASC).

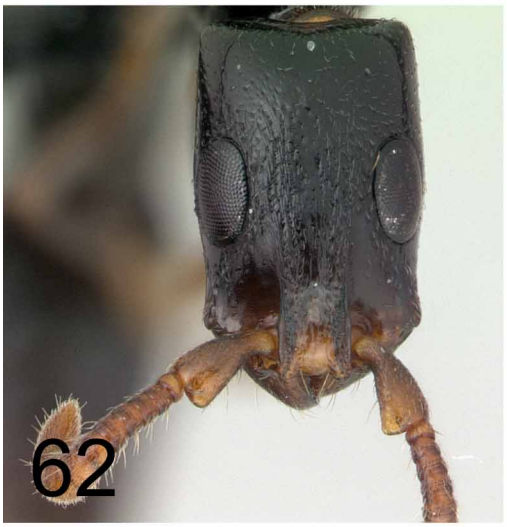
See the comparative notes under *emeryi*.

FIGURES 58–60. Lateral, full face and dorsal view of body. *Simopone merita* holotype worker CASENT0004543.

***Simopone nonnihil* Bolton & Fisher sp. n.**
(Figs 61–63)

WORKER (holotype in parentheses). HL 1.22–1.68 (1.54), HW 0.74–1.16 (0.99), SL 0.34–0.52 (0.45), EL 0.34–0.48 (0.42), PW 0.60–0.92 (0.78), AIIW 0.59–0.88 (0.78), AIIL 0.64–0.90 (0.80), AIIIW 0.68–1.04 (0.92), AIIIL

0.73–1.10 (0.93), WL 1.32–1.86 (1.70), MFL 0.60–1.00 (0.88), CI 61–72 (64), SI 42–46 (45), EL/HW 0.39–0.46 (0.42), EP 0.87–1.12 (1.12), AIIW/AIIL 0.92–1.01 (0.98), AIIIW/AIIIL 0.93–1.01 (0.99) (9 measured).



FIGURES 61–63. Lateral, full face and dorsal view of body. *Simopone nonnihil* worker CASENT0488927.

In full-face view anteriormost points of frontal lobes distinctly project forward as a pair of lobes that extend beyond the level of the anterior clypeal margin. Midpoint of anterior clypeal margin without a convex tumulus, so that the margin is evenly transverse or shallowly convex across. Eyes located close to the cephalic midlength (EP 0.87–1.12). Leading edge of scape with 1–2 projecting setae that are inclined toward the scape apex. In full-face view sides of head without projecting setae. Cephalic dorsum in profile with one, rarely two, short standing setae above the eye; these setae easily lost by abrasion. Ventral surface of head with distinct setae. Cephalic dorsum between eyes with longitudinally directed dense striolate-punctulate ground sculpture between punctures. In dorsal view the pronotum with a transverse carina anteriorly. Propodeal dorsum separated from declivity by a weak, low carina that is interrupted medially. Promesonotal suture weakly impressed and shallowly, evenly curved across the dorsum, not V-shaped medially. Metanotal groove vestigial to absent. Mesosoma in dorsal view narrower across mesonotum than propodeum. Density of punctate sculpture on pronotal and mesonotal dorsa about the same, without a very obvious reduction in density on the mesonotum. Pronotum with a single pair of setae close to the humeri, but these easily lost by abrasion; mesonotum and propodeum without setae. Dorsal (outer) surfaces of mesotibiae and metatibiae without projecting setae, except sometimes for one, close to the apex. Dorsal surface of AII (petiole) meets anterior surface through an angle, but there is no transverse carina. Posteriorly the dorsum of AII lacks a sharp carina, but usually a weak impression is present immediately above the foramen. In dorsal view the posterior corners of AII are bluntly angulate, but without posteriorly or laterally projecting sharp angles or teeth. In dorsal view AII and AIII as long as broad to slightly longer than broad. Abdominal tergites from AII to AIV without setae, but setae sparsely present at least posteriorly on sternite of AIII, and obvious on sternite of AIV. Abdominal tergites AII to AIV sculptured only with small punctures. Full adult colour black, appendages and clypeus somewhat lighter; often with a dull reddish spot on sides of pronotum, AIII and AIV.

Holotype worker (upper specimen of two on pin), **Madagascar**: Toamasina, Ambohidena, 20 m., 16°49.46’S, 49°57.85’E, 21-24.xi.2005, BLF12984, CASENT0066745-RES, littoral forest (*B.L. Fisher*) (CASC).

Paratypes. 1 worker mounted below holotype (crudely dissected); 1 worker and 1 male (abdominal segments behind AII missing) with same data as holotype (CASC).

See the comparative notes under *emeryi*; for the male see under Malagasy males, below.

Non-paratypic material examined. **Madagascar**: Prov. Toamasina, Mont Anjanaharibe, NNE Ambinanitele (*B.L. Fisher*); SSW Befingotra, Res. Anjananaribe-Sud (*B.L. Fisher*); Prov., Toamasina, Ambohidena (*B.L. Fisher*); Toliara, Forêt Ivohibe (*B.L. Fisher*); Toliara, Rés. Spéc. Ambatovaky, Sandrangato River (*B.L. Fisher*); RS Marotandrano (*B.L. Fisher*); SSW Iminiminy, Res. Androhahela (*G.D. Alpert*).

Simopone rex Bolton & Fisher sp. n.

(Figs 64–66)

WORKER (holotype in parentheses). HL 2.10–2.36 (2.24), HW 1.88–2.18 (2.01), SL 0.84–0.94 (0.94), EL 0.58–0.64 (0.64), PW 1.40–1.58 (1.54), AIIW 1.28–1.45 (1.36), AIIL 1.12–1.32 (1.18), AIIIW 1.58–1.84 (1.66), AIIIL 1.36–1.60 (1.44), WL 2.56–2.88 (2.64), MFL 1.76–2.08 (1.92), CI 85–92 (90), SI 43–47 (47), EL/HW 0.30–0.33 (0.32), EP 1.15–1.31 (1.25), AIIW/AIIL 1.10–1.16 (1.15), AIIIW/AIIIL 1.06–1.17 (1.15) (9 measured).

In full-face view anteriormost points of frontal lobes are slightly posterior to the level of the midpoint of the shallowly convex anterior clypeal margin. With head tilted slightly back from full-face view the clypeal margin in front of the antennal socket extends into a blunt triangular prominence that projects farther forward than the midpoint of the anterior clypeal margin. Frontal carinae relatively short; in full-face view terminating in front of the level of the anterior margins of the eyes. Eyes located behind the cephalic midlength (EP 1.15–1.31). Leading edge of scape with conspicuous projecting setae. In full-face view entire side of head with setae that are curved anteriorly. In profile entire dorsum of head, and ventral surface, with curved standing setae. Cephalic dorsum between eyes with sparse foveolate punctures. Anterior and dorsal surfaces of pronotum separated by an angle or weak margination, but without a strongly defined carina. Propodeal dorsum meets declivity through a blunt angle, without a transverse carina. Propodeal declivity without longitudinal striolae that radiate upwards from the foramen in which AII (petiole) is inserted. Promesonotal suture weakly impressed and distinguished by a series of minute ribs or aligned punctures; metanotal groove very faint but median pit conspicuous. Mesosoma in dorsal view broadest across pronotum, narrower across mesonotum and propodeum (in holotype PW 1.54, width across mesonotum at

FIGURES 64–66. Lateral, full face and dorsal view of body. *Simopone rex* worker CASENT0410467.

its midlength 1.25, maximum width across propodeum 1.35). Dorsum of mesosoma with scattered punctures. Entire mesosoma dorsally with numerous standing setae. Dorsal (outer) surfaces of mesotibiae and metatibiae with standing setae present that are curved or inclined toward the apex. Dorsal surface of AII (petiole) meets anterior surface in an angle, without a transverse carina. Posteriorly the dorsum of AII lacks a carina but a weak transverse impression is usually present above the foramen. In dorsal view the posterior corners of AII are rounded to obtusely angulate, not extended into projecting sharp angles or stout triangular teeth that project posterolaterally. Lateral surface of AII, below the dorsolateral margin and above the level of the spiracle, usually with a conspicuous longitudinal ridge or carina that extends the length of the sclerite; rarely the carina reduced so that it is only visible to the level of the spiracle. In dorsal view AII, AIII and AIV all distinctly broader than long. Abdominal tergites AII to AIV with numerous setae that are directed posteriorly and are mostly suberect to subdecumbent. Curved setae distinct on sternites of AIII and AIV. Abdominal tergites AII to AVI sculptured only with sparse punctures. Full adult colour black, appendages blackish brown to black; clypeus usually dull reddish; sides of pronotum and sides of abdominal tergites AIII and AIV sometimes with a dull reddish spot, but this is variably developed within series and may be inconspicuous or absent on any sclerite.

Holotype worker, **Madagascar**: Prov. Antsiranana, Forêt Orangea, 3.6 km 128° SE Remena, 90 m, 12°16'S, 49°22'E, 22-28.ii.2001, BLF3196, CASENT0410462, on low veg., trop. dry forest (*B.L. Fisher*) (CASC).

Paratypes. 2 workers with same data but CASENT0410463; 1 worker with same data but CASENT0410465 (CASC).

S. rex is one of a complex of five large, stocky, size-variable Madagascan species that are quickly distinguished from all others in the region by their abundant pilosity. In particular, the tergites of AII to AIV have numerous curved setae that arise over the entire surface of each sclerite. These setae, while not particularly long, are dense, curved posteriorly, suberect to subdecumbent and very conspicuous. In addition, the sternites of AII and AIV have similar setae which, while not usually as numerous as on the tergites, are also very distinct. Of the five, *victrix* alone has very dense, small punctures all over the tergites of AV and AVI; the other species have sparse, scattered punctures on these tergites. *S. rex* and *silens* have a conspicuous longitudinal carina on the side of AII tergite. Also in these two the posterior corners of AII are rounded, not extended into sharp angles or posterolaterally projecting teeth, and the frontal carinae are relatively short. In *dux*, *sicaria* and *victrix* there is no carina along the side of AII, or at most there may be a minute vestige of it close to the anterior margin. In *dux* the dorsal outline of the pronotum in profile is distinctly humped or swollen, while in the other species it is shallowly convex along its length. The male of this species is known, see under Malagasy males, below.

Non-paratypic material examined. **Madagascar**: Forêt d'Ampombofofo (*B.L. Fisher*); N Antalaha, Amboangy (*A. Patel*); N Antalaha, 3 k W to a hill (*G.D. Alpert*); Prov. Antsiranana, Forêt Orangea, SE Remena (*B.L. Fisher*); Prov. Antsiranana, Nosy Be, Rés. Lokobe, ESE Hellville (*B.L. Fisher*); Prov. Antsiranana, Rés. Spéc. Ankarana, SW Anivorano Nord (*B.L. Fisher*); Prov. Antsiranana, P.N. Marojejy, NE Andapa (*B.L. Fisher*); Prov. Antsiranana, Forêt Ambato, Ambanja (*B.L. Fisher*); Prov. Antsiranana, Montagne Français, SE Diego Suarez (*B.L. Fisher*); Prov. Antsiranana, Makirovana Forest (*B.L. Fisher*).

Simopone sicaria **Bolton & Fisher sp. n.**

(Figs 67–69)

WORKER (holotype in parentheses). HL 1.60–2.10 (1.92), HW 1.06–1.60 (1.42), SL 0.52–0.78 (0.70), EL 0.44–0.60 (0.55), PW 0.84–1.23 (1.08), AIIW 0.82–1.18 (1.01), AIIL 0.86–1.16 (1.04), AIIIW 1.02–1.52 (1.28), AIIIL 1.04–1.44 (1.28), WL 1.90–2.60 (2.28), MFL 0.98–1.52 (1.44), CI 66–80 (74), SI 46–50 (49), EL/HW 0.36–0.42 (0.38), EP 1.20–1.56 (1.56), AIIW/AIIL 0.95–1.07 (0.97), AIIIW/AIIIL 0.98–1.12 (1.00) (10 measured).

In full-face view anteriormost points of frontal lobes are very slightly posterior to the level of the midpoint of the shallowly convex anterior clypeal margin. With head tilted slightly back from full-face view the clypeal margin in front of each antennal socket is rounded and prominent, but does not distinctly project farther forward than the midpoint of the anterior clypeal margin. Frontal carinae in full-face view diverging posteriorly and terminating at about the level of the anterior margins of the eyes. Eyes located behind the cephalic midlength (EP 1.20–1.56). Leading edge of scape with conspicuous projecting setae. In full-face view entire side of head with projecting long setae that are curved anteriorly. In profile entire dorsum of head and ventral surface with abundant curved standing

FIGURES 67–69. Lateral, full face and dorsal view of body. *Simopone sicaria* worker CASENT0004544.

setae. Cephalic dorsum between eyes with sparse foveolate punctures on a glossy surface. Anterior and dorsal surfaces of pronotum separated by a weak margination or very feeble carina. Propodeal dorsum meets declivity through a blunt angle, without a transverse carina. Promesonotal suture weakly impressed, sometimes with vestiges of minute ribs; metanotal groove very faint to absent but median pit conspicuous. Mesosoma in dorsal view narrowest across mesonotum (in holotype PW 1.08, width across mesonotum at its midlength 0.98, maximum width across propodeum 1.10). Dorsum of mesosoma with scattered punctures. Entire mesosoma dorsally with numerous standing setae. Dorsal (outer) surfaces of mesotibiae and metatibiae with standing setae present that are curved or inclined toward the apex. Dorsal surface of AII (petiole) meets anterior surface at an angle or a weak transverse

carina. Posteriorly the dorsum of AII lacks a carina but a weak transverse impression is usually present above the foramen. In dorsal view the posterior corners of AII extend into projecting sharp angles or small triangular teeth that project laterally or posterolaterally. Lateral surface of AII, below the dorsolateral margin and above the level of the spiracle, without a longitudinal ridge or carina that extends the length of the sclerite. In dorsal view AII and AIII vary from slightly longer than broad to slightly broader than long; AIV is broader than long. Abdominal tergites AII to AIV with numerous setae that are directed posteriorly and are mostly suberect to subdecumbent. Curved setae numerous and distinct on sternites of AIII and AIV. Abdominal tergites AII to AVI sculptured only with sparse punctures. Full adult colour black, appendages blackish brown to black; clypeus usually dull reddish.

Holotype worker (top specimen of three on pin), **Madagascar**: 6.5 km SSW Befingotra, Res. Anjanaharibe-Sud, 14°45'S, 49°30'E, 875 m, 27.x.1994, BLF1136, CASENT0004545, ex rotten stick on ground, rainforest (*B.L. Fisher*) (CASC).

Paratypes. 2 workers mounted on same pin below holotype; 9 workers (one crudely dissected) with same data as holotype but labelled only with BLF1136, CASENT0004545 (CASC).

Among the material available this is the most size-variable species of the *silens* complex; see notes under *rex*. Its closest relative appears to be *dux*, differences are noted there. Gary Alpert (MCZC) has observed *S. sicaria* raiding an arboreal nest of *Terataner alluaudi*; the entire raid took less than 20 minutes. The *Simopone* workers moved rapidly among lower tree branches until they reached the *Terataner* nest in a twig, about 50 yards distant, which they entered. They emerged carrying the victim's brood; captured adult *Terataner* were discarded and dropped to the ground.

Non-paratypic material examined. **Madagascar**: W Andampibe, Cap Masoala (*G.D. Alpert*); Marojejy R.N.I. (*G.D. Alpert*); SSW Befingotra, Res. Anjanaharibe-Sud (*B.L. Fisher*); Prov. Antsiranana, Betaolana forest (*B.L. Fisher*).

Simopone silens **Bolton & Fisher sp. n.**

(Figs 70–72)

WORKER (holotype in parentheses). HL 1.96–2.16 (2.02), HW 1.56–1.84 (1.76), SL 0.72–0.84 (0.80), EL 0.50–0.56 (0.54), PW 1.20–1.36 (1.35), AIIW 1.14–1.32 (1.24), AIIL 0.92–1.04 (0.98), AIIIW 1.38–1.58 (1.54), AIIIL 1.16–1.36 (1.20), WL 2.32–2.60 (2.40), MFL 1.48–1.70 (1.60), CI 80–87 (87), SI 44–47 (45), EL/HW 0.30–0.32 (0.31), EP 1.17–1.40 (1.35), AIIW/AIIL 1.20–1.31 (1.26), AIIIW/AIIIL 1.17–1.28 (1.28) (12 measured).

In full-face view anteriormost points of frontal lobes are slightly posterior to the level of the midpoint of the shallowly convex anterior clypeal margin. With head tilted slightly back from full-face view the clypeal margin in front of each antennal socket is shallowly rounded to weakly angulate, but lacks blunt triangular prominences that project farther forward than the midpoint of the anterior clypeal margin. Frontal carinae relatively short; in full-face view terminating well in front of the level of the anterior margins of the eyes. Eyes located behind the cephalic midlength (EP 1.17–1.40). Leading edge of scape with conspicuous projecting setae. In full-face view entire side of head with setae that are curved anteriorly. In profile entire dorsum of head, and ventral surface, with curved standing setae. Cephalic dorsum between eyes with sparse foveolate punctures on a glossy surface. Anterior and dorsal surfaces of pronotum separated by an angle or weak margination, but without a strongly defined carina. Propodeal dorsum meets declivity through a blunt angle, without a transverse carina. Propodeal declivity usually with fine longitudinal striolae that radiate upwards from the foramen in which AII (petiole) is inserted; striolae easily visible in most specimens but sometimes faint, invisible in a very few. Promesonotal suture weakly impressed and distinguished by a series of minute ribs or aligned punctures; metanotal groove very faint to absent but median pit conspicuous. Mesosoma in dorsal view broadest across pronotum, narrower across mesonotum and propodeum (in holotype PW 1.35, width across mesonotum at its midlength 1.24, maximum width across propodeum 1.26). Dorsum of mesosoma with scattered punctures. Entire mesosoma dorsally with numerous standing setae. Dorsal (outer) surfaces of mesotibiae and metatibiae with standing setae present that are curved or inclined toward the apex. Dorsal surface of AII (petiole) meets anterior surface at an angle, without a transverse carina. Posteriorly the dorsum of AII lacks a carina but a weak transverse impression is usually present above the foramen. In dorsal view the posterior corners of AII are rounded to bluntly angular, but are not extended into projecting sharp angles or stout triangular teeth that project posterolaterally. Lateral surface of AII, below the dorsolateral margin and above

the level of the spiracle, with a conspicuous longitudinal ridge or carina that extends the length of the sclerite. In dorsal view AII, AIII and AIV all distinctly broader than long. Abdominal tergites AII to AIV with numerous setae that are directed posteriorly and are mostly suberect to subdecumbent. Curved setae numerous and distinct on sternites of AIII and AIV. Abdominal tergites AII to AVI sculptured only with sparse punctures. Full adult colour black, appendages blackish brown to black; clypeus usually dull reddish; sides of pronotum and sides of abdominal tergites AIII and AIV sometimes with a dull reddish spot, but this is variably developed within the series and may be inconspicuous or absent on any sclerite.

FIGURES 70–72. Lateral, full face and dorsal view of body. *Simopone silens* paratype worker CASENT0000562.

Holotype worker, **Madagascar**: Prov. Mahajanga, P.N. Tsingy de Bemaraha, 2.5 km 62° ENE Bekopaka, 100 m, 19°08'S, 44°49'E, 11-15.xi.2001, BLF4410, CASENT0000562, ex dead branch above ground, tropical dry forest (*B.L. Fisher*) (CASC).

Paratypes. 1 worker with same data as holotype but CASENT0000556; 2 workers with same data but CASENT0000557; 2 workers with same data but CASENT0000558; 2 workers with same data but CASENT0000559; 5 workers with same data but CASENT0000560 (also many workers retained in alcohol); 2 workers with same data but CASENT0000561 (CASC).

This species is closely related to *rex*, sharing its relatively short frontal carinae and unarmed posterior corners of AII. However, the two have a consistently different shape to the anterior clypeal margin in front of the antennal sockets, and the vast majority of *silens* specimens have very fine striolate sculpture on the propodeal declivity. The male of this species is known, see under Malagasy males, below.

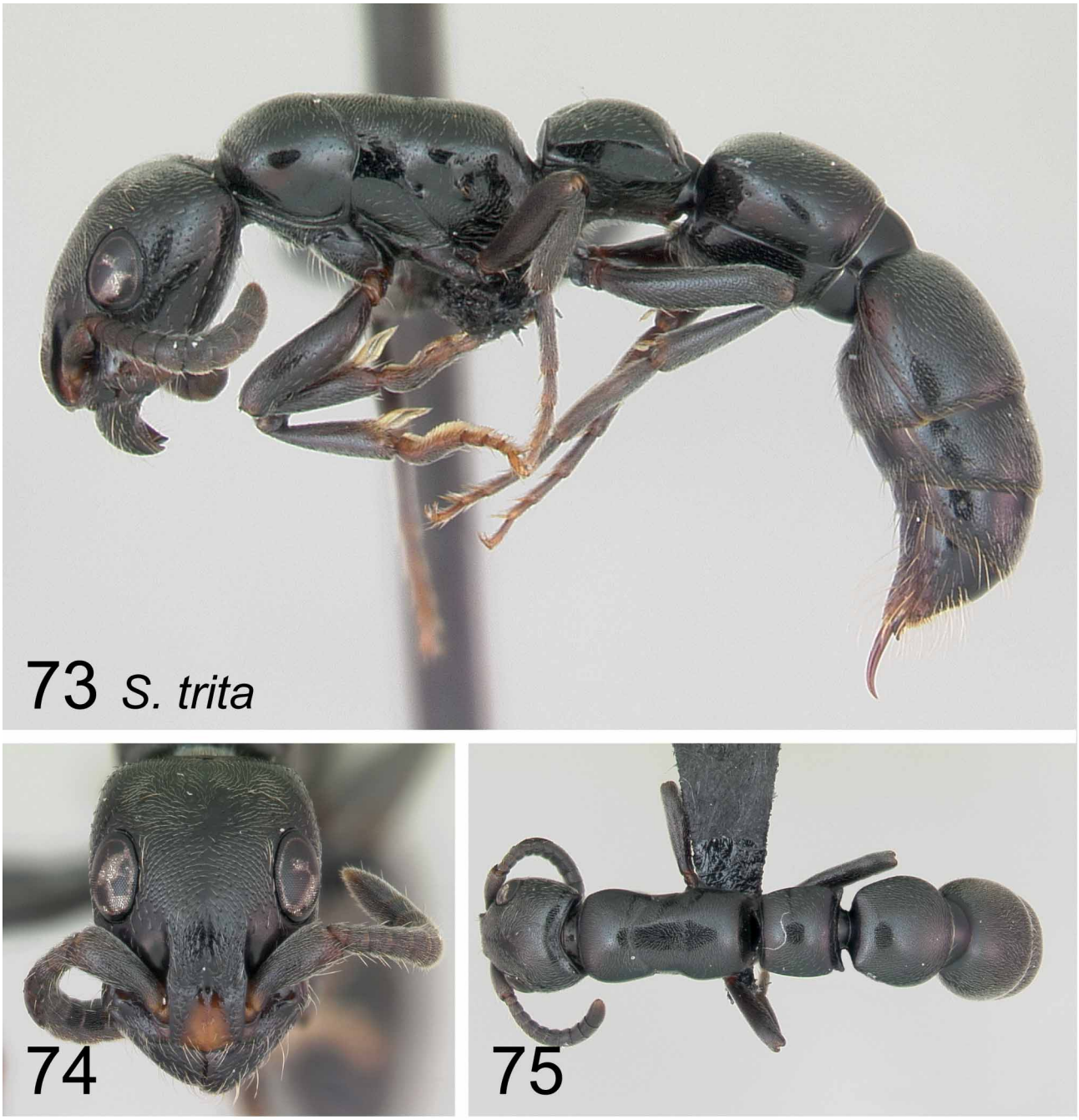
Non-paratypic material examined. **Madagascar**: Prov. Antsiranana, Forêt Anabohazo, WSW Maromandia (*B.L. Fisher*); Prov. Mahajanga, P.N. Tsingy de Bemaraha, ENE Bekopaka (*B.L. Fisher*); Prov. Mahajanga, P.N. Namoroka, NW Vilanandro (*B.L. Fisher*).

***Simopone trita* Bolton & Fisher sp. n.**
(Figs 73–75)

WORKER (holotype in parentheses). HL 1.56–1.94 (1.68), HW 1.14–1.46 (1.26), SL 0.54–0.68 (0.56), EL 0.44–0.55 (0.50), PW 0.95–1.16 (1.02), AIIW 0.91–1.18 (0.98), AIIL 0.85–1.06 (0.90), AIIIW 1.09–1.38 (1.17), AIIIL 1.00–1.22 (1.04), WL 1.82–2.20 (2.00), MFL 1.12–1.46 (1.18), CI 73–79 (75), SI 44–48 (44), EL/HW 0.36–0.40 (0.39), EP 1.15–1.55 (1.48), AIIW/AIIL 1.07–1.18 (1.09), AIIIW/AIIIL 1.06–1.19 (1.12) (15 measured).

In full-face view anteriormost points of frontal lobes are slightly posterior to the level of the midpoint of the convex anterior clypeal margin. Eyes located behind the cephalic midlength (EP 1.15–1.55). Leading edge of scape with 3–5 projecting setae that are curved or inclined toward the scape apex. In full-face view sides of head in front of eyes often with one or two projecting short setae, but behind eyes only with minute pubescence that is appressed or very nearly so. In profile frontal carinae with relatively long setae and cephalic dorsum with 2–3 standing short setae above the eye, and usually also with a very few setae that are located more posteriorly. Cephalic dorsum between eyes densely punctate, the punctures adjacent or nearly so. Anterior and dorsal surfaces of pronotum separated by an angle or weak margination, but without a strongly defined carina. Propodeal dorsum meets declivity through a blunt angle, without a transverse carina. Promesonotal suture weakly impressed; metanotal groove vestigial to absent. Mesosoma in dorsal view very obviously narrowest across mesonotum, much broader across pronotum and propodeum (in holotype PW 1.02, maximum width across mesonotum 0.80, maximum width across propodeum 1.00). Dorsum of mesosoma densely finely punctate everywhere. Mesosoma with a single pair of short setae, close to the pronotal humeri (easily abraded away, missing from holotype); mesosoma otherwise without setae but entire dorsum with appressed pubescence. Dorsal (outer) surfaces of mesotibiae and metatibiae mostly without projecting setae but one or two usually present close to their apices. Dorsal surface of AII (petiole) meets anterior surface in a fine transverse carina. Posteriorly the dorsum of AII lacks a sharp carina but a weak, arched ridge is present above the foramen. In dorsal view the posterior corners of AII are extended into stout triangular teeth that project posterolaterally. Lateral surface of AII, below the dorsolateral margin and above the level of the spiracle, with a longitudinal ridge or carina that extends the length of the sclerite. In dorsal view AII and AIII distinctly broader than long; AIV also broader than long. Abdominal tergites from AII to AIV often without setae, but a few may be present along the extreme apical margins of AIII and AIV; all three segments with quite dense, greyish appressed pubescence. Setae distinct on sternites of AIII and AIV. Abdominal tergites AII to AIV sculptured only with small punctures. Full adult colour black, appendages blackish brown to black; clypeus usually dull reddish; sides of pronotum and sides of abdominal tergites AIII and AIV often with a dull reddish spot, but this is variably developed and may be inconspicuous or absent on any sclerite.

Holotype worker (top specimen of three on pin), **Madagascar**: Prov. Antsiranana, Forêt Anlabe, 30.0 km 72° ENE Daraina, 30 m, 13°05.0'S, 49°54.5'E, 27–29.xi.2003, BLF9486, CASENT0499410, ex dead twig, above ground, littoral forest (*B.L. Fisher*) (CASC).



FIGURES 73–75. Lateral, full face and dorsal view of body. *Simopone trita* holotype worker CASENT0499410.

Paratypes. 2 workers on same pin, below holotype; 2 workers from same series as holotype but labelled only BLF9486, CASENT0499410-RES; 3 workers with same data as holotype but CASENT0499411; 3 workers with same data but CASENT0499412 (CASC).

S. trita and *dignita* form a small complex of species that in Madagascar is morphologically intermediate between the *silens* and *emeryi* complexes. They combine the reduced pilosity of the latter with the stocky AIII and posteriorly shifted eyes of the former. The two species are easily differentiated by the characters noted in the key, but in addition the posterior margins of tergites AIII and AIV in *trita* have a few short setae at most, whereas in *dignita* these margins each have a fringe of distinct setae that are obviously curved towards the midline.

Non-paratypic material examined. **Madagascar**: Ranomafana Nat. Park (*E. Rajeriarison*); Nosy Komba (*G.D. Alpert*); Prov. Antsiranana, Rés. Spéc. Ankarana, SW Anivorano Nord (*B.L. Fisher*); Prov. Antsiranana, Forêt Orangea, SE Remena (*B.L. Fisher*); Prov. Antsiranana, Nosy Be, Rés. Lokobe, ESE Hellville (*B.L. Fisher*); Prov. Antsiranana, Forêt Ampondrabe, NNE Daraina (*B.L. Fisher*); Prov. Antsiranana, Forêt Anlabe, ENE Daraina (*B.L. Fisher*); Prov. Antsiranana, Montagne Français, SE Diego Suarez (*B.L. Fisher*).

***Simopone victrix* Bolton & Fisher sp. n.**
(Figs 76–78)

WORKER (holotype in parentheses). HL 1.90–2.00 (1.90), HW 1.49–1.58 (1.49), SL 0.62–0.70 (0.62), EL 0.49–0.50 (0.49), PW 1.18–1.30 (1.18), AIIW 1.18–1.34 (1.18), AIIL 0.95–1.04 (1.04), AIIIW 1.40–1.52 (1.40), AIIIL 1.24–1.36 (1.32), WL 2.40–2.42 (2.40), MFL 1.45–1.48 (1.45), CI 78–79 (78), SI 42–44 (42), EL/HW 0.32–0.33 (0.33), EP 1.21–1.29 (1.29), AIIW/AIIL 1.14–1.30 (1.14), AIIIW/AIIIL 1.06–1.16 (1.06) (5 measured).

FIGURES 76–78. Lateral, full face and dorsal view of body. *Simopone victrix* paratype worker CASENT0134495.

In full-face view anteriormost points of frontal lobes are slightly posterior to the level of the midpoint of the shallowly convex anterior clypeal margin. With head tilted slightly back from full-face view the clypeal margin in front of each antennal socket is convex and projects slightly farther forward than the midpoint of the anterior clypeal margin. Frontal carinae are distinctly divergent posteriorly and extend back to the level of the anterior margins of the eyes, or very nearly so. Eyes located behind the cephalic midlength (EP 1.21–1.29). Leading edge of scape

with conspicuous projecting setae. In full-face view entire side of head with setae that are curved anteriorly. In profile entire dorsum of head, and ventral surface, with curved standing setae that are short and fine. Cephalic dorsum between eyes with numerous minute punctures and also with larger but sparse foveolate punctures, on a glossy surface. Anterior and dorsal surfaces of pronotum separated by an angle or weak margination, but without a strongly defined carina. Propodeal dorsum meets declivity through a blunt angle, without a transverse carina. Propodeal declivity finely densely punctulate. Promesonotal suture weakly impressed and without a series of ribs or aligned coarse punctures; metanotal groove vestigial to absent but median pit conspicuous. Mesosoma in dorsal view narrower across mesonotum than pronotum, broadest across propodeum (in holotype PW 1.18, width across mesonotum at its midlength 1.08, maximum width across propodeum 1.22). Dorsum of mesosoma with numerous small to minute punctures. Entire mesosoma dorsally with numerous short, fine, curved setae that are suberect to subdecumbent and longer on the anterior pronotum and posterior propodeum than in the intervening part of the dorsum. Dorsal (outer) surfaces of mesotibiae and metatibiae with standing setae present that are curved or inclined toward the apex. Dorsal surface of AII (petiole) meets anterior surface at an angle, without a transverse carina. Posteriorly the dorsum of AII lacks a carina but a weak transverse ridge is usually present above the foramen. In dorsal view the posterior corners of AII either form sharp angles or small triangular teeth that project laterally. Lateral surface of AII, below the dorsolateral margin and above the level of the spiracle, without a longitudinal ridge or carina that extends the length of the sclerite. In dorsal view AII, AIII and AIV all distinctly broader than long. Abdominal tergites AII to AIV with numerous curved setae that are directed posteriorly and are mostly suberect to subdecumbent. Curved setae numerous and distinct on sternites of AIII and AIV. Abdominal tergites AII to AIV sculptured only with numerous small punctures, sparsest on AII; tergites of AV and AVI also evenly densely covered with small punctures. Full adult colour black, appendages blackish brown to black; clypeus with or without a dull reddish tint; sides of pronotum and sides of abdominal tergites AIII and AIV without dull red spots in known material.

Holotype worker, **Madagascar**: Prov. Antsiranana, R.S. Manongarivo, 12.8 km 228° SW Antanambao, 780 m, 13°58.6'S, 48°25.4'E, 11-17.x.1998, BLF1898, CASENT0004512, on low vegetation, rainforest (*B.L. Fisher*) (CASC).

Paratypes. 1 worker, **Madagascar**: PN Montagne d'Ambre, 12.52574°S, 49.17238°E, 15.xi.2007, 1025 m, BLF18341, CASENT0134168, montane rainforest (*B.L. Fisher*); 1 worker with same locality data but 12.58132°S, 49.13368°E, 13.xi.2007, 1110 m, BLF18110, CASENT0134495, montane rainforest (*B.L. Fisher*); 1 worker with same locality data but 12.51391°S, 49.17784°E, 23.ii.-02.iii.2011, 984 m, BLF26057, CASENT0213949, 1 worker with same data as the previous specimen but BLF26077, CASENT0213236 (CASC).

Non-paratypic material examined. **Madagascar**: Prov. Antsiranana, PN Montagne d'Ambre (*B.L. Fisher*).

Of the five species in the *silens* complex *victrix* is quickly diagnosed by dense punctate sculpture on the tergites of AV and AVI; see the notes under *rex*.

Males of Malagasy species of *Simopone*

A preliminary investigation of the few available male specimens of *Simopone* collected in Madagascar has allowed the rough isolation of 13 species, with a residue of 4 specimens whose identities are very unsure but which appear to be related to *dux*; they exhibit differences in sculpture but are provisionally grouped with *dux* because knowledge of what constitutes normal sculpture variation in this sex is very limited. Males collected from nest samples in association with workers are named in the key, as is *mayri*, which was originally described from males and for which no associated worker has yet been discovered. Specimens of apparently different species, retrieved from light traps, are assigned a code letter until samples associated with workers can be found. It should be stressed that the key and identities are strictly provisional, because so few males are known that their degree of natural variation cannot be assessed with confidence.

A single male of *nonnihil*, collected with workers and part of the type-series, lacks all abdominal segments after AII. Its inclusion in the key relies on the assumption that its cinctus has cross-ribs. It has been included in that section of the key solely because it bears little resemblance to any known species in which cross-ribs are absent from the cinctus.

All male specimens are in CASC except for two residual specimens that may be *dux* (in MCZC), one specimen each of sp. A and sp. B (in UCDC), and the syntypes of *mayri* (in MSNG).

Provisional key to males of Malagasy species of *Simopone*

1 Cinctus of tergite of AIV smooth and polished, without cross-ribs 2
- Cinctus of tergite of AIV with conspicuous cross-ribs 6
2 With head in full-face view the posterior outlines of the ocelli do not break the line of the posterior margin of the head. Larger species, HW at maximum across eyes > 1.75, maximum width of mesoscutum 1.62–1.74, AIIW 0.82–0.96 3
- With head in full-face view the posterior outlines of the ocelli break the line of the posterior margin of the head. Smaller species, HW at maximum across eyes < 1.55, maximum width of mesoscutum 1.28–1.46, AIIW 0.62–0.72 4
3 Propodeum with a conspicuous transverse carina between dorsum and declivity, the carina crosses the entire width and is not interrupted medially. Posterior half of propodeal dorsum entirely foveolate-rugose. Longitudinal carina on side of AII weak, not strongly differentiated from the sculpture above it on the side. . . . . ***mayri***
- Propodeum with transverse carina between dorsum and declivity weak laterally and interrupted medially, so that for much of the width the dorsum rounds into the declivity. Posterior half of propodeal dorsum foveolate-rugose laterally but merely microreticulate medially. Longitudinal carina on side of AII sharply differentiated from the sculpture above it on the side . ***rex***
4 Side of AII (petiole) with a strong longitudinal carina that extends the length of the tergite above the level of the spiracle. AII with a sharp transverse carina that separates its anterior and dorsal surfaces across the entire width of the sclerite. **male sp. A**
- Side of AII (petiole) without a longitudinal carina or at most with a very feeble, low longitudinal blunt ridge. AII without a sharp transverse carina that separates its anterior and dorsal surfaces across the entire width of the sclerite 5
5 Side of AII above level of spiracle with rugulose sculpture. Propodeal declivity with fine rugulose sculpture, disorganised in places but predominantly transverse . . . . . **male sp. B**
- Side of AII above level of spiracle without rugulose sculpture. Propodeal declivity with sculpture predominantly transverse on upper half, longitudinal on lower half. . . . . **male sp. C**
6 Palp formula 5,3 . . . . . ***grandidieri*** (and presumably also the unknown male of *elegans*)
- Palp formula 6,4 7
7 Smaller species; maximum head width across eyes < 1.35, AIIIW < 0.80. 8
- Larger species; maximum head width across eyes > 1.50, AIIIW > 0.80. 11
8 Declivity of propodeum unsculptured except for a strip immediately below its dorsal margin 9
- Declivity of propodeum finely sculptured everywhere. . . . . **male sp. F**
9 Side of propodeum with a longitudinal ruga that runs along the sclerite immediately above the level of the spiracle. Sculpture above the ruga partially or entirely of longitudinal rugae. 10
- Side of propodeum without a longitudinal ruga above the level of the spiracle. Sculpture above the spiracle of disorganised low rugulae that are obviously not longitudinal. . . . . ***nonnihil***
10 Dorsum of propodeum, immediately in front of posterior transverse carina, with a continuous row of short, longitudinal costulae that extends across the entire width of the dorsum . . . . . **male sp. D**
- Dorsum of propodeum, immediately in front of posterior transverse carina, without a continuous row of costulae, at least the median third smooth and free of costulae . . . . . **male sp. E**
11 Side of AII with a sharp longitudinal carina that extends the length of the sclerite above the level of the spiracle. Propodeal declivity with coarse longitudinal rugae present that cover the entire surface of the declivity . . . . . ***silens***
- Side of AII without a longitudinal carina above the level of the spiracle. Propodeal declivity without coarse longitudinal rugae that cover the entire surface of the declivity 12
12 AII and AIII narrower; AIIW 0.66, AIIIW 0.88, AIIW/AIIL 0.83, AIIIW/AIIIL 0.83 . . . . . **male sp. G**
- AII and AIII broader; AIIW 0.72 or more, AIIIW 0.96 or more, AIIW/AIIL 0.90 or more, AIIIW/AIIIL 0.90 or more . . . . . ***dux***, plus residual specimens

Oriental and Malesian fauna of *Simopone*

Four certain extralimital species of *Simopone* have been described to date, three from the Malesian region and one from the Oriental. All four belong to the *grandidieri* group, by far the most widespread group of the genus, which also contains one Afrotropical member (*laevissima*) and two species from Madagascar (*elegans*, *grandidieri*). All four extralimital species exhibit the characters noted under the definition of that group. In particular, all have a distinct transverse sulcus on the mesopleuron, broad, transversely flattened frontal lobes and carinae, similarly shaped AII that lacks a lateral carina, and relatively sparse pilosity. Like the Afrotropical *laevissima*, two of these four species appear to have fairly well developed scrobes and all have a strong transverse sulcus on the metapleuron that continues the line and intensity of the mesopleural transverse sulcus. The scrobes are perhaps least well represented in *oculata*, which in this respect more closely resembles the Malagasy species *elegans* and *grandidieri*. The Oriental and Malesian species all appear to be rare and are known only from their holotypes, or from just one or two specimens. Radchenko (1993) has provided a key to workers of the four species discussed below.

Simopone bakeri Menozzi

Simopone bakeri Menozzi, 1926: 92. Holotype worker, SINGAPORE (*C.F. Baker*) (IEUB) [not seen]. [Redescribed by Taylor, 1966: 288.]

There is a single damaged dealate queen in MCZC (abdominal segments AIII to apex missing) which has the data "Singapore, coll. Baker". It matches adequately the original worker description of *bakeri* and most of the comments by Taylor (1966). It may well have been collected by Baker along with the holotype, but it was obviously not seen by Menozzi, who does not mention it. The maxillary palps of the MCZC specimen are short and the palp formula appears to be 4 (or perhaps 5), 3. If the maxillary palp has only 4 segments then *bakeri* will be unique in the genus. Perhaps the most obvious identifying character of this species is the anterior margin of the clypeus, which has a conspicuous prominent tooth at its midpoint, a character not shared with any other of the extralimital species. Taylor (1966) provides some extra notes on the holotype of *bakeri*.

Simopone chapmani Taylor

Simopone chapmani Taylor, 1966: 287. Holotype worker, PHILIPPINES: Negros I., Horns of Negros, 3600 ft. (*J.W. Chapman*) (MCZC) [examined].

The holotype and only known specimen of this species is fragmented and mounted on three card triangles on a single pin: head on top triangle, mesosoma + AII + AIII on middle triangle, AIV to apex on bottom triangle. The species was compared to *gressitti* by Taylor (1966) but the following features of *chapmani* deserve mention.

Antennal scrobe narrow but deep, apex of scrobe deflected ventrally as a triangular impression immediately in front of the anterior margin of the eye; scape very short, SI 33; metapleuron traversed by a sulcus that continues the line of the mesopleural sulcus; AII distinctly longer than broad (AIIW/AIIL 0.86); side of AII without a curved longitudinal carina between the dorsolateral margin and the level of the spiracle; AII longer than AIII in dorsal view; AIII longer than postergite of AIV.

Simopone gressitti Taylor

Simopone gressitti Taylor, 1965: 3, figs 1, 2. Holotype worker, NEW GUINEA: Hlandia-Binnen, 100 m., 1.xi.1958 (*J.L. Gressitt*) (BPBM) [not seen].

Well described by Taylor (1965), the general proportions of *gressitti* seem very similar to those of *chapmani*. Like that species, Taylor indicates (fig. 1) that the scrobe is deflected ventrally immediately in front of the eye, and a longitudinal sulcus is present across the metapleuron. He also appears to indicate anterior and posterior vestiges of a carina on the side of AII. From his measurements AII would appear to be distinctly shorter and broader (AIIW/AIIL 0.96) than in *chapmani*.

Simopone oculata Radchenko

Simopone oculata Radchenko, 1993: 45, figs 4–6. Holotype worker, VIETNAM: Isl. Kondor, N. 127-87, 5.iv.1987 (*A. Radchenko*) (UASK) [not seen].

This appears to be a more slender species than any of the above, with AIIW/AIIL 0.80. Like *chapmani* and *gressitti*, AII is longer than AIII and the metapleuron has a transverse sulcus. However, Radchenko's figs 4 and 5 show a lack of the defined antennal scrobe, deflected down in front of the eye, that is characteristic of those two species. In fact, the morphology of this area of the head seems more closely to resemble that of the Malagasy species *elegans* and *grandidieri*, where the impression between antennal socket and anterior margin of eye is a broad but shallow fossa, rather than a defined longitudinal scrobe.

Species excluded from *Simopone*

Cerapachys huode (Terayama) comb. n.

Simopone huode Terayama, 2009: 122, figs 121–123. Holotype alate queen, TAIWAN: Taitung Pref., Lan Hsu I., Hungtou, 11.vii.1971 (*K. Mizusawa*) (IAES) [not seen]. **Comb. n.**

Although described as a *Simopone* species, and reportedly having 11 antennomeres, *huode* is radically different from any other species examined in this study. We are convinced that this species is not correctly placed in *Simopone*. From the original description and drawings, and the rather poor photographs of the holotype available at www.niaes.affrc.go.jp, there appear to be 12 antennal segments, the scape is far too long and the eyes are too far forward (although the two eyes are at different levels in the drawing). In addition, the frontal carinae are close together, truncated posteriorly and terminate immediately behind the frontal lobes, as is usually seen in *Cerapachys* but never in *Simopone*. The antennal sockets appear almost entirely exposed, the posterior margin of the head and its corners are too rounded, an occipital surface is present, AII (petiole) is not laterally marginate, and the prora appears to have the wrong shape. In the illustrations it is impossible to see the condition of the mesotibial spurs (stated as absent in the description but may have been abraded away or overlooked in the poorly mounted specimen) or whether the pretarsal claws are toothed. Finally, the presence of a metabasitarsal glandular groove is not recorded. Until the holotype can be critically re-examined this species should be regarded as a member of genus *Cerapachys (sensu lato)*.

Genus *Vicinopone*

Vicinopone Bolton & Fisher gen. n.

Type-species: *Simopone conciliatrix* Brown, by present designation.

DIAGNOSIS OF WORKER

A monotypic Afrotropical genus of arboreal cerapachyine ants, with size-variable workers. With the shared characters of Cerapachyini listed in the introduction and also with the following combination of characters. An undoubted apomorphy of the genus is in *italics*.

1 Palp formula 3,2 (by dissection). Maxillary palp very short: with mouthparts retracted the apex of the maxillary palp, when extended back on underside of head, does not reach the posterior margin of the buccal cavity.

2 Antenna with 12 segments, gradually incrassate apically; apical antennomere large but subcylindrical, not swollen and bulbous.

3 Scape short (SI 56–67), when laid straight back in full-face view reaching the level of the posterior margin of the eye.

4 *Eyes large (EL/HW 0.31–0.45), located very far forward on the head so that the posterior eye margin is in front of the midlength of the head.*

5 Ocelli absent.

6 Clypeus more or less flat between the elevated frontal lobes; frontal carinae short, extending back to level of anterior margins of eyes only because the eyes are located so far forward.

7 Parafrontal ridges present but short and weak because of proximity of eye to front of head.

8 Head capsule with a short, vertical posterior surface above the occipital foramen; this surface separated from the vertex by a low, arched, transverse carina.

9 Head capsule, in ventral or ventrolateral view, with a carina that extends down the posterolateral margin and onto the ventral surface, which it crosses to meet its opposite number at the ventral midline; this carina is anterior to, and separate from, that which borders the occipital foramen.

10 Mesosoma dorsally with very feeble, shallow transverse concavities that represent the last vestiges of the promesonotal suture and metanotal groove; in some both are functionally absent. Dorsum and declivity of propodeum separated by a carina.

11 Mesopleuron without a strongly developed transverse sulcus; a vestige may remain in large workers.

12 Mesotibia without spurs.

13 Metatibia with a single, pectinate spur.

14 Metatibial gland absent (at least no external orifice or indication is present).

15 Metabasitarsus ventrally without a longitudinal glandular groove.

16 Pretarsal claws each with a single, small, preapical tooth on its inner surface.

17 Propodeal lobe in profile large and broad-based, rounded apically, continuous above with a narrow lamella that ascends the margin of the propodeal declivity.

18 AII (petiole) elongate, barrel-shaped, not marginate laterally and with a transverse carina that separates anterior and dorsal surfaces but without a similar carina posteriorly; the dorsum curves evenly down to the posterior foramen. Side of AII with a weak, oblique longitudinal carina above the level of the spiracle.

19 AIII postpetiolate, more voluminous than AII but the same length in dorsal view. AIII distinctly smaller than AIV.

20 Prora of AIII merely a curved carina that separates the anterior face of the poststernite from the lateral and ventral surfaces.

21 Pretergite of AIV in dorsal view strongly constricted with respect to posttergite of AIV.

22 Cinctus of AIV cross-ribbed.

23 Tergite of AIV without a pair of slightly depressed, subovate glandular patches on the posterior half.

24 Pygidium with its apical margin evenly curved and equipped with a continuous row of minute denticles that are all approximately equal in size.

DIAGNOSIS OF QUEEN (GYNE)

The queen is worker-like except that ocelli are present and the mesosoma has a full complement of flight sclerites. Therefore all the worker characters listed above, except for numbers 5 and 10, occur here. Venation unknown as the two queen specimens are dealate and were captured in a single nest, which implies that the species is probably polygynous.

MALE: unknown.

Comments on *Vicinopone*

The worker of the single small, yellow species included here was described in considerable detail by Brown (1975) as *Simopone conciliatrix*. He argued that the species exhibited a mixture of characters of several genus-rank taxa, but concluded that the "lack of spurs on the tibiae of the middle legs is considered here as definitive in placing the species in *Simopone*".

We are not convinced by the present investigation that the loss of mesotibial spurs represents a single evolutionary event, and most probably should not be considered as a synapomorphy of *Simopone* (*sensu lato*) and *S. conciliatrix*. In fact, the comparative analysis carried out here suggests a very different conclusion, as the loss of mesotibial spurs is just about the only derived feature that *conciliatrix* and the rest of *Simopone* have in common. The similar loss of mesotibial spurs in *Tanipone*, an otherwise very different taxon, only serves to reinforce the suspicion that spur loss is not synapomorphic but has merely been acquired by convergence in three separate lineages. Because of this, and in view of the differentiating characters listed below, *conciliatrix* is hereby removed from *Simopone* and transferred to its own monotypic genus, *Vicinopone*.

In major details of morphology, striking contrasts between *Vicinopone* and all species of *Simopone* include the following (the state considered apomorphic is *italicised*).

1 *Palp formula is 3,2* in *Vicinopone*, as opposed to 6,4 or more rarely 5,3 in *Simopone*.

2 Antennae have 12 antennomeres in *Vicinopone*, as opposed to *11 antennomeres* in *Simopone*.

3 Scape, when laid straight back, reaches the posterior margin of the eye in *Vicinopone*, as opposed to the *anterior margin of the eye* in *Simopone* (SI 57–67 in *Vicinopone*, SI 33–56 in *Simopone*).

4 *Ocelli are absent* in *Vicinopone*, as opposed to present in *Simopone*.

5 *Eyes are shifted very far forward* in *Vicinopone*, as opposed to being near or behind the midlength in *Simopone* (EP 0.32–0.41 in *Vicinopone*, EP 0.68–1.91 in *Simopone*).

6 A differentiated posterior (occipital) surface to the head occurs in *Vicinopone*, as opposed to *the lack of such a surface* in *Simopone*.

7 *Pre-occipital carina* (that extends down the posterolateral margin of the head and onto the ventral surface) *runs right across the ventral surface to intersect the ventral midline* in *Vicinopone*, as opposed to the carina terminating well before it approaches the ventral midline in *Simopone*.

8 Metabasitarsus lacks a ventral glandular groove in *Vicinopone*, as opposed to *the universal presence of such a groove* in *Simopone*.

9 AII (petiole) tergite in dorsal view is elongate and barrel-shaped in *Vicinopone*, as opposed to *flattened and laterally marginate* in *Simopone* (AIIW/AIIL 0.68–0.75 in *Vicinopone*, AIIW/AIIL 0.79–1.30 in *Simopone*).

10 *Cinctus of AIV is cross-ribbed* in *Vicinopone*, as opposed to smooth in *Simopone*.

Species of *Vicinopone*

conciliatrix (Brown, 1975) comb. n. Ghana, Gabon, Democratic Republic of Congo, Tanzania.

Vicinopone conciliatrix (Brown) comb. n.

(Figs 79–81)

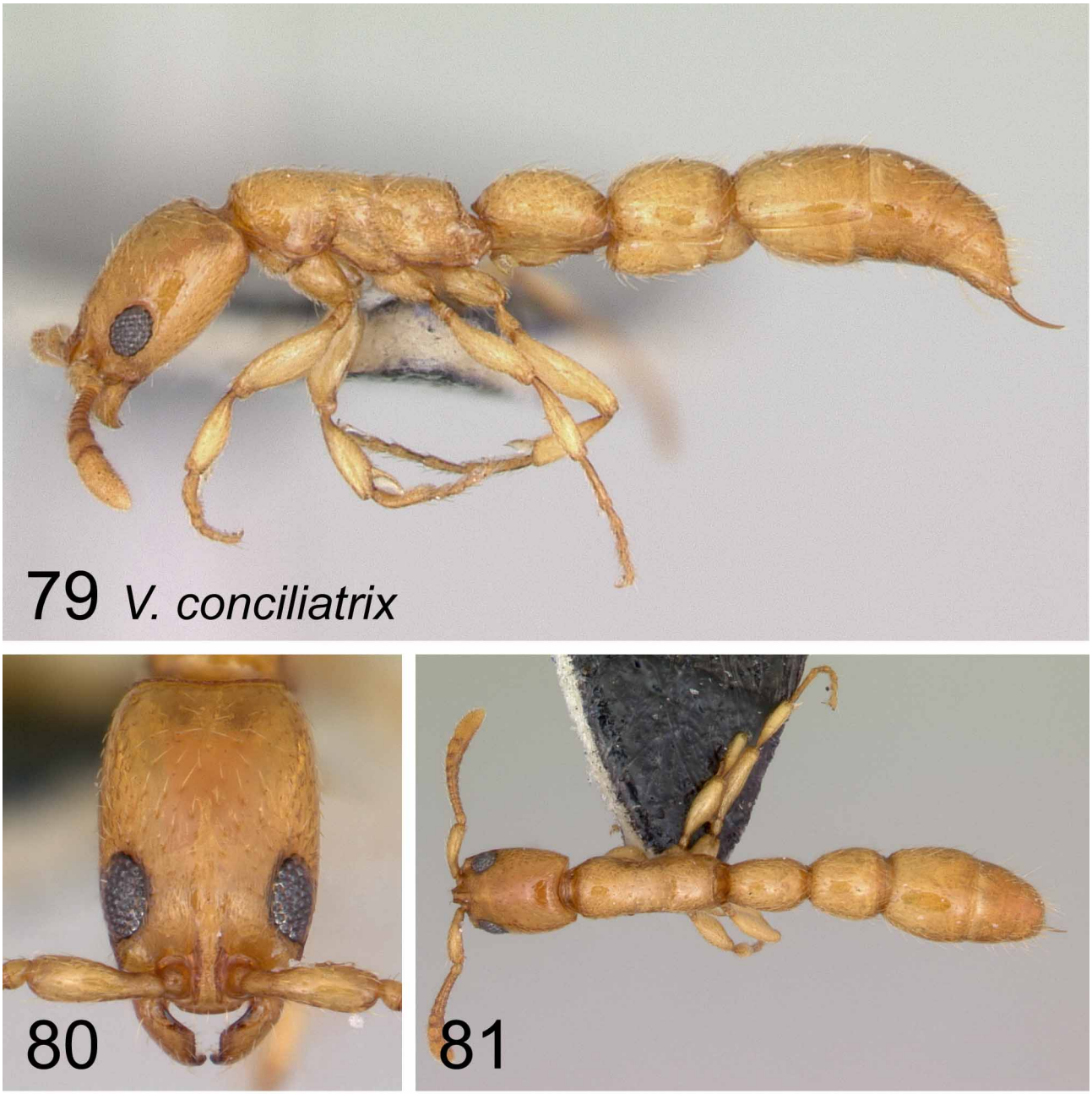
Simopone conciliatrix Brown, 1975: 79, figs 11–13. Holotype worker, paratype workers and paratype queens (dealate), GHANA: Tafo, 27.xi.1970, hollow cocoa twig, on tree (*B. Bolton*); paratype workers, DEMOCRATIC REPUBLIC OF CONGO ("Belg. Congo" on data label): Yangambi, Réserve Intégrale Riv. "Luco", 6.x.1949, C-1265 (*A. Raignier & J. van Boven*) (BMNH, MCZC) [examined].

Measurements: HL 0.53–0.68, HW 0.32–0.42, SL 0.18–0.28, EL 0.10–0.19, PW 0.22–0.32, AIIW 0.20–0.28, AIIL 0.24–0.38, AIIIW 0.26–0.37, AIIIL 0.24–0.38, WL 0.60–0.82, MFL 0.27–0.40, CI 59–63, SI 57–67, EL/HW 0.31–0.45, EP 0.32–0.41, AIIW/AIIL 0.68–0.75, AIIIW/AIIIL 0.95–1.08 (10 measured).

The original description of this species is detailed and does not need duplication here. The major characters listed for the genus, above, will easily isolate *conciliatrix*. One small point needs to be added: there is allometric variation in the size of the eyes, which become relatively larger with increased size. In the smallest workers measured (HW 0.32) the ratio EL/HW is 0.31. As HW increases the ratio increases, until in the largest workers (HW 0.42), EL/HW is 0.45. In full-face view the outer margins of the eyes of the smallest workers just graze the outline of the side of the head, whereas in larger workers the anterior halves of the outer margins of the eyes clearly interrupt the outlines of the sides.

V. conciliatrix appears to be a quite widely distributed but rare species. Its rarity is more likely apparent than real because it nests and forages in trees, rarely if ever coming down to the ground. Its type-locality at Tafo, in Ghana, was within the grounds of the Cocoa Research Institute of Ghana, where a nest of the species was discovered in a thin twig of a small cocoa tree, about 2 metres above the ground, in moderate shade. The nest contained 103 workers, 2 dealate queens and a number of brood. A second, smaller nest was also found at Tafo the following year, located just a few metres from the first, but the species does not appear to have been found there again. Brown (1975) recorded two paratypes from the Democratic Republic of Congo and Yanoviak *et al*. (2007) retrieved *conciliatrix* from forest canopy in Gabon. Recently, Peter Hawkes (AFRC) has sent us excellent photographs of a hand-collected specimen found in primary forest in Tanzania (Lindi Region, Ndimba Forest Reserve, 2008 (*Hawkes, Mlacha & Ninja*)).

Material examined. Ghana: Eastern Ghana, Tafo (= New Tafo (Akim)), 27.xi.1970 (*B. Bolton*) [Also a second series from the same locality but 18.i.1971 (*B. Bolton*).] **Gabon**: Ogooué-Maritime Prov., Gamba (*S.P. Yanoviak*). **Democratic Rebublic of Congo**: Yangambi, Rés. Intég. Riv. "Luco" (*Raignier & van Boven*).



FIGURES 79–81. Lateral, full face and dorsal view of body. *Vicinopone conciliatrix* worker CASENT0172777.

Genus *Tanipone*

***Tanipone* Bolton & Fisher gen. n.**

Type-species: *Tanipone hirsuta* sp. n., by present designation.

DIAGNOSIS OF WORKER

A Malagasy genus of predominantly terrestrial cerapachyine ants, but also quite frequently found on low vegetation. With the shared characters of Cerapachyini listed in the introduction and also with the following combination of characters. Two apomorphies of the genus are in *italics*.

1 Palp formula 6,4. *Maxillary palps extremely long: with mouthparts retracted the apices of the maxillary palps, when extended back on underside of head, extend beyond the level of the posterior margin of the eye and usually approach the occipital foramen.*

2 Antenna with 12 segments, tapering apically and not incrassate; apical antennomere subcylindrical and tapering apically, not swollen and bulbous, no broader than the preapical segment.

3 Scape short (SI 49–65), when laid straight back in full-face view the apex of the scape excedes the level of the anterior margin of the eye but never reaches the level of the posterior margin of the eye.

4 Eyes large (EL/HW 0.37–0.48), located slightly behind the midlength of the head.

5 Ocelli present.

6 Clypeus more or less flat between the slightly elevated frontal lobes; frontal carinae very short, constricted and terminating almost immediately behind the frontal lobes.

7 Parafrontal ridges short and indistinct, weakly developed.

8 Head capsule with a short, vertical posterior surface above the occipital foramen, that meets the vertex through a blunt angle; vertex behind ocelli usually with a very fine, low transverse ridge.

9 Head capsule, in ventral or ventrolateral view, with a carina that extends down the posterolateral margin and onto the ventral surface where it passes through a near right-angle and extends to the ventral midline.

10 Mesosoma dorsally without trace of the promesonotal suture; metanotal groove vestigial to absent.

11 Pronotum in dorsal view rounded anteriorly between anterior surface and dorsum, not transversely marginate nor carinate; propodeum marginate or carinate between dorsum and declivity, even if only weakly so.

12 Mesopleuron with a strongly developed transverse sulcus.

13 Mesotibia without spurs (a setiform vestige is usually visible).

14 Metatibia with a single, pectinate spur.

15 Metatibial gland present, its orifice usually small and indistinct.

16 Metabasitarsus ventrally without a longitudinal glandular groove.

17 Pretarsal claws of at least the metatarsus with a single, small, preapical tooth on the inner surface of each claw.

18 Propodeal lobe in profile small, rounded apically.

19 Propodeal spiracle orifice small, circular.

20 AII (petiole) not marginate laterally in dorsal view.

21 AIII not postpetiolate, in dorsal view more voluminous than AII but only a little smaller than AIV.

22 *Tergite of AIII with a pair of subovate glandular patches on the posterior half. Posterior margin of segment with a transverse band of pale cuticle, or a pair of pale patches, that subtend the glands.*

23 Prora of AIII a small, simple, convex cuticular boss or prominence, not delimited by a sharp curved carina that separates the anterior face of the poststernite from the lateral and ventral surfaces.

24 Pretergite of AIV in dorsal view not strongly constricted with respect to posttergite of AIV.

25 Cinctus of AIV either with or without cross-ribs.

26 Pygidial denticles sparse, restricted to a short apical arc along a narrow prominence at the extreme apex of the sclerite.

Comments on worker characters

Numbers correspond to character numbers above.

1 Palp formula 6,4 has been confirmed by *in situ* counts of fully extended mouthparts of all species, and also by dissection of *hirsuta*, *maculata*, *pilosa*, *varia* and *zona*. The extreme elongation of the palps, especially the maxillaries, is not matched in any other cerapachyine, or any other dorylomorph, genus.

9 The carina in *Tanipone* is very similar to that seen in *Vicinopone*, and quite different from the carina as developed in *Simopone*. In that genus the carina extends onto the ventral surface but terminates or fades out well before meeting the ventral midline.

13 As in *Simopone*, the mesotibial apex usually has one to several setae that are roughly aligned with the long axis of the tibia. In *Tanipone* one of these setae almost certainly represents the last vestige of a spur.

15 When a visible orifice of the metatibial gland is discernible, it generally appears as a slightly depressed, small, subovate patch or pore, located posterior to the small cuticular vesicle at the base of the spur and usually off the ventral midline of the metatibia. The orifice is variously developed in different species of the genus. In *aglandula* it is a shallow elongate depression; in *aversa*, *cognata*, *pilosa*, *scelesta*, *subpilosa* and *varia* it forms a

subcircular to subovate patch or pore; in *hirsuta* there is no obvious pore, but a small patch of pale cuticle is present. In the two very closely related species *maculata* and *zona*, no orifice can usually be seen, but an inconspicuous minute pore occurs in some workers. Variation of this nature is not surprising and is replicated elsewhere. For instance, in the two closely related West African *Cerapachys* species, *C. foreli* (Santschi) and *C. nkomoensis* (Forel), the gland orifice is a shallow oval pore in the former, but an elongate deep slit, often filled with whitish flocculent material, in the latter.

17 Unlike in *Simopone*, the extra tooth on each pretarsal claw is usually not uniformly present on every leg in the various species of *Tanipone*. On the metatarsus the preapical teeth of the pretarsal claws are most commonly present; they are always conspicuous in *aglandula*, *hirsuta* and *pilosa*, and small but usually distinct in *cognata* and *maculata*. However, in some species they may be minute and difficult to discern (*aversa*), and sometimes appear to be absent (*e.g*. not discernible in some specimens of *scelesta* and *zona*, and many specimens of *varia*). On the mesotibial claws a small extra tooth is uncommon; most specimens have the claws simple, although an extra tooth has been seen in some specimens of *aglandula*, *hirsuta*, *maculata* and *pilosa*. Protibial claws are almost always simple; a small tooth has been clearly detected only in a couple of specimens of *hirsuta*.

20 Anterior surface of AII slopes posteriorly in profile. The anterior and dorsal surfaces, and the dorsal and posterior surfaces, are separated by blunt angles or weak transverse carinae; the posterior margin in dorsal view is usually shallowly concave medially. The side of AII tergite has a longitudinal carina above the level of the spiracle.

22 In a single species, *aglandula*, the glandular patches are not visible on the surface of AIII by light microscopy, but the characteristic pale area that subtends the glands and appears associated with them is strongly retained. Whether the glands remain present beneath the tergite, or whether they have atrophied and been entirely lost in this species, remains to be seen. Whichever, it is most parsimonious to assume apparent modification or loss of the paired gland in *aglandula*, rather than to assume its individual development in every other species of the genus. The pale band, or pair of pale spots, at the apex of tergite AIII is conspicuous in all species save for a few specimens of *scelesta*, where it may be very faint or even absent, but in these few specimens the glandular patches themselves remain conspicuous.

24 In dorsal view the maximum width of the pretergite of AIV is 0.76–0.89 × the maximum width of the posttergite of the segment. This is relatively much wider than in *Simopone* (0.52–0.69) and *Vicinopone* (0.62–0.64).

The ratio has not yet been investigated in other cerapachyine genera.

25 When cross-ribs are present on the cinctus they are very short, indistinct, fine and crowded.

DIAGNOSIS OF PUTATIVE ERGATOID GYNE

No standard alate/dealate queens with any trace of developed flight sclerites have been discovered for any species of *Tanipone*. However, in *cognata*, *scelesta* and *maculata* a few specimens (1, 1, and 2, respectively) are distinctly more densely sculptured. In particular, they possess a very conspicuous, fine, dense microreticulation between the punctures on the dorsal mesosoma. In *scelesta* and *maculata*, these specimens differ from their otherwise identical workers only in this feature: in *maculata* a graded increment of sculpture appears to link specimens with the weakest sculpture to those with the strongest. The specimen of *cognata* is a singleton which, disregarding the mesosomal sculpture, does not otherwise resemble any known worker. It may be that these more heavily sculptured forms represent a rare upper limit of worker sculptural variation within each species of the *maculata* group. Yet the possibility that they may represent separate species cannot be dismissed. However, it is suspected that these rare forms do not represent separate species or densely sculptured workers, but are in fact extreme ergatoid gynes; they therefore exhibit all the characters of the worker diagnosis at genus rank. Only dissection of the ovaries and spermathecae of these oddities will reveal the truth of the matter, but material suitable for such a detailed examination is not presently available.

DIAGNOSIS OF MALE

Males caught in association with workers are known only for *zona*. In CASC are many unassociated males retrieved from light traps, where they appear to be reasonably common. These have not been treated in detail as regards species-rank taxonomy, but have been utilised to make the diagnosis of this sex as complete as possible.

1 Palp formula 6,4; the maxillary palps, when laid back along the underside of the head, reach or very nearly reach the occipital foramen.

2 Mandibles triangular and edentate, masticatory margins meeting at full closure; masticatory margins straight to shallowly concave.

3 Antenna 13-segmented, filiform; funicular segments 3 to apex longer than broad; apical segment tapering apically and not swollen, slightly longer than funicular segment 12 but no broader.

4 Eyes large and very conspicuous.

5 Ocelli present.

6 Frontal lobes short and convergent posteriorly, not concealing the antennal sockets in full-face view; frontal carinae short or very short, abruptly terminated posteriorly.

7 Head capsule, in ventral or ventrolateral view, with a carina that extends down the posterolateral margin and onto the ventral surface, where it abruptly curves medially and extends to the ventral midline.

8 Pronotum visible anteriorly in dorsal view as a narrow collar in front of the mesoscutum.

9 Notauli absent.

10 Parapsidal grooves present but often feebly developed.

11 Propodeal lobes present and conspicuous.

12 Mesotibia without spurs (a setiform vestige is usually present).

13 Metatibia with a single, pectinate spur.

14 Pretarsal claws with or without a preapical small tooth.

15 Venation as discussed below.

16 Prora present as a small lobe or short transverse crest.

17 AIII not postpetiolate; in dorsal view AIV > AIII, the two broadly articulated; AIII > AII.

18 Glandular patches absent from tergite of AIII.

19 Pygidium with posterior margin not denticulate.

Comments on male characters

Numbers correspond to character numbers above.

1 The palp formula of 6,4 has been seen in every specimen examined in which the mouthparts were extended and can even be counted in many specimens in which the mouthparts are fully retracted. The maxillary palps are as disproportionately elongated as in the workers and ergatoids.

9 No traces of notauli remain on the mesosocutum, in marked contrast to *Simopone* males, where notauli are very strongly developed.

10 In the majority of specimens parapsidal grooves are present on each side of the mesoscutum as fine, faint impressions. In a few specimens they are extremely faint and not easy to see.

14 In a single unassociated male a small preapical tooth is present on the pretarsal claws of the mesotarsus and metatarsus but absent from the protarsus. In *zona* and other males examined a tiny preapical tooth is often apparent on the metatarsal claws but is sometimes absent. The claws of the mesotarsi are predominantly simple, with only a tiny or vestigial tooth in some; the protarsal claws always appear simple.

15 The most complete forewing venation is shown by an unassociated male from Morondava, in UCDC (*P.S. Ward*#11112-7), from a light trap. The pterostigma is large and pigmented; C is absent and R1·f3 is absent distal of the pterostigma; pigmented tubular veins are represented only by Sc+R, Sc+R1, Rs·f1, M+Cu, M·f1, cu-a, and A to just distal of cu-a. The remaining veins are depigmented but mostly tubular, the long veins tend to fade distally: Rs+M, M and Cu are distinct, but Rs·f2-3 is absent and Rs·f4-5 fades out just before reaching the margin. Cross-veins cu-a (which always arises from M+Cu), 1m-cu and 2rs-m are present and easily visible, but 2r-rs is faint. Most specimens show reductions from this pattern, with various veins disappearing, but a large, pigmented pterostigma is always retained. In many specimens 2rs-m is lost, leaving a "stigmal vein" (= 2r-rs&Rs·f4-5) dependent from the pterostigma; but often this is very faint and may also be lost. In the most reduced forewings only a framework of weak veins in the proximal half of the wing membrane remains, consisting of Sc+R, Sc+R1, Rs·f1, M·f1, M+Cu and the basal portion of A.

Synoptic list of species of *Tanipone*

hirsuta **group**
hirsuta Bolton & Fisher **sp. n.**
pilosa Bolton & Fisher **sp. n.**
subpilosa Bolton & Fisher **sp. n.**

maculata **group**
aversa Bolton & Fisher **sp. n.**
cognata Bolton & Fisher **sp. n.**
maculata Bolton & Fisher **sp. n.**
scelesta Bolton & Fisher **sp. n.**
varia Bolton & Fisher **sp. n.**
zona Bolton & Fisher **sp. n.**

aglandula **group**
aglandula Bolton & Fisher **sp. n.**

Species groups of *Tanipone*

In addition to the characters noted in the diagnosis of the genus, workers of all known species of *Tanipone* have 2–3 projecting setae on the leading edge of the scape. Also, in all species the eyes are located at the broadest point of the head and the outer eye margins always break the outlines of the sides. In front of the eyes the sides of the head are weakly convex and distinctly convergent anteriorly; behind the eyes the sides converge weakly towards the posterior corners. Predominant surface sculpture in all species is of punctures, usually shallow and weakly foveolate but sometimes coarse and very closely packed, sometimes small and widely spaced. No other basic form of sculpture is known. Superficial microsculpture may occur between the punctures.

Characters of *hirsuta* species group (workers)

1 Each glandular patch on the tergite of AIII consists of a mass of large, coarse, closely-packed, deep punctures. The individual punctures are separated only by narrow, flattened rims between them and the surfaces of the rims are densely microsculptured and dull. The glandular patches are not depressed into the surface of the sclerite and each puncture gives rise to a short, curved seta that is subappressed and directed posteriorly (Figs 82–83).

2 Cephalic pilosity relatively dense. In full-face view side of head in front of eye with several (more than one) projecting setae of varying length; side of head below outline of eye with 2–3 setae that project laterally; side of head behind level of eye with several projecting setae of varying length. In profile the entire dorsum of the head and body with numerous standing setae of varying lengths, far more than the strictly limited number described below for the *maculata* group and too many to count easily.

3 With mesofemur in dorsal view standing setae occur on both the anterior and posterior surfaces; setae are always present and are not restricted to the apex of the femur. Metafemur in the same view is similarly hirsute.

Characters of *maculata* species group (workers)

1 Each glandular patch on the tergite of AIII consists of a slightly depressed area that, with light microscopy, appears extremely finely shagreenate to microreticulate, or even almost smooth; without coarse, deep, densely-packed punctures. With scanning electron microscope resolution the area of the patch, at least in *zona*, is seen to contain abundant, very closely packed, papillae (Figs 84–85).

2 Cephalic pilosity relatively sparse and arranged in a fixed pattern. In full-face view side of head in front of eye without projecting setae or at most with a single projecting seta close to the posterior clypeal margin; side of

head below outline of eye with a single seta that projects laterally; side of head behind level of eye with a single projecting seta; 2–4 setae along posterior margin of head. In profile, a single pair of erect setae immediately behind the frontal carinae and a single erect seta above the dorsal margin of each eye. In one specimen an additional short seta is present close to the ocelli. Any pubescence that is present is appressed, minute, inconspicuous and very sparse.

3 With mesofemur in dorsal view standing setae are either entirely absent, or are restricted to a single short, stout seta on the anterior surface close to the apex. Metafemur in the same view either lacks setae or has a single short seta close to the apex on its anterior surface. Minute appressed or slightly elevated pubescence is present on both femora.

This group falls neatly into two complexes of related species. The *varia* complex (*aversa, scelesta, varia*) is characterised by the presence of a short preapical seta on the anterior surface of the mesotobia (best seen in dorsal view), the presence of at least one pair of setae on the propodeum, and the anterior setae on the tergite of AIII are at or very close to the anterior margins of the glandular patches. The *maculata* complex (*cognata, maculata, zona*) lacks setae in both these places, and the anterior setae on the tergite of AIII are considerably in front of the anterior margins of the glandular patches.

Characters of *aglandula* species group (workers)

1 Tergite of AIII without discernible glandular patches (histological work is necessary to ascertain if the glands remain below the sclerite or are truly lost; see worker comment 22, under diagnosis of genus, above).

2 Cephalic pilosity is as described for the *maculata* group above, except that commonly two setae project laterally from below the eye and the sides of the head may have additional short setae present.

3 With mesofemur in dorsal view a single standing seta is present close to the apex on the anterior surface, and another is present on the posterior surface directly opposite to it. Metafemur in the same view has a single seta on the anterior surface only. Appressed short pubescence is present on both femora.

The single species in this group, *aglandula*, exhibits a density of pilosity that on the head and abdomen is intermediate between the severely restricted setal pattern characteristic of the *maculata* group and the much denser, more disorganised pilosity of the *hirsuta* group. The metatibial gland orifice in *aglandula* is the most extensively developed of the genus, and it is the only known species of *Tanipone* that has no visible glandular patches on AIII.

Key to workers and putative ergatoids of *Tanipone*

1 Dorsum of tergite of AIII with two glandular patches, one on each side of the midline. Each patch is roughly triangular to circular in shape and has sculpture or pilosity different from the remainder of the dorsum. Posterior margin of each glandular patch usually impinges upon a transverse band of off-white to yellow cuticle, or a pair of elongate off-white to yellow spots, on the posterior margin of AIII tergite 2

- Dorsum of tergite of AIII without visible glandular patches on each side of the midline. Posterior margin of AIII tergite retains a pair of large, off-white to yellowish spots . . . . . ***aglandula***

2 Glandular patches on the tergite of AIII consist of a slightly depressed area that is extremely finely shagreenate to microreticulate, or even almost smooth; without coarse, deep, densely-packed punctures that are separated by flat, densely microsculptured rims (Figs 84–85). With head in full-face view each side with a single, stout seta that projects laterally from below the outline of the eye. Side of head behind the posterior margin of the eye with a single stout seta that projects laterally, the only seta present between the posterior margin of the eye and the posterior corner. 3

- Glandular patches on the tergite of AIII consist of a mass of large, coarse, closely-packed, deep punctures. The individual punctures are separated only by narrow, flat rims, the surfaces of which are densely microsculptured and dull (Figs 82–83). With head in full-face view each side with 2–3 stout setae that project laterally from below the outline of the eye. Side of head behind the posterior margin of the eye with numerous setae of varying length that project laterally between the posterior margin of the eye and the posterior corner 8

3 With mesofemur in dorsal view its anterior surface has a single projecting seta that is located close to the apex. This seta is straight to slightly curved, is inclined in the direction of the femoral apex and is the only seta present on the anterior and posterior surfaces of the mesofemur. Propodeum with 1–3 pairs of setae, at least a pair present at the posterodorsal margin. On tergite of AIII a stout seta arises at, or very close to, the anterior margin of each glandular patch 4

- With mesofemur in dorsal view the anterior surface without a projecting seta located close to the apex; anterior and posterior surfaces of mesofemur entirely without setae. Propodeum without setae. On tergite of AIII the stout seta conspicuously arises well in front of the anterior margin of each glandular patch. 6

4 Pronotum, mesonotum and propodeum dorsally each with 2–3 pairs of setae; total number of pairs of setae on the mesosoma dorsum is always more than three (usually 6). Posterior margins of tergites of AIII and AIV each with a transverse sparse row of setae dorsally. With head in full-face view the side immediately behind the posterior clypeal margin with a single projecting stout seta. Katepisternum partially to entirely very finely and densely longitudinally striolate . . . . . ***scelesta***

- Pronotal dorsum with a single pair of setae, at the humeri; mesonotum with 0–1 pairs and propodeum with a single pair, at the posterior margin; total number of pairs of setae on mesosoma dorsum is 2–3. Posterior margins of tergites of AIII and AIV almost always without setae; only very rarely with one or two present. With head in full-face view the side immediately behind the posterior clypeal margin usually without a seta, but extremely rarely a small hair may be present. Katepisternum usually smooth, at most with some very feeble sculpture on part of the surface, but without longitudinal striolae 5

5 Tergite of AIII in dorsal view dark brown to black, the posterior margin with a pair of pale, off-white to yellowish spots that are separated medially by a longitudinal strip of dark cuticle that extends to, or very nearly to, the posterior margin. In dorsal view AII shorter and broader, AIIW/AIIL 1.15–1.30. Colour of dorsal head and mesosoma variable, ranging from orange brown to blackish brown . . . . . ***varia***

- Tergite of AIII in dorsal view orange, the posterior margin with a continuous pale band of off-white to yellowish cuticle. Width of pale band is more or less consistent across the sclerite, except where indented by the glandular patches, and is not bisected medially by a longitudinal strip of dark cuticle. In dorsal view AII longer and narrower, AIIW/AIIL 1.09–1.11. Colour of dorsal head and mesosoma uniformly orange . . . . . ***aversa***

6 Head, mesosoma and AII orange; AIII to apex of abdomen dark brown to blackish brown except for the pale apical band on AIII. Tergite of AIII broader, AIIIW 0.76 . . . . . ***cognata***

- Head, mesosoma and AII to apex of abdomen more or less uniformly brown to black, except for the pale apical band or spots on AIII. Tergite of AIII narrower, AIIIW 0.45–0.66 7

7 With tergite of AIII in dorsal view the posterior margin with a continuous pale band of off-white to yellowish cuticle. Width of pale band is more or less consistent across the sclerite, except where indented by the glandular patches, and is not bisected medially by a longitudinal strip of dark cuticle. . . . . ***zona***

- With tergite of AIII in dorsal view the posterior margin with a pair of large, pale, off-white to yellowish spots that are separated medially by a longitudinal strip of darker cuticle that extends to, or very nearly to, the posterior margin . . . . . ***maculata***

8 Punctures on basal third of tergite AIV broad and coarse, closely packed so that individual punctures are only separated by their narrow cuticular rims; distances between the punctures always clearly less than the puncture diameters. Side of pronotum usually distinctly more densely sculptured than anepisternum. Head averages broader and eyes located more posteriorly, CI 81–87, EP 1.92–2.28 . . . . . ***hirsuta***

- Punctures on basal third of tergite AIV small and shallow, most distinctly separated by flat areas of smooth cuticle; distances between the punctures mostly distinctly greater than the puncture diameters. Side of pronotum and anepisternum both unsculptured and smooth. Head averages narrower and eyes located more anteriorly, CI 76–82, EP 1.50–1.80 9

9 Larger species, HW 0.89–0.97, SL 0.52–0.58, PW 0.69–0.77, AIIW 0.62–0.74, AIIIW 0.76–0.88. AII relatively more massive (AIIW+AIIL/2 = 0.63–0.72) and eyes averaging smaller, EL/HW 0.37–0.42. With anterior portion of head in oblique dorsolateral view the diagonal area between the anterior half of the eye and the posterior limit of the frontal carinae with large foveolate punctures whose diameters are greater than the distances that separate them. Humeral setae followed on pronotal dorsum by 1–2 other pairs of setae that approach their length . . . . . ***pilosa***

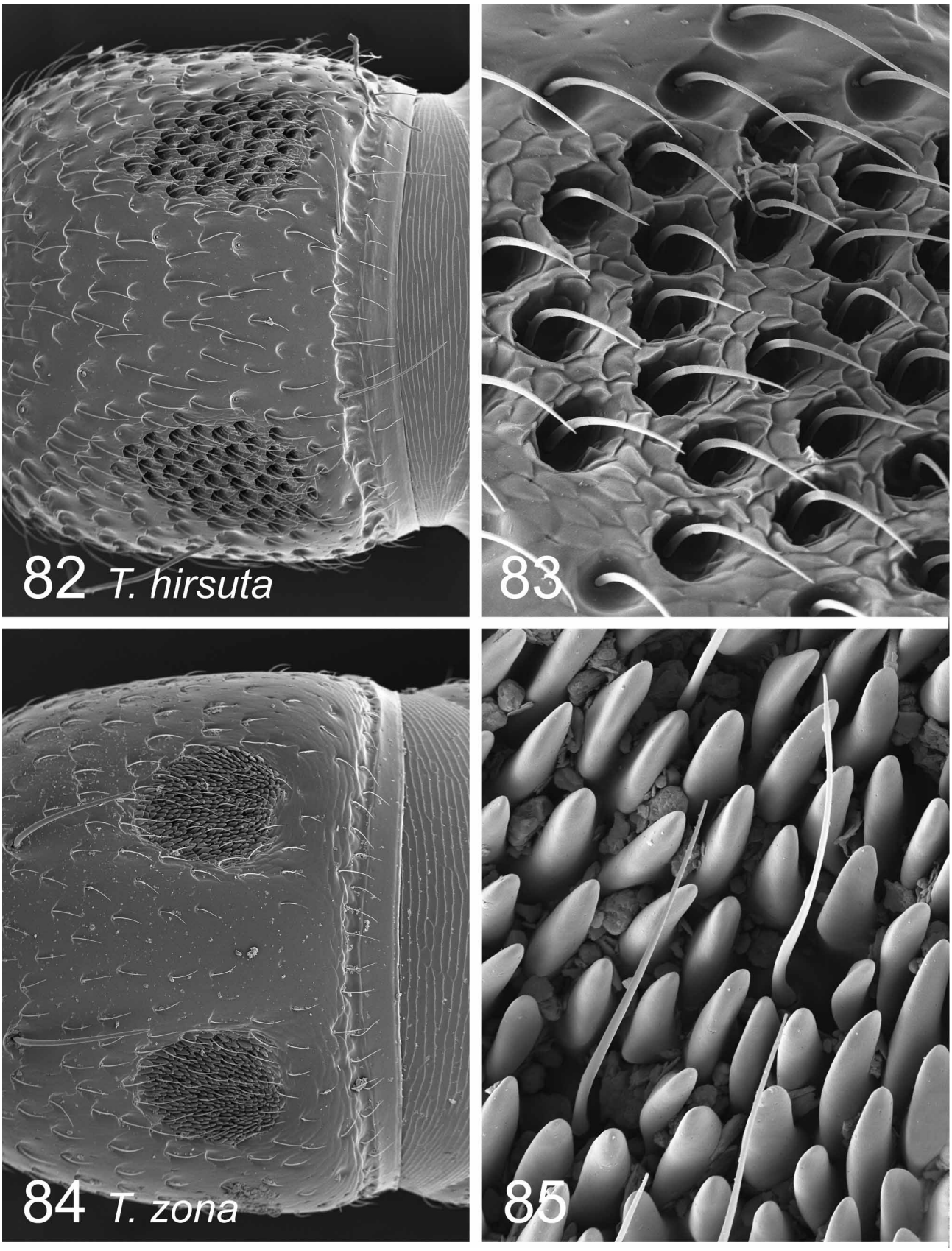
- Smaller species, HW 0.68–0.78, SL 0.38–0.42, PW 0.51–0.61, AIIW 0.44–0.59, AIIIW 0.57–0.70. AII relatively less massive (AIIW+AIIL/2 = 0.45–0.56) and eyes averaging larger, EL/HW 0.42–0.45. With anterior portion of head in oblique dorsolateral view the diagonal area between the anterior half of the eye and the posterior limit of the frontal carinae with small, scattered punctures whose diameters are less than the distances that separate them. Humeral setae not followed on pronotal dorsum by any other setae that approach their length . . . . . ***subpilosa***

Species of *Tanipone*

Tanipone aglandula Bolton & Fisher sp. n.

(Figs 86–88)

WORKER (holotype in parentheses). HL 0.92–1.13 (1.04), HW 0.74–0.95 (0.86), SL 0.40–0.50 (0.45), EL 0.30–0.38 (0.34), PW 0.57–0.73 (0.66), AIIW 0.50–0.69 (0.60), AIIL 0.48–0.68 (0.60), AIIIW 0.60–0.81 (0.72), AIIIL 0.56–0.72 (0.66), WL 1.08–1.38 (1.26), MFL 0.64–0.80 (0.73), CI 80–87 (83), SI 49–55 (52), EL/HW 0.40–0.44 (0.40), AIIW/AIIL 0.96–1.11 (1.00), AIIIW/AIIIL 1.07–1.16 (1.09) (10 measured).



FIGURES 82–83. Glandular patches on the tergite of AIII consisting of a mass of large, coarse, closely-packed, deep punctures. *Tanipone hirsuta* worker CASENT0010022.

FIGURES 84–85. Glandular patches on the tergite of AIII without coarse, deep, densely-packed punctures. *Tanipone zona* worker CASENT0010023.

FIGURES 86–88. Lateral, full face and dorsal view of body. *Tanipone aglandula* worker CASENT0492424.

In full-face view side of head in front of eye with a projecting seta close to the posterior clypeal margin; side of head below outline of eye with 1–2 (very rarely 3) setae that project laterally; side of head behind level of eye with 1–2 projecting setae; 2–4 setae along posterior margin. In profile, a single pair of erect setae immediately behind the frontal carinae and a single erect seta above the dorsal margin of each eye. In a few specimens one or two additional shorter setae are present between eye and ocelli. Dorsum of pronotum with a single pair of setae, at the humeri; mesonotum usually with a single pair of setae but in some workers these are very short, and in others they are absent; propodeum with a single pair of setae at the posterodorsal margin. Anterior surface of mesofemur in dorsal view with a single projecting seta, close to the apex; very rarely a second seta may be present on the anterior surface, close to the midlength. Posterior surface of mesofemur in dorsal view also with a single projecting seta,

close to the apex and directly opposite the seta on the anterior surface. Metafemur with a single seta on its anterior surface close to the apex, but without a corresponding seta on the posterior surface. Ventral surfaces of both mesofemur and metafemur always with one, but usually with 2, projecting setae present distal of the trochanter. Dorsal surface of AII (petiole) with an anterior pair of setae, the posterior margin with 4–6 setae, and rarely the dorsum with an additional pair of setae between the anterior pair and those at the posterior margin. Tergite of AIII without visible glandular patches but with a pair of conspicuous off-white to yellowish pale spots posteriorly; AIII tergite with a transverse row of 4–6 setae anteriorly, and 6–8 posteriorly. Tergite of AIV with a transverse row of 6–8 setae anteriorly and a row of 4–8 posteriorly. Sternites of AIII and AIV with setae present. Cephalic dorsum with relatively large, shallow punctures, the spaces between punctures smooth or with vestigial traces of ground sculpture, especially in the area behind the antennal fossae. Dorsum of mesosoma with scattered punctures that are generally smaller then those on the head, their diameters are usually less than the distances between them and the surface is mostly smooth and polished, especially on the mesonotum. Katepisternum mostly smooth, with a few widely scattered punctures. AII (petiole) in dorsal view about as long as to slightly longer than broad; in profile its tergite longer than high. Tergites of AIII and AIV punctate, the surface between punctures mostly smooth and polished. Full adult colour blackish brown to black everywhere, except for the pale spots on AIII.

Holotype worker, **Madagascar**: Prov. Mahajanga, Mahavavy River, 6.2 km 145° SE Mitsinjo, 1-5.xii.2002, 20 m, 16°03.1'S, 45°54.5'E, ex live stem, gallery forest, BLF6939, CASENT0492491 (*B.L. Fisher*) (CASC).

Paratypes. 3 workers with same data as holotype but on low vegetation, gallery forest, BLF7017, CASENT0481792 (CASC).

The sole member of the *aglandula* group, this species is immediately recognisable by the characters of the group diagnosis. Specimens were retrieved from tropical dry forest or gallery forest, sometimes as ground foragers but more usually on low vegetation, or in live or dead twigs and branches above the ground, or in rot pockets above the ground.

Non-paratypic material examined. Madagascar: Prov. Mahajanga, Mahavavy River, SE Mitsinjo (*B.L. Fisher*); Mahajanga, P.N. Baie de Baly, NNW Soalala (*B.L. Fisher*); Mahajanga, Baie de Baly, NNW Soalala (*Fisher & Griswold*); Mahajanga, Forêt de Tsimembo, NNW Soatana (*B.L. Fisher*); Mahajanga, P.N. Namoroka, NW Vilanandro (*B.L. Fisher*); Mahajanga, Sofia Region, Dist. Port-Berger, Ambovomamy, N. Port-Berger (*Mike, Frank & Rin'ha*); Prov. Toliara, Ranobe (*MGF*); Toliara, Forêt Beroboka, SE Ankidranoka (*B.L. Fisher*); Prov. Tulear (*R. Harin'Hala*).

Tanipone aversa Bolton & Fisher sp. n.

(Figs 89–91)

WORKER (holotype in parentheses). HL 0.87–0.90 (0.88), HW 0.70–0.72 (0.72), SL 0.42–0.46 (0.44), EL 0.26–0.29 (0.29), PW 0.56–0.57 (0.56), AIIW 0.50–0.51 (0.51), AIIL 0.46–0.47 (0.47), AIIIW 0.69–0.72 (0.69), AIIIL 0.50–0.56 (0.50), WL 1.08–1.09 (1.09), MFL 0.66–0.74 (0.70), CI 78–82 (82), SI 60–66 (61), EL/HW 0.37–0.40 (0.40), AIIW/AIIL 1.09–1.11 (1.09), AIIIW/AIIIL 1.23–1.38 (1.38) (3 measured).

Cephalic pilosity and structure of AIII glandular patches as described in definition of *maculata* group, above. With head in full-face view the side in front of the eye without a laterally projecting seta behind the level of the posterior clypeal margin. Posterior margin of head with 4–6 setae. Dorsum of pronotum with a single pair of setae, at the humeri; mesonotum with a single pair of short setae; propodeum with a single pair of setae at the posterodorsal margin. Mesofemur in dorsal view with a single projecting seta on the anterior surface, close to the apex; metafemur without a seta in this position. Ventral surfaces of mesofemur and metafemur each with a single projecting seta present just distal of the trochanter. Dorsal surface of AII (petiole) with an anterior and a posterior pair of setae, the latter at the posterior margin. Tergite of AIII with a pair of setae anteriorly, each of which is situated at, or very close to, the anterior margin of the glandular patch; AIII without setae on the posterior margin. Tergite of AIV with 4 setae anteriorly. Sternites of AIII and AIV with setae present. Cephalic dorsum with small punctures, the spaces between punctures smooth or with vestigial traces of ground sculpture, especially in the area behind the antennal fossae. Katepisternum partially superficially sculptured to smooth, without longitudinal striolae. Dorsum of mesosoma with scattered small punctures, the diameters of which are usually less than the distances between them and the surfaces of which are mostly smooth and polished, especially on the mesonotum. AII (petiole) in dorsal view appears slightly broader than long; in profile its tergite appears about as long as high. Tergite of AIII

FIGURES 89–91. Lateral, full face and dorsal view of body. *Tanipone aversa* holotype worker CASENT0207894.

sparsely punctate between the glandular patches and the surface between punctures is mostly smooth. The pale band at the apex of AIII tergite is obvious and is slightly narrowed or faded medially. Tergite of AIV punctate, spaces between the punctures unsculptured. Full adult colour with head, mesosoma, AII and AIII orange (except for the pale band on AIII); AIV to apex of abdomen black.

Holotype worker, **Madagascar**: Prov. Toliara, Makay Mts, 575 m, 21°18’48’’S, 45°08’43’’E, 6.xii.2010, burned savannah, BLF25675, CASENT0207894 (*B.L. Fisher*) (CASC).

Paratypes. 2 workers with same data as holotype but coded BLF25702, CASENT0207893; BLF25704, CASENT0207895 (CASC).

T. aversa appears to be closest related to *varia*. These two, together with *scelesta*, are linked by the characters given in the *maculata* species group diagnosis and the diagnosis of the *varia* complex mentioned there. *T. scelesta* is much more densely setose than the others and is very easily distinguished by the characters noted in the key. Head and body colour is variable in *varia*, but an orange AIII, such as is present in *aversa*, is not known. The posterior margin of AIII tergite in *varia* always has a pair of pale spots or patches, rather than the continuous band present in *aversa*. AII in dorsal view is always longer and narrower in *aversa* (AIIW/AIIL 1.09–1.11) than in *varia*, where it is universally shorter and broader (AIIW/AIIL 1.15–1.30). Finally, AIIW of *aversa* is always less than PW, whereas in *varia*, with very few exceptions, AIIW is greater than PW. As mentioned above, all three known specimens of this species were found in burned savannah.

***Tanipone cognata* Bolton & Fisher sp. n.**
(Figs 92–94)

HOLOTYPE PUTATIVE ERGATOID GYNE. HL 1.00, HW 0.81, SL 0.46, EL 0.36, PW 0.64, AIIW 0.62, AIIL 0.62, AIIIW 0.76, AIIIL 0.60, WL 1.30, MFL 0.74, CI 81, SI 57, EL/HW 0.44, AIIW/AIIL 1.00, AIIIW/AIIIL 1.27.

Cephalic pilosity and structure of AIII glandular patches as described in definition of *maculata* group, above. With head in full-face view the side in front of the eye without a laterally projecting seta behind the level of the posterior clypeal margin. Posterior margin of head with 2 setae. Dorsum of pronotum with a single pair of setae at the humeri and a pair on the mesonotum; propodeum without setae. Mesofemur and metafemur in dorsal view without projecting setae on the anterior or posterior surfaces. Ventral surfaces of mesofemur and metafemur each with a single projecting seta, located just distal of the trochanter. Dorsal surface of AII (petiole) with a single pair of setae. Tergite of AIII with two setae anteriorly, each of which is situated well in front of the anterior margin of the glandular patch; without setae on posterior margin. Tergite of AIV with 4 setae anteriorly. Sternites of AIII and AIV with setae present. Cephalic dorsum with scattered shallow punctures; anteriorly on the head their diameters at least equal to the distances between them, but behind the level of the eyes becoming more widely spaced. Spaces between punctures minutely but very conspicuously microreticulate everywhere. Katepisternum with some microsculpture but mostly appearing smooth. Dorsum of mesosoma with small punctures, the spaces between them minutely but distinctly microreticulate everywhere. AII (petiole) in dorsal view appears as broad as long; in profile its tergite appears longer than high. Tergite of AIII microreticulate everywhere except on the glandular patches, and with some small, inconspicuous punctures. The pale band across the apex of AIII tergite is slightly narrowed medially but is not broken by a longitudinal median strip of markedly darker cuticle. Tergite of AIV sparsely punctate, the entire surface blanketed with fine, dense microreticulate surface sculpture; tergites of AV–AVII also densely microreticulate. Head, mesosoma and AII orange, legs brown; AIII to apex dark brown to blackish brown (except for the pale band on AIII).

Holotype worker, **Madagascar**: Ifaty, 23°9’S, 43°37’E, 21.ix.1993, desert scrub forest, pyrethrin fogging of *Euphorbia stenoclada*, .9356w, BIOTA/CASENT0195405 (*W.E. Steiner*) (MCZC).

A single, most intriguing specimen is included under this name. It is large (HL 1.00, HW 0.81), relatively brightly coloured, has a continuous pale band across AIII, and features dense microreticulate ground sculpture on all of its dorsal surfaces. The development of dense, fine microreticulate sculpture has been treated elsewhere as an indication of an ergatoid gyne, though whether this is a true interpretation remains to be seen, as discussed under the diagnosis of putative ergatoids, above. The size of the specimen is certainly comparable to a supposed ergatoid of *maculata* (HL 0.98, HW 0.78), but the body colour and uninterrupted apical pale band on AIII appear to make association with that species improbable. The bright colour of the *cognata* holotype is most closely approached by the workers of *aversa*, but the characteristic arrangement of setae seen in *aversa* and its close relatives is absent in *cognata*. Taking all of this into consideration, the tentative conclusion is that *cognata* probably represents the ergatoid gyne of a species whose workers remain unknown. This hypothesis can only be tested when more *cognata*

specimens are collected, and preferably after a good nest-series of *maculata* is available for comparison. As mentioned above, the sole specimen ascribed to this species was obtained by insecticide fogging of a *Euphorbia* tree.

FIGURES 92–94. Lateral, full face and dorsal view of body. *Tanipone cognata* holotype worker CASENT0195405.

***Tanipone hirsuta* Bolton & Fisher sp. n.**
(Figs 82–83, 95–97)

WORKER (holotype in parentheses). HL 1.04–1.22 (1.21), HW 0.86–1.02 (1.02), SL 0.50–0.61 (0.60), EL 0.36–0.42 (0.42), PW 0.64–0.81 (0.81), AIIW 0.60–0.79 (0.78), AIIL 0.58–0.73 (0.72), AIIIW 0.70–0.92 (0.91), AIIIL

0.64–0.81 (0.80), WL 1.36–1.64 (1.64), MFL 0.84–1.00 (0.97), CI 81–87 (84), SI 55–60 (59), EL/HW 0.39–0.43 (0.41), AIIW/AIIL 1.00–1.08 (1.08), AIIIW/AIIIL 1.09–1.18 (1.14) (15 measured).

FIGURES 95–97. Lateral, full face and dorsal view of body. *Tanipone hirsuta* worker CASENT0000547.

With head in full-face view the side from the posterior clypeal margin to the anterior margin of the eye with more than one (usually 3–4) laterally projecting seta present. Side of head below outline of eye with 2–3 setae that project laterally. Side of head behind level of eye with numerous projecting, curved setae of varying length. In profile the entire cephalic dorsum with a number of long, fine, standing setae, and also with abundant short, suberect to subdecumbent setae; far too many setae in all to count easily. The short setae on the dorsum to the level of the eye are curved posteromedially; those near the posterior margin are curved anteriorly. Posterior margin of head with 6–8 longer setae and a greater number of short setae. Entire dorsum of mesosoma with an abundance of short, suberect to subdecumbent, curved setae. Dorsum of each sclerite also with a variable number of longer, fine setae: pronotum, mesonotum and propodeum each usually with 2–3 such long pairs; variation in numbers may be partially natural and partially the result of abrasion. Mesofemur and metafemur in dorsal view with a number of standing setae, of variable length, on both the anterior and posterior surfaces. Dorsal and ventral surfaces of both mesofemur and metafemur with setae present; those on the ventral surfaces tending to average longer than those on the dorsa. Dorsum of AII (petiole) with 2–3 pairs of long setae and numerous shorter setae, and with a transverse row of

about 6–8 long setae along the posterior margin. Dorsa of AIII and AIV each with standing long setae present all over their surfaces, and everywhere with abundant short subdecumbent setae that are directed posteriorly. Sternites of AIII and AIV with numerous setae of varying length present. Cephalic dorsum with densely packed, broad, shallow, foveolate punctures; distances between punctures distinctly less than the diameters of the punctures. Narrow spaces between the punctures very finely, superficially microreticulate. Side of pronotum usually with fine sculpture present, at least on the lower half; anepisternum almost entirely smooth. Dorsum of mesosoma with dense foveolate punctures that are similar to those on the cephalic dorsum. AII (petiole) in dorsal view appears as broad as long to slightly broader than long; in profile its tergite appears longer than high. Structure of AIII glandular patches as described in definition of *hirsuta* group, above. Tergite of AIII, in front of and between the glandular patches, with broad foveolate punctures; their diameters greater than the distances between them except posteromedially, where they tend to be somewhat more widely spaced. Cuticle between punctures smooth to weakly, superficially microsculptured. Posterior margin of AIII tergite with a pair of elongate off-white to yellowish spots. Tergite of AIV with dense foveolate punctures whose diameters, especially on the basal half, are distinctly greater than the distances between them. Full adult colour uniformly black, except for the pale spots on AIII; appendages usually lighter than mesosoma, brown to dark brown, and usually with tarsi lighter than tibiae and femora.

Holotype worker (top specimen of three on pin), **Madagascar**: Prov. Toliara, Kirindy, 15.5 km 64° ENE Marofandilia, 28.xi.-3.xii.2001, 100 m, 20°03’S, 44°40’E, ex rotting tree stump, tropical dry forest, BLF4633, CASENT0000842 (*B.L. Fisher*) (CASC).

Paratypes. 8 workers (two on same pin as holotype) with same data, all BLF4633 but coded: CASENT0000841; CASENT0000843; CASENT0000844 (CASC).

T. hirsuta is the most densely setose and most densely uniformly coarsely punctate species yet discovered in the genus. It also has the most posteriorly located eyes, with EP 1.92–2.28, as opposed to EP 1.10–1.80 for all other *Tanipone* species. The two most closely related species, as defined by the *hirsuta* group characters listed above, are *pilosa* and *subpilosa*. Both of these species are strikingly more finely and more sparsely punctate than *hirsuta*, and generally with the entire side of the pronotum as smooth as the anepisternum.

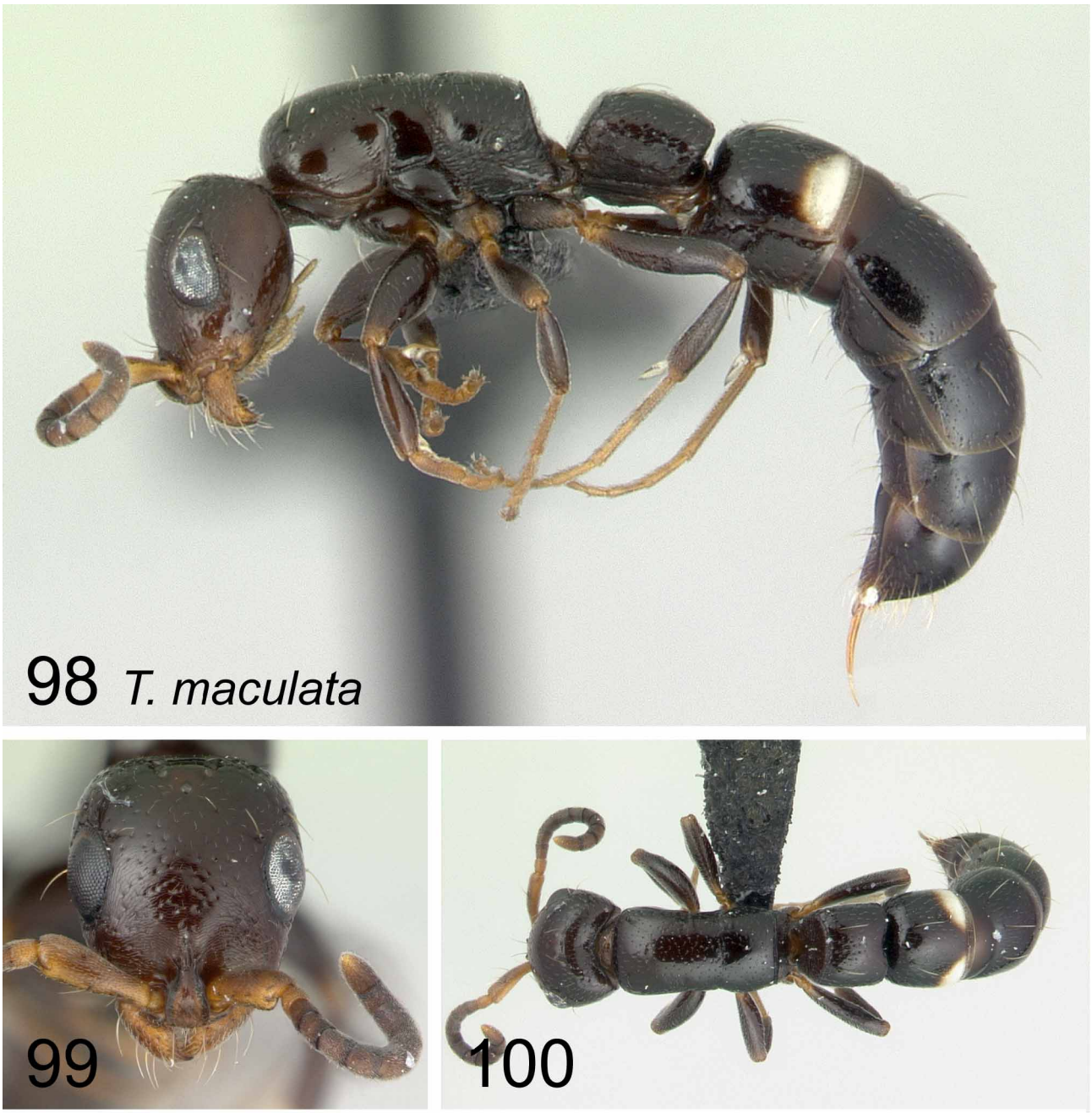
All specimens of *hirsuta* originate in tropical dry forest or spiny forest, except for one that was found in gallery forest. The majority of specimens were collected from low vegetation or in dead twigs and branches above the ground, but a good proportion were discovered as ground foragers, or in rotting logs and tree stumps. A single worker was retrieved as a stray, in a Malaise trap sample.

Non-paratypic material examined. Madagascar: Prov. Mahajanga, P.N. Tsingy de Bemaraha, ESE Antsalova (*B.L. Fisher*); Mahajanga, P.N. Tsingy de Bemaraha, E Bekopaka (*B.L. Fisher*); Mahajanga, Forêt de Tsimembo, NNW Soatana (*B.L. Fisher*); Mahajanga, P.N. Baie de Baly, NNW Soalala (*B.L. Fisher*); Mahajanga, Mahavavy River, SE Mitsinjo (*B.L. Fisher*); Mahajanga, P.N. Namoroka, NW Vilanandro (*B.L. Fisher*); Prov. Tulear (*R. Harin’Hala*); Prov. Toliara, NE Morondava (*P.S. Ward*); Toliara, P.N. Zombitse, E Sakaraha (*B.L. Fisher*); Toliara, For. de Zombitse, E Sakaraha (*Bartolozzi, Tiati & Raharimina*); Toliara, Forêt Tsinjoriaky, E Tsifota (*B.L. Fisher*); Toliara, Kirindy, NE Morondava (*B.L. Fisher*); Toliara, Kirindy Forest, ENE Morondava (*G.D. Alpert*); Toliara, Kirindy, ENE Marofandilia (*B.L. Fisher*); Toliara, P.N. Kirindy Mite, SE Belo sur Mer (*B.L. Fisher*); Toliara, Makay Mts (*B.L. Fisher*); Toliara, Forêt Beroboka, SE Ankidranoka (*B.L. Fisher*); Prov. Fianarantsoa, Forêt Analalava, W Ranohira (*B.L. Fisher*).

Tanipone maculata Bolton & Fisher sp. n.

(Figs 98–100)

WORKER (holotype in parentheses). HL 0.69–0.90 (0.86), HW 0.53–0.75 (0.69), SL 0.32–0.42 (0.40), EL 0.24–0.32 (0.31), PW 0.40–0.58 (0.54), AIIW 0.36–0.56 (0.52), AIIL 0.35–0.58 (0.50), AIIIW 0.45–0.66 (0.64), AIIIL 0.37–0.56 (0.55), WL 0.84–1.20 (1.10), MFL 0.48–0.68 (0.64), CI 75–83 (80), SI 54–61 (58), EL/HW 0.40–0.47 (0.45), AIIW/AIIL 0.97–1.09 (1.04), AIIIW/AIIIL 1.12–1.28 (1.16) (10 measured).



FIGURES 98–100. Lateral, full face and dorsal view of body. *Tanipone maculata* worker CASENT0002516.

Cephalic pilosity and structure of AIII glandular patches as described in definition of *maculata* group, above. With head in full-face view the side in front of the eye usually without a laterally projecting seta behind the level of the posterior clypeal margin, but very rarely one is present. Posterior margin of head with 2–4 setae. Dorsum of pronotum with a single pair of setae, at the humeri; mesonotum usually with a pair of setae; propodeum without setae. Mesofemur and metafemur in dorsal view without projecting setae on the anterior or posterior surfaces. Ventral surfaces of mesofemur and metafemur usually with a short seta present just distal of the trochanter, but these are absent in some specimens. Dorsal surface of AII (petiole) with an anterior pair of setae; rarely also with a posterior pair present. Tergite of AIII with 2–4 setae anteriorly, which are situated well in front of the anterior margins of the glandular patches; posterior margin of AIII tergite often without setae but sometimes a pair present and rarely with two pairs. Tergite of AIV with a transverse row of 4–6 setae anteriorly; sometimes also with setae at the posterior margin. Sternites of AIII and AIV with setae present. Cephalic dorsum with scattered small punctures, their diameters less than the distances between them. Spaces between punctures usually with weak ground sculpture at least in places, but sometimes the ground sculpture is extensive and easily visible. Katepisternum mostly to

entirely smooth. Dorsum of mesosoma with scattered small punctures, as on the head their diameters are less than the distances between them. Spaces between punctures vary from almost smooth to distinctly microreticulate. AII (petiole) in dorsal view appears slightly broader than long; in profile its tergite appears longer than high. Tergite of AIII between the glandular patches with scattered small punctures, the spaces between them varying from smooth to microreticulate. Apex of AIII tergite with a pair of transversely elongated pale spots that are separated medially by a longitudinal dark median strip that narrows posteriorly. Tergite of AIV sparsely punctate, usually the spaces between punctures with feeble ground sculpture, sometimes microreticulate. Full adult colour dark brown to black (except for the distinct pale spots on AIII). One of the heavily sculptured specimens has the dorsal head to the level of the eyes, and the sides of the head, orange brown. This specimen, suspected to be an ergatoid, is larger than the size range noted above, with HL 0.98, HW 0.78, SL 0.46; its indices and ratios are within the normal worker range.

Holotype worker (top specimen of three on pin), **Madagascar**: Prov. Toliara, P.N. Andohahela, 1.7 km 61° ENE Tsimelahy, 300 m, 24°56'S, 46°39'E, 16-20.i.2002, ex rotten log, tropical dry forest, BLF4969, CASENT0001335 (*B.L. Fisher*) (CASC).

Paratypes. 2 workers below holotype on same pin; 2 workers with same data but CASENT0001386; 3 workers with same data but CASENT0001426 (CASC).

In terms of pilosity and sculpture this is the most variable species of its group. The presence or absence of setae on several parts of the body, and their variable number when present, may to some extent be the result of abrasion, but may indicate that the components of what is regarded here as a single species could be further subdivided. Similarly, the variation in microsculpture, from almost absent to distinctly microreticulate, may indicate the presence of more than one real species. The acquisition of several good nest-samples is necessary to assess just how variable these morphological aspects may be in a single colony.

There are two especially densely microreticulate specimens. Their descriptions are included above, even though they are suspected of being ergatoids and not true workers. The uncertainty stems from the gradual increase in density and intensity of mesosomal microsculpture across a series of specimens, as well as because the densely sculptured forms tend also to be the most setose. Whether this perceived variation, possibly additionally confused by the presence of ergatoids, represents a normal morphocline within a single species, or an indication that more than one species is present, remains to be analysed.

Within the *maculata* complex the closest related species to *maculata* is *zona*. The two are most easily separated by the shape of the pale area on the tergite of AIII, which in *maculata* takes the form of a pair of pale spots and in *zona* of a continuous pale band. In addition, specimens of *maculata*, despite the variation mentioned above, tend to be more setose overall than those of *zona*. In particular, specimens of *maculata* predominantly possess a pair of mesonotal setae, and also have a single ventral seta on both the mesofemur and metafemur, located just distal of the trochanter. By contrast, specimens of *zona* predominantly lack mesonotal setae, and also usually lack setae on the ventral surfaces of both mesofemur and metafemur.

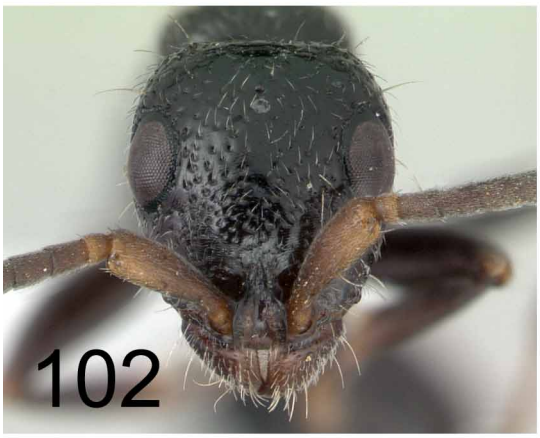
All known specimens of *maculata* have been captured as ground foragers, retrieved from litter samples and pitfall traps, or found under stones or in rotten logs; there are no records of this species from low vegetation or branches above the ground. Every sample originates in spiny forest or tropical dry forest.

Non-paratypic material examined. Madagascar: Prov. Toliara, Forêt Tsinjoriaky, E Tsifota (*B.L. Fisher*); Toliara, P.N. Andohahela, Manantalinjo, E Hazofotsy (*B.L. Fisher*); Toliara, P.N. Andohahela, ENE Tsimelahy (*B.L. Fisher*); Toliara, SW Marovato (*B.L. Fisher*); Toliara, P.N. Tsimanampetsotsa, Mitoho, ENE Efoetse (*B.L. Fisher*); Toliara, Vohibasia Forest, NE Sakaraha (*B.L. Fisher*); Toliara, Mahafaly Plateau, ENE Itampolo (*B.L. Fisher*); Prov. Tulear, Beza Mahafaly Reserve (*R. Harin'Hala*); Tulear, Tsimanampetsotsa Nat. Pk, Mitoho Forest (*M.E. Irwin & Rin'ha*).

Tanipone pilosa Bolton & Fisher sp. n.

(Figs 101–103)

WORKER (holotype in parentheses). HL 1.12–1.18 (1.12), HW 0.89–0.97 (0.90), SL 0.52–0.58 (0.52), EL 0.35–0.40 (0.36), PW 0.69–0.77 (0.70), AIIW 0.62–0.74 (0.67), AIIL 0.62–0.70 (0.62), AIIIW 0.76–0.88 (0.77), AIIIL 0.68–0.80 (0.73), WL 1.42–1.54 (1.48), MFL 0.90–1.00 (0.92), CI 78–82 (80), SI 58–61 (58), EL/HW 0.37–0.42 (0.40), AIIW/AIIL 0.96–1.08 (1.08), AIIIW/AIIIL 1.05–1.16 (1.05) (10 measured).



FIGURES 101–103. Lateral, full face and dorsal view of body. *Tanipone pilosa* worker CASENT0410479.

With head in full-face view the side from the posterior clypeal margin to the anterior margin of the eye with more than one laterally projecting seta present. Side of head below outline of eye usually with 2 long setae that project laterally; sometimes with a third close to the anterior margin of the eye. Side of head behind level of eye with numerous projecting, curved setae of varying length. In profile the entire cephalic dorsum with a number of long, fine, standing setae, and also with abundant short, suberect to subdecumbent setae; too many setae in all to count easily. The short setae on the dorsum to the level of the eye are curved posteromedially; those near the posterior margin are curved anteriorly. Posterior margin of head with 6–8 longer setae and a greater number of short setae. Entire dorsum of mesosoma with an abundance of short, suberect to subdecumbent, curved setae. Dorsum of each sclerite also with a variable number of longer, fine setae: pronotum, mesonotum and propodeum each usually with 2–3 such long pairs. Mesofemur and metafemur in dorsal view with a number of standing setae, of variable length, on both the anterior and posterior surfaces. Generally with two longer setae near the apex on the anterior surface of each femur, and usually with one long pair near the apex on the posterior surface. Dorsal and ventral surfaces of both mesofemur and metafemur with setae present; on the ventral surfaces usually with 2–3 that are relatively long, at least near the trochanter. Dorsum of AII (petiole) with 2–3 pairs of long setae and numerous shorter

setae, and with a transverse row of about 4–6 long setae along the posterior margin. Dorsa of AIII and AIV each with standing long setae present all over their surfaces, and with abundant, short subdecumbent setae everywhere that are directed posteriorly. Sternites of AIII and AIV with numerous setae of varying length present. Cephalic dorsum with shallow foveolate punctures; distances between punctures, at least above the eyes and between the eyes and antennal fossae, less than the diameters of the punctures. Narrow spaces between the punctures with very fine microsculpture between eye and antennal fossa, smooth elsewhere. Side of pronotum as smooth as anepisternum. Dorsum of mesosoma with small foveolate punctures, the spaces between which are generally equal to or slightly greater than the puncture diameters. AII (petiole) in dorsal view appears as broad as long to slightly broader than long; in profile its tergite appears longer than high. Structure of AIII glandular patches as described in definition of *hirsuta* group, above. Tergite of AIII, in front of and between the glandular patches, with spaced foveolate punctures; cuticle between punctures smooth. Posterior margin of AIII tergite with a pair of elongate off-white to yellowish spots. Tergite of AIV with small foveolate punctures whose diameters average equal to or less than the distances between them. Full adult colour uniformly black, except for the pale spots on AIII; appendages usually lighter than mesosoma, brown to dark brown, and usually with tarsi lighter than tibiae and femora.

Holotype worker, **Madagascar**: Prov. Antsiranana, Rés. Analamerana, 28.4 km 99° Anivorano-Nord, 12°44.80'S, 49°29.69'E, 60 m, 5-7.xii.2004, tropical dry forest, BLF11424, CASENT0110420 (*B.L. Fisher*) (CASC).

Paratype. 1 worker with same data as holotype but coded BLF11412, CASENT0110579 (CASC).

Superficially as *hirsuta*, with similar dense pilosity and AIII glandular patches. However, *pilosa* is distinctly less strongly sculptured and has eyes that are situated more anteriorly than in *hirsuta*. All samples of *pilosa* were discovered in tropical dry forest, either as ground foragers, on low vegetation, or in rot pockets on tree trunks.

Non-paratypic material examined. Madagascar: Prov. Antsiranana, Res. Ankarana (*G.D. Alpert*); Antsiranana, Res. Ankarana, English Camp (*G.D. Alpert*); Antsiranana, Rés. Spéc. Ankarana, SW Anivorano-Nord (*B.L. Fisher*); Antsiranana, Rés. Analamerana, Anivorano-Nord (*B.L. Fisher*); Antsiranana, Res. Ankarana, SE Matsaborimanga (*P.S. Ward*).

Tanipone scelesta Bolton & Fisher sp. n.

(Figs 104–106)

WORKER (holotype in parentheses). HL 0.65–0.79 (0.69), HW 0.49–0.61 (0.54), SL 0.30–0.38 (0.30), EL 0.23–0.27 (0.23), PW 0.38–0.48 (0.41), AIIW 0.32–0.42 (0.34), AIIL 0.27–0.34 (0.29), AIIIW 0.46–0.61 (0.50), AIIIL 0.36–0.50 (0.39), WL 0.80–1.00 (0.86), MFL 0.44–0.58 (0.49), CI 75–80 (78), SI 56–64 (56), EL/HW 0.43–0.48 (0.43), AIIW/AIIL 1.06–1.26 (1.17), AIIIW/AIIIL 1.20–1.32 (1.28) (20 measured).

Cephalic pilosity and structure of AIII glandular patches as described in definition of *maculata* group, above. With head in full-face view the side in front of the eye with a single laterally projecting seta present, behind the level of the posterior clypeal margin. Posterior margin of head with 4 setae. Dorsum of pronotum, mesonotum and propodeum each usually with 2 pairs of setae; less commonly the mesonotum, propodeum, or both, with 3 pairs. Mesofemur in dorsal view with a single, curved seta present on the anterior surface, close to the apex; ventral surface with a single projecting seta, just distal of the trochanter. Metafemur usually without a preapical seta on its anterior surface but sometimes one present; ventral surface with a single projecting seta, just distal of the trochanter. Dorsal surfaces of AII, AIII and AIV each with a sparse transverse row of setae anteriorly, and a second sparse transverse row posteriorly; occasionally extra setae occur on the dorsum of one or more of these segments between the anterior and posterior rows. Sternites of AIII and AIV with several setae present. Cephalic dorsum with scattered punctures, the spaces between them smooth or with fine, weak ground sculpture that is variable in density; when present, ground sculpture usually fades out posteriorly. Katepisternum with very fine, dense longitudinal striolae, at least on its upper half. Dorsum of mesosoma with scattered punctures that are about as dense as on the head, or slightly less. AII (petiole) in dorsal view appears broader than long; in profile its tergite appears at least as high as long. Tergite of AIII, between the glandular patches, variably sculptured. At minimum this area has scattered, shallow but relatively large punctures. The cuticle between punctures may be more or less smooth, but most often some weak, superficial microsculpture is present. However, in most specimens there is distinct sculpture of very fine, dense, longitudinal striolae and minute punctulae that encroaches on the larger punctures; in many speci-

mens this sculpture is very dense and extensive, almost obliterating the punctate component and extending from the posterior margin almost to the anterior margin of the tergite. The pale band at the apex of AIII tergite is usually distinct, but in relatively few specimens (10 out of 108) the band is very faint or even absent so that the tergite is more or less uniformly coloured throughout. Tergite of AIV is predominantly punctate, sometimes with spaces between punctures smooth, but commonly with fine ground sculpture between them. On occasion there may be weak superficial sculpture within the punctures themselves. Full adult colour uniform brown to blackish brown, except for pale band on AIII; AIV to apex often black; appendages usually somewhat lighter than mesosoma.

FIGURES 104–106. Lateral, full face and dorsal view of body. *Tanipone scelesta* worker CASENT0002323.

Holotype worker, **Madagascar**: Prov. Toliara, P.N. Tsimanampetsotsa, Mitoho, 6.4 km 77° ENE Efoetse, 24°03'S, 43°46'E, 40 m, 18-22.iii.2002, ground forager(s), spiny forest/thicket, BLF6183, CASENT0430032 (*B.L. Fisher*) (CASC).

Paratype. 1 worker with same data as holotype but coded CASENT0430033 (CASC).

T. scelesta is perhaps the most easily recognisable species of the whole *maculata* group because it has considerably more numerous mesosomal and abdominal setae than any of its relatives. In terms of setal density behind the

head it falls between the other species of the *maculata* group, which are quite uniform, and the much more extensively setose species of the *hirsuta* group.

On a single specimen of the 108 *scelesta* examined, CASENT0212591 (CASC), from Ambositra, Antapia, the cuticle of the dorsal mesosoma, between the usual punctures, is filled with fine, superficial punctulate ground sculpture rather than being smooth. In places the punctulae are arranged in rough lines and appear minutely striolate. This specimen is tentatively identified as an ergatoid gyne, as discussed above. Its size falls well within the range of the workers, with HL 0.72, HW 0.58, EL 0.25, AIIW 0.37, AIIIW 0.54.

Specimens of this species have been discovered as ground foragers, under stones, and in pitfall traps in savannah shrubland and woodland, in spiny forest and tropical dry forest; some series are specifically labelled as originating in Uapaca woodland and Bismarckia woodland. A single specimen is recorded as having been captured in an urban garden.

Non-paratypic material examined. Madagascar: Prov. Toliara, P.N. Kirindy Mite, SE Belo sur Mer (*B.L. Fisher*); Toliara, P.N. Tsimanampetsotsa, Bemanateza (*B.L. Fisher*); Toliara, Forêt Mite, WNW Tongobory (*B.L. Fisher*); Toliara, P.N. Andohahela, Manantalinjo, E Hazofotsy (*B.L. Fisher*); Toliara, Ejeda (*B.L. Fisher*); Toliara, Rés. Cap Sainte Marie, W Marovato (*B.L. Fisher*); Ambositra, Antapia (*A. Ravelomanana*); Ambositra, Mampiarika (*A. Ravelomanana*); Ranohira, Ampandravelo (*A. Ravelomanana*); NNW Betroka (*Ivie & Pollock*); Réserve forest Beanka (*B.L. Fisher*); Réserve Berenty (*P.S. Ward*); Tulear, Berenty Spec. Res. (*Rin'Ha & Irwin*); ENE Morondava (*P.S. Ward*); Prov. Fianarantsoa, P.N. Isalo, Ambove Springs, N Ranohira (*B.L. Fisher*); P.N. Isalo, Isalo (*A. Ravelomanana*); P.N. Isalo, Ampotoampoto (*A. Ravelomanana*); Réserve forest Bianka (*B.L. Fisher*).

Tanipone subpilosa Bolton & Fisher sp. n.

(Figs 107–109)

WORKER (holotype in parentheses). HL 0.86–0.96 (0.95), HW 0.68–0.78 (0.77), SL 0.38–0.42 (0.42), EL 0.29–0.34 (0.34), PW 0.51–0.61 (0.61), AIIW 0.44–0.59 (0.58), AIIL 0.46–0.54 (0.52), AIIIW 0.57–0.70 (0.69), AIIIL 0.54–0.60 (0.58), WL 1.04–1.20 (1.20), MFL 0.64–0.70 (0.68), CI 76–81 (81), SI 54–59 (55), EL/HW 0.42–0.45 (0.44), AIIW/AIIL 1.00–1.13 (1.12), AIIIW/AIIIL 1.06–1.19 (1.19) (10 measured).

With head in full-face view the side from the posterior clypeal margin to the anterior margin of the eye with at least one laterally projecting seta present. Side of head below outline of eye usually with 2, uncommonly with 3, long setae that project laterally. Side of head behind level of eye with numerous projecting, curved setae of varying length. In profile the entire cephalic dorsum with a number of long, fine standing setae, and also with numerous short, suberect to subdecumbent setae; too many setae in all to count easily. The short setae on the dorsum to the level of the eye are curved posteromedially; those near the posterior margin are curved anteriorly. Posterior margin of head with 4–6 longer setae and a greater number of short setae. Entire dorsum of mesosoma with a number of short, suberect to subdecumbent, curved setae. Dorsum of each sclerite also with longer, fine setae: pronotum with a single, humeral pair; mesonotum with 1 pair and propodeum usually with 2 pairs. Mesofemur and metafemur in dorsal view with a number of standing setae, of variable length, on both the anterior and posterior surfaces. Generally with 1–2 longer setae near the apex on the anterior surface of each femur, and usually with one long pair near the apex on the posterior surface. Ventral surfaces of both mesofemur and metafemur with setae present, usually with 2–3 that are relatively long, distal of the trochanter. Dorsum of AII (petiole) with 1–2 pairs of long setae and several shorter setae, and with a sparse transverse row along the posterior margin. Dorsa of AIII and AIV each with standing long setae present all over their surfaces, and with numerous short subdecumbent setae everywhere that are directed posteriorly. Sternites of AIII and AIV with numerous setae of varying length present. Cephalic dorsum with small, foveolate punctures; distances between punctures, at least above the eyes and between the eyes and antennal fossae, usually less than the diameters of the punctures. Spaces between the punctures are generally weakly superficially microsculptured anteriorly, but this tends to fade posteriorly. Side of pronotum as smooth as anepisternum. Dorsum of mesosoma with small foveolate punctures, the spaces between which are at least equal to, but generally distinctly greater than, the puncture diameters. AII (petiole) in dorsal view appears slightly broader than long; in profile its tergite appears longer than high. Structure of AIII glandular patches as described in definition of *hirsuta* group, above. Tergite of AIII, in front of and between the glandular patches, with sparse, small foveolate punctures; cuticle between punctures smooth. Posterior margin of AIII tergite with a pair of elongate off-

white to yellowish spots. Tergite of AIV with small foveolate punctures whose diameters average less than the distances between them. Full adult colour uniformly black, except for the pale spots on AIII; appendages usually lighter than mesosoma, brown to dark brown, and usually with tarsi lighter than tibiae and femora.

FIGURES 107–109. Lateral, full face and dorsal view of body. *Tanipone subpilosa* paratype worker CASENT0410477.

Holotype worker, **Madagascar**: Prov. Antsiranana, Montagne Français, 7.2 km 142° SE Diego Suarez, 180 m, 12°19'S, 49°20'E, 22-28.ii.2001, beating low vegetation, tropical dry forest, BLF3132, CASENT0410477 (*B.L. Fisher*) (CASC).

Paratype. 1 worker, Madagascar, Prov. Antsiranana, Rés. Analamerana, 28.4 km 99° Anivorano Nord, 12°44.80'S, 49°29.69'E, 60 m, 5-7.xii.2004, tropical dry forest, BLF11443, CASENT0110426 (*B.L. Fisher*) (CASC).

The smallest, most diffusely sculptured, and least densely setose member of the *hirtsuta* group yet discovered, *T. subpilosa* appears to be restricted to tropical dry forest, where it has been found on low vegetation and as ground foragers.

Non-paratypic material examined. Madagascar: Prov., Antsiranana, Montagne Français, SE Diego Suarez (*B.L. Fisher*); Antsiranana, Rés. Analamerana, Anivorano-Nord (*B.L. Fisher*); Antsiranana, Res. Ankarana, SE Matsaborimanga (*P.S. Ward*).

***Tanipone varia* Bolton & Fisher sp. n.**
(Figs 110–112)

WORKER (holotype in parentheses). HL 0.82–0.92 (0.88), HW 0.64–0.74 (0.70), SL 0.40–0.46 (0.43), EL 0.26–0.30 (0.28), PW 0.47–0.57 (0.54), AIIW 0.49–0.62 (0.56), AIIL 0.41–0.50 (0.44), AIIIW 0.64–0.78 (0.71), AIIIL 0.46–0.58 (0.53), WL 0.96–1.15 (1.12), MFL 0.63–0.71 (0.66), CI 78–83 (80), SI 59–65 (61), EL/HW 0.38–0.42 (0.40), AIIW/AIIL 1.15–1.30 (1.27), AIIIW/AIIIL 1.30–1.41 (1.34) (13 measured).

FIGURES 110–112. Lateral, full face and dorsal view of body. *Tanipone varia* worker CASENT0002488.

Cephalic pilosity and structure of AIII glandular patches as described in definition of *maculata* group, above. With head in full-face view the side in front of the eye without a laterally projecting seta behind the level of the posterior clypeal margin. Posterior margin of head with 4–6 setae. Dorsum of pronotum with a single pair of setae, at the humeri; mesonotum with a single pair of short setae; propodeum with a single pair of setae at the posterodorsal margin. Mesofemur in dorsal view with a single projecting seta on the anterior surface, close to the apex; metafemur without a seta in this position. Ventral surfaces of mesofemur and metafemur each with a single projecting seta present just distal of the trochanter. Dorsal surface of AII (petiole) with an anterior pair of setae and usually also with a second pair of setae at the posterior margin, though sometimes these are absent. Tergite of AIII with a pair of setae anteriorly, each of which is situated at, or very close to, the anterior margin of the glandular patch; AIII usually without setae on the posterior margin but rarely a pair present. Tergite of AIV with 4–6 setae anteriorly. Sternites of AIII and AIV with setae present. Cephalic dorsum with small punctures, the spaces between punctures smooth or with vestigial traces of ground sculpture, especially in the area behind the antennal fossae. Katepisternum partially superficially sculptured to smooth, without longitudinal striolae. Dorsum of mesosoma with scattered small punctures, their diameters are usually less than the distances between them and the surface is mostly smooth and polished, especially on the mesonotum. AII (petiole) in dorsal view broader than long; in profile its tergite about as long as high or slightly longer than high. In dorsal view the sides of AII usually flare outwards slightly at the posterior corners. The posterior margin of AII is usually sharply defined and indented medially. Tergite of AIII with sparse minute punctures between the glandular patches and the surface between punctures is mostly smooth and polished. Apex of AIII tergite with a pair of pale spots that are separated by darker cuticle that extends to the posterior margin. Tergite of AIV with scattered small punctures, spaces between the punctures unsculptured or at most with vestigial traces of superficial microsculpture. Full adult colour variable. Head and mesosoma varying from orange brown, through brown and dark brown, to blackish brown; sometimes the pronotum slightly lighter in shade than the remainder of the mesosoma. AII varying from orange brown, through dull reddish brown, to very dark brown. AIII to apex of abdomen varying from dark brown to black.

Holotype worker, **Madagascar**: Prov. Toliara, Forêt Beroboka, 5.9 km 131° SE Ankidranoka, 22°14'S, 43°22'E, 80 m, 12-16.iii.2002, BLF6070(8), CASENT0021184, sifted litter, tropical dry forest (*B.L. Fisher*) (CASC).

Paratypes. 7 workers with same data as holotype, but coded: BLF6070(9), CASENT0021185; BLF6070(21), CASENT0021186; BLF6070(22), CASENT0021187; BLF6070(23), CASENT0021188; BLF6070 (34), CASENT0021189; BLF6070(L0), CASENT0021192.

Apart from the variable colours of this species, most specimens are morphologically very uniform. The most extreme variation from the norm is seen in a series of 4 workers from Forêt Analalava, noted below. These are uniformly blackish brown (apart from the pale patches on AIII) and have punctures that are slightly more coarse than is usual. In addition, these few specimens have PW slightly greater than AIIW, so that AIIW/PW is 0.92–0.94. In all other samples of *varia* PW is equal to or slightly less than AIIW, so that AIIW/PW is 1.00–1.09. It is possible that these few specimens may represent a separate sibling, but at present we are not fully convinced of this. Therefore they are included here under *varia* until more material for comparison has accumulated. See also the comments under *aversa*.

Samples of *varia* originate in spiny forest and tropical dry forest, as well as in desert scrub forest and Uapaca woodland. All specimens collected have been terrestrial, found under stones and in leaf litter, and also occur in rotten logs, as ground foragers, and in pitfall traps. The vast majority of specimens come from leaf litter samples in tropical dry forest.

Non-paratypic material examined. Madagascar: Prov. Toliara, Ranobe (*MGF*); Toliara, Mahafaly Plateau, ENE Itampolo (*B.L. Fisher*); Toliara, Forêt Tsinjoriaky, E Tsifota (*B.L. Fisher*); Toliara, P.N. Tsimanampetsotsa, SE Efoetse (*B.L. Fisher*); Toliara, Forêt Beroboka, SE Ankidranoka (*B.L. Fisher*); Prov. Fianarantsoa, Forêt Analalava (*B.L. Fisher*); Ifaty (*Steiner & Andriamasimanana*).

Tanipone zona Bolton & Fisher sp. n.

(Figs 84–85, 113–115)

WORKER (holotype in parentheses). HL 0.68–0.81 (0.76), HW 0.53–0.63 (0.60), SL 0.30–0.40 (0.34), EL 0.23–0.29 (0.28), PW 0.39–0.50 (0.46), AIIW 0.36–0.47 (0.44), AIIL 0.36–0.44 (0.44), AIIIW 0.46–0.59 (0.55), AIIIL

0.36–0.50 (0.44), WL 0.80–1.04 (1.00), MFL 0.46–0.58 (0.54), CI 73–79 (79), SI 55–63 (57), EL/HW 0.44–0.48 (0.47), AIIW/AIIL 0.96–1.12 (1.00), AIIIW/AIIIL 1.16–1.30 (1.25) (12 measured).

FIGURES 113–115. Lateral, full face and dorsal view of body. *Tanipone zona* holotype worker CASENT0020383.

Cephalic pilosity and structure of AIII glandular patches as described in definition of *maculata* group, above. With head in full-face view the side in front of the eye without a laterally projecting seta behind the level of the posterior clypeal margin. Posterior margin of head with 2 setae. Dorsum of pronotum with a single pair of setae, at

the humeri; mesonotum and propodeum usually without setae but very rarely the mesonotum with a single short pair present. Mesofemur and metafemur in dorsal view without projecting setae on the anterior or posterior surfaces. Ventral surfaces of mesofemur and metafemur usually without projecting setae, but very rarely a short seta present just distal of the trochanter. Dorsal surface of AII (petiole) with an anterior pair of setae; usually without setae posteriorly but in one specimen a short pair present on the posterior margin. Tergite of AIII with two setae anteriorly, each of which is situated well in front of the anterior margin of the glandular patch. Tergite of AIV with 2–4 setae anteriorly; in general segments AIII and AIV without setae posteriorly, but extremely rarely a short pair present at the posterior margin of one or both sclerites. Sternites of AIII and AIV with setae present. Cephalic dorsum with scattered small punctures, their diameters obviously less than the distances between them. Spaces between punctures smooth or with vestigial ground sculpture, except behind antennal fossae, where weak ground sculpture is usually visible. Katepisternum mostly to entirely smooth. Dorsum of mesosoma with scattered small punctures, as on the head their diameters are obviously less than the distances between them. AII (petiole) in dorsal view appears slightly broader than long; in profile its tergite appears longer than high. Tergite of AIII, between the glandular patches smooth, with minute punctures and sometimes traces of vestigial superficial sculpture. The pale band at the apex of AIII tergite is always very obvious and is of approximately equal width across the sclerite; never interrupted by a longitudinal dark median strip. Tergite of AIV sparsely punctate, often with spaces between punctures smooth, but sometimes with feeble ground sculpture. Full adult colour dark brown to blackish brown (except for the distinct pale band on AIII).

Holotype worker, **Madagascar**: Prov. Toliara, P.N. Tsimanampetsotsa, 6.7 km 130° SE Efoetse, 24°06'S, 43°46'E, 18-22.iii.2002, BLF6169(50), CASENT0020383, sifted litter, spiny forest/thicket (*B.L. Fisher*) (CASC).

Paratypes. 7 workers with same data as holotype but coded 6160(10), CASENT0020374; 6160(29), CASENT0020377; 6160(31), CASENT0020378; 6160(33), CASENT0020379; 6160(37), CASENT0020380; 6160(46), CASENT0020382 (specimen fragmented); 6160(L0), CASENT0020384 (CASC).

Very closely related to *maculata*, but in the latter the tergite of AIII has a pair of pale spots that are separated by a median longitudinal dark strip, rather than the continuous transverse pale band of approximately uniform width that is characteristic of *zona*. In addition, the setae are usually slightly more numerous in *maculata*; see the notes under that species.

Primarily terrestrial, material of *zona* has mostly been captured as ground foragers, under stones, in leaf litter samples, in rotten tree stumps and logs, and in pitfall traps. It has also been recovered from low vegetation, but much more rarely. Primarily found in tropical dry forest, spiny forest, or Uapaca woodland, but it has also been discovered in gallery forest, littoral rainforest and mangroves.

Non-paratypic material examined. Madagascar: Ambositra, Mampiarika (*A. Ravelomanana*); Mahajanga, Maropapango (*B.L. Fisher*); Prov. Toliara, Kirindy Forest, ENE Morondava (*G. Alpert*); Toliara, Rés. Berenty, Forêt Bealoka, NNW AmbosaryToliara, Rés. Cap Sainte Marie, W Marovato (*B.L. Fisher*); Toliara, Forêt de Ptriky, W Tolagnaro (*B.L. Fisher*); Toliara, P.N. Andohahela, Manantalinjo, E Hazofotsy (*B.L. Fisher*); Toliara, P.N. Andohehela, ENE Tsimelahy (*B.L. Fisher*); Toliara, P.N. Tsimanampetsotsa, Mitoho, ENE Efoetse (*B.L. Fisher*); P.N. Tsimanampetsotsa, Bemanateza, SE Beheloka (*B.L. Fisher*); Toliara, P.N. Kirindy Mite, SE Belo sur Mer (*B.L. Fisher*); Toliara, Beza-Mahafaly, E Betioky (*B.L. Fisher*); Toliara, Res. Beza-Mahafaly (*G. Alpert*); Toliara, Res. Beza-Mahafaly (*P.S. Ward*); Toliara, Ranobe (*MGF*); Toliara, Forêt Tsinjoriaky, E Tsifota (*B.L. Fisher*); Prov. Fianarantsoa, P.N. Isalo, Sahanafa River, N Ranohira (*B.L. Fisher*).

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