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Taxonomy of Afrotropical and West Palaearctic ants of the ponerine genus *Hypoponera* Santschi (Hymenoptera: Formicidae)

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Abstract

The taxonomy of the ponerine ants of the genus *Hypoponera* is revised for the Afrotropical and West Palaearctic regions. A combined key to both faunae is presented, and the West Palaearctic species are also keyed separately. Fifty-six species are recognised in total, of which 51 are Afrotropical endemics and two are restricted to the West Palaearctic; three tramp species occur in both regions. Thirty-four Afrotropical species are described as new while 33 names, including a number of infraspecific taxa and extralimital forms, are relegated to synonymy. Two previously described Afrotropical *Hypoponera* names are regarded as *species inquirendae* (*lea, petiolata*). Two extralimital species are mentioned with respect to the studied fauna: *gibbinota*, described from a casual introduction in a Palaearctic hothouse, and the Oriental *assmuthi*, which is provisionally raised to species to dissociate it from the Palaearctic *abeillei*, to which it was previously linked as an infraspecific taxon.

Key words: Ponerinae, *Hypoponera*, Afrotropical, West Palaearctic, taxonomy

Introduction

Among the Afrotropical ants *Hypoponera* represents the epitome of morphological monotony and taxonomic confusion, and it is one of the genera that has actively initiated avoidance behaviour among taxonomists. To cite a significant instance of this, there is no mention at all of *Ponera* (as it was then) in the taxonomic section of Wheeler's (1922) huge volume on ants collected in the territory that was then called the Belgian Congo, despite the fact that numerous specimens must have been collected. This omission must reflect a deliberate decision by Wheeler to ignore the genus. We can be fairly sure of this because in a survey of leaf litter ants conducted by Belshaw & Bolton (1994) in Ghana the number of *Hypoponera* specimens retrieved was high. The total number of individuals referable to the tribe Ponerini (*sensu* Bolton, 2003) in that survey was 3554, which was about 8% of the total number of ants sampled. Of these, 2410 (about 68% of Ponerini) were *Hypoponera*, which in terms of the total number of ants found in the survey represents a very significant 5.5%. Further, a single species of *Hypoponera*, *H. dulcis*, on its own represented 4.2% of all the ants collected in the survey, a remarkable 51% of all the Ponerini. In other words, *Hypoponera* specimens are very common in West Africa, as indeed they are in other tropical regions (Ward, 2000). In addition to these figures from Ghana, many samples of the most common species of the region, in particular *dulcis* and *coeca*, have been collected by hand or Winkler bag from all across the forest zone of West and Central Africa, so Wheeler's omission of *Hypoponera* was probably deliberate. The main reason for his decision

almost certainly lay in the remarkable uniformity of the component species of *Hypoponera* and the difficulty in separating them. These similarities led to their superficial and shabby taxonomic treatment throughout most of the taxonomic history of the group in this region. Original descriptions of the Afrotropical forms are uniformly poor, so poor in fact that hardly any single species can be recognised from its original description alone. The original descriptions of type-material contain much pointless repetition of insignificant features and irrelevant comparisons of features already published by earlier authors, regardless of the fact that many of those characters lacked taxonomic value. Any attempt to analyse characters for usefulness across a number of species, or to investigate other characters for novelty, is conspicuous by its absence. The poverty of endeavour in the genus has truly been monumental. Coupled with this, and complicating the taxonomic task even more, is the fact that we have never before encountered a genus in which the type-material of the various taxa has been in such degraded condition. Much is missing, and much of what remains is damaged, very poorly mounted, or both. The type-series of several taxa were found to be mixed, containing either two different *Hypoponera* species, or in one instance a *Hypoponera* plus a member of a separate genus. Original descriptions based on such series are incomprehensible, obviate any later attempts at identification and only serve to cloud the taxonomic waters to the point of total opacity. A final factor that contributed to the overall confusion was the largely unrecognised ability of some common Afrotropical species to produce intercastes between queens and workers, and the ability of one commonly collected species to produce ergatoid males. On some occasions the large-eyed but worker-like intercastes, and the very worker-like ergatoid males, were described as workers of separate species, or as infraspecific forms. The combination of all these circumstances accounts for most of the taxonomic confusion that descended upon the Afrotropical fauna of *Hypoponera*.

The West Palaearctic fauna is depauperate compared with the 54 Afrotropical species. Individuals are far less frequently encountered, which is not surprising as *Hypoponera* is primarily a tropical genus. Only five species are known from the sub-region, three of which (*eduardi, punctatissima, ragusai*), all tramps, are shared with the Afrotropical and also with other regions. Of the two exceptions, *abeillei* belongs to a primarily Afrotropical group but has not yet been detected in that region; the other, *nivariana*, appears to be a genuine endemic species of the Canary Islands. Most West Palaearctic species are found in the circum-Mediterranean zone and numbers rapidly fall off with increased latitude, except for synanthropic discoveries of tramp species.

As a genus-rank taxon *Hypoponera* dates back only to Taylor (1967), before which it had been treated as a subgenus of *Ponera* since it was first described by Santschi (1938). Since 1967 very little taxonomic work has been devoted to *Hypoponera*. What has been done has mostly been based on single countries, where each study has accounted for no more than two or three species. Notable exceptions include the work of Wilson & Taylor (1967), who revised and keyed the Polynesian species, and contributions to the species of Japan by Onoyama (1989), Morisita, *et al*. (1989) and Imai, *et al*. (2003), that have effectively revised the country's fauna. Other territories covered include Armenia (Arakelian, 1994), the Balkans (Agosti & Collingwood (1987b), Bulgaria (Atanassov & Dlussky, 1992), China (Wu & Wang, 1995), Cuba (Alayo, 1974), European Russia (Arnold'i & Dlussky, 1978), Korea (Kim, *et al*. 1998), the Mediterranean Basin (Bernard, 1967), Portugal (Collingwood & Prince, 1998), Saudi Arabia (Collingwood & Agosti, 1996), Spain (Collingwood, 1978) and Turkmenistan (Dlussky, *et al*. 1990). Prior to Taylor (1967), when *Hypoponera* and *Ponera* were regarded as a single genus, useful information on some *Hypoponera* species and local faunae can still be gleaned from André (1882), Bingham (1903), Creighton (1950), Emery (1896, 1900, 1909, 1916), Forel (1900), Gallardo (1918), Mann (1921) and Wilson (1958); other, older references are summarised in Bolton (2003). Despite the fact that *Ponera* and *Hypoponera* appear morphologically very similar, and were treated as a single genus prior to 1967, recent molecular analyses (Schmidt, 2009 and Philip S. Ward (pers. com.)) indicate that the two are not sister-groups, nor are they particularly closely related within the Ponerini.

Apart from the Polynesian study of Wilson & Taylor (1967) and the repetitive coverage of a couple of Holarctic species whose references are above, this is the first attempt at a revision of the *Hypoponera* fauna of an entire zoogeographical region that contains more than a small handful of species. Previous works on the *Hypoponera* of sub-Saharan Africa, beside the scattered literature of original descriptions of new taxa, include only the studies by Arnold (1915) for South Africa and Bernard (1953) for West Africa. Arnold's work is now considerably out of date and Bernard's contains many misinterpretations. Bernard (1953: 197) at least attempted to draw up a key to species, ostensibly of West Africa but also including some but by no means all extralimital species. Unfortunately this key is largely unworkable because of the confused taxonomy in use at that time.

Since its inception *Hypoponera* has been included in the tribe Ponerini of subfamily Ponerinae. A diagnosis of the tribe, together with taxonomic and historical references, are provided in Bolton (2003). More recent molecular-based phylogenetic studies by Ouellette, *et al*. (2006), Brady, *et al*. (2006) and Schmidt (2009) all retrieve the genus as a monophyletic group within Ponerini, although admittedly all are based on very few species.

In the Afrotropical region species of the genus *Hypoponera* are characteristically members of the fauna of leaf litter, topsoil (directly or under stones), rotten wood on or in the ground and among the roots of plants, with nests built in all of these places as well as under flakes of tree bark at soil level. They may also be found, but apparently uncommonly, within the structure of termitaries (Dejean, *et al*. 1997), usually after the termitarium has been abandoned by its builders. To the best of our knowledge no Afrotropical species are arboreal, for example, none was recorded in Watt, *et al*. (2002), but the possibility that nests might still be found in soil pockets on trees, or in rotten wood high up a tree, must be entertained. Members of *Hypoponera* are generally considered to be predators of small arthropods, but apart from a record by Lévieux (1983) of a species "near *coeca*" preying on collembolans, definite records are not known to exist. In short, general biological information about the species is conspicuous by its absence.

Recently, Serna & MacKay (2010) have published a morphological paper that proposes a number of new terms. One of them, **cinctus**, is adopted here. In terms of this paper the cinctus is the constriction between the presclerites and postsclerites of the second gastral segment (= abdominal segment IV), that has previously been called the "girdling constriction" of that segment (as defined in Bolton, 1994: 195).

Abbreviations of depositories

AFRC Afribugs Collection, Wolmer, Pretoria North, South Africa
BBRC B. Bolton Reference Collection, Ventnor, Isle of Wight, U.K.
BMNH The Natural History Museum, London (= British Museum, Natural History), U.K.
CASC California Academy of Sciences, San Francisco, California, U.S.A.
DEIC Deutsches Entomologisches Institut, Eberswalde, Germany
DEUN Dipartimento de Entomologia e Zoologia Agraria "Filippo Silvestri", Napoli, Italy
IZUC Istituto di Zoologia dell'Università di Cagliari, Cagliari, Sardinia, Italy
KUIC Kagoshima University, Faculty of Science, Kagoshima, Japan
MCZC Museum of Comparative Zoology, Cambridge, Mass. U.S.A.
MHNG Muséum d'Histoire Naturelle, Genève, Switzerland
MNHN Muséum National d'Histoire Naturelle, Paris, France
MSNG Museo Civico di Storia Naturale "Giacomo Doria", Genova, Italy
MSNM Museo Civico di Storia Naturale, Milano, Italy
MZUF Museo di Storia Naturale, Zoologia, Università degli Studi, Firenze, Italy
NHMB Naturhistorisches Museum, Basel, Switzerland
NHMM Natuurhistorisch Museum, Maastricht, The Netherlands
OXUM University Museum, Oxford, U.K.
SAMA South Australian Museum, Adelaide, Australia
SAMC Iziko Museums of Cape Town (= South African Museum), South Africa
UCDC University of California, Davis, California, U.S.A.
USNM United States National Museum of Natural History, Washington, D.C., U.S.A.
ZFMK Zoologisches Forschungsinstitut und Museum Koenig, Bonn, Germany
ZMHB Zoologisches Museum der Humboldt-Universität, Berlin, Germany
ZMUM Zoological Museum, Moscow State University, Moscow, Russia

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 to the mid-point of the posterior margin. Where the posterior margin is concave the measurement is taken from the midpoint of a transverse line that spans the apices of the projecting posterior corners.

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

Head Size (HS). HL + HW, divided by 2.

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.

Pronotal Width (PrW). 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.

Hind Femur Length (HFL). The maximum straight-line length of the metafemur.

Petiole Height (PeH). The vertical height of the petiole measured in profile from the lowest point of the subpetiolar process to a line that intersects the highest point of the dorsal outline.

Petiole Node Length (PeNL). In profile, the maximum length of the petiole node, measured in a straight horizontal line from immediately above the dorsal base of the anterior petiolar tubercle to the posterior margin.

Petiole Node Width (PeNW). The maximum width of the petiole node in dorsal view.

Petiole Size (PeS). PeH + PeNL + PeNW, divided by 3.

Indices

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

Mandibular Index (MI). Length of closed mandible in full-face view from apex to midpoint of clypeal margin, divided by HL, × 100.

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

Petiole Node Index (PeNI). PeNW divided by PrW, × 100.

Lateral Petiole Index (LPeI). PeNL divided by PeH, × 100.

Dorsal Petiole Index (DPeI). PeNW divided by PeNL, × 100.

Images

Digital colour images were created using a JVC KY-75 digital camera and Syncroscopy Auto-Montage (v. 5.0) software.

Genus *Hypoponera*

Hypoponera Santschi

Hypoponera Santschi, 1938: 79 [as subgenus of *Ponera*]. Type-species: *Ponera abeillei* André, 1881: 61 and xlviii, by original designation. [Raised to genus: Taylor, 1967: 9.]

Diagnosis of worker

Members of subfamily Ponerinae, tribe Ponerini (*sensu* Bolton, 2003) that principally inhabit rotten wood, leaf litter and topsoil.

1 Mandible triangular and stout, short to moderate in length (MI 27–35), without a basal groove and without a basal pit; with a basal angle between masticatory and basal margins. When mandibles are fully closed there is no space between the masticatory margins, nor between basal margins of mandibles and the clypeus.

2 Masticatory margin of mandible with 7 to about 18 teeth and denticles in total.

3 Palp formula 1,1 or 1,2, the maxillary palp usually minute.

4 Clypeus simple, without extended lobes or teeth on either the median or the lateral portions and usually unarmed anteromedially. Median portion of clypeus inserted as a small narrow triangle between the extreme anterior ends of the frontal lobes.

5 Frontal lobes small, almost confluent medially, separated only by a median longitudinal impression; the frontal lobes not raised or specialised in any way and their anterior margins well behind the anterior clypeal margin. Frontal carinae and antennal scrobes absent.

6 Eyes absent or present; when present always small (generally of 1 to about 20 ommatidia), lateral and located well in front of the midlength of the head.

7 Antenna with 12 segments, the apical 4–6 antennomeres gradually incrassate; only extremely rarely with a sharply differentiated club.

8 Dorsum of mesosoma with or without a metanotal groove.

9 Mesopleuron without a distinct transverse sulcus that conspicuously divides it into anepisternum and katepisternum.

10 Epimeral sclerite usually absent.

11 Metapleural gland orifice small and simple, opening posteriorly.

12 Metasternal process small and simple.

13 Propodeal spiracle small, circular to slightly elliptical, located far down on the side, usually close to the bulla of the metapleural gland.

14 Propodeum unarmed; propodeal lobes vestigial to absent.

15 Mesotibiae, metatibiae, mesobasitarsi and metabasitarsi all without spines and without enlarged prominent setae to enhance traction on their dorsal (outer) surfaces.

16 Mesotibia and metatibia each with only a single spur; metatibial spur always pectinate.

17 Pretarsal claws small and simple, without preapical teeth.

18 Petiole tergite nodiform to squamiform, always unarmed.

19 Subpetiolar process usually simple, a rounded to angulate ventral lobe; never with paired prominent teeth at the posteroventral corner of the lobe; subpetiolar process usually without an anterior fenestra or thin-spot but a fenestra present in some *abeillei* group members.

20 Articulation of petiole to helcium simple.

21 Helcium arises low down on anterior face of first gastral tergite (Abd. III) and is always simple; anterior surface of first gastral tergite forms a tall vertical surface above the helcium.

22 Prora usually present (absent in only one Afrotropical species): an arched tranverse crest that extends across the first gastral sternite below the helcium; usually the prora extends up the anterior face of the first sternite on each side, so that the entire prora is broadly U-shaped in anterior view.

23 Cinctus of second gastral tergite (Abd. IV) present, usually conspicuous.

24 Stridulitrum absent or present on pretergite of abdominal segment IV.

In addition, fine sculpture is predominantly present, uncommonly entirely absent. The sculpture is expressed as various forms of punctation, that varies in density and intensity on different parts of the body and sometimes differs between species. Coarse, dense sculpture, such as rugae, costulae, or strong striation, appears never to be developed.

Comments on worker characters

The list of characters above forms a good inclusive diagnosis of the genus, but there is so much convergent evolution and parallelism among smaller species of various Ponerini genera, especially those that spend their lives in the leaf litter, topsoil and rotten wood, that no character can currently be singled out as unquestionably autapomorphic for *Hypoponera*. The numbers used below refer to the character numbers listed above.

1 MI above applies to Afrotropical species. A few extralimital species were also measured and fell into the same range, but the MI range recorded above does not reflect the world fauna. In all Afrotropical and West Palaearctic species the mandibles are smooth with scattered punctures; no species with mandibles striate or otherwise sculptured has been recorded.

2 Dentition in Afrotropical species is very uniform across all the species, contrary to Bernard (1953), who was of the opinion that dentition was very diverse between species. There is variation in dentition within species, within nest series and sometimes between left and right mandibles on the same specimen. In general, larger species have proportionately larger teeth and denticles than smaller species. Also, larger species and those with relatively longer mandibles (MI *ca* 35) usually have more teeth and denticles than smaller species and those with shorter mandibles (MI *ca* 27). These variations are found in a gradient across the genus, change with overall size, and usually do not isolate individual species. Total dental count (teeth plus denticles) recorded in Afrotropical species is 8–13 and is generally arranged as follows: three teeth apically, apical the largest and the second smaller than the third; then 0–2 denticles followed by a larger fourth tooth that is usually about the same size as the third; basal of this the margin is

variously denticulate to the basal angle, most usually with 1 or 2 of the denticles somewhat larger than their neighbours. On occasion the basalmost section of the masticatory margin is more or less edentate, though this may be due to wear.

3 Without dissection the maxillary palp is often extremely difficult to see, even in specimens with the mouthparts fully everted. It may be absent in some species but is never of more than one segment.

6 In some species eyes are universally present but are always small and usually insignificant. Sometimes just a single ommatidium occurs but often there are 2–7 present, which may be partially fused. In others, the eye is reduced to a depigmented ommatidium or merely appears as a spot on the cuticle, which may be difficult to discriminate from the surrounding punctate sculpture. In several species eyes are univerally absent. However, there are a number of species where variation is apparent, with some workers eyeless but others with a faint eye spot and still others with a fairly distinct ommatidium. In some species where eyes are present they differ in size between individuals and in extralimital species up to about 20 ommatidia may occur.

7 Most Afrotropical species have funicular segments 7–11 gradually incrassate, some have 6–11 gradually incrassate. Only a single species, *angustata*, has a marked 4-segmented club.

8 In the majority of *Hypoponera* species there is either a strongly developed metanotal groove that forms a sharply incised narrow impression right across the dorsal mesosoma, or there is no trace of a groove at all. However, many intermediate species exist in which a vestige of the metanotal groove remains. This may take the form of an almost effaced weak concavity, a slight change of slope between mesonotum and propodeum, or merely a discoloured line that appears to represent the last vestige of the groove or perhaps a slight invagination of the cuticle. Taken together, the entire sequence is one of morphoclinal reduction and eventual elimination of the metanotal groove. In the group as a whole the presence or absence of a metanotal groove has variously been used in an attempt to isolate genera or subgenera (*e.g.* Santschi (1938), Bernard (1953)). The effort was misplaced, as it is now obvious that the metanotal groove comes and goes between various species groups of both *Ponera* and *Hypoponera* (Taylor (1967) and current study), as well as in other ponerine taxa, such as those currently assigned to *Pachycondyla*.

9 In the vast majority of species the mesopleuron forms a single sclerite. In a few there may be a faint remnant of a transverse impression, but there is never a strong sulcus.

10 Presence or absence of an epimeral sclerite has recently been used as a diagnostic feature of ponerine males (Yoshimura & Fisher, 2007; Bolton & Fisher, 2008c), but has not figured in the diagnoses of ponerine workers. When present in Ponerini workers it takes the form of a discrete small sclerite, usually subcircular, that covers the orifice of the metathoracic spiracle and is located on the side of the mesosoma, at the apex of the metapleuron just behind the posterodorsal margin of the mesopleuron, or behind the posterodorsal anepisternum in those taxa where the mesopleuron is subdivided. The sclerite is universally absent in both *Hypoponera* and *Ponera*, except for *H. zwaluwenburgi* (Wheeler) where it appears to be present (Imai, *et al*. 2003: 197).

18 In profile the petiole tergite is often a roughly rectangular, fairly narrow, tall node that has a distinct dorsal surface. In a few the node is lower and longer but in some major groups it is considerably narrowed and strongly tapered dorsally, producing a thickly squamiform appearance.

19 Most species of Afrotropical *Hypoponera* have a sensory seta that projects laterally or posterolaterally from the lateral surface of the subpetiolar process, close to its anterior margin. In many species where the subpetiolar process is relatively strongly developed, including *importuna, lepida, molesta, natalensis* and *producta*, the basal pit of this seta is large, distinct and quite obviously concave. The pit is even more strongly developed in *boerorum* and *spei*, where it often appears as a thin spot or fenestra that is reminiscent of the condition universal in *Ponera*. Coupled with this, in *spei* the subpetiolar process often has a distinct sharp posteroventral angle, so that in profile the *Ponera*-like condition becomes even more apparent. This is probably a convergence phenomenon because, unlike *Ponera*, the *Hypoponera* species with this fenestra do not have a posteriorly bifurcated ventral surface to the petiole sternite and the posteroventral apex of the subpetiolar process is never produced into a pair of sharp teeth that represent the apices of the bifurcation, such as is universal in genuine *Ponera*.

Two recently described species of *Ponera*, *P. nangongshana* Xu (2001) from China and *P. yuhuang* Terayama (2009) from Taiwan, are both characterised as lacking posteroventral teeth on the subpetiolar process, but possessing a fenestra anteriorly. In view of the morphoclinal development of a fenestra in Afrotropical *Hypoponera* and the otherwise universal presence of posteroventral subpetiolar teeth in *Ponera*, the generic combination of these two Oriental species should be re-assessed.

20 The sternite of the petiole and the articulation of petiole to helcium does not show any of the derived morphology that was described by Bolton & Fisher (2008a, 2008b) for *Asphinctopone*, *Phrynoponera*, or some other Ponerini groups mentioned in those papers.

22 The prora in some extralimital species may be represented by a short transverse bar that is slightly concave in frontal view, a reduction from the condition seen in Afrotropical species. In a single Afrotropical species (*aprora*) the prora has been lost.

Diagnosis of worker-queen intercaste (= ergatoid gyne)

Characters as worker but always with much larger eyes than conspecific worker (intercastes with 7–30 ommatidia in Afrotropical species in which workers have 0–7 ommatidia), but without ocelli; often with a shorter petiole node in profile and a somewhat enlarged gaster; sometimes with a gyne-like transverse sulcus on mesopleuron. One intercaste of *punctatissima* was dissected: a spermatheca was present and the ovaries were enlarged, though much smaller than in the gyne (see also Yamauchi, *et al*. (1996)).

Intercastes have been confirmed in the following species that occur in the Afrotropical region. *H. abeillei* group: *austra*, *importuna*, *lepida*, *producta*. *H. punctatissima* group: *eduardi, ragusai, punctatissima*. Possible intercastes are also suspected in *ignavia* and *occidentalis* (see discussions of those species). It seems reasonable to assume that intercastes occur in many more species but are not currently represented in collections. It is equally obvious that some species, such as the extremely common *dulcis*, do not produce them. In some previous publications, intercastes have been termed major workers or ergatoid females (*e.g.* Forel (1894), Le Masne (1956), Brown (1958)). Observations on the reproductive biology of intercastes can be found in Le Masne (1956), Yamauchi, *et al*. (1996) and Yamauchi, *et al*. (2001).

Diagnosis of queen (gyne)

Characters as listed for workers except for worker characters 6, 8, 9; with the following differences.

1 Eyes always present and large, usually obviously with > 50 ommatidia. Eyes are located in front of mid-length of head and all species examined have small setae that project between the ommatidia.

2 Ocelli present.

3 Mesopleuron with a well developed transverse suture that divides it into anepisternum and katepisternum.

4 Mesosoma with a full complement of flight sclerites (alate when virgin).

5 Jugal lobe absent from hindwing.

6 Venation almost complete (only cross-vein 1r-rs absent); with 8 or 9 closed cells including the pterostigma (8 cells in those species with Cu2 incomplete or absent); Rs.f5 meets R1.f3 on the anterior margin (*i.e.* marginal cell always closed); cross-veins 2r-rs, 2rs-m, 1m-cu and cu-a all present; cu-a arises from M+Cu (*i.e.* proximal of point where M+Cu divides into M and Cu; 2rs-m distal of 2r-rs; a free abscissa of M (M.f2) present between Rs+M and 1m-cu; an angle or bend sometimes present in Rs.f2&3; a fenestra present in cu-a and fenestrae sometimes visible in Rs.f2&3 and 2rs-m, but not in minute species.

7 Petiole node in profile is usually more slender, and often more tapered dorsally, than in the conspecific worker.

Generally slightly larger than conspecific worker; gaster sometimes distinctly larger.

Comments on gyne characters

The numbers used below refer to the character numbers listed above.

1 The presence of short setae that project between the ommatidia has been confirmed in the following species: *angustata, aprora, austra, blanda, coeca, comis, dema, dulcis, eduardi, fatiga, hebes, ignavia, importuna, inaudax, lassa, lepida, meridia, molesta, obtunsa, occidentalis, odiosa, producta, punctatissima, ragusai, segnis, spei, sulcatinasis, tristis*, and also in a number of extralimital species from the Holarctic, Oriental, Malesian and Neotropical regions (BMNH).

6 For a recent illustration of general ponerine venation see Yoshimura & Fisher (2007: 24, fig. 1).

Diagnosis of alate male

1 Mandible lobiform to unidentate (apical tooth only present), not meeting at full closure. Basal cavity of mandible extends to its front face and is visible in full-face view.

2 Eyes large and conspicuous, with minute setae projecting from between the ommatidia. Three distinct ocelli present.

3 Antenna with 13 segments, filiform.

4 Scape short, shorter than second funicular segment.

5 Second funicular segment longer than the first and also longer than the third.

6 Palp formula 1,1; 1,2; 1,3; 1,4; very rarely maxillary palp of 2 segments.

7 Mesonotum in profile not overhanging pronotum.

8 Mesoscutellum convex in profile.

9 Notauli absent; parapsidal grooves present but sometimes very faint.

10 Epimeral sclerite absent.

11 Mesotibia and metatibia each with a single spur; metatibial spur always pectinate.

12 Pretarsal claws simple.

13 Venation as alate gyne.

14 Jugal lobe absent from hindwing.

15 Petiole unspecialised ventrally; helcium very low on anterior face of first gastral segment.

16 Prora present, small.

17 Cinctus of second gastral tergite (Abd. IV) present.

18 Tergite of abdominal segment VIII (pygidium) without a median downcurved spine.

19 Pygostyles (= cerci) present.

Comments on alate male characters

Among Afrotropical species alate males that have been found associated with workers are known only for *austra, coeca, dulcis, eduardi, obtunsa* and *ragusai*. The characters and comments are supplemented with observations based on unidentified males and extralimital species.

1 The reduced state of the male mandible is characteristic of all alate male Ponerini (Bolton, 2003). The basal cavity character was first used by Yoshimua & Fisher (2007) for Malagasy species.

2 All alate males examined also have short setae that project between the ommatidia, as in the gynes, but so few are known that the universality of the character is unclear.

3–5 The configuration of the four basal antennal segments in *Hypoponera* alate males is extremely common in Ponerini. See for example Ogata (1987), Yoshimura & Fisher (2007), Bolton & Fisher (2008b).

6 The palp formulae are originally from Taylor (1967), with additions and confirmations by Bolton (2003). The discovery of a 2-segmented maxillary palp in one Malagasy species is by Yoshimura & Fisher (2007).

Diagnosis of ergatoid male

1 Body form extremely worker-like but male genitalia present.

2 Mandibles reduced (similar to alate males) or worker-like.

3 Antenna with 12 or 13 segments, worker-like or specialised but without the basal segment arrangement of alate males (male characters 4 and 5, above). Scape distinctly shorter than in conspecific worker.

4 Eyes present or absent.

Comments on ergatoid male characters

The production of ergatoid males appears to be restricted to species of the *punctatissima* group (see below). The characters above are based on *eduardi*, *punctatissima* and *ragusai*, but ergatoid males are also produced by extralimital members of the group, such as *opacior* (Forel), *opaciceps* (Mayr) and *nubatama* Terayama & Hashimoto.

At first glance ergatoid males can easily be mistaken for workers, especially as the characteristic male genitalia are retractile and may be almost entirely concealed within the body. The ergatoid male of *eduardi* is monomorphic, with reduced mandibles, 13-segmented antennae and small eyes present. The ergatoid male of *punctatissima* is dimorphic. Both morphs have worker-like mandibles and head shape and 12-segmented antennae, but the larger morph is brown and has small eyes, while the smaller morph is yellow and lacks eyes. Ergatoid males of *ragusai* have not yet been found in the Afrotropical region, but specimens from the U.S.A. have a worker-like head and mandibles, as *punctatissima*, but possess 13-segmented antennae.

Separation of *Hypoponera* from convergent genera

1 ***Ponera***

No native species of *Ponera* has ever been found in sub-Saharan Africa and it is probably now safe to say that the genus is not represented by endemic species in this region. However, some *Ponera* species have tramping ability and one small, as yet unidentified, species has been intercepted in East Africa (BMNH), which is the only confirmed record from the entire Afrotropical region. There are also three species found on islands in the Southwest Indian Ocean, all of which are assumed to be introduced. The West Palaearctic contains two indigenous species of *Ponera*, *coarctata* (Latreille) and *testacea* Emery (Csösz, 2003; Csösz & Seifert, 2003). At first glance *Ponera* workers may be difficult to separate from *Hypoponera*, but *Ponera* workers (and queens) have a 2-segmented maxillary palp and a specialised subpetiolar process on which an anterior fenestra is present and the posteroventral angles of which project into a pair of sharp teeth (Taylor, 1967). Sometimes the petiolar sternite itself is bifurcated posteriorly. In *Hypoponera* the maxillary palp is 1-segmented at most, there is usually no fenestra (but see worker comment 19, above) and the posteroventral angle of the subpetiolar process, no matter how acute, never terminates in a pair of teeth. The males of *Ponera* always have the tergite of abdominal segment VIII produced into an elongate, downcurved median spine, whereas in male *Hypoponera* abdominal tergite VIII is a simple triangular sclerite.

2 ***Cryptopone***

Only a single Afrotropical species seems correctly placed in *Cryptopone*, *C. hartwigi* Arnold (1948) from South Africa. Brown (1963: 6) regarded *hartwigi* as a member of *Ponera*, saying that true *Cryptopone* had not been taken in Africa south of the Sahara. This appears to have led Taylor (1967: 12) to transfer *hartwigi* to *Hypoponera* as it did not conform to his diagnosis of *Ponera*, but it is unlikely that either author had seen an actual specimen at that time. Genuine *hartwigi* workers have a basal mandibular pit, a characteristic of *Cryptopone* that is absent from all *Hypoponera* and *Ponera*. A second African species, originally described as *Cryptopone angustata*, properly belongs in *Hypoponera* and is discussed below. There is a single West Palaearctic species of *Cryptopone*, *ochracea* (Mayr), that has a distinct basal mandibular pit.

3 ***Pachycondyla***

In the Afrotropical region there is a discrete group of at least three small, yellow *Pachycondyla* species that bear a superficial close resemblance to *Hypoponera*. This group currently contains *Pachycondyla gulera* Özdikmen, 2010: 992 (a replacement name for *Ponera ambigua* Weber, 1942: 46, which was a junior secondary homonym of *Pachycondyla ambigua* André, 1890: 316), *P. weberi* (Bernard, 1953: 194), and a third, apparently undescribed species from Cameroun and Gabon (CASC). *P. gulera* and the undescribed species will run to *Hypoponera* in standard keys to genera because they have lost the anterior mesotibial and metatibial spurs. The absence of these features gives them, convergently, the same spur formula as *Hypoponera*; the anterior spurs on both tibiae are retained in *weberi*. Taken together the three species are quickly distinguished from *Hypoponera* by their elongate triangular mandibles (MI *ca* 45–50) and palp formula of 3,3.

In West and Central Africa there are also two apparently undescribed species of eyeless but darkly coloured *Pachycondyla* (BMNH, CASC) in which the subpetiolar process terminates posteroventrally in a *Ponera*-like pair of teeth. These species retain mesotibial and metatibial anterior spurs and have an epimeral sclerite, and by *in situ* count appear to have a palp formula higher than 2,2. At first glance they are reminiscent of the very common and widespread *P. brunoi* Forel (see Brown, 1963), but are considerably different in detail.

Afrotropical and West Palaearctic species groups of *Hypoponera*

The groups as presently constituted are designated and defined only to reflect what is seen in the Afrotropical and West Palaearctic faunae; some of them may prove to be inaccurate or artificial on a world-wide basis.

***abeillei* group**

Species with the following combination of characters in the worker caste.

1 Metanotal groove vestigial to absent across dorsum of mesosoma; at most represented by a vague depression, slight change of slope or a simple line, never a strongly defined deep groove that conspicuously interrupts the surface.

2 Mesonotal-mesopleural suture feeble to absent.

3 Petiole node never squamiform.

4 Eyes absent, or a dark spot, or a single small, inconspicuous ommatidium; only uncommonly with several ommatidia.

5 Anterior clypeal margin lacks a median indentation or notch.

This large group, by far the largest in Africa, falls into two main sections, each of which contains a number of closely related species complexes.

Section 1 contains those species in which the disc of the second gastral tergite is microreticulate or has superficial punctures that are so closely packed that their margins are confluent or nearly so; and which have the maximum width of the first gastral tergite in dorsal view less than the width of the second tergite at its midlength. The latter is because the sides of the second tergite, in dorsal view, tend to be convex, for example Figs 9, 12, 15, 21, 27, 45, 48, 60, 66, 84, 93. This section, which contains *abeillei* itself, breaks down into four Afrotropical complexes of related species. In the first complex (*lepida* and *obtunsa*), the base of the cinctus of the second gastral tergite is smooth, without cross-ribs. In the other complexes cross-ribs are conspicuous. The second complex contains only *angustata*, a minute species in which the funiculus has only the four apical segments distinctly enlarged; in all other species there are usually obviously five, and sometimes vaguely six, gradually incrassate segments apically. The third complex contains *austra*, *exigua*, *natalensis* and *traegaordhi*, characterised by the possession of a transverse groove or impression, which has a conspicuous dorsal margin, on the posterior face of the petiole node above the posterior peduncle. The final complex is artificial and contains all the remaining species of the section that lack the specialisations just mentioned (*blanda, bulawayensis, camerunensis, coeca, defessa, fatiga, juxta, hawkesi, inaudax, lassa, meridia, orba, pulchra, regis, rigida, perparva*).

Section 2 contains those species that have the disc of the second gastral tergite with sharply incised punctures that are widely separated by areas of smooth, shining cuticle; and the maximum width of the first gastral tergite in dorsal view is equal to or greater than the width of the second tergite at its midlength, because the sides of the second tergite, in dorsal view, tend to be straight or even slightly concave, for example Figs 6, 24, 30, 51, 57, 81, 87, 90, 120, 129. This section falls into three complexes. In the first (*faex, hebes, jeanneli, jocosa, mixta, quaestio, surda, tecta, ursa*) the posterior surface of the petiole node has a radiating series of short cuticular ridges just above the posterior peduncle, and the base of the cinctus of the second gastral tergite has cross-ribs present. In the second complex (*dema, molesta, segnis, tristis, venusta*) cuticular ridges are absent from the posterior face of the petiole node but the cinctus of the second gastral tergite retains cross-ribs. The final complex (*aprora, comis, dis, importuna, occidentalis, odiosa, producta*) lacks ridges on the posterior face of the petiole node and also lacks cross-ribs at the base of the cinctus of the second gastral tergite so that the base of the cinctus is smooth and shining.

***dulcis* group**

Species with the following combination of characters in the worker caste.

1 Metanotal groove present and strongly developed across dorsum of mesosoma; always a strongly defined deep groove that conspicuously interrupts the surface.

2 Mesonotal-mesopleural suture present.

3 Petiole node squamiform.

4 Eyes present, small but always distinct.

5 Maximum width of first gastral tergite in dorsal view is equal to or slightly less than the width of the second tergite at its midlength.

6 Cinctus of second gastral tergite smooth, without cross-ribs at its base.

7 Anterior clypeal margin lacks a median indentation or notch.

Only a single species of this group, *dulcis*, occurs in sub-Saharan Africa, where it is extremely common and very widespread; in fact it is the most common and most abundant Afrotropical *Hypoponera* species. A scan of the rest of the world's fauna indicates that there are abundant species in the Oriental, Malesian, Austral and Neotropical regions that apparently belong in the same group as *dulcis*. Given the abundance of this group elsewhere and the presence of only a single species in the Afrotropical region, the possibility that *dulcis* may represent an ancient but very successful invasion from outside the region must be considered.

***punctatissima* group**

Species with the following combination of characters in the worker caste.

1 Metanotal groove present and strongly developed across dorsum of mesosoma; always a strongly defined deep groove that conspicuously interrupts the surface.

2 Mesonotal-mesopleural suture vestigial to absent.

3 Petiole node not squamiform.

4 Eyes present, small but always distinct and located very far forward on the side of the head.

5 Maximum width of first gastral tergite in dorsal view is distinctly less than the width of the second tergite at its midlength.

6 Cinctus of second gastral tergite smooth, without cross-ribs at its base.

7 Anterior clypeal margin lacks a median indentation or notch.

Three species of this group occur in both sub-Saharan Africa and the West Palaearctic, *eduardi, punctatissima* and *ragusai*. Another, *nivariana*, is restricted to the Canary Islands and a fifth species, *sinuosa*, has so far been found only in Guinea. There are several more nominal taxa in other regions. *H. punctatissima* is without doubt the most successful ponerine tramp species in the world, and both *eduardi* and *ragusai* also have recognised tramping ability.

***boerorum* group**

Species with the following combination of characters in the worker caste.

1 Metanotal groove present across dorsum of mesosoma.

2 Petiole node not squamiform.

3 Eyes usually present, rarely absent.

4 Maximum width of first gastral tergite in dorsal view is about the same as the width of the second tergite at its midlength.

5 Cinctus of second gastral tergite with strong cross-ribs.

6 Anterior clypeal margin lacks a median indentation or notch.

Five southern African species are included here (*boerorum*, *ignavia*, *spei, sulcatinasis, transvaalensis*). The group may be artificial as it basically represents species that are similar to the *abeillei* group but which retain a strongly developed metanotal groove.

Key to Afrotropical and West Palaearctic species groups (workers)

1 With mesosoma in dorsal view the metanotal groove is absent or at most vestigially represented by a slight concavity, change of slope, or faint transverse line that does not interrupt the surface.. . . . . *abeillei* group

\- With mesosoma in dorsal view the metanotal groove is conspicuous and strongly developed as a distinct transverse groove that clearly interrupts the surface 2

2 Base of cinctus of second gastral tergite (Abd. IV) strongly cross-ribbed . . . . . *boerorum* group

\- Base of cinctus of second gastral tergite (Abd. IV) smooth, without cross-ribs. 3

3 Petiole squamiform. Mesonotal-mesopleural suture present. Maximum width of first gastral tergite in dorsal view equal to or slightly greater than width of second tergite at its midlength . . . . . *dulcis* group

\- Petiole short-nodiform. Mesonotal-mesopleural suture absent. Maximum width of first gastral tergite in dorsal view less than width of second tergite at its midlength . . . . . *punctatissima* group

Synonymic list of Afrotropical and West Palaearctic species

abeillei **group**

Section 1

abeillei (André, 1881)

angustata (Santschi, 1914)

austra Bolton & Fisher **sp. n.**

blanda Bolton & Fisher **sp. n.**

bulawayensis (Forel, 1913) **stat. n.**
camerunensis (Santschi, 1914)
coeca (Santschi, 1914)
= *myrmicariae* (Wasmann, 1918) **syn. n.**
defessa Bolton & Fisher **sp. n.**
exigua Bolton & Fisher **sp. n.**
fatiga Bolton & Fisher **sp. n.**
hawkesi Bolton & Fisher **sp. n.**
inaudax (Santschi, 1919)
juxta Bolton & Fisher **sp. n.**
lassa Bolton & Fisher **sp. n.**
lepida Bolton & Fisher **sp. n.**
meridia Bolton & Fisher **sp. n.**
natalensis (Santschi, 1914)
obtunsa Bolton & Fisher **sp. n.**
orba (Emery, 1915)
perparva Bolton & Fisher **sp. n.**
pulchra Bolton & Fisher **sp. n.**
regis Bolton & Fisher **sp. n.**
rigida Bolton & Fisher **sp. n.**
traegaordhi (Santschi, 1914)

Section 2

aprora Bolton & Fisher **sp. n.**
comis Bolton & Fisher **sp. n.**
dema Bolton & Fisher **sp. n.**
dis Bolton & Fisher **sp. n.**
faex Bolton & Fisher **sp. n.**
hebes Bolton & Fisher **sp. n.**
importuna Bolton & Fisher **sp. n.**
jeanneli (Santschi, 1935)
= *jeanneli* st. *abyssinica* (Santschi, 1938) **syn. n.**
= *coarctata* subsp. *imatongica* (Weber, 1942) **syn. n.**
jocosa Bolton & Fisher **sp. n.**
mixta Bolton & Fisher **sp. n.**
molesta Bolton & Fisher **sp. n.**
occidentalis (Bernard, 1953)
= *intermedia* (Bernard, 1953) **syn. n.**
odiosa Bolton & Fisher **sp. n.**
producta Bolton & Fisher **sp. n.**
quaestio Bolton & Fisher **sp. n.**
segnis Bolton & Fisher **sp. n.**
surda Bolton & Fisher **sp. n.**
tecta Bolton & Fisher **sp. n.**
tristis Bolton & Fisher **sp. n.**
ursa (Santschi, 1924)
venusta Bolton & Fisher **sp. n.**

dulcis **group**

dulcis (Forel, 1907)
= *dulcis* var. *uncta* (Santschi, 1914) **syn. n.**
= *rothkirchi* (Wasmann, 1918) **syn. n.**
= *lotti* (Weber, 1947) **syn. n.**

= *muscicola* (Weber, 1947) **syn. n.**
= *lamottei* (Bernard, 1953) **syn. n.**
= *mandibularis* (Bernard, 1953) **syn. n.**
= *villiersi* (Bernard, 1953) **syn. n.**

punctatissima **group**

eduardi (Forel, 1894)
= *antipodum* (Forel, 1895)
= *dideroti* (Forel, 1913) **syn. n.**
= *opaciceps* r. *chilensis* (Forel, 1914) **syn.n.**

ragusai (Emery, 1894)
= *gleadowi* (Forel, 1895) **syn. n.**
= *gleadowii* r. *decipiens* (Forel, 1899) **syn. n.**
= *gleadowi* subsp. *aethiopica* (Forel, 1907) (junior homonym) **syn. n.**
= *ragusai* v. *santschii* (Emery, 1909) **syn. n.**
= *japonica* r. *formosa* (Forel, 1913) **syn. n.**
= *lesnei* (Bondroit, 1916)
= *parva* (Bondroit, 1918) (junior homonym)
= *massiliensis* (Bondroit, 1920) (first replacement name)
= *gyptis* (Santschi, 1921) (second replacement name)
= *oblongiceps* (Smith, M.R., 1939) **syn. n.**

nivariana (Santschi, 1908)

punctatissima (Roger, 1859)
= *androgyna* (Roger, 1859)
= *tarda* (Charsley, 1877)
= *punctatissima* r. *jugata* (Forel, 1892)
= *ergatandria* (Forel, 1893)
= *kalakauae* (Forel, 1899)
= *punctatissima* subsp. *schauinslandi* (Emery, 1899) **syn. rev.**
= *ergatandria* subsp. *bondroiti* (Forel, 1911) **syn. n.**
= *dulcis* var. *aemula* (Santschi, 1911) **syn. n.**
= *ergatandria* st. *cognata* (Santschi, 1912) **syn. n.**
= *ragusai* var. *sordida* (Santschi, 1914) **syn. n.**
= *incisa* (Santschi, 1914) **syn. n.**
= *sulcatinasis* r. *durbanensis* (Forel, 1914) **syn. n.**
= *ergatandria* r. *petri* (Forel, 1916) **syn. n.**
= *brevis* (Santschi, 1921) **syn. n.**
= *punctatissima* v. *exacta* (Santschi, 1923)
= *mina* (Wheeler, 1927)
= *argonautorum* (Arnol'di, 1932) **syn. n.**
= *mumfordi* (Wheeler, 1933)
= *mesoepinotalis* (Weber, 1942) **syn. n.**
= *breviceps* (Bernard, 1953) **syn. n.**
= *ursoidea* (Bernard, 1953) **syn. n.**
= *sulcitana* (Stefani, 1970) **syn. n.**

sinuosa (Bernard, 1953)

boerorum **group**

boerorum (Forel, 1901)

ignavia Bolton & Fisher **sp. n.**

spei (Forel, 1910)
= *spei* r. *devota* var. *sancta* (Forel, 1914) unavailable name
= *spei* var. *fidelis* (Santschi, 1926) **syn. n.**

sulcatinasis (Santschi, 1914)
= *spei* st. *devota* (Santschi, 1914) **syn. n.**
transvaalensis (Arnold, 1947)

Species inquirendae
lea (Santschi, 1937)
petiolata (Bernard, 1953)

Extralimital species
gibbinota (Forel, 1912)

Key to Afrotropical and West Palaearctic species of *Hypoponera* (workers)

[Note. The positions of *sinuosa* and *petiolata* in the key are conjectural: see the respective discussions of these species. West Palaearctic species are included here for comparative purposes but are also keyed separately, below.]

1 In dorsal view the base of the cinctus of the second gastral tergite (Abd. IV) is traversed by crowded longitudinal short cross-ribs or a continuous distinct row of aligned coarse punctures with raised margins between them. 2
- In dorsal view the base of the cinctus of the second gastral tergite (Abd. IV) is smooth and shining, not traversed by crowded longitudinal short cross-ribs and without a continuous row of aligned coarse punctures with raised margins between them. . 44

2 Metanotal groove sharply and conspicuously present in dorsal view as a depressed transverse groove that clearly interrupts the surface 3
- Metanotal groove absent or vestigial in dorsal view; at most there may be a slight change of angle between mesonotum and propodeum, or a superficial transverse line, or rarely there may be the merest vestige of a shallow depression, but the surface is not clearly interrupted by a transverse groove 7

3 Disc of second gastral tergite almost entirely smooth; sculpture consists only of minute superficial punctures that are separated by very wide areas of shining, polished cuticle. Eye variably developed, either absent or of a single ommatidium, or a small, featureless blister. (Figs 52–54) (Zimbabwe, South Africa) . . . . . ***ignavia***
- Disc of second gastral tergite densely punctate, reticulate-punctate, or with a microreticulate appearance, without minute punctures separated by broad shining areas. Eye present, small but usually conspicuous 4

4 Dorsum of first gastral tergite (Abd. III) without conspicuous standing setae that arise along the entire length of the sclerite when viewed in profile. Scape relatively longer, SI 88–96 (SL/HL 0.75–0.80). Full adult colour blackish brown to black. At least anterior portion of propodeal dorsum finely and densely reticulate-punctate and opaque 5
- Dorsum of first gastral tergite with conspicuous standing setae that arise along the entire length of the sclerite when viewed in profile. Scape relatively shorter, SI 77–85 (SL/HL 0.66–0.76). Full adult colour yellow to light brown. Propodeal dorsum smooth and shining, with only very inconspicuous, scattered minute superficial punctures 6

5 Dorsum of propodeum finely sculptured everywhere; the sculptured dorsum contrasts strongly with the smooth shining declivity and the transition between the two is sharp and abrupt. Metanotal groove in dorsal view narrow and simple, without a defined metanotal sclerite. Punctate sculpture on pronotal and mesonotal dorsa dense, sharply defined and obvious. (Figs 115–117) (South Africa) . . . . . ***sulcatinasis***
- Dorsum of propodeum with sculpture fading out posteriorly so that the posterior half is almost smooth; without a sharp and abrupt transition between sculptured dorsum and smooth declivity. Metanotal groove in dorsal view broad, with a narrow metanotal sclerite defined. Punctate sculpture on pronotal and mesonotal dorsa sparse, weakly defined and superficial. (South Africa) . . . . . ***transvaalensis***

6 Setae on dorsum of first gastral tergite (Abd. III) long and fine. In full-face view the apex of the scape, when laid straight back from its insertion, just fails to reach or just touches the midpoint of the posterior cephalic margin. Larger species with petiole relatively broader, HW 0.61– 0.74, PeNI 68–76, DPeI 150–180. (Figs 112–114) (South Africa) . . . . . ***spei***
- Setae on dorsum of first gastral tergite short, stiff and stubbly. In full-face view the apex of the scape, when laid straight back from its insertion, distinctly fails to reach the midpoint of the posterior cephalic margin. Smaller species with petiole relatively narrower, HW 0.56–0.60, PeNI 61–65, DPeI 140–158. (South Africa) . . . . . ***boerorum***

7 Base of posterior face of petiole node with a radiating series of about 4–8 short straight cuticular ridges that arise just above the peduncle and extend a short distance up the posterior surface of the node. 8
- Base of posterior face of petiole node smooth, flat or with a transverse groove or ridge above the peduncle, but without a radiating series of cuticular ridges that arise on the posterior surface just above the peduncle 18

8 Lateroventral surfaces of head completely covered with very coarse and distinct reticulate-punctate to punctate-rugulose sculpture; without areas of smooth, shining cuticle between separated discrete punctures 9
- Lateroventral surfaces of head at most with small punctures that are separated by areas of smooth, shining cuticle that are at least as wide as the puncture diameters; sometimes only minute diffuse superficial punctate sculpture is present so that the surface is mostly smooth 10

9 Eye absent. Smaller species: HW 0.64–0.67, HS 0.700–0.735, SL 0.54–0.57, HFL 0.58–0.62, PeH 0.52–0.54, PeS 0.393–0.417. Pronotal dorsum, except along the midline, densely and coarsely reticulate-punctate, the sculpture nearly as strong as that on the coarsely reticulate-punctate dorsum of the head. (Figs 49–51) (Rwanda) . . . . . ***hebes***
- Eye present and conspicuous, of 5–6 small ommatidia. Larger species: HW 0.72, HS 0.800, SL 0.66, HFL 0.72, PeH 0.58, PeS 0.427. Pronotal dorsum, except along the midline, sculptured with spaced small punctures, the sculpture much more sparse and feeble than that on the dorsum of the head. (Ethiopia) . . . . . ***faex***

10 Row of cuticular ridges at base of posterior face of petiole node bounded dorsally by a darkly coloured arched transverse rim or carina; the cuticular ridges lie within a shallow transverse groove of which the dark rim or carina is the upper margin . . . 11
- Row of cuticular ridges at base of posterior face of petiole node not bounded dorsally by an arched transverse dark rim or carina; the cuticular ridges not lying within a shallow transverse groove 12

11 Smaller species, HL 0.55, HW 0.43, SL 0.36, HS 0.490, PeH 0.30; with petiole node relatively narrower, PeNI 67, DPeI 157. In dorsal view maximum width of first gastral tergite is distinctly less than width of second tergite at its midlength. Subpetiolar process with an anteroventral angle that is followed by a long, straight ventral surface that slopes upward posteriorly, without an ascending angle at about the midlength of the sternite. (South Africa) . . . . . ***traegaordhi***
- Larger species, HL 0.66–0.68, HW 0.52–0.54, SL 0.44–0.48, HS 0.590–0.610, PeH 0.40–0.43; with petiole node relatively broader, PeNI 72–79, DPeI 168–188. In dorsal view maximum width of first gastral tergite is subequal to or slightly greater than width of second tergite at its midlength. Subpetiolar process an elongate low lobe that has a short but distinct ascending angle at about the midlength of the sternite. (Figs 40–42) (Ethiopia). . . . . ***exigua***

12 With head in full-face view the mid-point of the anterior clypeal margin is overhung by a small but conspicuous, acutely projecting sharp denticle that arises from the mid-line of the clypeus just behind the margin. In profile the denticle is seen to be the projecting sharp apex of the mid-clypeal ridge. (Figs 121–123) (Kenya) . . . . . ***tecta***
- With head in full-face view the mid-point of the anterior clypeal margin blunt and rounded, without trace of a projecting acute denticle 13

13 Petiole node in profile relatively shorter and higher, LPeI 35–38; in dorsal view petiole node relatively shorter and broader, DPeI 179–200. Scape relatively short, SI 81–85, SL/HL 0.66–0.68. (Ethiopia) . . . . . ***jocosa***
- Petiole node in profile relatively longer and lower, LPeI 43–50; in dorsal view petiole node relatively longer and narrower, DPeI 137–170. Scape usually relatively longer, SI 82–93, SL/HL 0.64–0.75; if SI<85 or SL/HL<0.68 then DPeI in range 140–165 14

14 With petiole node in profile the anterior and posterior faces inclined and obviously convergent dorsally. Larger species, HL 0.68–0.74, HS 0.620–0.665, SL 0.50–0.54, HFL 0.52–0.54. (Figs 76–78) (Kenya) . . . . . ***mixta***
- With petiole node in profile the anterior and posterior faces parallel or nearly so, at most only very slightly convergent dorsally. Smaller species, HL 0.58–0.68, HS 0.525– 0.620, SL 0.40–0.48, HFL 0.39–0.48 15

15 In profile dorsum of first gastral tergite, discounting the apical margin, densely pubescent but without conspicuous standing setae; at most one or two minute standing hairs present that appear more like erect pubescence than setae; dorsum of second tergite the same. Petiole node relatively broad, PeNI 76, DPeI 172. (Figs 103–105) (Tanzania) . . . . . ***quaestio***
- In profile dorsa of first and second gastral tergites, discounting the apical margins, densely pubescent and also with numerous conspicuous short standing setae that are usually easily distinguished from the pubescence. Petiole node relatively narrower, PeNI 65–74, DPeI 140–165 16

16 Petiole node in dorsal view thickly D-shaped, with a strongly convex anterior margin. Petiole larger, PeS 0.297–0.317 (PeNL 0.19–0.21, PeH 0.40–0.45, PeNW 0.28–0.30). Head larger, HS 0.585–0.620 (HL 0.63–0.68, HW 0.52–0.56). SL/HL 0.71–0.75. (Figs 118–120) (Kenya) . . . . . ***surda***
- Petiole node in dorsal view not thickly D-shaped, with a shallowly convex anterior margin. Petiole smaller, PeS 0.237–0.283 (PeNL 0.15–0.19, PeH 0.34–0.40, PeNW 0.24–0.28). Head smaller, HS 0.525–0.580 (HL 0.58–0.64, HW 0.46–0.52). SL/HL 0.66–0.72 17

17 Funiculus segments 7–10 all conspicuously broader than long: the sum of the widths of funiculus segments 7–10, divided by the sum of their lengths, is 1.60 or more. (Democratic Republic of Congo) . . . . . ***ursa***
- Funiculus segments 7–10 gradually increase in width apically: the sum of the widths of funiculus segments 7–10, divided by the sum of their lengths, is 1.50 or less. (Figs 61–63) (Cameroun, Ethiopia, Sudan, Uganda, Rwanda, Kenya, Tanzania, Zimbabwe) . . . . . ***jeanneli***

18 Either: disc of second gastral tergite (Abd. IV) with sharply incised discrete small punctures that are separated from each other by at least the diameter of the punctures, the spaces between punctures glassy smooth; entire surface without a reticulate-punctate or microreticulate appearance. Or: in dorsal view the maximum width of the first gastral tergite (Abd. III) is greater than the width of the second gastral tergite at its midlength, usually obviously so; or usually both of these 19

- Either: disc of second gastral tergite (Abd. IV) appears reticulate-punctate, microreticulate or with crowded superficial punctures whose margins are nearly confluent, so that the surface appears disorganised; without discrete small punctures separated by distinct smooth broad spaces. Or: in dorsal view the maximum width of the first gastral tergite (Abd. III) is usually less than the width of the second gastral tergite at its midlength, at most the two are subequal; or usually both of these 23

19 With head in full-face view the mid-point of the anterior clypeal margin with a small, sharp denticle; in profile this is seen as the termination of a raised, sharp cuticular ridge on the anterior clypeal midline. (Figs 28–30) (Uganda, Rwanda) . . . . . ***dema***

- With head in full-face view the mid-point of the anterior clypeal margin without a denticle 20

20 Smaller species: HL 0.53–0.64, HW 0.40–0.48, SL 0.32–0.43, HFL 0.33–0.45. With gaster in profile the dorsum of the first tergite with abundant short, bristly erect setae that are clearly distinguished from the underlying pubescence 21

- Larger species: HL 0.65–0.79, HW 0.50–0.60, SL 0.46–0.58, HFL 0.47–0.60. With gaster in profile the dorsum of the first tergite without, or with only very sparse, short setae; those that are present are scarcely distinguished from the dense elevated pubescence 22

21 Petiole node relatively very broad, PeNI 89–94, DPeI 170–180. (Figs 79–81) (Gabon, Democratic Republic of Congo) . . . . . ***molesta***

- Petiole node relatively narrower, PeNI 76–82, DPeI 139–160. (Figs 127–129) (Rwanda) . . . . . ***venusta***

22 Petiole node shorter in profile, broader in dorsal view, LPeI 32–43, DPeI 180– >200. (Figs 109–111) (Democratic Republic of Congo, Rwanda, Kenya) . . . . . ***segnis***

- Petiole node longer in profile, narrower in dorsal view, LPeI 46–50, DPeI 154–170. (Figs 124–126) (Rwanda, Uganda) ***tristis***

23 Apex of antenna very distinctly with only 4 enlarged funicular segments that form an obvious club. Minute species, HW 0.27–0.35. (Figs 1–3) (Guinea, Ivory Coast, Ghana, Nigeria, Cameroun, Gabon, Central African Republic, Rwanda, Uganda, Kenya) . . . . . ***angustata***

- Apex of antenna gradually incrassate, the incrassation involving 5–6 segments, without an obvious 4-segmented club. Size vary from minute to moderate, HW 0.30–0.57, but usually > 0.35 24

24 Petiole node in dorsal view relatively long in proportion to its width, as long as broad or only slightly broader than long; DPeI 100–120 25

- Petiole node in dorsal view shorter in proportion to its width, usually very obviously broader than long; DPeI 125 or more, usually considerably greater. 28

25 Larger species, HL 0.54 or more, HW 0.40 or more, SL 0.36 or more, WL 0.70 or more, PeH 0.30 or more; HS 0.475–0.565 and PeS 0.240–0.260. Scape relatively long, SI 90–94 and SL/HL 0.65–0.72. 26

- Smaller species, HL 0.47 or less, HW 0.37 or less, SL 0.30 or less, WL 0.61 or less, PeH 0.24 or less; HS 0.350–0.420 and PeS 0.155–0.200. Scape relatively short, SI 73–85 and SL/HL 0.57–0.66 27

26 Width of petiole node in dorsal view about three-quarters the width of the pronotum, PeNI 70–76; in profile petiole relatively low in relation to its length, LPeI 67. Smaller species, HW 0.40–0.41, SL 0.36–0.37 (SL/HL 0.65–0.69). Anterodorsal and posterodorsal angles of petiole node in profile about equally rounded. (Figs 13–15) (Tanzania, Zimbabwe) . . . . . ***bulawayensis***

- Width of petiole node in dorsal view about half the width of the pronotum, PeNI 54; in profile petiole relatively high in relation to its length, LPeI 58. Larger species, HW 0.49, SL 0.66 (SL/HL 0.72). Anterodorsal angle of petiole node in profile distinctly more broadly rounded than posterodorsal angle. (Figs 106–108) (Tanzania) . . . . . ***regis***

27 Petiole node broader, PeNW 0.18–0.20, PeNI 69–77, LPeI 61–70. Scape slightly longer, SI 80–85, SL/HL 0.61–0.66. DPeI 120 is bottom of range for the species (DPeI 120–136). Subpetiolar process absent. (Figs 10–12) (Central African Republic, Uganda) . . . . . ***blanda*** (part)

- Petiole node narrower, PeNW 0.14–0.16, PeNI 61–67, LPeI 52–62. Scape slightly shorter, SI 73–81, SL/HL 0.57–0.60. DPeI 120 is top of range for the species (DPeI 108–120). Subpetiolar process present. (Figs 91–93) (Congo, Tanzania, South Africa) . . . . . ***perparva***

28 Posterior face of petiole node with a transverse groove or impression above the posterior peduncle; the upper margin of the groove is dark, conspicuous in posterodorsal view and located well above the peduncle (South African species). 29

- Posterior face of petiole node without a transverse groove or impression above the peduncle, or at most with a weak ridge immediately adjacent to the peduncle 30

29 Petiole in dorsal view relatively broad, DPeI 160–187; in profile somewhat shorter and higher, LPeI 41–47. Scape slightly longer, SL 0.42–0.50, SI 84–90. Dorsum of mesosoma usually with a vestigial remnant of the metanotal groove. Cross-ribs at base of cinctus of second gastral tergite usually long, coarse and strongly developed. (Figs 82–84) (South Africa) . . ***natalensis***

\- Petiole in dorsal view relatively narrow, DPeI 137–150; in profile somewhat longer and lower, LPeI 47–56. Scape slightly shorter, SL 0.38–0.42, SI 80–84. Dorsum of mesosoma usually without trace of the metanotal groove. Cross-ribs at base of cinctus of second gastral tergite short, delicately developed. (Figs 7–9.) (South Africa). . . . . ***austra***

30 Petiole node in dorsal view very narrow in relation to width of pronotum, PeNI 56–59. Scape relatively long, SI 90–94. Apex of scape, when laid straight back from its insertion, projects slightly beyond the midpoint of the posterior margin of the head; SL/HL 0.74–0.78. (Figs 46–48) (Uganda, Tanzania) . . . . . ***hawkesi***

\- Petiole node in dorsal view broader in relation to width of pronotum, PeNI 63–81; if PeNI 70 or less then SI <90. Apex of scape, when laid straight back from its insertion, usually distinctly fails to reach the midpoint of the posterior margin of the head, only very rarely just touches it; SL/HL 0.60–0.72 31

31 Petiole in profile relatively tall and more slender, LPeI 37–44. 32

\- Petiole in profile relatively low and more stout, LPeI 46–70 35

32 On the second gastral tergite (Abd. IV) the cross-ribs at the base of the cinctus very coarse, long and stout, widely spaced and extremely conspicuous. (Ethiopia) . . . . . ***juxta***

\- On the second gastral tergite (Abd. IV) the cross-ribs at the base of the cinctus fine and delicate, short and slender, closely packed and often inconspicuous 33

33 Head large, HS 0.575, HW 0.51; scape longer, SL 0.44; petiole node slightly more slender, DPeI 147, PeNI 66. (Equatorial Guinea (Bioko I.)). . . . . ***pulchra*** (part)

\- Head smaller, HS 0.410–0.495, HW 0.36–0.44; scape shorter, SL 0.28–0.38; petiole node slightly more broad, DPeI 155–180, PeNI 67–78 34

34 Lateroventral surfaces of head densely and conspicuously punctate, almost reticulate-punctate, the punctures closely packed and sharply defined; diameters of individual punctures generally greater than the distances between them. Slightly larger species: HW 0.40–0.44, HS 0.455–0.495, SL 0.34–0.38, PeH 0.33–0.38, PeS 0.227–0.260. Scape averages slightly longer, SI 84–90. (Figs 64–66) (Ivory Coast, Ghana) . . . . . ***lassa***

\- Lateroventral surfaces of head feebly and inconspicuously punctate, the punctures small, superficial, weakly defined and widely separated; diameters of individual punctures less than the distances between them. Slightly smaller species: HW 0.36–0.40, HS 0.410–0.450, SL 0.28–0.33, PeH 0.27–0.31, PeS 0.195–0.220. Scape averages slightly shorter, SI 78–86. (Figs 43–45) (Ghana, Central African Republic, Uganda, Kenya, Tanzania) . . . . . ***fatiga***

35 Clypeus in oblique dorsolateral view without a raised median longitudinal ridge or crest. Lateroventral surfaces of head finely but quite densely and conspicuously punctate. (Figs 25–27) (Ivory Coast, Ghana, Togo, Cameroun, Gabon) . . . . . ***defessa***

\- Clypeus in oblique dorsolateral view with a raised median longitudinal ridge or crest. Lateroventral surfaces of head almost entirely smooth and polished, with only a very few minute, inconspicuous and widely separated punctulae 36

36 Head large, HS 0.575, HW 0.51. (Equatorial Guinea (Bioko I.)). . . . . ***pulchra*** (part)

\- Head smaller, HS 0.365–0.530, HW 0.33–0.46 37

37 With petiole node in profile either the anterior and posterior faces are vertical and parallel, not convergent dorsally, so that length of node just above the level of the anterior tubercle is about the same as at the points where the anterior and posterior faces meet the dorsum; or the anterior face is vertical and the posterior face is very slightly inclined towards it. 38

\- With petiole node in profile either the anterior and posterior faces are both inclined and converge dorsally, so that length of node just above the level of the anterior tubercle is distinctly greater than at the points where the anterior and posterior faces meet the dorsum; or the posterior face is vertical and the anterior face is inclined towards it, usually quite distinctly so 40

38 Smaller species with petiole node narrower with respect to the pronotum; HL 0.46, SL 0.28, WL 0.56, PeH 0.24, PeNW 0.17 (PeS 0.180); PeNI 65. (Uganda) . . . . . ***rigida***

\- Larger species with petiole node broader with respect to the pronotum; HL 0.52–0.56, SL 0.32–0.38, WL 0.67–0.70, PeH 0.28–0.32, PeNW 0.20–0.25 (PeS 0.210–0.257); PeNI 70–78. 39

39 With petiole in profile the posterodorsal angle distinctly rounded, not a right-angle; posterodorsal angle more broadly rounded than the anterodorsal angle. First gastral tegite (Abd. III) in dorsal view broader than long. Width of first gastral tergite at posterior margin *ca* 1.4 × the width at the anterior margin in dorsal view. Scape both absolutely and relatively slightly shorter, SL 0.32–0.36, SI 82–89, SL/HL 0.62–0.65. (Figs 73–75) (South Africa) . . . . . ***meridia*** (part)

\- With petiole in profile the posterodorsal angle a right-angle or very nearly so; anterodorsal angle distinctly more broadly rounded than the posterodorsal angle. First gastral tergite (Abd. III) in dorsal view slightly longer than broad. Width of first gastral tergite at posterior margin *ca* 1.6 × the width at the anterior margin in dorsal view. Scape both absolutely and relatively slightly longer, SL 0.37–0.38, SI 95, SL/HL 0.68–0.69. (circum-Mediterranean) . . . . . ***abeillei***

40 Petiole in profile relatively lower and longer, LPeI 61–70. DPeI not greater than 136 (DPeI range 120–136). Petiole in profile without a ventral process or at most with a minute, denticle-like projection. (Figs 10–12) (Central African Republic, Uganda). ..... ***blanda*** (part)

- Petiole in profile relatively higher and shorter, LPeI 47–59. DPeI often greater than 136 (DPeI range 125–173). Petiole in profile with a ventral process of some form present 41

41 Larger species, HS 0.470–0.530. [If HS is in the range 0.470–0.480 then SI 74–80, DPeI 156–167 and PeS 0.237–0.243.] (Figs 16–18) (Cameroun, Gabon, Democratic Republic of Congo, Uganda) ..... ***camerunensis***

- Smaller species, HS 0.365–0.470. [If HS is in the range 0.460–0.470 then SI 81–90, DPeI 125–157 and PeS 0.213–0.230.] . 42

42 With the following combination of indices: LPeI 47 and DPeI 150–157 and SI 90–92. In dorsal view the sides of the second gastral tegite (Abd. IV) are straight and parallel; the posttergite, from the posterior margin of the cinctus to the apex, is slightly longer than broad. (Eritrea)..... ***orba***

- With the following combination of indices: LPeI 50–59 and DPeI 125–150 and SI 74–89. In dorsal view the sides of the second gastral tegite (Abd. IV) are shallowly convex; the posttergite, from the posterior margin of the cinctus to the apex, is slightly broader than long 43

43 Larger species, SL 0.30–0.35, HW 0.37–0.42, HL 0.47–0.52, PeH 0.25–0.31, HS 0.415–0.465, PeS 0.187–0.233; with relatively longer scape, SI 80–89, SL/HL 0.65–0.71. (Figs 19–21) (Guinea, Ivory Coast, Ghana, Togo, Nigeria, Cameroun, Gabon, Central African Republic, Congo, Angola, Uganda, Kenya, Tanzania, South Africa) ..... ***coeca***

- Smaller species, SL 0.25–0.28, HW 0.33–0.37, HL 0.40–0.46, PeH 0.22–0.25, HS 0.365–0.410, PeS 0.167–0.190; with relatively shorter scape, SI 74–82, SL/HL 0.60–0.66. (Figs 58–60) (Guinea, Ivory Coast, Ghana, Nigeria, Cameroun, Gabon, Democratic Republic of Congo, Kenya)..... ***inaudax***

44 Metanotal groove sharply and conspicuously present in dorsal view as a depressed transverse groove that clearly interrupts the surface. 45

- Metanotal groove absent or vestigial in dorsal view; at most there may be a slight change of angle between mesonotum and propodeum, or a superficial transverse line, or there may be the merest vestige of a shallow depression, but the surface is not clearly interrupted by a transverse groove 51

45 Dorsum of mesosoma sculptured with fine transverse rugulae. (Guinea) ..... ***petiolata***

- Dorsum of mesosoma usually with fine punctate sculpture that varies in intensity and density between species; sometimes the punctate sculpture may be almost effaced, leaving the surface mostly smooth and shining; never with transverse rugulae. . . 46

46 Mesopleuron with very fine, dense punctulate-shagreenate to minutely striolate sculpture at least on the upper half; sculpture frequently blankets the entire sclerite and renders it opaque; upper half of mesopleuron without unsculptured shining areas. 47

- Mesopleuron almost entirely unsculptured and shining, at most with a few scattered small punctures on a smooth surface; without fine dense sculpture that blankets at least the upper half of the sclerite and renders it opaque..... 48

47 Full adult colour dark brown to almost black. Apex of scape, when laid straight back from its insertion, touches or slightly exceeds midpoint of posterior margin of head, SL/HL 0.72–0.78. Propodeal dorsum densely superficially punctulate to reticulate-punctulate. Slightly larger species with longer scape and broader petiole node, HL 0.63–0.70, HW 0.54–0.59, SL 0.47–0.54, SI 86–93, DPeI 167–188. (Figs 37–39) (South Africa; circum-Mediterranean eastwards to Turkmenistan, Macaronesian Atlantic islands; tramp species)..... ***eduardi***

- Full adult colour dull yellow. Apex of scape, when laid straight back from its insertion, distinctly fails to reach midpoint of posterior margin of head, SL/HL 0.68. Propodeal dorsum almost smooth, with scattered minute superficial punctulae. Slightly smaller species with shorter scape and narrower petiole node, HL 0.56, HW 0.46, SL 0.38, SI 83, DPeI 157. (Canary Is (Tenerife) only) ..... ***nivariana***

48 Petiole node scale-like and with a narrow dorsal surface; petiole relatively higher and shorter, LPeI 32–39. In dorsal view node relatively thin from front to back, DPeI 180–218. Side of mesosoma with a suture between mesonotum and mesopleuron. In dorsal view the maximum width of the first gastral tergite is equal to or slightly greater than the width of the second tergite at its midlength. Scape relatively longer, SI 90–102 and SL/HL 0.74–0.83. (Figs 34–36) (Guinea, Ivory Coast, Ghana, Nigeria, Cameroun, Central African Republic, Gabon, Congo, Democratic Republic of Congo, Angola, Eritrea, Sudan, Uganda, Kenya, Tanzania, Zimbabwe, South Africa) ..... ***dulcis***

- Petiole node not scale-like and with a well-defined, flat to convex dorsal surface; petiole relatively lower and longer, LPeI 43–61. In dorsal view node relatively thick from front to back, DPeI 120–165. Side of mesosoma without a suture between mesonotum and mesopleuron (note: this suture present in intercastes). In dorsal view the maximum width of the first gastral tergite is distinctly less than the width of the second tergite at its midlength. Scape relatively shorter, SI 75–87 and SL/HL 0.61–0.70. 49

49 Petiole node in profile relatively longer and lower, LPeI 55–61; in dorsal view the petiole node relatively longer from front to back, DPeI 120–140. (Ethiopia, Kenya, circum-Mediterranean; tramp species) ..... ***ragusai***

- Petiole node in profile relatively shorter and higher, LPeI 43–53; in dorsal view the petiole node relatively shorter from front to back, DPeI 140–165 50

50 Petiole in profile with anterior and posterior faces only weakly convergent dorsally, so that dorsal length of node is only slightly less than length immediately above the anterior tubercle. Dorsal midline of head with a narrow impression that extends back from the frontal lobes and reaches beyond the midlength of the vertex. Eye small but distinct, far forward on side of head. (Figs 97–99) (Guinea, Ivory Coast, Ghana, Togo, Benin, Nigeria, Cameroun, Gabon, São Tomé & Principe, Central African Republic, Democratic Republic of Congo, Angola, Ethiopia, Rwanda, Kenya, Uganda, Tanzania, Zambia, Botswana, Zimbabwe, South Africa; West Palaearctic (frequently synanthropic); cosmopolitan tramp species) . . . . . ***punctatissima***
- Petiole in profile with anterior and posterior faces very strongly convergent dorsally, so that dorsal length of node is less than half the length immediately above the anterior tubercle. Dorsal midline of head without a narrow impression that reaches beyond the midlength of the vertex. Eye a minute vestigial blister, difficult to discern. (Guinea) . . . . . ***sinuosa***

51 Scape relatively longer, SI 99–108. DPeI 135–155. Apex of scape, when laid straight back in full-face view, just touches the midpoint of the posterior margin of the head. (Figs 94–96) (Cameroun, Gabon) . . . . . ***producta***
- Scape relatively shorter, SI 78–96. If SI in range 90–96 then either DPeI >160, or apex of scape, when laid straight back in full-face view, fails to reach the midpoint of the posterior margin of the head, or both of these. 52

52 Disc of second gastral (Abd. IV) tergite finely, sharply punctate; the individual punctures are sharply incised, minute and separated by wide areas of glassy smooth cuticle; distance between punctures is distinctly greater than puncture diameters. In dorsal view width of second gastral tergite at its midlength is less than the maximum width of the first tergite. 53
- Disc of second gastral (Abd. IV) tergite microreticulate or superficially reticulate-punctate; individual punctures are expanded and superficial, their margins confluent and slightly raised to give a microreticulate effect; without areas of glassy smooth cuticle between isolated punctures. In dorsal view width of second gastral tergite at its midlength is at least equal to, and usually greater than, the maximum width of the first tergite 58

53 Petiole node in dorsal view short but very broad, DPeI 182–200 (mean = 190) 54
- Petiole node in dorsal view longer and narrower, DPeI 145–180 (mean = 157) 55

54 Petiole node in profile with anterior and posterior faces above level of anterior tubercle parallel or very nearly so; node longer, higher and broader, PeNL 0.20–0.22, PeH 0.48–0.53, PeNW 0.38–0.41 (PeS 0.360–0.383); in dorsal view node relatively broader with respect to pronotum, PeNI 85–95. Full adult colour of head and mesosoma dark reddish brown. (Figs 55–57) (Gabon, Central African Republic, Kenya) . . . . . ***importuna***
- Petiole node in profile with anterior and posterior faces above level of anterior tubercle converging dorsally; node shorter, lower and narrower, PeNL 0.16–0.17, PeH 0.39–0.41, PeNW 0.29–0.32 (PeS 0.280–0.297); in dorsal view node relatively narrower with respect to pronotum, PeNI 75–82. Full adult colour of head and mesosoma blackish brown to black. (Figs 22–24) (Tanzania) . . . . . ***comis***

55 Larger species, HL 0.58 or more, HW 0.46 or more, SL 0.38 or more, PrW 0.35 or more, PeH 0.35 or more; HS 0.520 or more, PeS 0.280 or more 56
- Smaller species, HL 0.53 or less, HW 0.42 or less, SL 0.36 or less, PrW 0.32 or less, PeH 0.32 or less; HS 0.470 or less, PeS 0.250 or less. 57

56 With petiole in profile the posterior face of the node vertical and straight, the anterior and posterior faces approximately parallel; anterodorsal and posterodorsal angles of node about equally bluntly rounded and the dorsum between them convex. Petiole slightly higher, PeH 0.42–0.52. Generally averaging slightly larger, HW 0.48–0.60, SL 0.44–0.55, HFL 0.46–0.58. (Figs 85–87) (Guinea, Ivory Coast, Ghana, Cameroun, Gabon, Equatorial Guinea, Central African Republic, Kenya, Tanzania, Zimbabwe) . . . . . ***occidentalis***
- With petiole in profile the posterior face of the node weakly convex and converging on the vertical anterior face dorsally; anterodorsal angle of node distinctly more sharply developed than posterodorsal angle and the dorsum between them flat. Petiole slightly lower, PeH 0.38–0.43. Generally averaging slightly smaller, HW 0.46–0.49, SL 0.38–0.44, HFL 0.42–0.47. (Figs 88–90) (Cameroun) . . . . . ***odiosa***

57 With base of gaster in profile the prora present, visible as a short vertical raised crest or rim that extends from just below the helcium to the anteroventral corner of the first gastral sternite and separating the anterior and lateral surfaces of the sternite; prora darker in colour than the cuticle posterior to it. (Figs 31–33) (Tanzania) . . . . . ***dis***
- With base of gaster in profile the prora absent; anterior and lateral surfaces of first gastral sternite meet in a blunt angle but there is no raised crest or rim separating the two surfaces. (Figs 4–6) (Tanzania) . . . . . ***aprora***

58 Petiole node in profile relatively short and tall, LPeI 38–47; PeH 0.32–0.39. (Figs 67–69) (Ivory Coast, Ghana, Nigeria, Cameroun, Central African Republic) . . . . . ***lepida***
- Petiole node in profile relatively long and low, LPeI 52–65; PeH 0.26–0.32. 59

59 With petiole in profile the anterior and posterior faces of the node are parallel. Petiole larger, PeNL 0.18–0.20, PeH 0.30–0.32, PeNW 0.24–0.25 (PeS 0.240–0.257). Head relatively narrower and scape longer, CI 73–77, SI 82–86. (Figs 73–75) (South Africa) ..... ***meridia*** (part)

- With petiole in profile the anterior and posterior faces of the node are inclined and converge dorsally. Petiole smaller, PeNL 0.14–0.15, PeH 0.26–0.27, PeNW 0.20–0.21 (PeS 0.200–0.207). Head relatively broader and scape shorter, CI 80–82, SI 78–80. (Zimbabwe)..... ***obtunsa***

Key to West Palaearctic species of *Hypoponera* (workers)

1 With head in full-face view the anterior clypeal margin with a conspicuous semicircular median notch or impression. (Great Britain; probably tropical, described from a casual introduction found in a botanical hothouse) ..... ***gibbinota***

- With head in full-face view the anterior clypeal margin without a semicircular median notch or impression; midpoint of anterior clypeal margin convex 2

2 Eye absent. Metanotal groove absent; in dorsal view the mesosoma surface is not clearly interrupted by a depressed transverse groove between mesonotum and propodeum. Base of the cinctus of the second gastral tergite (Abd. IV) is conspicuously traversed by crowded longitudinal cross-ribs. (Portugal, Spain, France (Corsica), Italy, Israel, Saudi Arabia, Egypt, Tunisia)..... ***abeillei***

- Eye present; small and located far forward on the side of the head. Metanotal groove present; in dorsal view the mesosoma surface is sharply and conspicuously interrupted by a depressed transverse groove between mesonotum and propodeum. Base of the cinctus of the second gastral tergite (Abd. IV) is smooth and shining, or at most with a few superficial punctures 3

3 At least the upper half of the mesopleuron finely, densely sculptured and opaque; usually the entire mesopleuron sculptured. Mid-dorsal longitudinal impression on head terminates immediately behind the frontal lobes and does not extend to the midlength of the vertex or beyond. 4

- Entire mesopleuron smooth and polished, without fine opaque sculpture over half or more of its surface. Mid-dorsal longitudinal impression on head extends back beyond the midlength of the vertex and usually approaches the posterior margin 5

4 Full adult colour dark brown to almost black. Apex of scape, when laid straight back from its insertion, touches or slightly exceeds midpoint of posterior margin of head, SL/HL 0.72–0.78. Propodeal dorsum densely superficially punctulate to reticulate-punctulate. Slightly larger species with longer scape and broader petiole node, HL 0.63–0.70, HW 0.54–0.59, SL 0.47–0.54, SI 86–93, DPeI 167–188. (Macaronesian Islands of Atlantic Ocean, circum-Mediterranean countries, Balkan states, Armenia, Turkmenistan, Iran, Saudi Arabia; tramp species at least in Old World Tropics)..... ***eduardi***

- Full adult colour dull yellow. Apex of scape, when laid straight back from its insertion, distinctly fails to reach midpoint of posterior margin of head, SL/HL 0.68. Propodeal dorsum almost smooth, with scattered minute superficial punctulae. Slightly smaller species with shorter scape and narrower petiole node, HL 0.56, HW 0.46, SL 0.38, SI 83, DPeI 157. (Canary Is (Tenerife)) ..... ***nivariana***

5 Petiole node in profile relatively longer and lower, LPeI 55–61; in dorsal view the petiole node relatively longer from front to back, DPeI 120–140. (France, Italy, Tunisia, Algeria, Israel; tramp species). ..... ***ragusai***

- Petiole node in profile relatively shorter and higher, LPeI 43–53; in dorsal view the petiole node relatively shorter from front to back, DPeI 140–165. (Cosmopolitan tramp species, sometimes synanthropic)..... ***punctatissima***

Afrotropical and West Palaearctic species of *Hypoponera*

Hypoponera abeillei (André)

Ponera abeillei André, 1881: 61 and xlviii. Syntype workers, FRANCE: Corsica, nr Ajaccio (*Abeille de Perrin*) (MNHN) [examined]. [Description of male: Santschi, 1921b: 167. Combination in *Ponera (Hypoponera)*: Santschi, 1938: 79; in *Hypoponera*: Taylor, 1967: 12.] (See note.)

NOTE. The males described by Santschi (1921b) were captured in flight, not associated with workers or queens. Their identity as *abeillei* is therefore not assured, but is most probably correct.

WORKER. *Measurements*: HL 0.54–0.56, HW 0.39–0.40, HS 0.465–0.480, SL 0.37–0.38, PrW 0.30, WL 0.68, HFL 0.34, PeNL 0.15, PeH 0.28–0.29, PeNW 0.22, PeS 0.217–0.220 (2 measured). *Indices*: CI 71–72, SI 95, PeNI 73, LPeI 52–54, DPeI 147.

Eyes absent. In full-face view apex of scape, when laid straight back from its insertion, fails to reach the mid-

point of the posterior margin; SL/HL 0.68–0.69. Reticulate-punctulate sculpture of cephalic dorsum very fine and superficial; pronotal dorsum with minute punctulae, almost smooth. Lateroventral surfaces of head almost smooth, only with widely separated minute punctulae. With mesosoma in dorsal view the metanotal groove absent. Propodeal declivity separated from sides by blunt angles; not sharply marginate, not carinate. Mesopleuron unsculptured. Petiole in profile with the node relatively short and of moderate height, the anterior and posterior faces vertical, straight and parallel, not converging dorsally; dorsal surface almost flat. In profile the anterodorsal angle of the petiole node is conspicuously more broadly rounded than the posterodorsal angle; the latter almost a right-angle. Subpetiolar process with a small, shallow ventral angle. Posterior surface of petiole node without a transverse groove or impression above the peduncle and lacking cuticular ridges that radiate upwards from the posterior petiolar peduncle. Maximum width of first gastral tergite in dorsal view distinctly less than the width of the second tergite at its midlength. First gastral tergite in dorsal view as long as or slightly longer than broad, much narrower across the anterior margin (*ca* 0.20) than across the posterior margin (*ca* 0.32) and with the sides distinctly divergent posteriorly. Base of cinctus of second gastral tergite with distinct cross-ribs. Sides of second gastral segment straight and parallel for most of their length in dorsal view; narrowing extremely feebly only at the cinctus anteriorly and the apex posteriorly. Posttergite of second gastral segment, from posterior margin of cinctus to apex, as long as broad to slightly longer than broad. Disc of second gastral tergite shallowly reticulate-punctate to microreticulate. Full adult colour light brownish yellow.

Although not yet recorded from the Afrotropical region proper, *abeillei* appears to be closely related to *meridia*, *orba* and *coeca*. It is very probable that *abeillei* is of Afrotropical origin, but has not yet been detected south of the Sahara. Its known distribution consists of sporadic circum-Mediterranean discoveries, but it appears to be very rare everywhere. Published records of the species exist for Portugal, Spain, France, Italy, Israel, Saudi Arabia and Tunisia (Baroni Urbani, 1971; Bernard, 1967; Boieiro, *et al*. 2002; Collingwood & Agosti, 1996; Emery, 1916; Espadaler & López-Soria, 1991; Kugler, 1988; Santschi, 1921b), and it has recently been reported from Egypt (Mostafa Sharaf, pers. comm.). In the circum-Mediterranean zone it is very obviously different from all other *Hypoponera* species as it is the only one that is eyeless, lacks a metanotal groove across the dorsal mesosoma and has distinct cross-ribs at the base of the cinctus of the second gastral tergite, a combination of characters that render it easily identifiable. In his key, Bernard (1953) recorded *abeillei* from Cameroun, but it is suspected that he included the name merely because *camerunensis* had originally been described as an infraspecific form of *abeillei*, from that country. Forel (1905) described an infraspecific form, *abeillei* r. *assmuthi*, from India. Forel himself expressed doubts about the association and it now seems most probable that *assmuthi* is not correctly assigned here. It is most likely an independent species but has not yet been investigated in detail. To remove the name from its association with *abeillei* it is provisionally raised to species rank here, pending detailed investigation: *Hypoponera assmuthi* (Forel, 1905: 182) **stat. n.**

In the Afrotropical key *abeillei* runs out with *meridia*, a South African species. Superficially the two are similar, but they are easily distinguished by the characters mentioned in the key.

Material examined. **France**: Corsica, nr Ajaccio (*Abeille de Perrin*).

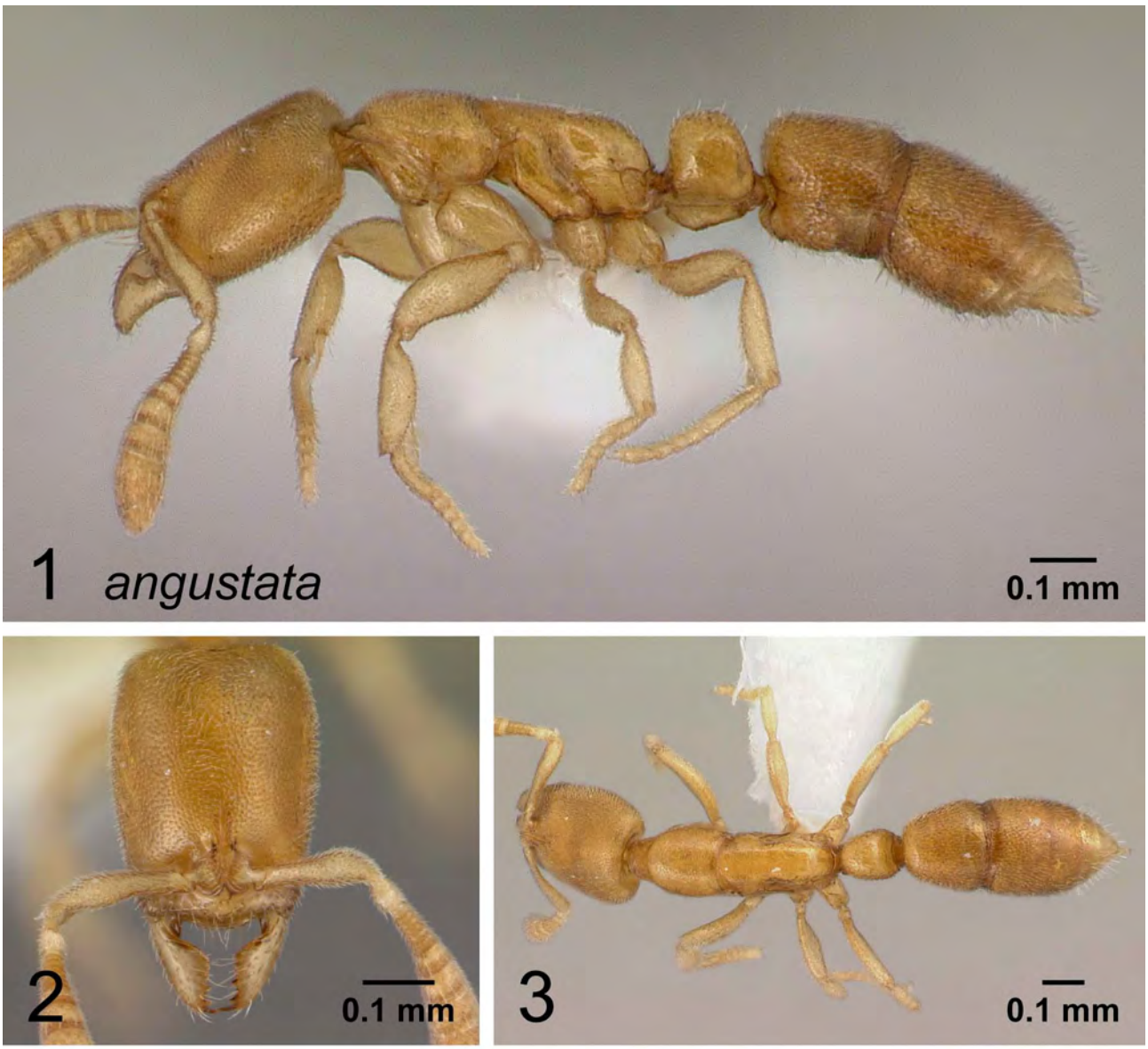
Hypoponera angustata (Santschi)
(Figs 1–3)

Cryptopone angustata Santschi, 1914b: 319, fig. 7. Syntype workers, GUINEA: Kakulima, 1913 (*F. Silvestri*), and GUINEA: Mamou (*F. Silvestri*) (NHMB) [examined]. [Combination in *Pseudocryptopone*: Santschi, 1937b: 366; in *Ponera*: Brown, 1963: 6; in *Hypoponera*: Taylor, 1967: 12.]

WORKER. *Measurements*: HL 0.38–0.45, HW 0.27–0.35, HS 0.320–0.390, SL 0.20–0.26, PrW 0.19–0.25, WL 0.45–0.54, HFL 0.18–0.23, PeNL 0.11–0.14, PeH 0.18–0.22, PeNW 0.12–0.15, PeS 0.140–0.167 (28 measured). *Indices*: CI 72–78, SI 71–79, PeNI 56–70, LPeI 55–70, DPeI 100–125.

Minute species. Eyes absent. Scape very short; when laid straight back from its insertion the apex falls far short of the midpoint of the posterior margin in full-face view; SL/HL 0.53–0.60. Funiculus of antenna conspicuously with only four enlarged segments apically. Cephalic dorsum minutely reticulate-punctate. Mesonotal-mesopleural suture absent; fine pubescence of mesonotum ends at line where the suture would be expected to run. Dorsum of mesosoma without trace of a metanotal groove. Propodeal declivity narrow; declivity rounds into the sides through

a blunt angle, without a carina or sharp margin separating them. Pronotal dorsum with very weak, superficial punctulate sculpture, much weaker and less dense than on the head. Petiole node in dorsal view as broad as long or only slightly broader than long (DPeI 125 at maximum); anterior face of node bluntly rounded, the sides usually very weakly divergent posteriorly. Posterior surface of node without cuticular ridges radiating from the peduncle, but usually with a fine transverse carina just above the peduncle. Petiole node in profile low and relatively long, with a weakly convex dorsum. Anterior and posterior faces of node usually very weakly convergent dorsally, but sometimes almost parallel. Subpetiolar process usually with a simple angle in the ventral margin of the sternite, but the angle may vary from distinct to very rounded and inconspicuous. In dorsal view the maximum width of the first tergite is less than the width of the second tergite at its midlength. Base of cinctus of second gastral tergite is sculptured with a dense row of very short longitudinal cross-ribs that may appear as a row of adjacent punctures with raised margins between them. Sides of second gastral tergite shallowly convex in dorsal view; midline length of second gastral posttergite, from posterior margin of cinctus to apex, is less than the maximum width of the segment. Disc of second gastral tergite microreticulate or with superficial reticulate-punctate sculpture. Dorsal surfaces of body with short but quite distinct pubescence, and with numerous very short projecting setae. Full adult colour yellow.



FIGURES 1–3. Lateral, full face and dorsal view of body. *Hypoponera angustata* worker CASENT0226559.

A very distinctive and widely distributed minute species that occurs in leaf litter and rotten wood throughout the forest zones of west, central and east Africa. Immediately obvious in *angustata* is the clearly differentiated 4-segmented antennal club, with funiculus segment 7 extremely reduced compared to segment 8 and scarcely larger than segment 6. This is the only known Afrotropical species with a differentiated club, all others have the funiculus more or less obviously gradually incrassate towards the apex, the incrassation involving 5 or 6 segments. Similar in appearance to *angustata* is *perparva*, but the latter has the antenna gradually incrassate apically, with a vaguely 5-segmented club (*i.e.* funiculus segment 7 is smaller than 8, but distinctly larger than segment 6), and in profile has the anterior and posterior faces of the node strongly convergent dorsally. Both species are small to minute (HW 0.27–0.35, SL 0.20–0.26) and are characterised together within section 1 of the *abeillei* group by having relatively short scapes, relatively long narrow petiole nodes in dorsal view and relatively long low petiole nodes in profile, *i.e.* low SI and DPeI combined with high LPeI. These ranges are not completely exclusive, as individuals from some other species overlap their ends, but in general the other species have relatively longer scapes, relatively shorter and broader petiole nodes in dorsal view, and relatively shorter, higher petiole nodes in profile. The species *angustata* and *perparva* together have the ranges SI 71–81 (SL/HL 0.53–0.60), DPeI 100–125 and LPeI 52–70. In the remaining species of the section the combined range of SI is 75–92 (SL/HL 0.60–0.73), with only very few specimens having relatively short scapes with SI < 80. DPeI in remaining species of the section is 100–187, but only *bulawayensis* (DPeI 110), *regis* (DPeI 100), some specimens of *blanda* (minimum DPeI 120) and some workers of *inaudax* and *coeca* (lowest DPeI 125) overlap the range of *angustata* and *perparva*.

Material examined. **Guinea**: Kakulima (*F. Silvestri*); Mamou (*F. Silvestri*). **Ivory Coast**: Abidjan, Adiopodoumé (*I. Löbl*), Abidjan, Banco Nat. Pk (*I. Löbl*), Agboville, Yapo-Gare (*I. Löbl*), Iringou (*F. Krell*), Tai Forest (*V. Mahnert*). **Ghana**: Tafo (*D. Leston*), Tafo (*R. Belshaw*), Mampong (*P.M. Room*), Efiduase (*R. Belshaw*), Poano (*R. Belshaw*), Esunkawkaw (*R. Belshaw*), Sui For. Res. (*R. Belshaw*), Sagymasi (*R. Belshaw*), Kade (*R. Belshaw*), Bunso (*R. Belshaw*). **Nigeria**: Ile-Ife (*J.T. Medler*). **Cameroun**: Mbalmayo (*N. Stork*), Prov. Sud-Ouest, Bimbia For., Limbe (*B.L. Fisher*), Prov. Sud-Ouest, Korup, Mundemba (*B.L. Fisher*), Prov. Sud, Res. Campo, Massif des Mamelles (*B.L. Fisher*), Prov. Sud, PN Campo, Campo (*B.L. Fisher*), Prov. Sud, Res. de Faune de Campo (*B.L. Fisher*), Prov. Sud, N'kolo, Bondé For., Elogbatindi (*B.L. Fisher*). **Gabon**: Prov. Ogooue-Maritime, Res. Moukalaba, Doussala (*B.L. Fisher*), Prov. Ogooue-Maritime, Res. Monts Doudou (*B.L. Fisher*), Prov. Estuaire, FC Mondah, NNW Libreville (*B.L. Fisher*), Prov. Estuaire, Pointe Ngombe, Ekwata (*B.L. Fisher*), Prov. Woleu-Ntem, ESE Minvoul (*B.L. Fisher*). **Central African Republic**: PN Dzanga-Ndoki, Lidjombo (*B.L. Fisher*), Res. Dzanga-Sangha, Bayanga (*B.L. Fisher*). **Rwanda**: Rangiro (*P. Werner*). **Uganda**: Kalinzu N.P. (*M. Kiyono*). **Kenya**: Western Prov., Kakamega For., Buyangu (*G. Fischer*); Kakamega For., Ngavira (*F. Hita Garcia*); Kakamega Distr., Yala River Nat. Res. (*Snelling & Espira*); Nakuru, Lake Naivasha (*Mahnert & Perret*); Lamu, nr Witu (*Mahnert & Perret*); Lake Nakuru Nat. Pk (*V. Mahnert*); Kisumu Chemelil (*V. Mahnert*).

Hypoponera aprora Bolton & Fisher **sp. n.**
(Figs 4–6)

WORKER (holotype in parentheses). *Measurements*: HL 0.51–0.53 (0.51), HW 0.40–0.41 (0.40), HS 0.455–0.470 (0.455), SL 0.34–0.36 (0.34), PrW 0.30–0.32 (0.31), WL 0.65–0.68 (0.66), HFL 0.34–0.35 (0.34), PeNL 0.15–0.16 (0.15), PeH 0.30–0.32 (0.31), PeNW 0.26–0.27 (0.26), PeS 0.240–0.250 (0.240) (8 measured). *Indices*: CI 77–79 (78), SI 83–88 (85), PeNI 84–87 (84), LPeI 49–53 (49), DPeI 163–173 (173).

Conforming to the general description given for *dis* but lacking a prora. In *aprora*, with the first gastral segment in profile, the anterior and lateral surfaces of first gastral sternite meet in a blunt angle; there is no prominent raised proral crest or rim separating the two surfaces below the level of the helcium. Similarly, there is no transverse raised margin or lip separating the anterior and ventral surfaces of the first sternite. Full adult colour glossy dark brown to blackish brown.

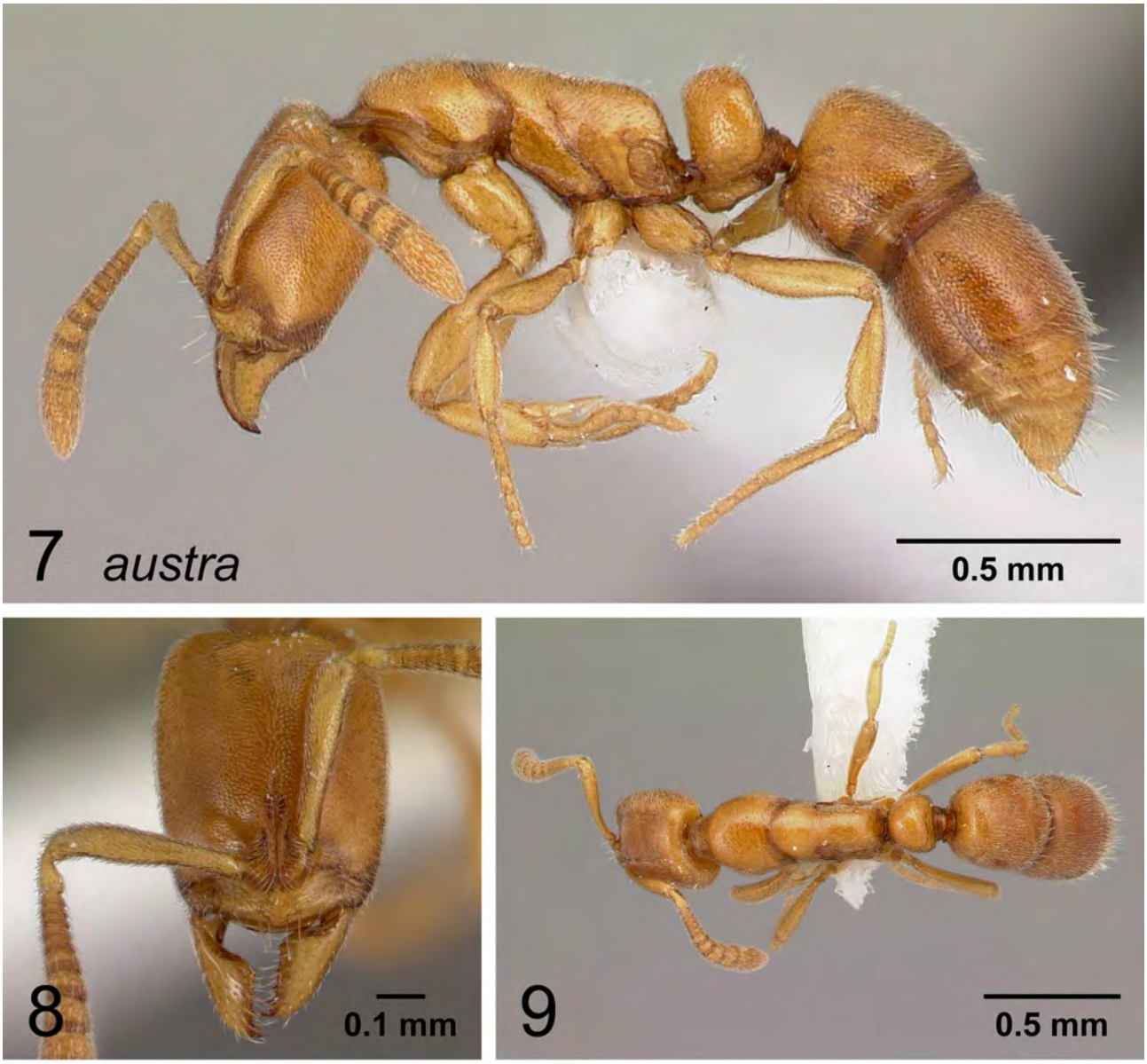
Holotype worker, **Tanzania**: Tanga Region, Kilindi Forest Reserve, 1015 m., 27-30.viii.2005, CEPF-TZ-3.2-F09, 5.57934S, 37.57971E, primary forest leaf litter, Winkler (*P. Hawkes, J. Makwati, R. Mtana*) (SAMC).
Paratypes. 7 workers and 1 dealate queen, with same data as holotype (SAMC, CASC, AFRC, BBRC).

This species is immediately distinguished from all its Afrotropical and West Palaearctic congeners by its lack of the prora on the first gastral sternite, both laterally and anteroventrally. It belongs in the *occidentalis* complex of the *abeillei* group, notes on the species of which are given under *occidentalis*. See also under *dis*, which appears to be its closest relative.

FIGURES 4–6. Lateral, full face and dorsal view of body. *Hypoponera aprora* holotype worker CASENT 0192382.

Hypoponera austra Bolton & Fisher **sp. n.**
(Figs 7–9)

WORKER (holotype in parentheses). *Measurements*: HL 0.59–0.63 (0.62), HW 0.46–0.50 (0.48), HS 0.525–0.560 (0.550), SL 0.38–0.42 (0.40), PrW 0.36–0.38 (0.36), WL 0.77–0.88 (0.86), HFL 0.38–0.44 (0.42), PeNL 0.18–0.20 (0.20), PeH 0.34–0.37 (0.36), PeNW 0.26–0.28 (0.28), PeS 0.260–0.280 (0.280) (12 measured). *Indices*: CI 75–79 (77), SI 80–84 (83), PeNI 69–78 (78), LPeI 47–56 (56), DPeI 137–150 (140).



FIGURES 7–9. Lateral, full face and dorsal view of body. *Hypoponera austra* holotype worker BLF1542(18)-1.

Eyes vestigial to absent, sometimes with a small depigmented spot that appears to be the remnant of a single ommatidium; sometimes no trace of an eye spot. In full-face view apex of scape, when laid straight back from its insertion, distinctly fails to reach the midpoint of the posterior margin; SL/HL 0.63–0.67. Reticulate-punctulate sculpture of cephalic dorsum fine, but head more densely sculptured than pronotal dorsum. Lateroventral surfaces of head with extremely feeble superficial punctate sculpture, the surfaces almost smooth. With mesosoma in dorsal view the metanotal groove absent. Propodeal declivity separated from sides by blunt angles or weak marginations. Mesopleuron smooth and shining. Petiole in profile with the node relatively short and of moderate height, the anterior and posterior faces parallel or at most only extremely feebly convergent dorsally; dorsal surface shallowly broadly convex. Subpetiolar process shallow, usually with a low, blunt ventral angle. Posterior surface of petiole node with a shallow transverse groove or impression above the peduncle, the upper margin of the impression appears as a transverse dark line or ridge in posterodorsal view. Without cuticular ridges that radiate upwards into the impression from the posterior peduncle. Maximum width of first gastral tergite in dorsal view less than the width of the second tergite at its midlength. Base of cinctus of second gastral tergite with short but conspicuous cross-ribs. Posttergite of second gastral segment, from posterior margin of cinctus to apex, distinctly broader than long. Disc of second gastral tergite shallowly reticulate-punctate to microreticulate. With first gastral segment in profile, the dorsum with sparse, short, standing setae. Full adult colour yellowish brown to light brown.

Holotype worker, **South Africa**: W. Cape Prov., Table Mtn, Orange Kloof N.R., 34°00.1'S, 18°23.5'E, 125 m., 15.xii.1997, sifted litter (leaf mold, rotten wood), montane rainforest, #1542(18)-1 (*B.L. Fisher*) (CASC).
Paratypes. 12 workers and 1 dealate queen with same data as holotype, all #1542 but coded (2)-3, (5)-1, (6)-3, (8)-2, (10)-6, (14)-3, (15)-1, (17)-1 (queen), (19)-1, (20)-5, (LO)-6 (CASC, BMNH).

See notes under *natalensis*. Two examples of worker-queen intercastes have been seen in *austra*. The specimens (Table Mtn and Knysna, in CASC) are very worker-like but have partially depigmented distinct eyes of about 7–10 ommatidia, much larger and much more obvious than in true workers. A single specimen from Newlands Forest (CASC) has a strangely thickened petiole, with LPeI 60, DPeI 119. Other specimens from the same series are quite ordinary and one is mounted on the same pin as the oddity. Whether this is teratological, or is some kind of intercaste, or perhaps represents a socially parasitic form (unlikely) is not known.

Non-paratypic material examined. **South Africa**: W. Cape Prov., Table Mtn, Orange Kloof (*B.L. Fisher*) (series other than type-series); Table Mtn, Newlands Forest (*H.J. Ratsirarson*); W. Cape Prov., ENE Knysna, Diepwalle (*B.L. Fisher*), W. Cape, Leopard's Gorge, Kogelberg Nat. Res. (*P.S. Ward*); Cape Prov., Tsitsikamma N.P., Bloukran Pass (*S.Zoia*).

Hypoponera blanda Bolton & Fisher **sp. n.**
(Figs 10–12)

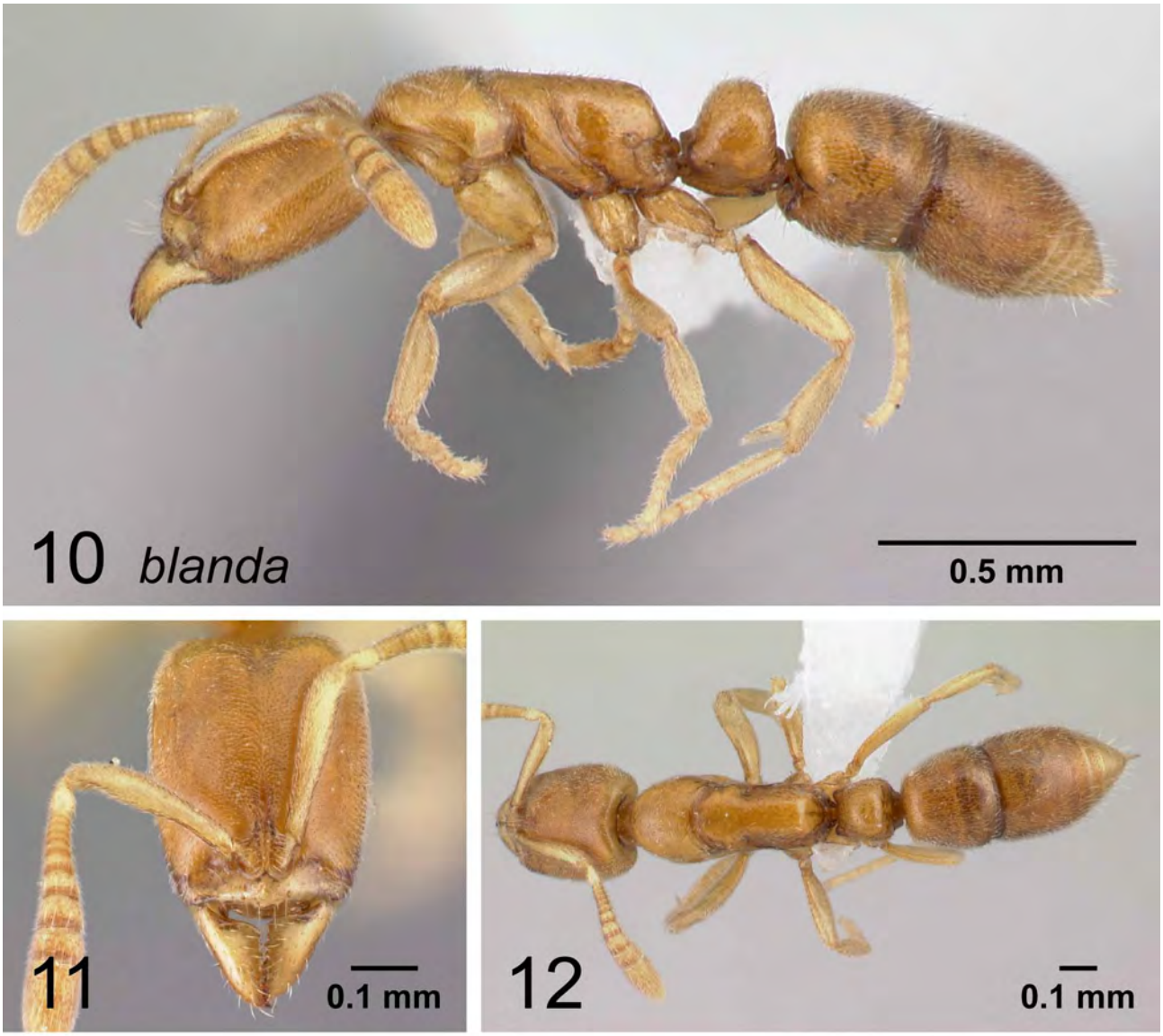
WORKER (holotype in parentheses). *Measurements*: HL 0.44–0.47 (0.47), HW 0.34–0.37 (0.36), HS 0.395–0.420 (0.415), SL 0.28–0.30 (0.30), PrW 0.26–0.28 (0.26), WL 0.56–0.61 (0.60), HFL 0.27–0.30 (0.28), PeNL 0.14–0.16 (0.16), PeH 0.21–0.24 (0.24), PeNW 0.18–0.20 (0.20), PeS 0.177–0.200 (0.200) (15 measured). *Indices*: CI 76–79 (77), SI 80–85 (83), PeNI 69–77 (77), LPeI 61–70 (67), DPeI 120–136 (125).

Eyes absent. In full-face view apex of scape, when laid straight back from its insertion, distinctly fails to reach the midpoint of the posterior margin; SL/HL 0.61–0.66. Funiculus with 5 enlarging apical segments. Metanotal groove absent from dorsum of mesosoma or a vestige of its former path may be discernible, but there is never an incised transverse groove that interrupts the surface. Mesonotal-mesopleural suture absent from side of mesosoma. Propodeal declivity separated from sides by blunt angles; without acute raised margins or sharp carinae. Posterior surface of petiole node without short cuticular ridges that radiate from the peduncle. Node of petiole in profile relatively long and low, the anterior and posterior faces converge dorsally so that length of node just above anterior tubercle is noticeably greater than length of dorsum; posterior face usually shallowly convex. Dorsal surface of node is almost flat to shallowly convex in profile and both anterodorsal and posterodorsal angles are blunt and rounded. Sternite of petiole in profile usually evenly shallowly convex, without a differentiated ventral process of any form; in some a minute impression occurs at about the midlength of the sternite and in a few a minute, denticle-like projection is present. Maximum width of first gastral tergite in dorsal view is less than width of second gastral tergite at its midlength. Sides of second gastral tergite shallowly convex in dorsal view. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is less than the maximum width of the segment. Cross-ribs at base of cinctus short, fine and very closely packed. Disc of second gastral tergite with crowded, small, superficial punctures so that the surface appears superficially microreticulate at lower magnifications. First and second gastral tergites dorsally pubescent and with a number of short, standing setae that project just above the level of the pubescence. Full adult colour yellow.

Holotype worker. **Central African Republic**: P.N. Dzanga-Ndoki, 37.9 km. 169° S Lidjombo, 2°22'N, 16°10'E, 360 m., 21.v.2001, CASENT 0417325, 4130(38), sifted litter (leaf mold, rotten wood) rainforest (*B.L. Fisher*) (CASC).
Paratypes. 10 workers and 3 queens, with same data as holotype but workers coded 4130(14), 4130(15), 4130(17), 4130(21), 4130(23), 4130(24), 4130(37), 4130(42), 4130(46), 4130(47); queens coded 4130(31), 4130(43), 4130(45) (CASC, BBRC).

Similar to *coeca* but averaging smaller and with a distinctly lower, longer petiole node that usually has no ventral process.

Non-paratypic material examined. **Central African Republic**: Res. Dzanga-Sangha, 12.7 km. 326° NW Bayanga (*B.L. Fisher*). **Uganda**: nr Mbarara (*S. Yamane*).



FIGURES 10–12. Lateral, full face and dorsal view of body. *Hypoponera blanda* holotype worker CASENT0417325.

Hypoponera boerorum (Forel)

Ponera coarctata r. *boerorum* Forel, 1901: 339. Syntype workers, SOUTH AFRICA: Natal, alt. 5300 ft (1600 m. in description), no. 159 (*Haviland*) (MHNG) [examined]. [Raised to species: Santschi, 1938: 78. Combination in *Hypoponera*: Taylor, 1967: 12.]

WORKER. *Measurements*: HL 0.68–0.72, HW 0.56–0.60, HS 0.620–0.660, SL 0.46–0.50, PrW 0.45–0.48, WL 0.94–0.96, HFL 0.48–0.52, PeNL 0.18–0.20, PeH 0.40–0.42, PeNW 0.28–0.30, PeS 0.287–0.297 (6 measured). *Indices*: CI 82–86, SI 80–83, PeNI 61–65, LPeI 45–50, DPeI 140–158.

Eyes present, small and inconspicuous, depigmented in the syntypes. In full-face view apex of scape, when laid straight back from its insertion, distinctly fails to reach the midpoint of the posterior margin; SL/HL 0.68–0.70. Reticulate-punctulate sculpture of cephalic dorsum fine, but head distinctly more densely sculptured than pronotal dorsum. Propodeal dorsum smooth, with only faint traces of scattered minute punctulae. Mesonotal-mesopleural suture absent or with a weak vestige still visible. Metanotal groove distinctly incised across dorsum of mesosoma; mesonotum with a well-defined posterior margin. Propodeal declivity separated from side by a blunt angle or a weak margination, without sharp carinae. Mesopleuron smooth and shining. Petiole in profile with the anterior and posterior faces of the node convergent dorsally; node distinctly longer just above the anterior tubercle than at the

dorsum. Sternite of petiole in profile with a rounded subpetiolar process that lacks sharp angles anteriorly or posteriorly. Anterior margin of subpetiolar process, near its base, with a conspicuous pit from which a sensory seta arises. Maximum width of first gastral tergite in dorsal view less than the width of the second tergite at its mid-length. Base of cinctus of second gastral tergite with strong cross-ribs. Posttergite of second gastral segment, from posterior margin of cinctus to apex, distinctly broader than long. Punctures on disc of second gastral tergite superficial and densely crowded but not appearing microreticulate. With first gastral segment in profile, the dorsum with many short, stubbly, standing setae that arise along the entire length of the tergite. Full adult colour yellow.

At first glance *boerorum* appears to be a somewhat smaller version of *spei*, but the form of the pilosity on the dorsum of the first gastral tergite separates the two in the material available. In *boerorum* there are many standing setae that arise all over the sclerite, but all are short and stubble-like except for those at the extreme apex of the segment, which are notably longer. In *spei* the setae are less numerous but much longer, fine and very conspicuous. In addition, the subpetiolar process of *boerorum* is rounded, without a developed posteroventral angle, whereas in *spei* a posteroventral angle is often, but not always, present; see description of *spei*. Despite this, it should be stressed that *boerorum* and *spei* are extremely similar and the possibility that the latter will eventually prove to be a junior synonym of the former must be considered.

The original description of *boerorum* associated it with *coarctata* (type-species of *Ponera*) and was superficial in the extreme. No useful discriminating characters were documented and it was vaguely compared with *lucida* Emery, now a junior synonym of *Ponera coarctata* from Turkestan, and with *mackayensis* (Forel), an unrelated *Hypoponera* species from Australia. When *spei* was described, nearly a decade later, no mention was made of *boerorum*, although the type-localities of the two were both in Natal and probably only a few miles apart. Because the description of *spei* was marginally better than that of *boerorum*, it became the template for understanding the species, and *boerorum* was effectively forgotten until Santschi (1938) elevated the name to species rank. He did this merely by pointing out a few differences between *coarctata* and *boerorum*, but failed to compare the latter with any other African congener.

Both *boerorum* and *spei* usually have a distinct pit near the anterior margin of the subpetiolar process, from which a sensory seta arises. The seta and its pit are very common in Afrotropical *Hypoponera* and are easily visible in many species, but in these two the pit appears hypertrophied, by comparison with other species, and in the most extreme examples appears very similar to the thin-spot or fenestra that is diagnostic of *Ponera*. See comments on worker characters under the diagnosis of the genus.

Material examined. **South Africa**: Natal (*Haviland*).

Hypoponera bulawayensis (Forel) **stat. n.**

(Figs 13–15)

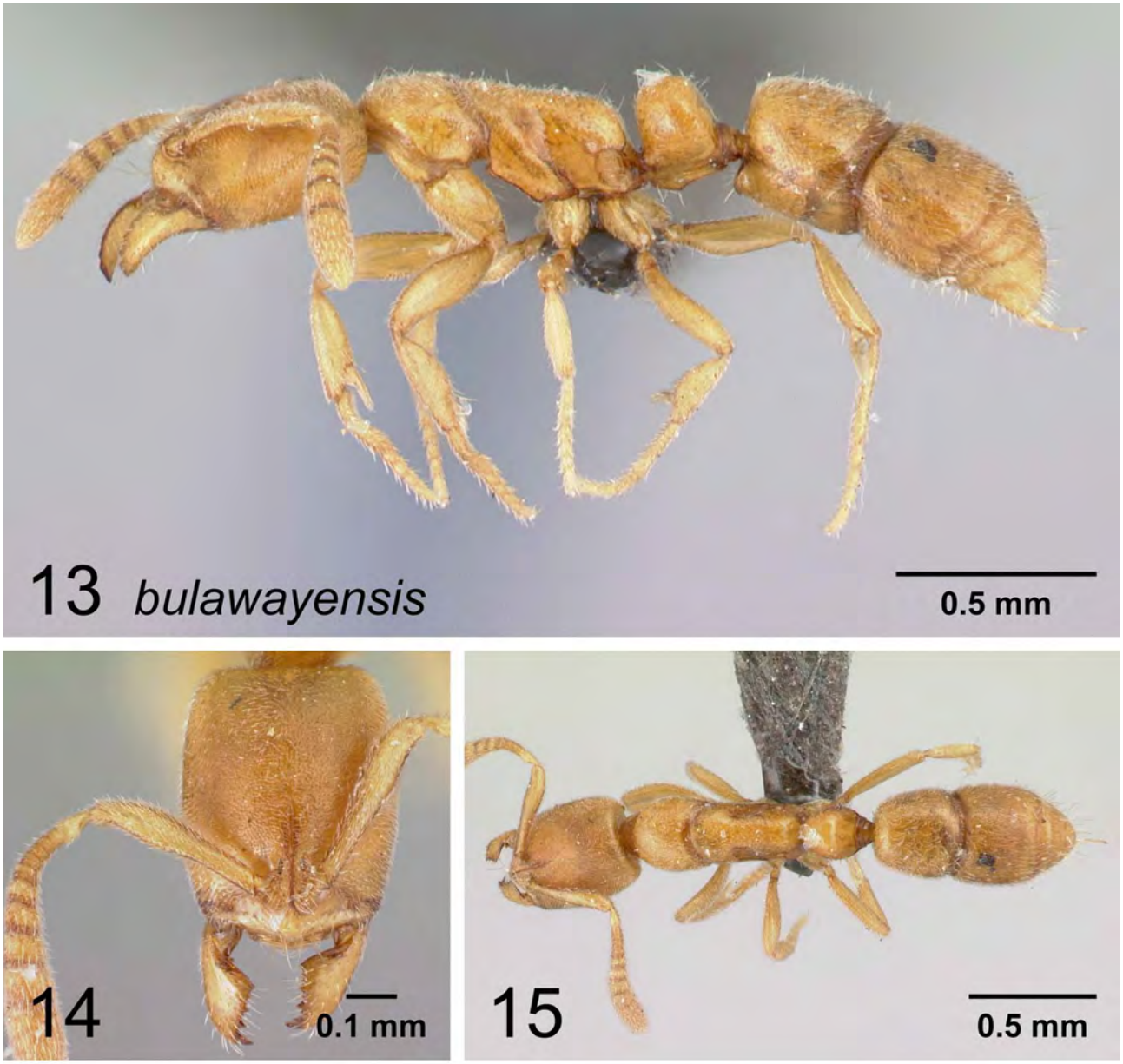
Ponera ragusai st. *bulawayensis* Forel, 1913a: 203. Holotype worker, ZIMBABWE: Bulawayo, 23.iii.13, no. 158 (*G. Arnold*) (MHNG) [examined]. **Stat. n.** [Combination in *Hypoponera*: Bolton, 1995: 213.]

WORKER. *Measurements*: HL 0.54–0.55, HW 0.40–0.41, HS 0.475–0.480, SL 0.36–0.37, PrW 0.29–0.32, WL 0.72 (WL of holotype not measurable because head plus propleuron, prosternum and forelegs are detached as a unit and glued down so that they are partially on top of the pronotum), HFL 0.33–0.34, PeNL 0.20, PeH 0.30, PeNW 0.22, PeS 0.240 (2 measured). *Indices*: CI 73–76, SI 90, PeNI 70–76, LPeI 67, DPeI 110.

Eyes absent. Scape relatively long (SI 90) but when laid straight back from its insertion in full-face view its apex distinctly fails to reach the midpoint of the posterior margin; SL/HL 0.65–0.69. Funiculus distinctly with 5 enlarging apical segments. Reticulate-punctate sculpture of cephalic dorsum fine and dense. Pronotal dorsum with minute superficial punctulae, almost smooth, obviously less strongly and densely sculptured than cephalic dorsum. Mesonotum and dorsum of propodeum almost smooth, shiny and almost entirely devoid of punctulae. No trace of metanotal groove on dorsum of mesosoma. Mesonotal-mesopleural suture absent from side of mesosoma. Propodeum rounded between declivity and side. Posterior surface of petiole node without short cuticular ridges that radiate from just above the peduncle. Node of petiole in profile distinctly stout-nodiform, relatively long and low. Anterior and posterior faces of node in profile slightly convergent to almost parallel; length of node just above the anterior tubercle is slightly greater than length of dorsum; dorsal surface is very weakly convex. Subpetiolar process simple, with a shallow, obtuse ventral angle but without a sharply defined ventral tooth or prominent acute

angle. In dorsal view petiole node relatively long, only 10 percent broader than long (DPeI 110), with posterior face transverse; sides and anterior face form a single thickly D-shaped convex surface, with the sides slightly convergent anteriorly. Maximum width of first gastral tergite in dorsal view 0.36; width of second gastral tergite at its midlength 0.38–0.40. Cross-ribs present at base of cinctus of second gastral tergite. Sides of second gastral tergite in dorsal view almost straight. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is equal to the maximum width of the segment. Disc of second gastral tergite finely microreticulate. First and second gastral tergites dorsally pubescent and with a number of very short standing setae that project just above the level of the pubescence. Full adult colour yellow.

The relatively long, low petiole node is characteristic of *bulawayensis*. In section 1 of the *abeillei* group the *bulawayensis* LPeI 67 is approached only by *angustata*, for which a maximum LPeI of 70 has been recorded. In all others the node in profile is much taller and shorter from front to back, with a combined range of LPeI 37–59. *H. angustata* is not likely to be confused with *bulawayensis*, as the former has shorter scapes, SI 71–79, and conspicuously has only four enlarged apical funicular segments, as opposed to SI 90 and five enlarging funicular segments in *bulawayensis*.



FIGURES 13–15. Lateral, full face and dorsal view of body. *Hypoponera bulawayensis* worker CASENT0192424.

In dorsal view the petiole node of *bulawayensis* has DPeI 110, very long in proportion to its width. This is approached only by *regis* (DPeI 100), *angustata* (DPeI 100–125) and *perparva* (DPeI 108–120). Of these, *regis* is easily separated by the characters in the key while the last two are smaller species (HW 0.35 or less) and as noted above the first has only four conspicuously enlarged apical funicular segments. Also, both these small species have scapes that are relatively markedly shorter, SI 71–80, as opposed to SI 90 in *bulawayensis*. Discounting these three species, the remainder of section 1 of the *abeillei* group shows a combined DPeI of 133–187, far exceeding *bulawayensis*. As frequently happened in the early taxonomy of Afrotropical *Hypoponera*, the name *bulawayensis* was originally associated with a species to which it is not actually related, in this case *ragusai*.

Only two specimens, from widely separated localities, are known. Both have exactly the same petiole measurements, SI, LPeI and DPeI. With the petiole node in profile the Tanzania specimen has its anterior and posterior faces slightly more convergent dorsally than in the holotype and its PrW is slightly greater, resulting in a slightly lower PeNI.

Material examined. **Zimbabwe**: Bulawayo (*G. Arnold*). **Tanzania**: Pwani Reg., Mlola For., Mafia I. (*Hawkes, Mlacha & Ninga*).

Hypoponera camerunensis (Santschi)
(Figs 16–18)

Ponera abeillei var. *cammerunensis* Santschi, 1914b: 321. Syntype worker, CAMEROUN: Victoria (*F. Silvestri*) (NHMB) [examined]. [Combination in *Ponera (Hypoponera)* and spelling justifiably emended to *camerunensis*: Santschi, 1938: 79. Combination in *Hypoponera* and raised to species: Taylor, 1967: 12.]

NOTE. In the original description of *camerunensis*, Santschi states that the petiole is as long as broad in dorsal view. This is incorrect as the petiole in the syntype is conspicuously broader than long and indeed is broader than long (*i.e.* DPeI>100) in almost all Afrotropical *Hypoponera*.

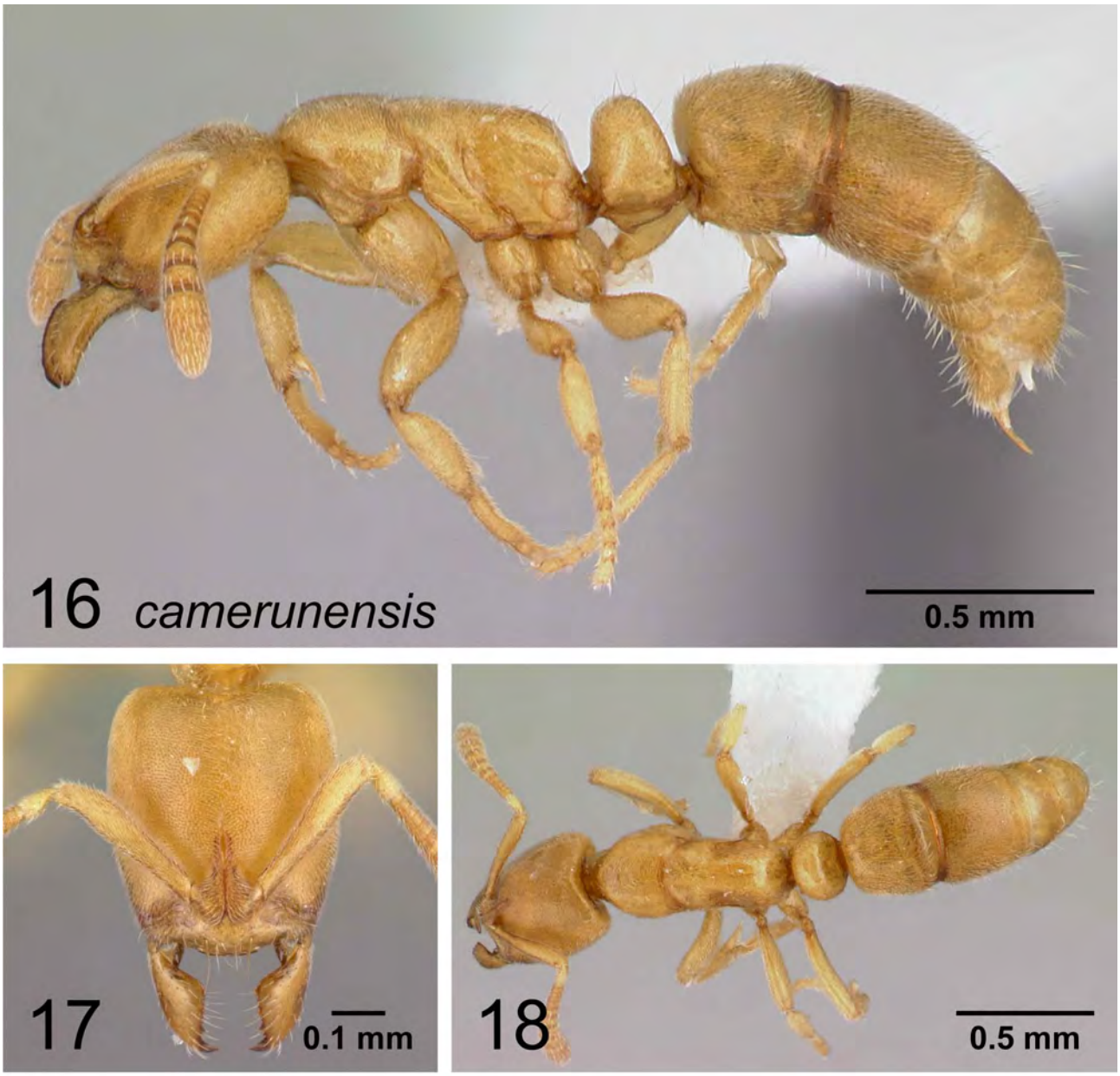
WORKER. *Measurements*: HL 0.51–0.57, HW 0.42–0.46, HS 0.470–0.530, SL 0.32–0.40, PrW 0.32–0.37, WL 0.68–0.76, HFL 0.32–0.41, PeNL 0.16–0.18, PeH 0.30–0.33, PeNW 0.23–0.28, PeS 0.227–0.260 (25 measured). *Indices*: CI 78–85, SI 75–91, PeNI 69–81, LPeI 48–56, DPeI 133–173.

Eyes absent. In full-face view apex of scape, when laid straight back from its insertion, fails to reach, or just touches, the midpoint of the posterior margin; SL/HL 0.63–0.72. Funiculus distinctly with 5 enlarging apical segments. Metanotal groove often entirely absent from dorsum of mesosoma but in some a remnant of its former path may be represented by a slight change of slope or vestigial indentation of the cuticle. Mesonotal-mesopleural suture absent from side of mesosoma. Propodeal declivity separated from sides by bluntly rounded curves or moderately defined blunt angles; never with an acute raised margin or a sharp carina. Posterior surface of petiole node without short cuticular ridges that radiate from just above the peduncle. Node of petiole in profile short-nodiform, the anterior and posterior faces converge dorsally so that length of node just above anterior tubercle is usually noticeably greater than length of dorsum; dorsal surface is almost flat to shallowly convex. Subpetiolar process in profile conspicuous; usually with a descending anterior face that terminates in a distinct ventral angle or broad tooth that is variably developed. Maximum width of first gastral tergite in dorsal view is noticeably less than width of second gastral tergite at its midlength. Sides of second gastral tergite shallowly convex in dorsal view. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is less than the maximum width of the segment. Cross-ribs at base of cinctus of second gastral tergite short, fine and densely crowded. Disc of second gastral tergite with densely crowded, small, superficial punctures so that the surface appears microreticulate at lower magnifications. First and second gastral tergites dorsally pubescent and with a number of short standing setae that project just above the level of the pubescence. Full adult colour yellow.

As in *coeca* there is sufficient variation among samples of *camerunensis* to imply that more than one sibling species may currently be hidden within this name. In some (including the syntype) the scape apex, when laid straight back in full-face view, fails to reach the midpoint of the posterior margin of the head by a noticable distance. In others it fractionally fails to reach the midpoint, while in most of the Ugandan specimens the scape apex just touches the midpoint. Coupled with this are differences in petiole shape and width (note in particular the large range of DPeI) and in the appearance and degree of development of the subpetiolar process. For the present all are

treated as constituting a single species, but more material and further analysis is certainly needed. In general appearance *camerunensis* is a larger version of the more widespread and common *coeca*, as indicated in the key. The similar scape and petiole variation in both demands a more detailed assessment in the future.

Material examined. **Cameroun**: Victoria (*Silvestri*); Korup N.P., Mundemba (*B.L. Fisher*); Prov. Sud-Ouest, Bimbia For., Limbe (*B.L. Fisher*). **Gabon**: Prov. Ogooue-Maritime, Res. Monts Doudou, nr Doussala (*B.L. Fisher*); Prov. Estuaire, Pointe Ngombe, Ekwata (*B.L. Fisher*). **Democratic Republic of Congo**: Epulu (*S.D. Torti*). **Uganda**: Bushenyi Distr., Kalinzu For. (*S. Yamane*).



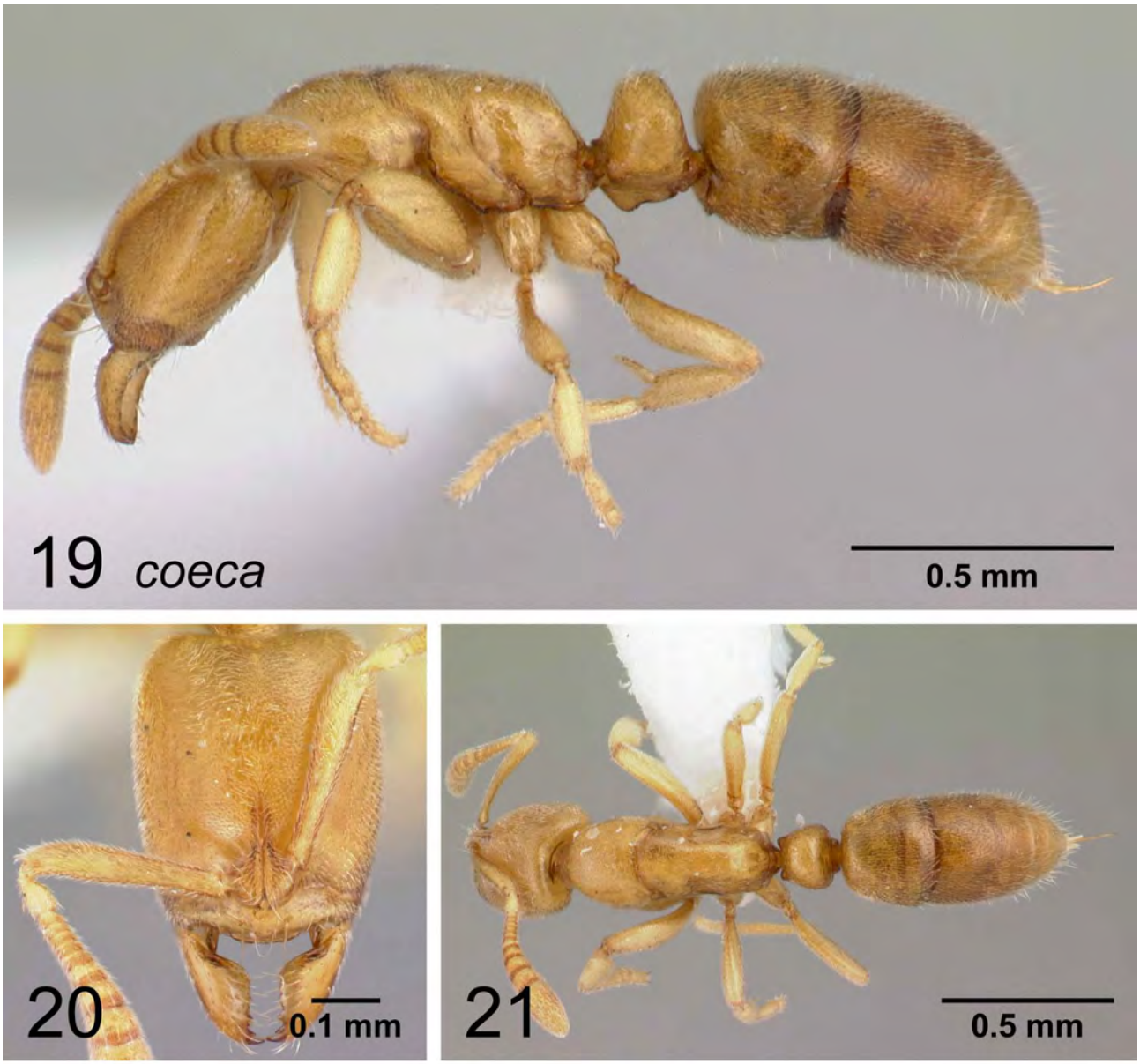
FIGURES 16–18. Lateral, full face and dorsal view of body. *Hypoponera camerunensis* worker CASENT0217335.

Hypoponera coeca (Santschi)
(Figs 19–21)

Ponera coeca Santschi, 1914b: 322, fig. 9. Syntype worker and queen, CAMEROUN: Victoria (*F. Silvestri*) (NHMB) [not seen, presumed lost]. [Combination in *Ponera (Hypoponera)*: Santschi, 1938: 79; in *Hypoponera*: Bolton, 1995: 213.] (See note.)

Ponera myrmicariae Wasmann, 1918: 144. Syntype workers, CAMEROUN: Kamerunburg, Soppo, 730 m., xii.1912, "bei *Myrmicaria eumenoides*" (*von Rothkirch*) (NHMM) [examined]. **Syn. n.** [Combination in *Ponera (Hypoponera*): Santschi, 1938: 79; in *Hypoponera*: Bolton, 1995: 215.]

NOTE. Neither of the original syntypes seems to have survived. A pair of specimens in NHMB, one queen and one headless worker, identified as *coeca* by Santschi and possessing red "type" rectangles, are mislabelled as they are from Guinea: Camayenne (*Silvestri*) and hence are not part of the type-series. The worker body is very small and resembles *inaudax*. In the original description Santschi (1914b) compares *coeca* with *gleadowi* and *ergatandria*. The first of these is now a junior synonym of *ragusai* and the second a junior synonym of *punctatissima*. Both of these species always have small but conspicuous eyes and a strongly developed metanotal groove across the dorsal mesosoma; they are not closely related to *coeca* which, in Santschi's own description, is referred to as "aveugle" and with the metanotal groove "presque effacée." Santschi's original description and drawings of *coeca* match a species that is common and widespread in west and central Africa, and is conspecific with the syntypes of Wasmann's *myrmicariae*.



FIGURES 19–21. Lateral, full face and dorsal view of body. *Hypoponera coeca* worker CASENT0012681.

WORKER. *Measurements*: HL 0.47–0.52, HW 0.37–0.42, HS 0.415–0.465, SL 0.30–0.35, PrW 0.26–0.32, WL 0.61–0.70, HFL 0.29–0.35, PeNL 0.13–0.17, PeH 0.25–0.31, PeNW 0.18–0.22, PeS 0.187–0.233 (75 measured). *Indices*: CI 77–84, SI 80–89, PeNI 63–77, LPeI 50–57, DPeI 125–150.

Eyes usually absent, extremely rarely a tiny eye-spot present (see below). In full-face view apex of scape, when laid straight back from its insertion, fails to reach the midpoint of the posterior margin; SL/HL 0.65–0.71. Funiculus distinctly with 5 enlarging apical segments. Metanotal groove usually entirely absent from dorsum of mesosoma but in some a vestige of its former path may be visible. Mesonotal-mesopleural suture absent from side of mesosoma or at most represented by an almost effaced faint line. Propodeal declivity separated from sides by bluntly rounded curves or blunt angles; without an acute raised sharp carina. Posterior surface of petiole node without short cuticular ridges that radiate from just above the peduncle. Node of petiole in profile short-nodiform, the anterior and posterior faces converge dorsally, usually obviously so; length of node just above anterior tubercle is noticeably greater than length of dorsum. Subpetiolar process conspicuously present in profile, somewhat variable in shape but always with a descending anterior face that terminates in a distinct ventral angle. Behind the angle the outline may slope evenly upwards posteriorly, but more usually there is a short, more steeply ascending portion of the margin immediately behind the angle; intermediate forms are known. Maximum width of first gastral tergite in dorsal view is noticeably less than width of second gastral tergite at its midlength. Sides of second gastral tergite shallowly convex in dorsal view. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is less than the maximum width of the segment. Cross-ribs at base of cinctus are short and crowded, but conspicuous. Disc of second gastral tergite with densely crowded, small, superficial punctures so that the surface appears microreticulate at lower magnifications. First and second gastral tergites dorsally pubescent and with a number of short standing setae that project just above the level of the pubescence. Full adult colour yellow.

As with its very close relatives *camerunensis* and *inaudax*, the present concept of *coeca* may conceal more than one real species, but these currently defy analysis. Different samples show subtle variations in the shape and size of the petiole node. Some have the node slightly longer, higher or broader than others, some have the petiole dorsum more broadly convex than in others, some have the anterior and posterior surfaces more obviously convergent dorsally than in others and there is variation in the shape of the ventral process. In addition, although the vast majority of specimens completely lack eyes, extremely rarely a tiny eye-spot is discernible that at its greatest development is a single ommatidium, small and only partially pigmented. They are best developed in a short series in CASC from Gabon (Res. Monts Doudou, 19.iii.2000, numbers 2250, 2256 and 2258). Because they otherwise fit the above description, they have been retained within *coeca* for the time being.

Within the limits of the description above, *coeca* is a small, yellow species that is very widespread and quite common in samples of leaf litter and rotten wood across wide areas of sub-Saharan Africa.

Material examined. **Guinea**: Nimba (*Lamotte*). **Ivory Coast**: Tai For. (*V. Mahnert*); Nzi Noua (*W.L. Brown*); Iringou (*F. Krell*); Abidjan, Banco For. Res. *(I. Löbl*); Banco Nat. Pk (*I. Löbl*); Banco (*Delamare*); Man (*Mahnert & Perret*); Agboville, Yapo For., nr Yapo-Gare (*I. Löbl*); Sassandra, Monogaga (*I. Löbl*). **Ghana**: Bobiri (*R. Belshaw*); Poano (*R. Belshaw*); Esunkawkaw (*R. Belshaw*); Sagymasi (*R. Belshaw*); Atewa For. Res., Kibi (*R. Belshaw*); Mt Atewa (*D. Leston*); Tafo (*R. Belshaw*); Tafo (*D. Leston*); Mampong (*P. Room*); Legon (*D. Leston*). **Togo**: Palimé, Klouto For. (*Vit*). **Nigeria**: Gambari (*B. Bolton*). **Cameroun**: Mbalmayo (*N. Stork*); Nkoemvon (*D. Jackson*); Korup (*D. Jackson*); Korup N.P., Mundemba (*B.L. Fisher*); Mvini (*A. Dejean*); Yaoundé (*A. Dejean*); Prov. Sud, P.N. Campo (*B.L. Fisher*); Res. de Faune de Campo, Ebodjé (*B.L. Fisher*); Res. Campo, Massif des Mamelles (*B.L. Fisher*); N'Kolo, Bondé For., Elogbatindi (*B.L. Fisher*); Prov. Sud-Ouest, Bimbia For., Limbe (*B.L. Fisher*); Mtn Cameroon, Mapanja (*B.L. Fisher*); Kamerunberg, Soppo (*von Rothkirch*). **Gabon**: Makokou (*I. Lieberburg*); Prov. Woleu-Ntem, Minvoul (*B.L. Fisher*); Prov. Ogooue-Maritime, Res. Monts Doudou, nr Doussala (*B.L. Fisher*); Res. Moukalaba, nr Doussala (*B.L. Fisher*); F.C. Mondah (*B.L. Fisher*). **Central African Republic**: Dzanga-Ndoki, Mabéa Bai (*B.L. Fisher*); Dzanga Ndoki, Lidjombo (*B.L. Fisher*); Res. Dzanga-Sangha, Bayanga (*B.L. Fisher*). **Congo**: Res. de Tchimpounga, Pointe Noire surr. Lac Foni (*Bartolozzi & Bambi*). **Uganda**: Bushenyi Dist., Kalinzu For. (*S. Yamane*). **Kenya**: Western Prov., Kakamega For., Lugari (*S. Maurer*); Kakamega For., Isecheno (*R.R. Snelling*); Isecheno, Nat. Res. (*R.R. Snelling*); Isecheno For. Res., Kalunya Glade (*R.R. Snelling*); Malindi (*Pardi & Ugolini*). **Tanzania**: Tanga Reg., Kilindi For. Res. (*Hawkes, Makwati & Mtana*); Morogoro Reg., Mkungwe For. Res. (*Hawkes, Bhoke & Richard*); Pwani Reg., Kichi Hills For. Res. (*Hawkes, Mlacha & Ninga*). **Angola**: Gabela (*P.M. Hammond*). **South Africa**: Gauteng Prov., Ezemvelo Nat. Res. (*Hawkes & Clark*).

Hypoponera comis Bolton & Fisher **sp. n.**
(Figs 22–24)

WORKER (holotype in parentheses). *Measurements*: HL 0.61–0.65 (0.64), HW 0.48–0.50 (0.50), HS 0.545–0.570 (0.570), SL 0.44–0.47 (0.46), PrW 0.38–0.40 (0.40), WL 0.80–0.88 (0.86), HFL 0.42–0.46 (0.46), PeNL 0.16–0.17 (0.16), PeH 0.39–0.41 (0.40), PeNW 0.29–0.32 (0.32), PeS 0.280–0.270 (0.297) (8 measured). *Indices*: CI 75–79 (78), SI 92–96 (92), PeNI 75–82 (80), LPeI 39–44 (40), DPeI 185–200 (200).

FIGURES 22–24. Lateral, full face and dorsal view of body. *Hypoponera comis* holotype worker CASENT0192386.

Small eyes present but sometimes difficult to see against the black colour of the side of the head; usually of 1–2 ommatidia but up to 4 may be present. In full-face view apex of scape, when laid straight back from its insertion, just fails to reach the midpoint of the posterior margin; SL/HL 0.70–0.75. Cephalic dorsum finely but distinctly reticulate-punctate. Pronotal dorsum almost smooth, with spaced, minute, superficial punctures, obviously much less strongly and densely sculptured than cephalic dorsum. Latroventral surfaces of head with spaced minute punctures. Metanotal groove absent to vestigially present on dorsum of mesosoma. Mesonotal-mesopleural suture absent to vestigially marked on side of mesosoma. Propodeum distinctly marginate between declivity and side. Posterior surface of petiole node without short cuticular ridges that radiate upward from the peduncle. Node of petiole in profile tall and slender, the anterior and posterior faces distinctly convergent dorsally so that the node is much broader just above the tubercle than at its apex, the dorsum narrowly convex. Subpetiolar process with an obtuse ventral angle. Petiole node in dorsal view short from front to back and very broad. Maximum width of first gastral tergite in dorsal view distinctly greater than the width of the second gastral tergite at its midlength. Base of cinctus of second gastral tergite glossy and polished, without trace of cross-ribs. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is about equal to or slightly less than the width of the segment at its midlength. Disc of second gastral tergite with sharply incised, small punctures that are separated by areas of glossy cuticle; the diameters of the punctures are distinctly less than the distances separating them. First and second gastral tergites dorsally pubescent and with a number of short, standing setae that conspicuously project above the level of the pubescence in profile. Full adult colour of head and mesosoma blackish brown to black, the petiole and gaster usually slightly lighter than the head.

Holotype worker, **Tanzania**: Iringa Region, Ndundulu Forest Reserve, 1567 m., 23-26.x.2007, CEPF-TZ-8.2-F21, 7.78912S, 36.48539E, AFRC-TZ-03, primary forest, leaf litter, Winkler (*P. Hawkes, M. Bhoke, U. Richard*) (SAMC).
Paratypes. 11 workers and 1 dealate queen, with same data as holotype (SAMC, CASC, AFRC, BBRC).

Closely related to *importuna* and with a similar, relatively very broad petiole in dorsal view. In addition to the differences in colour and petiole shape and size noted in the key, *importuna* is larger than *comis*, with HW 0.52–0.58, HS 0.590–0.650, SL 0.48–0.52, PrW 0.42–0.46. See also the notes under *occidentalis*.

Hypoponera defessa Bolton & Fisher **sp. n.**
(Figs 25–27)

WORKER (holotype in parentheses). *Measurements*: HL 0.57–0.61 (0.58), HW 0.43–0.46 (0.45), HS 0.500–0.530 (0.515), SL 0.39–0.41 (0.40), PrW 0.32–0.35 (0.32), WL 0.74–0.80 (0.76), HFL 0.40–0.43 (0.42), PeNL 0.16–0.19 (0.17), PeH 0.34–0.37 (0.36), PeNW 0.23–0.26 (0.24), PeS 0.243–0.270 (0.257) (11 measured). *Indices*: CI 74–78 (78), SI 87–93 (89), PeNI 70–76 (75), LPeI 46–53 (47), DPeI 134–150 (141).

Eyes absent. Median portion of clypeus evenly convex from side to side, without a raised median longitudinal ridge or crest except posteriorly, between the extreme anterior portions of the frontal lobes. Apex of scape, when laid straight back from its insertion, distinctly fails to reach the midpoint of the posterior margin in full-face view; SL/HL 0.65–0.70. Reticulate-punctate sculpture on cephalic dorsum fine and dense, the punctures crowded, small, and sharply defined. Lateroventral areas of head distinctly punctate, the individual punctures sharply incised but much more widely spaced than on the dorsum. Punctate sculpture on disc of pronotum very weak, much less strongly defined, more sparse and more widely spaced than on cephalic dorsum. Metanotal groove entirely absent from dorsum of mesosoma. Sides of propodeal declivity bluntly angular, not carinate. Petiole node in dorsal view thickly D-shaped, with a strongly convex anterior face that is continuous with the sides, the anterior and lateral faces form a single continuous convexity. Petiole node in profile thickly columnar, with parallel sides from just above tubercle to apex; dorsum shallowly convex. Posterior surface of petiole node without radiating cuticular ribs above the peduncle. Subpetiolar process with a curved and obliquely descending anterior face, a ventral angle that may be sharp or blunt and a short, ascending posterior surface. Base of cinctus of second gastral tergite densely cross-ribbed. Disc of second gastral tergite microreticulate to superficially reticulate-punctate; without sharply incised widely separated punctures. Maximum width of first gastral tergite in dorsal view is subequal to the width of the second tergite at its midlength. Midline length of second gastral posttergite, from posterior margin of cinctus

to apex, is about the same as the maximum width of the segment. Suberect to erect setae on dorsum of first gastral tergite sparse and short, only about half the length of the setae on the posterodorsal margin of the node. Full adult colour light brown, the appendages lighter.

FIGURES 25–27. Lateral, full face and dorsal view of body. *Hypoponera defessa* worker CASENT0226566.

Holotype worker (upper specimen of two on pin), **Ghana**: Poano, ix.1992 (*R. Belshaw*) (BMNH).
Paratypes. 3 workers with same data as holotype, one mounted below holotype (BMNH).

A fairly widespread but apparently uncommon species. Each of the samples noted below consists of only one or a few specimens. *H. defessa* is closely related to two other species; the widespread *fatiga* and the Ivory Coast and Ghana species *lassa*. All three are small (HW 0.36–0.46), eyeless, brownish-yellow to brown species in which the metanotal groove is absent, the cinctus of the second gastral tergite has cross-ribs and the disc of the second gastral

tergite is superficially reticulate-punctate to microreticulate. *H. defessa* is distinguished from both *fatiga* and *lassa* by its lack of a raised median longitudinal clypeal ridge, which is conspicuous in the last two named. In addition, the petiole node in *defessa* is columnar in profile and relatively stout (LPeI 46–53), is D-shaped in dorsal view and is longer relative to its width (DPeI 134–150). In *fatiga* and *lassa* the correponding indices combined are LPeI 37–44 and DPeI 155–180. In the order *lassa – defessa – fatiga* the three species show a morphoclinal reduction in the density and intensity of the punctate sculpture of the lateroventral surfaces of the head. In *lassa* the sculpture is nearly reticulate-punctate, with the individual punctures sharply defined and closely packed, the distances between the punctures generally less than the puncture diameters; in *defessa* the punctures are still sharply defined but more widely spaced, the distances between the punctures equal to or greater than the puncture diameters; in *fatiga* the punctures are widely spaced, minute, feeble and superficial. The ratio SL/HL shows a combined range of 0.65–0.71 in *defessa* and *lassa*, but tends to average somewhat lower in *fatiga*, 0.60–0.67.

A single specimen from Togo (MHNG, data below) is somewhat at variance with the description just given. Most of its dimensions and indices fall easily within the range given, but its HW 0.54 and SL 0.42 are slightly too high. Coupled with this, the anterior and posterior faces of its petiole node in profile are weakly convergent dorsally. It is suspected that this specimen may represent an intercaste rather than a sibling species, but this cannot be proved at present.

H. defessa should not be confused with the common, yellow, *coeca* as the latter has a median clypeal crest, has dorsally convergent anterior and posterior faces to the petiole node in profile, tends to be smaller (HL 0.47–0.52, HS 0.415–0.465, SL 0.30–0.35, PeH 0.25–0.31, PeS 0.187–0.233), with slightly broader head and shorter scape (CI 77–84, SI 80–89) and has the punctulate sculpture of the lateroventral areas of the head very sparse, superficial and faint.

Non-paratypic material examined. **Ivory Coast**: Tai Forest (*J. Piart*); Tai Forest (*Mahnert & Perret*); Man (*Mahnert & Perret*); Zaidon (*I. Löbl*). **Ghana**: Asiakwa (*R. Belshaw*). **Togo**: Palimé, Klouto For. (*Vit*). **Cameroun**: Prov. Sud, P.N. Campo, Campo (*B.L. Fisher*); Prov Sud, Res. Campo, Massif des Mamelles (*B.L. Fisher*); Prov. Sud, N'Kolo, Bondé For., Elogbatindi (*B.L. Fisher*). **Gabon**: Prov. Estuaire, F.C. Mondah, Libreville (*B.L. Fisher*).

Hypoponera dema Bolton & Fisher **sp. n.**
(Figs 28–30)

WORKER (holotype in parentheses). *Measurements*: HL 0.78–0.84 (0.83), HW 0.64–0.68 (0.65), HS 0.715–0.760 (0.740), SL 0.55–0.61 (0.59), PrW 0.52–0.54 (0.53), WL 1.08–1.18 (1.14), HFL 0.60–0.68 (0.62), PeNL 0.26–0.29 (0.27), PeH 0.58–0.60 (0.58), PeNW 0.43–0.48 (0.46), PeS 0.423–0.450 (0.437) (9 measured). *Indices*: CI 78–83 (78), SI 86–92 (91), PeNI 82–89 (87), LPeI 43–48 (47), DPeI 154–185 (170).

With head in full-face view midpoint of anterior clypeal margin with sharp denticle; in profile this is seen as the apex of a raised, low but sharp cuticular longitudinal ridge. Eyes absent or present; if the latter, the eye small and poorly defined. Apex of scape, when laid straight back from its insertion, just fails to touch or just touches the midpoint of the posterior margin in full-face view; SL/HL 0.71–0.76. Cephalic dorsum densely reticulate-punctate. Lateroventral areas of head with sharply incised spaced punctures. Pronotal dorsum obviously much less strongly and densely sculptured than the cephalic dorsum. Side of pronotum, especially on curve between side and dorsum, more strongly sculptured, the puncturation on the curve slightly less dense than that seen on the head. Metanotal groove absent from dorsum of mesosoma or with a vestigial trace. Propodeum distinctly sharply marginate between declivity and side. Petiole in profile stout, its anterior face often feebly concave, so that the node increases slightly in length towards the dorsum; dorsal surface rounded. Posterior surface of petiole node without cuticular ridges that radiate upward from the peduncle. Subpetiolar process with a ventral angle. In dorsal view petiole node stout and broad, with posterior face transverse and anterior face convex. Maximum width of first gastral tergite in dorsal view distinctly greater than width of second gastral tergite at its midlength. Cross-ribs at base of cinctus of second gastral tergite conspicuous. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, slightly less than the width of the segment at its midlength. Disc of second gastral tergite with sharply incised, small punctures that are separated by areas of glossy cuticle; the diameters of the punctures are equal to, or slightly less than, the distances that separate the punctures. First gastral tergite dorsally pubescent and with numerous conspicuous, standing setae that are clearly much longer and more erect than the pubescence.

FIGURES 28–30. Lateral, full face and dorsal view of body. *Hypoponera dema* paratype worker CASENT0226546.

Holotype worker (top specimen of three on pin), **Rwanda**: Rangiro, ix.1976 (*P. Werner*) (MHNG).
Paratypes. 20 workers with same data as holotype; 6 workers and 1 dealate queen **Rwanda**: Rangiro, 1800 m., 10.vii.1973 (*P. Werner*) (MHNG, BMNH, CASC, BBRC)

In the Afrotropical fauna four other species, *molesta*, *segnis*, *tristis* and *venusta* share the following set of characters with *dema*: metanotal groove absent; posterior surface of petiole node without cuticular ridges; cinctus of second gastral tergite with cross-ribs at base; maximum width of first gastral tergite at least equal to, and usually greater than, width of second tergite at its midlength; disc of second gastral tergite with sharply defined, distinctly separated punctures.

The smallest species in this complex are *molesta* and *venusta*, with HW 0.40–0.48, SL 0.32–0.43; the others together have HW 0.54–0.68, SL 0.46–0.61. *H. molesta* has a much broader petiole node (PeNI 89–94) than *venusta* (PeNI 76–82). In fact, *molesta* has the broadest node in the complex relative to its pronotal width, being approached only by some workers of *dema* (PeNI 82–89), but the latter is a much larger species (HW 0.64–0.68, SL 0.55–0.61) and has a sharp denticle at the midpoint of the anterior clypeal margin. The three species just mentioned all have very conspicuous standing setae on the dorsum of the first gastral tergite. These setae are quite

numerous and distinct from the underlying pubescence, the setae being obviously longer and more erect. *H. segnis* and *tristis* lack these conspicuous setae. In size they are larger than *molesta* and *venusta*, having a combined HW 0.54–0.60, but are smaller than *dema* (HW 0.64–0.68). The petiole node is shorter in profile in *segnis* (LPeI 32–43) than in *tristis* (LPeI 46–49) and in dorsal view the node is distinctly shorter in relation to its width in *segnis* (DPeI 180–220) than in *tristis* (DPeI 154–170).

Non-paratypic material examined. **Rwanda**: Kayove (*P. Werner*). **Uganda**: Kibale For. Res. (*M.R. Orr*).

Hypoponera dis Bolton & Fisher **sp. n.**
(Figs 31–33)

WORKER (holotype in parentheses). *Measurements*: HL 0.50–0.52 (0.51), HW 0.38–0.40 (0.39), HS 0.440–0.460 (0.450), SL 0.33–0.35 (0.34), PrW 0.29–0.30 (0.29), WL 0.64–0.68 (0.65), HFL 0.32–0.34 (0.33), PeNL 0.15–0.16 (0.15), PeH 0.30–0.32 (0.30), PeNW 0.23–0.24 (0.23), PeS 0.227–0.237 (0.227) (8 measured). *Indices*: CI 75–78 (76), SI 83–88 (87), PeNI 77–81 (79), LPeI 47–53 (50), DPeI 145–160 (153).

FIGURES 31–33. Lateral, full face and dorsal view of body. *Hypoponera dis* holotype worker CASENT0192394.

Eyes absent. Apex of scape, when laid straight back from its insertion, distinctly fails to reach the midpoint of the posterior margin in full-face view; SL/HL 0.65–0.67. Cephalic dorsum finely but distinctly reticulate-punctate. Pronotal dorsum almost smooth, with spaced minute, superficial punctures; obviously much less strongly and densely sculptured than cephalic dorsum. Latroventral surfaces of head with spaced minute punctures. Metanotal groove absent on dorsum of mesosoma. Mesonotal-mesopleural suture absent on side of mesosoma. Propodeum angulate between declivity and side. Posterior surface of petiole node without short cuticular ridges that radiate upward from the peduncle. Node of petiole in profile with the anterior and posterior faces somewhat convergent dorsally so that the node is broader just above the tubercle than at its apex. Subpetiolar process with an obtuse ventral angle. Maximum width of first gastral tergite in dorsal view distinctly greater than the width of the second gastral tergite at its midlength. Base of cinctus of second gastral tergite glossy and polished, without trace of cross-ribs. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is greater than the width of the segment at its midlength. Disc of second gastral tergite with superficial small punctures. First and second gastral tergites dorsally pubescent and with a number of short standing setae that project above the level of the pubescence in profile. Full adult colour light to medium brown.

Holotype worker, **Tanzania**: Pwani Region, Mlolo Forest, Mafia Island, 20 m., 9-13.iii.2008, CEPF-TZ-18.2-F08, 7.89576S, 39.82842E, AFRC-TZ-02, primary forest leaf litter, Winkler (*P. Hawkes, Y. Mlacha, F. Ninga*) (SAMC). Paratypes. 9 workers with same data as holotype; 1 worker with same data but CEPF-TZ-18.2-F71 (SAMC, CASC, AFRC, BBRC).

H. dis resembles *aprora* in most respects, but differs strikingly because the latter lacks the prora on the first gastral sternite, a structure that is obviously present in *dis* (as well as in all other known Afrotropical species). In addition, *aprora* is darker brown and has the anterior and posterior faces of the petiole node less convergent dorsally when viewed in profile. Petiolar indices are also different, compare *aprora* PeNI 84–87, DPeI 163–173, with the indices for *dis*, above.

An isolated worker from Tanzania (AFRC, details below) is darker in colour than the type-series of *dis*, and some of its dimensions and indices (HW 0.42, PrW 0.32, WL 0.72, CI 81, SI 81) are very slightly outside the range of *dis*, while others are within it. As only a single specimen is known, and its resemblance to *dis* is so striking, it is retained in that species for the present.

Non-paratypic material examined. **Tanzania**: Tanga Region, Nilo Forest Reserve (*Hawkes, Makwati & Mtana*).

Hypoponera dulcis (Forel)
(Figs 34–36)

Ponera dulcis Forel, 1907a: 2. Holotype worker, TANZANIA: Arusha-chini (*Katona*) (not in MHNG, presumed lost.) [Combination in *Hypoponera*: Bolton, 1995: 214.] (See note 1.)

Ponera dulcis var. *uncta* Santschi, 1914c: 7. Holotype worker, SOUTH AFRICA: Zululand, Dukudu, dans la mousse, 27.vii.05 (*I. Trågärdh*) (not in NHMB, presumed lost). **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 216.] (See note 2.)

Ponera rothkirchi Wasmann, 1918: 145. Holotype worker, CAMEROUN: Kamerunburg, Soppo, 730 m., xii.1912 (*von Rothkirch*) (NHMM) [not examined directly]. **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 216.] (See note 3.)

Ponera lotti Weber, 1942: 45, fig. 5. Syntype workers, SUDAN: Imatong Mts, Equatoria, Lotti Forest, 24.vii. - 5.viii.1939, nos. 1442, 1448 (*N.A. Weber*) (MCZC) [examined]. **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 215.]

Ponera muscicola Weber, 1942: 45, fig. 13. Holotype queen, SUDAN: Imatong Mts, 25.vii.1939, 7200 ft, no. 1313, in wet moss in cavity of a tree (*N.A. Weber*) (not in MCZC, presumed lost). **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 215.] (See note 4.)

Ponera lamottei Bernard, 1953: 204, fig. 3B. Syntype workers, GUINEA: Nion, 700 m., 15.iv., st. 22 (*Lamotte*) (MNHN) [examined]. **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 215.]

Ponera mandibularis Bernard, 1953: 205, fig. 3F. LECTOTYPE worker (teneral) (by present designation), GUINEA: Nimba (*Lamotte*) (MNHN) [examined]. **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 215.] (See note 5.)

Ponera (Hypoponera) villiersi Bernard, 1953: 206, fig. 3G. Holotype worker (teneral), GUINEA: N.-E. du Nimba, mousses de la forêt (*Villiers*) (MNHN) [examined]. **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 216.] (See note 6.)

NOTES.

1 Dr Bernhard Merz (MHNG) informs us that the holotype of *dulcis* is missing from the Forel collection. He

says that there are three empty pin-holes in the Forel collection under this name, one of which was presumably the holotype. Fortunately three specimens so identified by Forel remain; they are conspecific and indicate exactly what Forel regarded as *dulcis*: one worker each from South Africa (Durban), Zimbabwe (Bulawayo) and Eritrea (Nefasit). Designation of a neotype was considered but rejected because there is a chance that the holotype may eventually be found and there is no doubt about what Forel considered the species to be.

2 The holotype of *uncta* is missing from the NHMB collection. However, Santschi does not cite any characters that would isolate *uncta* or separate it from *dulcis*. The dentition he describes is extremely common in *dulcis* but not elsewhere and his description is an adequate match with Forel's South Africa specimen. Together, this information seems sufficient to place var. *uncta* safely in synonymy here.

3 Dr Paul Beuk (NHMM) kindly sent several photographs of the holotype of *rothkirchi* and answered a series of questions concerning details of its morphology, confirming the synonymy of this name under *dulcis*. The synonymy was previously suspected from Wasmann's original description and the sketches of the holotype made later by Santschi (1926: 208, fig. 1A,B). In Santschi's drawing of the head in full-face view, fig. 1A, small eyes are indicated, but these are omitted from the profile view that is his fig. 1B. In view of their presence in fig. 1A, and of Wasmann's statement that the holotype has "sehr deutliche kleine Augenpunkte", confirmed by Dr Beuk's photographs, it seems reasonable to assume that Santschi's omission of eyes from his fig. 1B was an oversight.

4 We are informed by Stefan Cover that although the holotype of *muscicola* is registered as present in MCZC the specimen is missing from the collection and cannot be found. However, Weber's description, and his drawing of the petiole, make it reasonably certain that the specimen was a queen of *dulcis*.

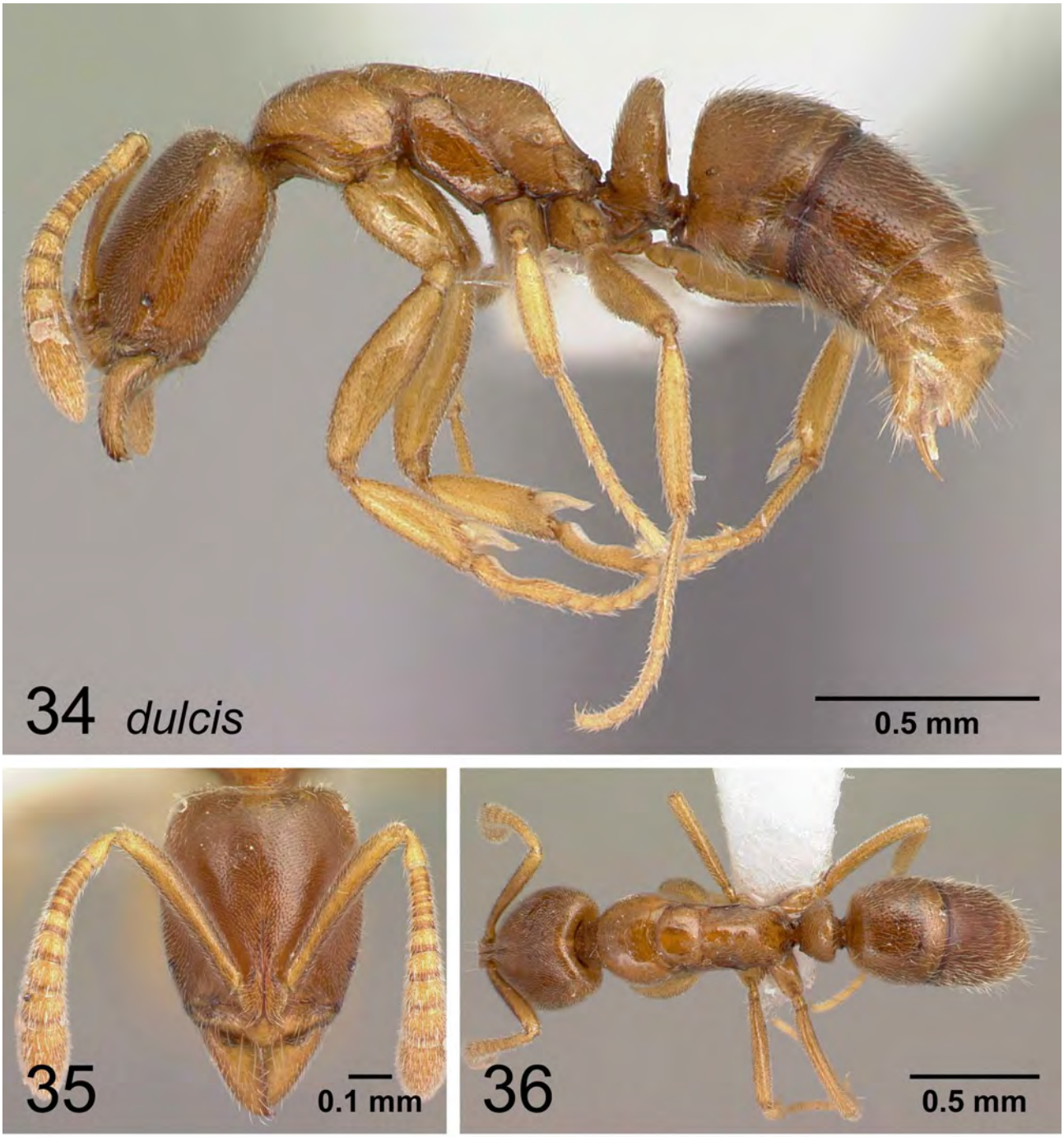
5 Bernard's original syntype series for *mandibularis* included one worker and one queen from Guinea: Nimba (*Lamotte*) as "types", and one worker and one queen from Ivory Coast: Banco (worker) and La Bé (queen) (*Delamare*) as "cotypes". The two Nimba specimens are mounted on a single card rectangle. The queen has no head, is mounted upside-down and lacks most of its legs. However, the petiole node is clear of the substrate and visible; the specimen is certainly a queen of *coeca* or *inaudax* and is certainly a different species from the worker mounted on the same card, which is a teneral of *dulcis*. Of the two Ivory Coast specimens one, labelled Banco, 8.8.45, appears to be a queen of *coeca*; the other, a worker from La Bé, was not found. Note that Bernard (1953: 205) states that the queen is from La Bé and the worker from Banco, the opposite of the data on the available label. The Nimba worker specimen is here designated as lectotype as that is the one actually described by Bernard; only the length of the queen is given, without further information. All specimens except the lectotype are hereby excluded from the type-series.

6 The head of the *villiersi* holotype has been lost and much of the mesosoma, petiole and gastral base are coated with glue. However, what remains is very obviously a teneral worker of *dulcis*. Bernard (1953: 201) runs *villiersi* out in his key under the section in which the metanotal groove is absent; it is present but obscured by glue.

WORKER. *Measurements*: HL 0.54–0.63, HW 0.44–0.52, HS 0.490–0.570, SL 0.41–0.48, PrW 0.33–0.39, WL 0.73–0.84, HFL 0.44–0.54, PeNL 0.11–0.14, PeH 0.34–0.39, PeNW 0.23–0.28, PeS 0.227–0.267 (60 measured). *Indices*: CI 77–84, SI 92–102, PeNI 60–76, LPeI 32–39, DPeI 180–218.

Eyes present, black, small but distinct (always very conspicuous in specimens in alcohol), of 2–6 small ommatidia that are variable in size. The individual ommatidia are sometimes poorly defined or even partially fused; occasionally when several ommatidia are present one may be decidedly larger than the rest. Mandible most commonly with three relatively large teeth distally that are followed proximally by a variable number of smaller teeth or denticles that are all of approximately the same size, giving the margin a roughly serrate appearance. In some, one or two teeth in the serrate row may be somewhat enlarged. Scapes relatively long, SI 92–102; apex of scape, when laid straight back from its insertion in full-face view, varies from just failing to reach to slightly exceeding the midpoint of the posterior margin; SL/HL 0.74–0.83. Reticulate-punctate sculpture on cephalic dorsum very fine, frequently superficial but denser than on the dorsal pronotum, which is almost smooth with only very widely spaced minute superficial punctulae present. Mesonotal-mesopleural suture distinct on side of mesosoma. Metanotal groove conspicuous across dorsum of mesosoma, distinctly incised; mesonotum with a well-defined posterior margin. Mesopleuron mostly to entirely smooth and shining, unsculptured except for a few scattered minute pits. With propodeum in profile the length of the dorsum may vary from slightly to distinctly shorter than the full depth of the declivity. Petiole squamiform; node in profile tall and narrow, with the anterior and posterior faces converging dorsally to a short and narrowly rounded dorsum. Subpetiolar process in profile distinct but blunt, without acute or

sharply developed angles anteriorly or posteriorly. In dorsal view the petiole node much broader than long (DPeI 180 or more), the dorsal surface very short from front to back. Maximum width of first gastral tergite in dorsal view sometimes slightly greater than width of the second tergite at its midlength, but often the two are about equal. Base of cinctus of second gastral tergite smooth and shining in dorsal view, without cross-ribs. Posttergite of second gastral segment, from posterior margin of cinctus to apex, broader than long. First gastral tergite pubescent and dorsally with standing setae that vary from absent to conspicuous (see discussion below). Full adult colour varies from dull yellow to dark brown; most common shades are light brown to medium brown.



FIGURES 34–36. Lateral, full face and dorsal view of body. *Hypoponera dulcis* worker CASENT0226572.

This is one of the most widely distributed and most abundant *Hypoponera* species throughout sub-Saharan Africa. It may be extremely numerous in leaf litter samples. For instance, in Belshaw & Bolton (1994), *dulcis* (recorded as *H*.sp.2) accounted for more than three times the number of all the other Ghanaian *Hypoponera* species

combined. On its own *dulcis* represented an incredible 51% of all the Ponerini retrieved and comprised 4.2% of all the ants collected in the survey. This preponderance is also reflected in B. L. Fisher's collections in Cameroun, Gabon and the Central African Republic (unpublished data).

As defined above, *dulcis* is perhaps the most easily recognised of all the Afrotropical *Hypoponera*. In brief, any specimen that combines the characters of eyes small but distinctly present, scapes relatively long, mesonotal-mesopleural suture (in profile) and metanotal groove (in dorsal view) both present, petiole scale-like, mesopleuron unsculptured and cinctus of second gastral tergite smooth at its base, is *dulcis*. However, there is some variation in the material examined that may suggest the presence of a second species within this group. In some darkly coloured specimens from Cameroun and Gabon (in BMNH and CASC), the mesonotum in profile is distinctly convex, whereas in all other material it is more or less flat. The degree of convexity varies and is sometimes difficult to assess as specimens in which the pronotum is fully flexed down with respect to the mesonotum appear more convex than those in which the two sclerites are aligned, because more of the curved anterior articulatory surface of the mesonotum is exposed. Coupled with this, the dorsum of the first gastral tergite in these workers where the mesonotum is more convex has conspicuous setae, whereas in the vast majority of specimens the setae on the first tergite are sparse and minute, and sometimes appear to be absent. The state in which the setae are reduced or absent applies to all queens examined, apparently regardless of the condition exhibited by their workers. None of the names included in the synonymic synopsis above, and none of Forel's surviving specimens of *dulcis*, show either of the variations just discussed. It would perhaps be justifiable to nominate the variant forms as a separate species, but intermediates would, it is suspected, render the separation untenable. The resolution of this problem is beyond the scope of this contribution and must await individual analysis.

Variation in full adult colour seems insignificant as all intermediate shades between the lightest (dull yellow) and the darkest (dark brown) occur. No worker-queen intercaste forms have been seen in the hundreds of specimens examined, nor has any ergatoid male been detected; all queens and males seen have been fully alate.

The taxon *H. lea* (Santschi) may be a junior synonym of *dulcis*; see the discussion under *species inquirendae*.

Material examined. **Guinea**: Nion (*Lamotte*); Nimba (*Lamotte*), N.E. Nimba (*Villiers*); Crête de Nion (no collector's name). **Ivory Coast**: Agboville, Yapo For., Yapo-Gare (*I. Löbl*); Abidjan, Banco Nat. Pk (*I. Löbl*); Tai Forest (*V. Mahnert*); Man (*Mahnert & Perret*); Man, Mt Tonkou (*I. Löbl*); Zaidon (*I. Löbl*); Sassandra, Monogaga, Monoho Pt (*I. Löbl*); Sangouiné (*I. Löbl*). **Ghana**: Bunso (*R. Belshaw*); Tafo (*B. Bolton*); Tafo (*R. Belshaw*); Poana (*R. Belshaw*); Mabang (*R. Belshaw*); Sui For. Reserve (*R. Belshaw*); Atewa For. Res. (*H. Wright*); Bobiri (*R. Belshaw*); Esunkawkaw (*R. Belshaw*); Kade (*R. Belshaw*); Akomodan (*R. Belshaw*); Sajymasi (*R. Belshaw*); Asiakwa (*R. Belshaw*); Asiakwa (*H. Wright*); Nkawkaw (*R. Belshaw*); Ofinso (*R. Belshaw*); Efiduase (*R. Belshaw*); Juaso (*R. Belshaw*); Tinte Bepo For. Res. (*R. Belshaw*); Mankrang (*R. Belshaw*); Jachie (*R. Belshaw*). **Nigeria**: Ibadan (*A. Russel-Smith*); Gambari (*B. Bolton*). **Cameroun**: Mbalmayo (*N. Stork*); Nkoemvon (*D. Jackson*); Prov. Sud, N'Kolo, Bondé For., Elogbatindi (*B.L. Fisher*); Prov. Sud, Res. Campo, Massif des Mamelles, Ebodjé (*B.L. Fisher*); Prov. Sud, P.N. Campo, Campo (*B.L. Fisher*); Res. de Campo (*D.M. Olson*); Prov. Sud, Res. de Faune de Campo (*B.L. Fisher*); Prov. Sud-Ouest, Bimbia For., Limbe (*B.L. Fisher*); Prov. Sud-Ouest, Korpu, Mundemba (*B.L. Fisher*). **Gabon**: La Makandé, For. des Abeilles (*S. Lewis*); Prov. Ogooue-Maritime, Res. Moukalaba (*B.L. Fisher*); Prov. Ogooue-Maritime, Res. Monts Doudou, Doussala (*B.L. Fisher*); Prov. Woleu-Ntem, Minvoul (*B.L. Fisher*); Prov. Estuaire, Pointe Ngombe, Ekwata (*B.L. Fisher*); Prov. Estuaire, F.C. Mondah, Libreville (*B.L. Fisher*); For. de la Mondah, Cap Esterias, n. Libreville (*Bartolozzi & Taiti*). **Central African Republic**: Dzanga-Sangha, Bayanga (*B.L. Fisher*); Dzanga-Ndoki, Mabéa Bai (*B.L. Fisher*); Dzanga-Ndoki, Lidjombo (*B.L. Fisher*). **Congo**: Res. de Tchimpounga, Pointe Noire, surr. Lac Foni (*Bartolozzi & Bambi*). **Democratic Republic of Congo**: Epulu (*S.D. Torti*). **Angola**: W. Gabela (*P. Hammond*). **Eritrea**: Nefasit (*Escherich*). **Sudan**: Equatoria, Lotti Forest (*N.A. Weber*). **Uganda**: Kibale For. Res. (*M.R. Orr*); Kalinzu For., Bushenyi Distr. (*S. Yamane*); nr Mbarara (*S. Yamane*). **Kenya**: Tana R., Wema (*Mahnert & Perret*); Kisumu, Chemelil (*V. Mahnert*); Lamu, Lk Mukunguya (*Mahnert & Perret*); Embu, W. Ishiara (*Mahnert & Perret*); Western Prov., Kakamega For., Colobus (*G. Fischer*); Colobus (*M. Peters*); Kakamega For., Buyanga (*M. Peters*); Kakamega For., Ikuywa (*F. Hita Garcia*); Kakamega Distr., Isecheno (*R.R. Snelling*); Isecheno For. Res., Kalunya Glade (*R.R. Snelling*); Malindi (*Bartolozzi*); Arabuko Sokoke For. Res., S. Malindi (Miss. Acc. Lincei). **Tanzania**: Mahale Mts N.P. (*M. Kiyono*); Morogoro Reg., Mkungwe For. Res. (*Hawkes, Bhoke & Richard*); Lindi Reg., Rondo For. Res. (*Hawkes, Mlacha & Ninga*); Mtwara Reg., Mkunya River proposed FR (*Hawkes, Mlacha & Ninga*). **Zimbabwe**: Bulawayo (*G. Arnold*). **South Africa**: Natal, Durban (*H.W.B. Marley*); Natal, Dukuduku Nat. Res. (*D.J. Brothers*); Kwazulu-

Natal, Umtamvuna Nat. Res. (*S. van Noort*); E. Cape, Mkambati Game Res. (*B.L. Fisher*); Mpumalanga, Songimuelo Nat. Res., Komati Riv. (*D. Ubick*).

Hypoponera eduardi (Forel)
(Figs 37–39)

Ponera eduardi Forel, 1894: 15. Syntype workers and worker-queen intercastes (ergatoids), ALGERIA: Oran, Forêt de Msila, 1893 (*A. Forel*) (MHNG) [examined]. [Description of queen and male: Emery, 1895: 61. Description of ergatoid male: Forel, 1904: 421. Combination in *Hypoponera*: Taylor, 1967: 12.] (See note.)

Ponera antipodum Forel, 1895: 43. Holotype queen (not worker, see Brown, 1958: 23), NEW ZEALAND: Rotorua (*Brauns*) (MHNG) [not seen]. [Junior synonym of *eduardi*: Brown, 1958: 23.]

Ponera dideroti Forel, 1913a: 203. Syntype worker, queen and male, SOUTH AFRICA: Cape Prov., Knysna (as Nynsna in description), no. 159 (*H. Brauns*) (MHNG) [examined]. **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 214.]

Ponera opaciceps r. *chilensis* Forel, 1914: 264. Syntype workers, CHILE: Valparaiso (*H.-G. Brameld*) (MHNG) [examined]. **Syn. n.** [Combination in *Hypoponera*: Kempf, 1972: 123. Previously junior synonym of *opaciceps*: Snelling & Hunt, 1976: 66.]

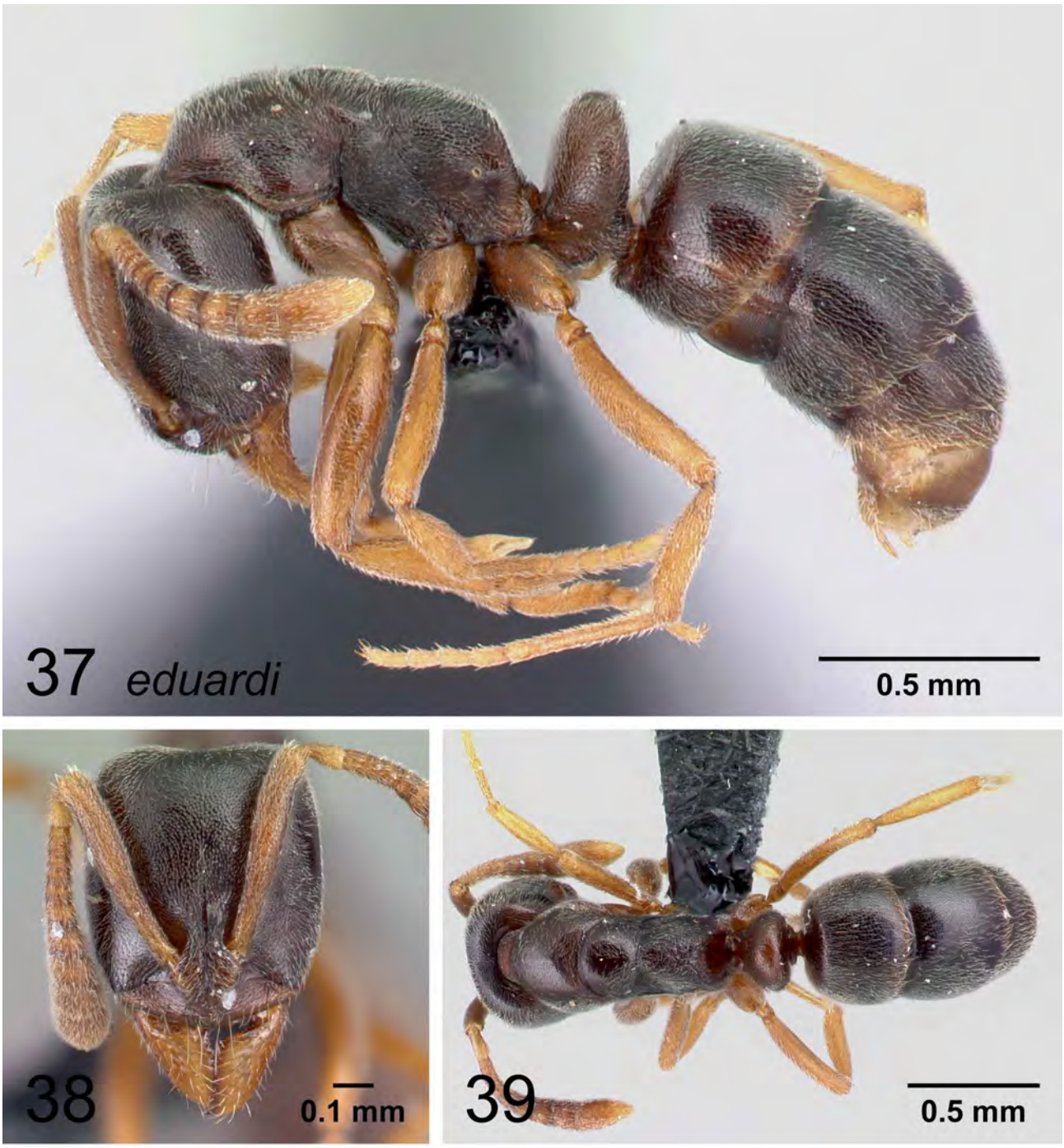
NOTE. In the original description of *eduardi* Forel described major and minor workers and this nomenclature was repeated by Le Masne (1956). Brown (1958) pointed out that the "major workers" referred to by Forel and Le Masne are in fact worker-queen intercastes (= ergatoids) of this species. In the Forel collection (MHNG) a number of specimens from Madeira, collected by E. Schmitz, are labelled as "types". This is the material described later by Forel (1904) and is not part of the type-series.

WORKER. *Measurements*: HL 0.63–0.70, HW 0.54–0.59, HS 0.615–0.640, SL 0.47–0.54, PrW 0.39–0.46, WL 0.86–0.91, HFL 0.50–0.54, PeNL 0.16–0.18, PeH 0.35–0.44, PeNW 0.28–0.32, PeS 0.277–0.310 (30 measured). *Indices*: CI 82–86, SI 86–93, PeNI 67–75, LPeI 39–47, DPeI 167–188.

Eyes small but conspicuous, of 1–7 ommatidia that are irregular in size and may be partially fused, located far forward on the side of the head. Median portion of anterior clypeal margin shallowly convex, not indented. Dorsum of head with a short median impression that terminates just behind the frontal lobes; without a fine impressed line that extends well beyond the midlength of the vertex. Apex of scape, when laid straight back from its insertion in full-face view, touches or slightly exceeds the midpoint of the posterior margin; SL/HL 0.72–0.78. Reticulate-punctulate sculpture of cephalic dorsum fine and dense. Mesonotal-mesopleural suture sometimes absent but often with a vestige present. Mesopleuron sculptured, densely punctulate-shagreenate to extremely finely striolate everywhere; entirely lacking smooth, unsculptured areas. Metanotal groove conspicuous on dorsum of mesosoma; mesonotum with a well-defined posterior margin. Propodeum bluntly marginate between declivity and sides. Propodeal dorsum minutely reticulate-punctate, usually stronger towards the sides than medially. Side of propodeum, above the spiracle, finely reticulate-punctate. In profile the anterior margination of the mesopleuron angulate behind base of anterior coxa. Petiole in profile with the anterior and posterior faces of the node more or less parallel, at most very weakly convergent close to the dorsal surface. Subpetiolar process in profile without sharp angles anteriorly or posteriorly. In dorsal view the petiole node distinctly broader than long. Maximum width of first gastral tergite in dorsal view less than the width of the second tergite at its midlength. Base of cinctus of second gastral tergite smooth in dorsal view, without cross-ribs dorsally though one or two may occur laterally; descending surface of posttergite that forms the posterior surface of the cinctus sometimes weakly sculptured. Posttergite of second gastral segment, from posterior margin of cinctus to apex, much broader than long. Disc of second gastral tergite finely and densely superficially reticulate-punctulate, appearing microreticulate. Full adult colour dark brown to almost black.

The most broadly recognised continuous distribution of this species in the Palaearctic is circum-Mediterranean, then eastwards through Turkey at least to Turkmenistan and adjacent countries and south to Saudi Arabia (Agosti & Collingwood (1987a), Arakelian (1994), Baroni Urbani (1971), Cagniant & Espadaler (1993), Collingwood (1969), Collingwood & Agosti (1996), Dlussky, *et al*. (1990), Kugler (1988)). Apart from this *eduardi* is also well established on the Macaronesian Atlantic islands of the Azores, Madeira, Canary Is and Cape Verde Is (Hohmann, *et al*. (1993), Collingwood & van Harten (1993), Espadaler (2007), Wetterer, *et al*. (2004), Wetterer, *et al*. (2007)). Its presence in New Zealand has been known for more than a hundred years (Brown (1958), Don (2007))

and it is now also known to occur on the Indian Ocean islands of the Comoros, Mauritius, Réunion and the Seychelles, but in the Afrotropical region it has only been recorded from South Africa. It would appear to be unable to compete with native species in more typically African forest or savannah habitats.



FIGURES 37–39. Lateral, full face and dorsal view of body. *Hypoponera eduardi* worker CASENT0010995.

Like other species in the *punctatissima* group, *eduardi* produces worker-queen intercastes (ergatoids) as well as alate queens and its dimorphic males consist of an alate and an ergatoid form, although the last has not yet been recorded from New Zealand (Don (2007). The worker-queen intercastes have distinctly larger eyes than the workers (*ca* 20–30 ommatidia) and the ergatoid males have small eyes (7–8 ommatidia), reduced mandibles and 13-segmented antennae. The polymorphism of both the female and male sexes, and the reproductive biology of *eduardi*, have been documented by Le Masne (1956). He referred to worker-queen intercastes as major workers, following

Forel (1894), and also noted the presence of a less numerous caste intermediate between workers and intercastes that he termed media workers. The relationship of *eduardi* with the Japanese *H. nubatama* Terayama & Hashimoto (1996) should be investigated as the description and figures of the latter, and the forms of its various castes, are very reminiscent of *eduardi*. Mating behaviour in *nubatama* has been discussed by Yamauchi, *et al*. (2001).

H. eduardi is related to *punctatissima* but the workers and intercastes are immediately separated by their mesopleural sculpture, separate ranges of SI and DPeI, and the presence of an elongate, longitudinal, slightly impressed mid-dorsal line on the head of *punctatissima*. The mesopleuron is completely covered with fine sculpture in *eduardi* but is smooth in *punctatissima*. Also, the punctate sculpture of the propodeal dorsum in *eduardi* workers is generally somewhat coarser and more dense than that on the pronotal dorsum, whereas in *punctatissima* the punctures of the propodeal dorsum are almost effaced. In addition to sculpture and cephalic groove, *eduardi* workers have longer scapes and the petiole node in dorsal view is broader. Compare the indices above with *punctatissima* SI 75–84, SL/HL 0.62–0.70, DPeI 140–165. For comments on other related species within the group see under *nivariana*, *punctatissima* and *ragusai*.

The ergatoid males of *punctatissima* and *eduardi* are very easily distinguished as in *punctatissima* the head and mandibles are worker-like in shape and the antennae are 12-segmented, with the scape relatively short compared to the worker (SI *ca* 60–72) but relatively very long for a ponerine male. Ergatoid males of *eduardi*, on the other hand, have a head that is not worker-like, reduced mandibles and 13-segmented antennae, with the scape extremely short, SI *ca* 25–30.

Finally, while discussing the New Zealand fauna, Brown (1958), commented that *opacior* (Forel, 1893) was, "difficult if not impossible to separate from *eduardi* in the worker and female castes," and went on to speculate about the synonymy of the two names. Syntypes of *opacior* (in MHNG) were examined in the course of this study and directly compared to those of *eduardi*. It was concluded that, though related, *eduardi* and *opacior* represent quite different species. In particular, the syntype workers of *opacior* differ from *eduardi* as follows.

1 In *opacior* the mesopleuron is much less densely sculptured, with weak punctulae that are densest on the uppermost and lowermost parts of the sclerite, but almost effaced medially except along the posterior margin; in *eduardi* sculpture of the mesopleuron is universal and there are no unsculptured areas.

2 In *opacior* the propodeal dorsum is more or less smooth, with almost effaced vestiges of sculpture only; in *eduardi* the propodeal dorsum is minutely reticulate-punctate.

3 In *opacior* the metanotal groove is represented only by a faint vestige across the dorsal mesosoma; in *eduardi* it is conspicuous and much more strongly developed.

4 In *opacior* the mesonotal-mesopleural suture is distinct; in *eduardi* it is only very weakly present at best, and often is absent.

5 In *opacior* the maximum width of the first gastral tergite in dorsal view is equal to or slightly greater than the width of the second tergite at its midlength; in *eduardi* the maximum width of the first gastral tergite in dorsal view is less than the width of the second tergite at its midlength.

6 In *opacior* the petiole has LPeI 34–37, DPeI 188–213; in *eduardi* LPeI 39–47, DPeI 167–188.

H. opacior is apparently widely distributed in the New World (*e.g.* Kempf, 1972; Smith, D.R., 1979). No specimens attributable to *opacior* have been seen in this study from the Afrotropical or West Palaearctic regions. However, an examination of the syntypes of *opaciceps chilensis* (MHNG) revealed that they were indistinguishable from the syntypes of *eduardi* in any way, and therefore the name *chilensis* has been transferred from the synonymy of *opaciceps* to the synonymy of *eduardi*. The establishment of this identity indicates that the tramping ability of *eduardi* extends to the New World.

Material examined. **Spain**: Murcia, no loc. (*H. Franz*). **Gibraltar**: (*J.J. Walker*). **Portugal**: Porto, Leca de Palmeira (*Abraham & Horacsek*). **Italy**: Imperia, Ospedaletti (*H. Donisthorpe*); Naples (coll. F. Smith); Sardinia, Isolotto (coll. Poldi); Sicily, Lago Il Biviere, sud-est di Gela (*G. Mariana*); Sicily, Palermo (*H. Donisthorpe*). **Greece**: Beotie, Thèbe, lac Iliki (*A. Senglet*); Rhodes (*Cl. Besuchet*); Rhodes, Petaloudes (*Cl. Besuchet*); Cyprus, Stroumbi (*Cl. Besuchet*). **Turkey**: Antakya, Hanbiye (*Besuchet & Löbl*); Istanbul (*Fiaccadori*); S. Coastlands, Harbiye (*C. Kosswig*). **Iran**: loc. illegible (*Senglet*). **Morocco**: Oulmès env. (*J. Kalab*). **Algeria**: Oran, Forêt de Msila (*A. Forel*); Gde Kabylie, Djebel Bou-Berak (*Besuchet, Löbl & Burckhardt*). **Azores Is**: Ponta Delgada (*A. Schatzmayr*). **Cape Verde Is**: Nicolau, Mte Gordo (*Lindberg*) **Madeira I.**: Palheira (*E. Schmitz*); Jardim da Serra (*S. Vit*); no loc. (*Wollaston*). **Canary Is**: Tenerife, Anaga, Pico del Inglés (*R. Sciaky*). **Comoros**: Moheli, Ouallah (*Fisher, et al.*). **Réunion I**.: Cirque de Salazie, S Piton d'Enchaing (*Zoia & Polesi*); Mare Longue (*Fisher, et al*.); Maido

(*Fisher, et al*.); Les Makes (*Fisher, et al*.); Grande Chaloupe (*Fisher, et al*.); Circe de Mafate (*Fisher, et al*.). **Mauritius**: Brise Mt, Bambous (*Fisher, et al*.); Ile aux Aigrettes (*Fisher, et al*.); Cocotte Mt (*Fisher, et al*.); Le Pouce Mt, Moka Range (*Fisher, et al*.). **Seychelles**: Silhouette I., Jardin Marron (*J. Gerlach*); Silhouette I., Corgot-Cocos Marron Ridge (*J. Gerlach*); Mahé, Roche Caiman (*J. Gerlach*). **South Africa**: Cape Prov., Knysna (*H. Brauns*); W. Cape Prov., Table Mtn, Newlands Forest (*H.J. Ratsirarson*); W. Cape Prov., Table Mtn, Orange Kloof N.R. (*B.L. Fisher*); Cape of Good Hope, Platboombaai (*S. Zoia*). **New Zealand**: MC Christchurch, Halswell (*P.M. Hammond*). **Chile**: Valparaiso (*H.-G. Brameld*).

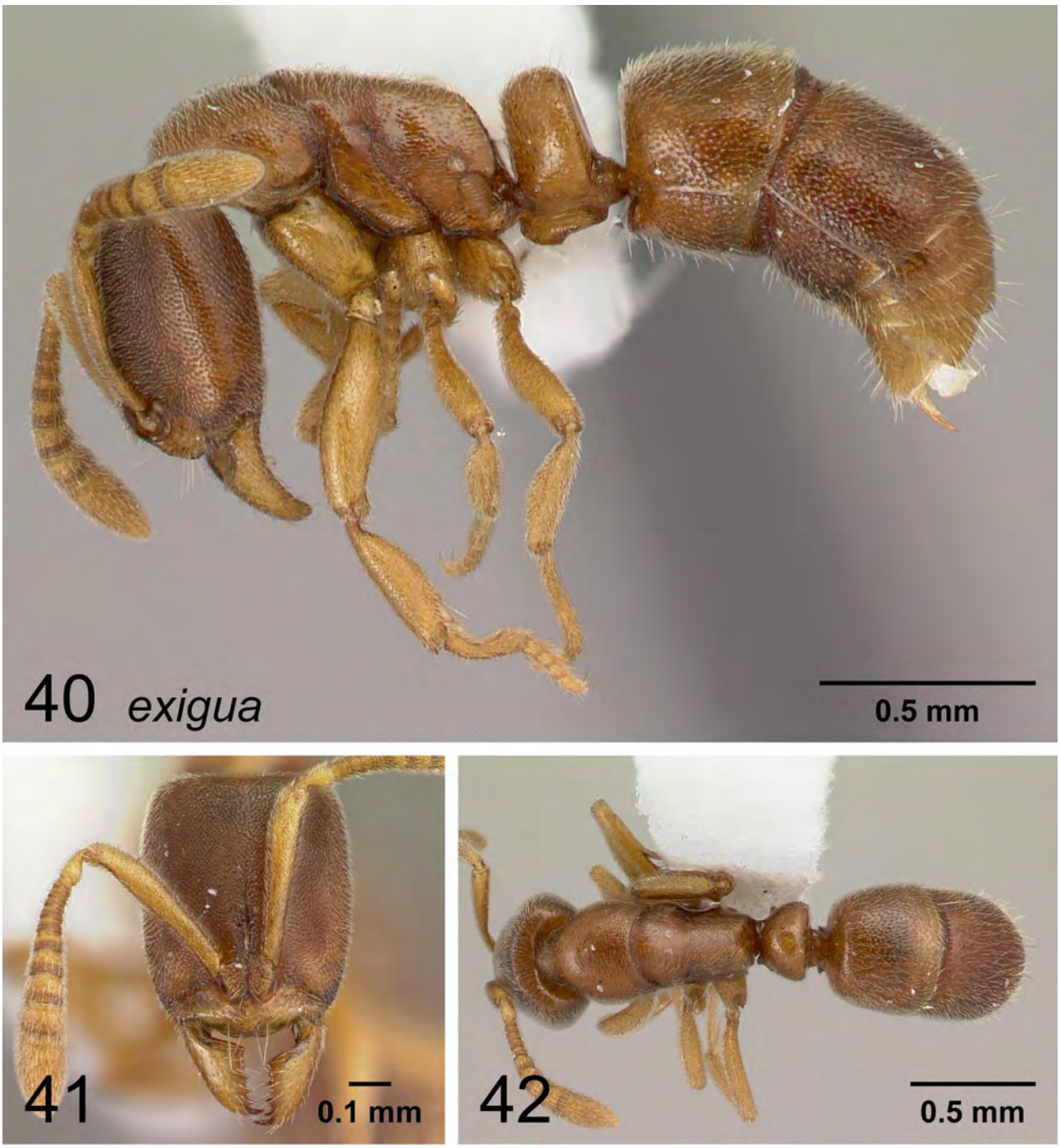
Hypoponera exigua Bolton & Fisher **sp. n.**
(Figs 40–42)

WORKER (holotype in parentheses). *Measurements*: HL 0.66–0.68 (0.66), HW 0.52–0.54 (0.53), HS 0.590–0.610 (0.595), SL 0.44–0.48 (0.44), PrW 0.39–0.43 (0.41), WL 0.86–0.90 (0.88), HFL 0.45–0.48 (0.46), PeNL 0.16–0.19 (0.18), PeH 0.40–0.43 (0.42), PeNW 0.30–0.32 (0.31), PeS 0.293–0.313 (0.303) (10 measured). *Indices*: CI 78–80 (80), SI 83–89 (83), PeNI 72–79 (76), LPeI 39–45 (43), DPeI 168–188 (172).

Eyes absent. Apex of scape, when laid straight back from its insertion, just fails to reach the midpoint of the posterior margin in full-face view; gap between apex of scape and midpoint of margin *ca* 0.10 × SL, about half the apical width of the scape; SL/HL 0.67 –0.71. Cephalic dorsum finely and densely reticulate-punctate. Lateroventral areas of head with small, evenly spaced, superficial punctures. Punctate sculpture on dorsum of mesosoma faint and superficial, almost entirely effaced on propodeum. Mesonotal-mesopleural suture absent or extremely feebly present. Mesopleuron smooth, its anterior margin bluntly angulate behind the anterior coxa. Metanotal groove entirely absent from dorsum. Declivity of propodeum separated from sides by distinct marginations, the latter conspicuous in profile. Posterior surface of petiole node with a series of 4–5 short cuticular ridges at its base which radiate upward from the posterior peduncle. The cuticular ridges terminate dorsally in a darkly coloured, arched transverse rim or carina that is more darkly coloured than the surrounding cuticle. This transverse rim marks the upper boundary of a shallow transverse depression, within which the cuticular ridges are located. The depression terminates at each side in a short, vertical carina that ascends the posterolateral edge of the node and is visible in profile. With petiole node in profile the anterior and posterior faces are approximately parallel and the dorsum is distinctly rounded. Subpetiolar process an elongate low lobe that terminates in a short ascending angle at about the midlength of the sternite. Base of cinctus of second gastral tergite with a continuous row of strong cross-ribs. Maximum width of first gastral tergite in dorsal view is subequal to, or slightly greater than, the width of the second tergite at its midlength. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is distinctly less than the maximum width of the segment. Disc of second gastral tergite with small punctures that are relatively close-packed but narrowly separated by smooth cuticle; spaces between the punctures are less than the puncture diameters. First gastral tergite in profile with very short standing setae that project only slightly above the level of the decumbent pubescence. Full adult colour light brown.

Holotype worker, **Ethiopia**: Bale reg., Bale Mts N.P., Harenna For., Katcha area, 2400 m., 24.viii.1998, #10c, leaf litt.+bushpig drop., in For. (*G. Cuccodoro & D. Erne*) (MHNG).
Paratypes. 30 workers with same data as holotype (MHNG, BMNH, CASC, BBRC).

At first glance *exigua* is very similar to the South African *traegaordhi*, especially as regards the distinct combination of transverse depression and vertical cuticular ribs at the base of the posterior face of the petiole node. But *traegaordhi* is a distinctly smaller species in which, apart from the differences noted in the key, the apex of the scape does not approach the midpoint of the posterior margin of the head nearly as closely as in *exigua*.



FIGURES 40–42. Lateral, full face and dorsal view of body. *Hypoponera exigua* paratype worker CASENT0226547.

Hypoponera faex Bolton & Fisher **sp. n.**

HOLOTYPE WORKER. *Measurements*: HL 0.88, HW 0.72, HS 0.800, SL 0.66, PrW 0.57, WL 1.30, HFL 0.72, PeNL 0.26, PeH 0.58, PeNW 0.44, PeS 0.427. *Indices*: CI 82, SI 92, PeNI 77, LPeI 45, DPeI 169.

Eyes present, of 5–6 small ommatidia. In full-face view apex of scape, when laid straight back from its insertion, just fails to touch the midpoint of the posterior margin; SL/HL 0.75. Cephalic dorsum coarsely and densely reticulate-punctate. Lateroventral surfaces of head completely covered with very coarse and conspicuous reticulate-punctate to punctate-rugulose sculpture, without discrete punctures separated by areas of smooth shining cuticle. Side of pronotum reticulate-punctate, strongly so but slightly less coarsely and densely than the head; this sculpture fades out dorsally and towards the midline the pronotum is almost entirely smooth. Mesonotum finely and densely

punctate dorsally; the propodeal dorsum with disorganised punctate sculpture anteriorly, but this fades out posteriorly so that the mid-dorsal area just before the declivity is smooth. Metanotal groove absent on dorsum of mesosoma but a slight change of slope is present between mesonotum and propodeum. In profile the anterior margination of the mesopleuron is merely obtusely angled behind base of anterior coxa; without a projecting acute angle or tooth. Propodeum narrowly marginate between declivity and sides. Posterior face of petiole node with a series of short cuticular ridges that arise from the base of the peduncle. Petiole node with weak sculpture present on sides, and more weakly so on dorsum, fading out towards the midline. Maximum width of first gastral tergite in dorsal view is greater than the width of the second tergite at its midlength. Base of cinctus of second gastral tergite with cross-ribs conspicuous in dorsal view. Posttergite of second gastral segment, from posterior margin of cinctus to apex, very slightly broader than long. Disc of second gastral tergite with sharply incised punctures that are separated by areas of smooth cuticle; distance between punctures averages distinctly greater than diameters of the punctures.

Holotype worker, **Ethiopia** (Abyssinia on main label): Gamo Prov., Bonghé valley, Gughé highlands, c. 9500–10000 ft, 8.xii.1948, Ethiopia 1948-49, BM 1949-184, sifted humus under bamboo, near waterfall, south side of valley (*H. Scott*) (BMNH).
Right funiculus is missing from holotype.

This is a large, conspicuous and coarsely sculptured species, the only known Afrotropical species that combines the presence of radiating cuticular ridges at the base of the posterior face of the petiole node with relatively well-developed eyes. The condition of the metanotal groove is between absent and vestigially present. There is no strong, deep groove that cuts across and interrupts the surface, but a slight change of slope and vague hint of a depression remains.

Hypoponera fatiga Bolton & Fisher **sp. n.**
(Figs 43–45)

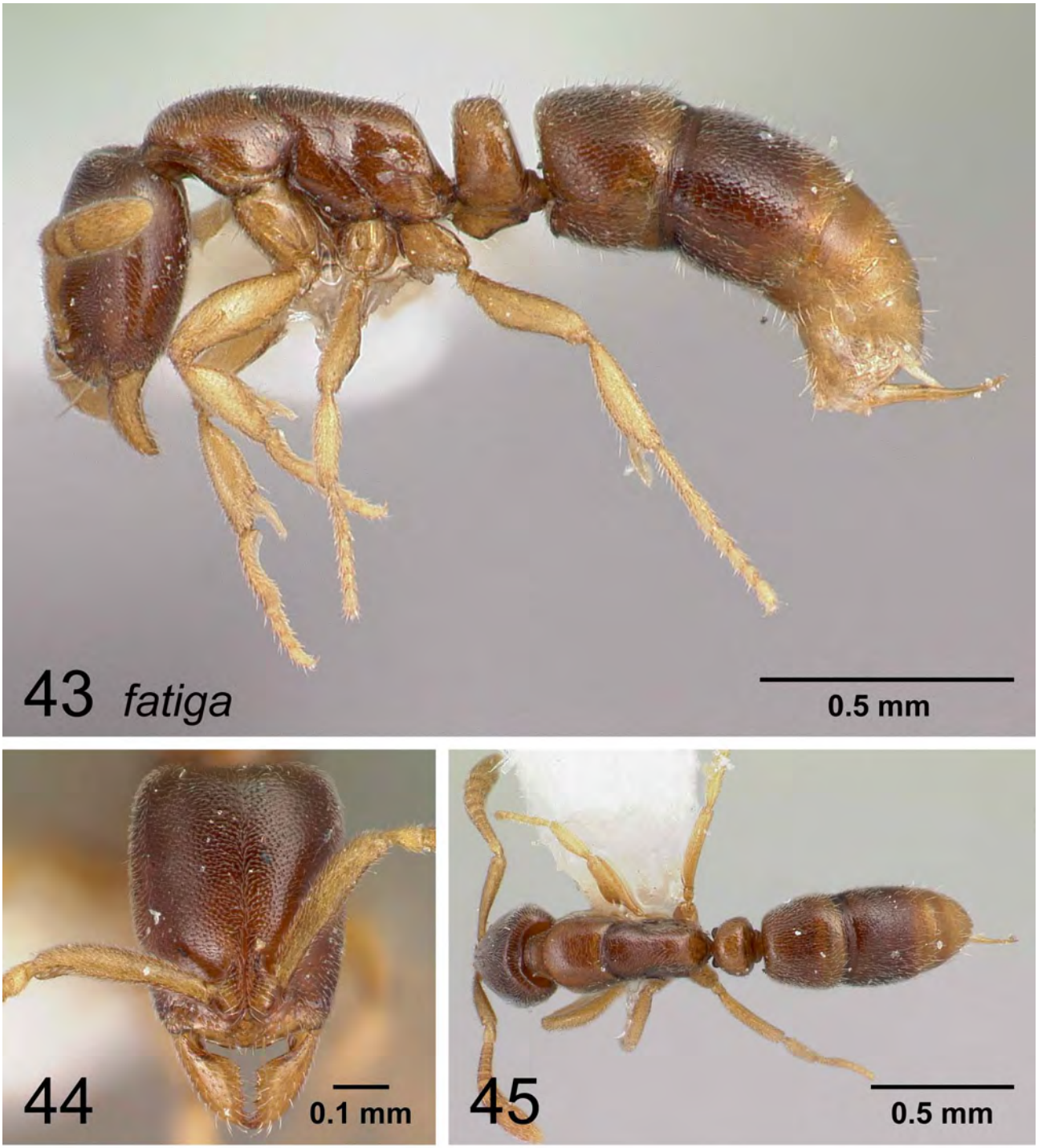
WORKER (holotype in parentheses). *Measurements*: HL 0.46–0.53 (0.49), HW 0.36–0.40 (0.38), HS 0.410–0.450 (0.435), SL 0.28–0.34 (0.32), PrW 0.26–0.31 (0.29), WL 0.58–0.68 (0.64), HFL 0.28–0.34 (0.32), PeNL 0.12–0.14 (0.13), PeH 0.27–0.32 (0.30), PeNW 0.18–0.22 (0.22), PeS 0.195–0.227 (0.217) (30 measured). *Indices*: CI 73–80 (77), SI 78–87 (84), PeNI 67–78 (76), LPeI 39–44 (43), DPeI 155–180 (169).

Eyes absent. Median portion of clypeus with a raised median longitudinal ridge or crest. Apex of scape, when laid straight back from its insertion, distinctly fails to reach the midpoint of the posterior margin in full-face view; distance from apex of scape to midpoint *ca* 0.20 × SL, greater than the apical width of the scape; SL/HL 0.60–0.67. Reticulate-punctate sculpture on cephalic dorsum fine and dense, the punctures crowded, small and sharply defined. Lateroventral areas of head almost smooth, with widely separated, minute, superficial punctulae. Punctate sculpture on dorsum of pronotum about the same as on lateroventral surface of head. Metanotal groove entirely absent from dorsum of mesosoma. Sides of propodeal declivity weakly marginate. Petiole node in dorsal view transverse, the anterior and lateral surfaces distinctly convex, but not thickly D-shaped. Petiole node in profile slender and of moderate height, with the sides weakly convergent from just above tubercle to apex; dorsum very shallowly convex. Posterior surface of petiole node without radiating cuticular ribs above the peduncle. Subpetiolar process with a blunt ventral angle. Base of cinctus of second gastral tergite with short, fine, crowded cross-ribs. Disc of second gastral tergite microreticulate to superficially reticulate-punctate; without sharply incised widely separated punctures. Maximum width of first gastral tergite in dorsal view is less than the width of the second tergite at its midlength. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is slightly less than the maximum width of the segment. Suberect to erect setae on dorsum of first gastral tergite sparse and short, stubbly. Full adult colour light brown to brown.

Holotype worker (top specimen of two on pin), **Ghana**: Esunkawkaw, x.1992 (*R. Belshaw*) (BMNH).
Paratypes. 22 workers and 3 dealate queens, with same data as holotype (BMNH, CASC, BBRC).

This small species is currently known from only a few forest leaf litter samples, but appears to be very widely distributed. The various populations are remarkably similar and show only slight differences in the ranges of

dimensions, which at present are not considered as significant at species-rank. However, the Kenyan samples tend to have a petiole node that is somewhat more tapered dorsally, though the taxonomic significance of this is not currently apparent. The acquisition of samples from the vast territories that lie between these populations is essential, so that the situation can be assessed more accurately. In itself, the discovery of closely related populations as far apart as Ghana and Kenya, is not surprising, because the Kakamega Forest is the easternmost extension of the vast west and central African forest zone. That the species spans the entire zone is hinted at by the presence of a single specimen from Central African Republic. Critical measurements and indices of the main populations, for comparative purposes, are as follows.



FIGURES 43–45. Lateral, full face and dorsal view of body. *Hypoponera fatiga* paratype worker CASENT0226549.

Ghana workers (BMNH, CASC, BBRC). *Measurements*: HL 0.47–0.50, HW 0.36–0.38, HS 0.415–0.440, SL 0.28–0.32, PrW 0.28–0.30, PeNL 0.12–0.13, PeH 0.28–0.31, PeNW 0.20–0.22, PeS 0.200–0.220 (13 measured). *Indices*: CI 75–77, SI 78–86, PeNI 70–78, LPeI 41–43, DPeI 162–180.

Uganda workers ((KUIC). *Measurements*: HL 0.51–0.53, HW 0.38–0.40, HS 0.435–0.450, SL 0.31–0.33, PrW 0.30–0.31, PeNL 0.12, PeH 0.29–0.31, PeNW 0.20–0.21, PeS 0.203–0.213 (4 measured). *Indices*: CI 73–75, SI 82–83, PeNI 67–69, LPeI 39–41, DPeI 165–170.

Kenya workers (ZFMK). *Measurements*: HL 0.50–0.52, HW 0.38–0.40, HS 0.445–0.450, SL 0.33–0.34, PrW 0.28–0.30, PeNL 0.12–0.14, PeH 0.30–0.32, PeNW 0.20–0.22, PeS 0.210–0.227 (8 measured). *Indices*: CI 75–80, SI 84–87, PeNI 69–76, LPeI 39–44, DPeI 155–170.

Tanzania workers (KUIC). *Measurements*: HL 0.46–0.50, HW 0.36–0.38, HS 0.410–0.440, SL 0.28–0.31, PrW 0.27–0.29, PeNL 0.12, PeH 0.27–0.30, PeNW 0.18–0.20, PeS 0.195–0.207 (4 measured). *Indices*: CI 75–78, SI 78–83, PeNI 67–74, LPeI 40–44, DPeI 155–167.

See also the notes under *defessa* and *juxta*.

Non-paratypic material examined. **Ghana**: Poano (*R. Belshaw*); Kade (*R. Belshaw*); Tinte Bepo (*R. Belshaw*); Bobiri (*R. Belshaw*). **Central African Republic**: Dzanga-Ndoki, Lidjombo (*B.L. Fisher*). **Uganda**: Bushenyi Distr., Kalinzu For. (*S. Yamane*); Kalinzu N.P., Musanga For. (*M. Kiyono*). **Kenya**: Westen Prov., Kakamega For., Bunyale (*G. Fischer*); Kakamega For., Malawa (*G. Fischer*); Kakamega For., Kaimosi (*G. Fischer*); Kakamega Distr., Buyangu Nat. Res., nr Salazar Circuit (*Snelling & Espira*); Kakamega Distr., Isecheno For. Res., Isecheno (*R.R. Snelling*); Isecheno For. Res., nr Kalunya Glade (*R.R. Snelling*). **Tanzania**: Mahale Mts N.P., gallery forest (*M. Kiyono*).

Hypoponera hawkesi Bolton & Fisher **sp. n.**
(Figs 46–48)

WORKER (holotype in parentheses). *Measurements*: HL 0.57–0.58 (0.58), HW 0.47–0.48 (0.48), HS 0.520–0.530 (0.530), SL 0.42–0.45 (0.45), PrW 0.34–0.37 (0.37), WL 0.76–0.80 (0.78), HFL 0.43–0.46 (0.45), PeNL 0.14–0.15 (0.15), PeH 0.32–0.35 (0.35), PeNW 0.20–0.21 (0.21), PeS 0.217–0.237 (0.237) (4 measured). *Indices*: CI 82–83 (83), SI 90–94 (94), PeNI 56–59 (57), LPeI 43–45 (43), DPeI 140–150 (140).

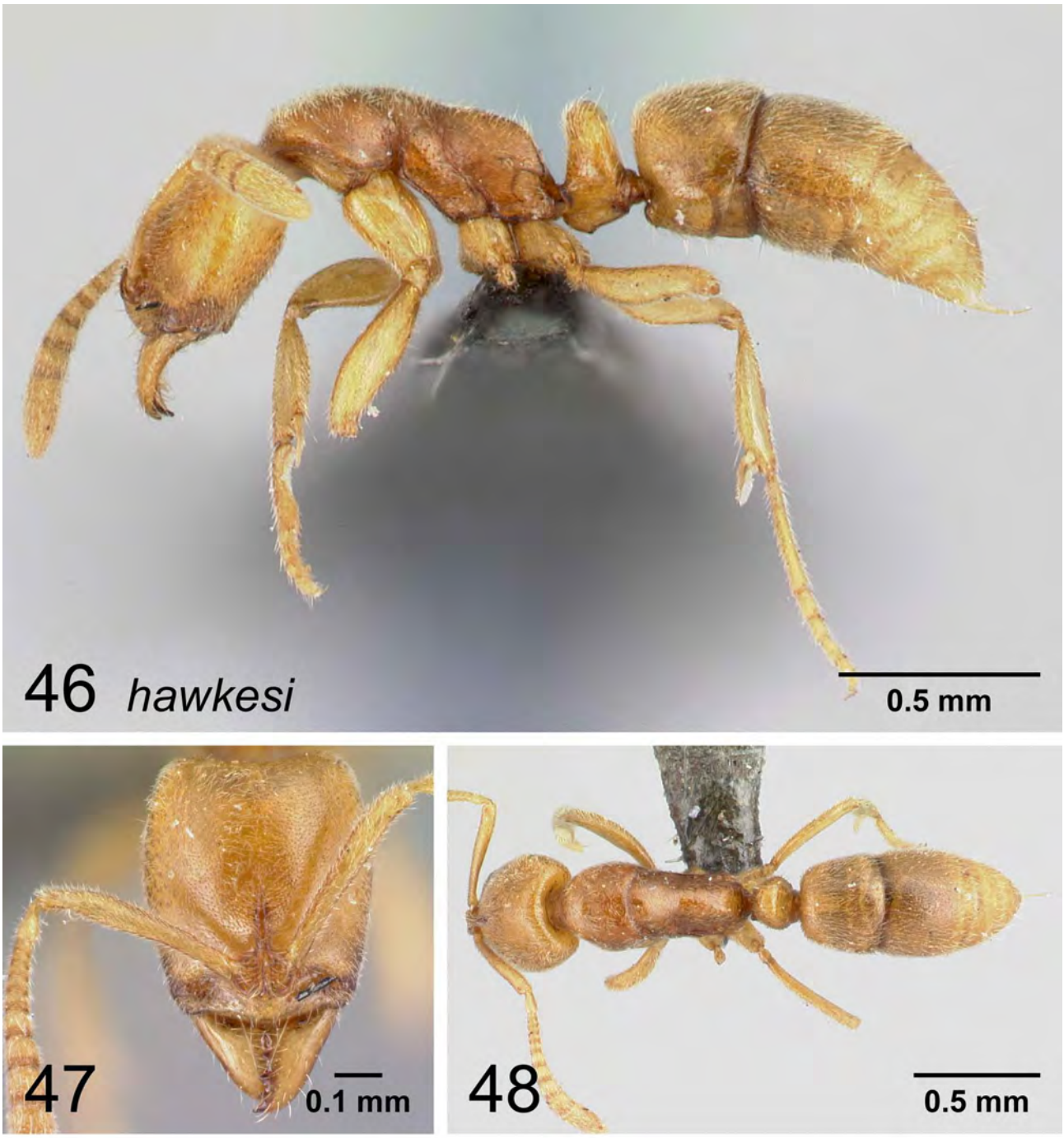
Eyes absent. Apex of scape, when laid straight back from its insertion, projects slightly beyond the midpoint of the posterior margin in full-face view; SL/HL 0.74–0.78. Funiculus with 5 enlarging apical segments. Metanotal groove absent from dorsum of mesosoma but its former track marked by a change of slope between mesonotum and propodeum. Mesonotal-mesopleural suture weakly indicated on side of mesosoma. In profile dorsum of mesonotum slopes down posteriorly, its anterior portion highest and distinctly higher than the propodeal dorsum. Posterior surface of petiole node without short cuticular ridges that radiate from just above the peduncle. Node of petiole in profile tall and slender, the anterior and posterior faces distinctly convergent dorsally; the length of the dorsum is markedly less than the length just above the tubercle. In dorsal view the petiole node relatively very narrow in relation to the width of the pronotum (PeNI 56–59). Subpetiolar process in profile with a low but distinct ventral angle. Maximum width of first gastral tergite of holotype in dorsal view (0.40) is noticeably less than width of second gastral tergite at its midlength (0.44). Sides of second gastral tergite shallowly convex in dorsal view. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is less than the maximum width of the segment. Cross-ribs at base of cinctus of second gastral tergite short but distinctly present. Disc of second gastral tergite with densely crowded, small, superficial punctures so that the surface appears microreticulate at lower magnifications. First and second gastral tergites dorsally pubescent and with a few inconspicuous short standing setae that are sparse, minute and difficult to see, resembling isolated erect pubescence rather than real setae. Full adult colour yellow.

Holotype worker, **Tanzania**: Morogoro Region, Sali Forest Reserve, 1150 m., 17-20.x.2007, CEPF-TZ-9.4-F25, 8.94497S, 36.67261E, AFRC-TZ-04, primary forest, hand collected (*P. Hawkes, M. Bhoke, U. Richard*) (SAMC).

All legs on the right side of the holotype are damaged: front leg missing beyond femur, midleg missing beyond trochanter, hind leg missing beyond femur.

This very distinctive species is known only from the holotype and three workers from Uganda. It is a member of section 1 of the *abeillei* group but is rendered quite distinct by its high, short but dorsally very narrow petiole node, gracile appearance and relatively long scapes. The dentition is unusual for an African *Hypoponera* as there are 5 teeth, with just a single denticle between tooth 3 and 4, and teeth 4 and 5 are easily as large as tooth 3. It is impossible to say if this dentition is stable and characteristic of the species as a whole because so few workers are known.

Non-paratypic material examined. **Uganda**: Kalinzu NP (*M. Kiyono*).



FIGURES 46–48. Lateral, full face and dorsal view of body. *Hypoponera hawkesi* holotype worker CASENT0192422.

Hypoponera hebes Bolton & Fisher **sp. n.**
(Figs 49–51)

WORKER (holotype in parentheses). *Measurements*: HL 0.76–0.81 (0.78), HW 0.64–0.67 (0.64), HS 0.700–0.735 (0.710), SL 0.54–0.57 (0.56), PrW 0.48–0.53 (0.50), WL 1.04–1.16 (1.08), HFL 0.58–0.62 (0.58), PeNL 0.26–0.28 (0.27), PeH 0.52–0.54 (0.53), PeNW 0.40–0.43 (0.41), PeS 0.393–0.417 (0.403) (10 measured). *Indices*: CI 80–84 (82), SI 83–88 (88), PeNI 80–84 (84), LPeI 50–54 (51), DPeI 150–159 (150).

FIGURES 49–51. Lateral, full face and dorsal view of body. *Hypoponera hebes* paratype worker CASENT0226553.

Eyes absent. In full-face view apex of scape, when laid straight back from its insertion, just fails to reach the midpoint of the posterior margin; SL/HL 0.67–0.72. Cephalic dorsum coarsely and very densely reticulate-punctate. Lateroventral surfaces of head completely covered with very coarse and conspicuous reticulate-punctate to punctate-rugulose sculpture, without discrete punctures separated by areas of smooth, shining cuticle. Side of pronotum, and pronotal dorsum except for midline, coarsely reticulate-punctate, very nearly as coarsely and densely sculptured as the head. Mesonotum conspicuously punctate dorsally; the propodeal dorsum with finer but more disorganised punctate sculpture that extends to the margin of the declivity. Metanotal groove absent on dorsum of mesosoma but a slight change of slope may be present between mesonotum and propodeum. In profile the anterior margination of the mesopleuron is distinctly angled behind base of anterior coxa, and the sclerite has superficial sculpture present on at least part of its surface. Propodeum narrowly and quite sharply marginate between declivity and sides. Posterior face of petiole node with a series of short cuticular ridges that arise from the base of the peduncle. Maximum width of first gastral tergite in dorsal view is greater than the width of the second tergite at its midlength. Base of cinctus of second gastral tergite with short but distinct cross-ribs in dorsal view. Posttergite of second gastral segment, from posterior margin of cinctus to apex, about as broad as long. Disc of second gastral tergite with sharply incised scattered punctures that are separated by areas of smooth cuticle; distance between punctures distinctly greater than diameters of the punctures. Standing setae on dorsum of first gastral tergite numerous, long and erect, very clearly differentiated from the underlying pubescence; similar long setae present and numerous on second gastral tergite.

Holotype worker (top specimen of three on pin), **Rwanda**: Rangiro, 1800 m., 6.viii.1973 (*P. Werner*) (MHNG).
Paratypes. 22 workers and 1 dealate queen with same data as holotype (MHNG, BMNH, CASC).

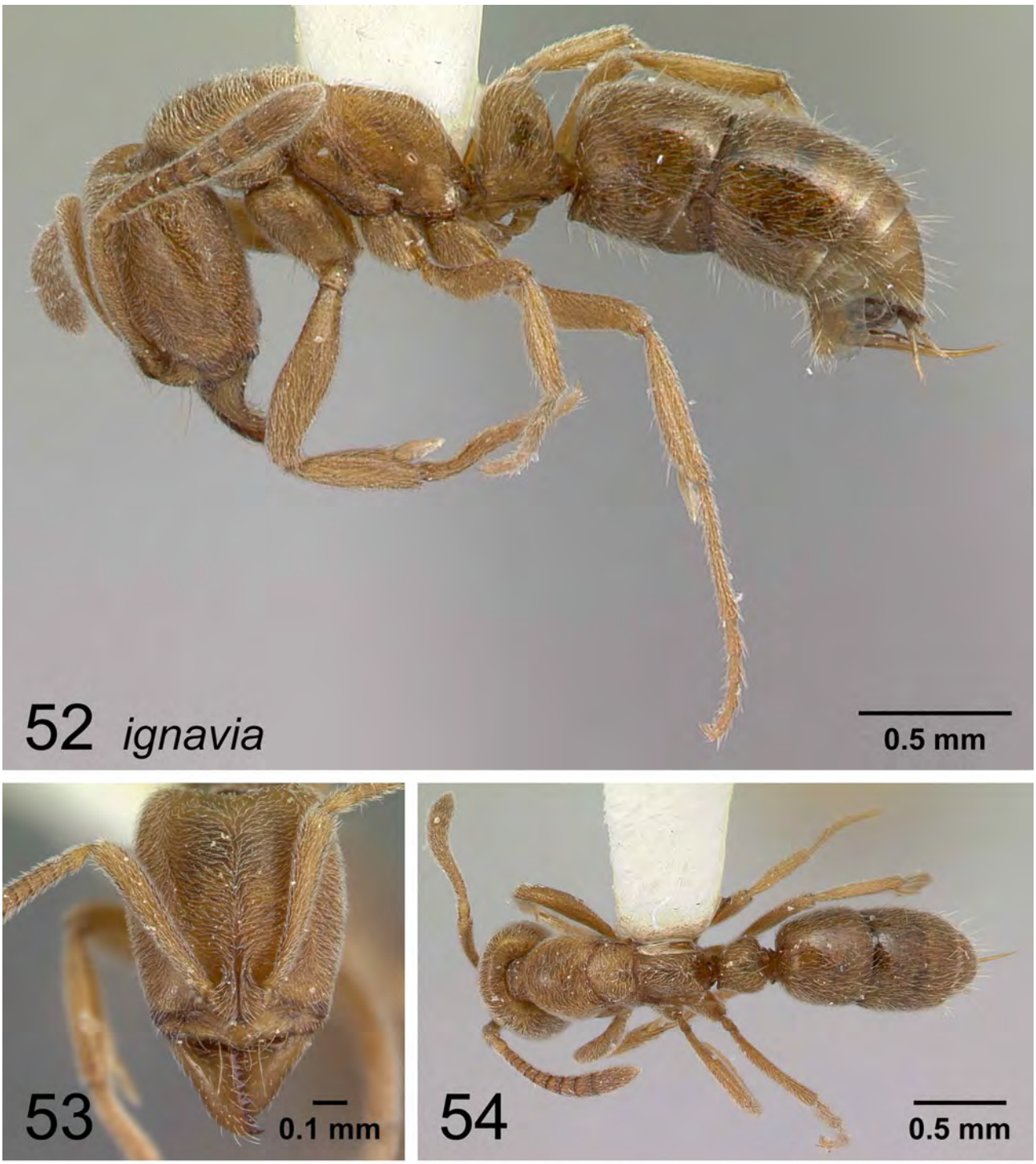
The sculpture exhibited by this species is among the most strongly developed of the *Hypoponera* of the Afrotropical region. Among those species with cuticular ridges on the posterior surface of the petiole node, *hebes* is approached only by *faex* in terms of density and intensity of sculpturation, but the latter is larger (HL 0.88, HW 0.72), has well-developed eyes, and lacks the long, strongly differentiated, standing setae on the first gastral tergite that are so conspicuous in *hebes*. See also the notes under *jeanneli*.

Non-paratypic material examined. **Rwanda**: Rangiro (*P. Werner*) (two short series).

Hypoponera ignavia Bolton & Fisher **sp. n.**
(Figs 52–54)

WORKER (holotype in parentheses). *Measurements*: HL 0.78–0.88 (0.88), HW 0.61–0.71 (0.71), HS 0.695–0.795 (0.795), SL 0.54–0.67 (0.67), PrW 0.46–0.52 (0.52), WL 1.03–1.20 (1.20), HFL 0.59–0.73 (0.73), PeNL 0.21–0.25 (0.25), PeH 0.45–0.52 (0.52), PeNW 0.32–0.37 (0.37), PeS 0.327–0.380 (0.380) (4 measured). *Indices*: CI 78–83 (81), SI 87–94 (94), PeNI 67–71 (71), LPeI 45–49 (48), DPeI 140–155 (148).

Eyes variably developed, see discussion below. In full-face view apex of scape, when laid straight back from its insertion, reaches or very slightly exceeds the midpoint of the posterior margin; SL/HL 0.69–0.76. Reticulate-punctulate sculpture of cephalic dorsum fine and superficial, but dorsal head distinctly more densely sculptured than pronotal dorsum, which is almost smooth. Lateroventral areas of head weakly superficially punctate. Propodeal dorsum almost smooth, with only faint, widely spaced, minute punctulae. Mesonotal-mesopleural suture absent. Metanotal groove distinctly incised across dorsum of mesosoma; mesonotum with a defined posterior margin. Propodeal declivity separated from side by a blunt angle or a weak margination, without sharp carinae. Mesopleuron smooth and shining. Petiole in profile with the anterior and posterior faces of the node weakly convergent dorsally; node only very slightly longer just above the anterior tubercle than at the dorsum. Sternite of petiole in profile with a differentiated lobe that lacks sharp angles anteriorly or posteriorly. Anterior margin of subpetiolar process, near its base, with a conspicuous pit from which a sensory seta arises. Maximum width of first gastral tergite in dorsal view about equal to the width of the second tergite at its midlength. Base of cinctus of second gastral tergite with strong, conspicuous cross-ribs. Posttergite of second gastral segment, from posterior margin of cinctus to apex, broader than long. Punctures on disc of second gastral tergite superficial, minute and sparse; distances between punctures greater than diameters of punctures and the surface appearing glossy. With first gastral segment in profile its dorsum with scattered short standing setae (mostly lost from holotype but conspicuous in both paratypes). Full adult colour light brown.



FIGURES 52–54. Lateral, full face and dorsal view of body. *Hypoponera ignavia* worker CASENT0218463.

Holotype worker (top specimen of two on pin), **Zimbabwe**: Umtali, Melsetter, 1700 m., ii.1969 (*R. Mussard*) (MHNG).

Paratypes. 2 workers with same data as holotype (MHNG, BMNH).

Each of the three specimens that make up the type-series of *ignavia* has differently developed eyes; the degree of development is associated with the overall size of the specimen. In the holotype (HW 0.71, SL 0.67) the eye is a featureless blister; in the MHNG paratype (HW 0.65, SL 0.60) it is a depigmented single ommatidium and in the BMNH paratype (HW 0.61, SL 0.54) it is entirely absent. The possibility that the holotype is an intercaste and not a true worker must be considered, because as well as being the largest specimen with the largest eye, it also has a faint vestige of a transverse suture on the mesopleuron, dividing the sclerite into anepisternum and katepisternum.

H. ignavia is closely related to *boerorum* and *spei*, but contrasts with them as follows.

1 Sculpture on the disc of the second gastral tergite is much more superficial and diffuse in *ignavia* than in either *boerorum* or *spei*.

2 Setae on the dorsum of the first gastral tergite are short, more closely resembling *boerorum* than *spei*.

3 The subpetiolar process is low and ventrally rounded, again more closely resembling *boerorum*.

4 Dimensions of *ignavia* (HW, SL) are within the known range of *spei*, but its CI 78–81 is slightly lower than in *spei* or *boerorum*, which have a combined CI 82–89. Also, SI 89–94 of *ignavia* is slightly higher than in *spei* plus *boerorum* (SI 77–85). PeNI, HS and PeS of *ignavia* fall within the range of *spei*.

In a short series (one worker and two dealate queens) from the Drakensberg Mountains of South Africa (data below, specimens in CASC), the worker appears to have a tiny, completely depigmented, vestigial eye spot, a rounded subpetiolar lobe, standing setae on the first gastral tergite that are sparse and elongate (as in *spei*), and punctulate sculpture on the second gastral tergite that is even more faint and diffuse than in the *ignavia* type-series, so that at low magnification the sclerite appears polished and almost smooth. The extremely reduced gastral sculpture is duplicated in the queens and is very different from the densely punctate sculpture seen in *spei* queens. Because of the very reduced gastral sculpture these specimens are tentatively incorporated in *ignavia*, until more material is assembled and the situation can be reviewed.

Non-paratypic material examined. **South Africa**: Transvaal, Drakensberg Mts, W. of Klaserie (*Ross & Leech*).

Hypoponera importuna Bolton & Fisher **sp. n.**
(Figs 55–57)

WORKER (holotype in parentheses). *Measurements*: HL 0.66–0.72 (0.68), HW 0.52–0.58 (0.55), HS 0.590–0.650 (0.615), SL 0.48–0.52 (0.52), PrW 0.42–0.46 (0.46), WL 0.94–1.02 (0.96), HFL 0.52–0.58 (0.55), PeNL 0.20–0.22 (0.22), PeH 0.48–0.53 (0.49), PeNW 0.38–0.41 (0.40), PeS 0.360–0.383 (0.370) (14 measured). *Indices*: CI 79–83 (81), SI 86–96 (95), PeNI 85–95 (87), LPeI 40–46 (45), DPeI 182–200 (182).

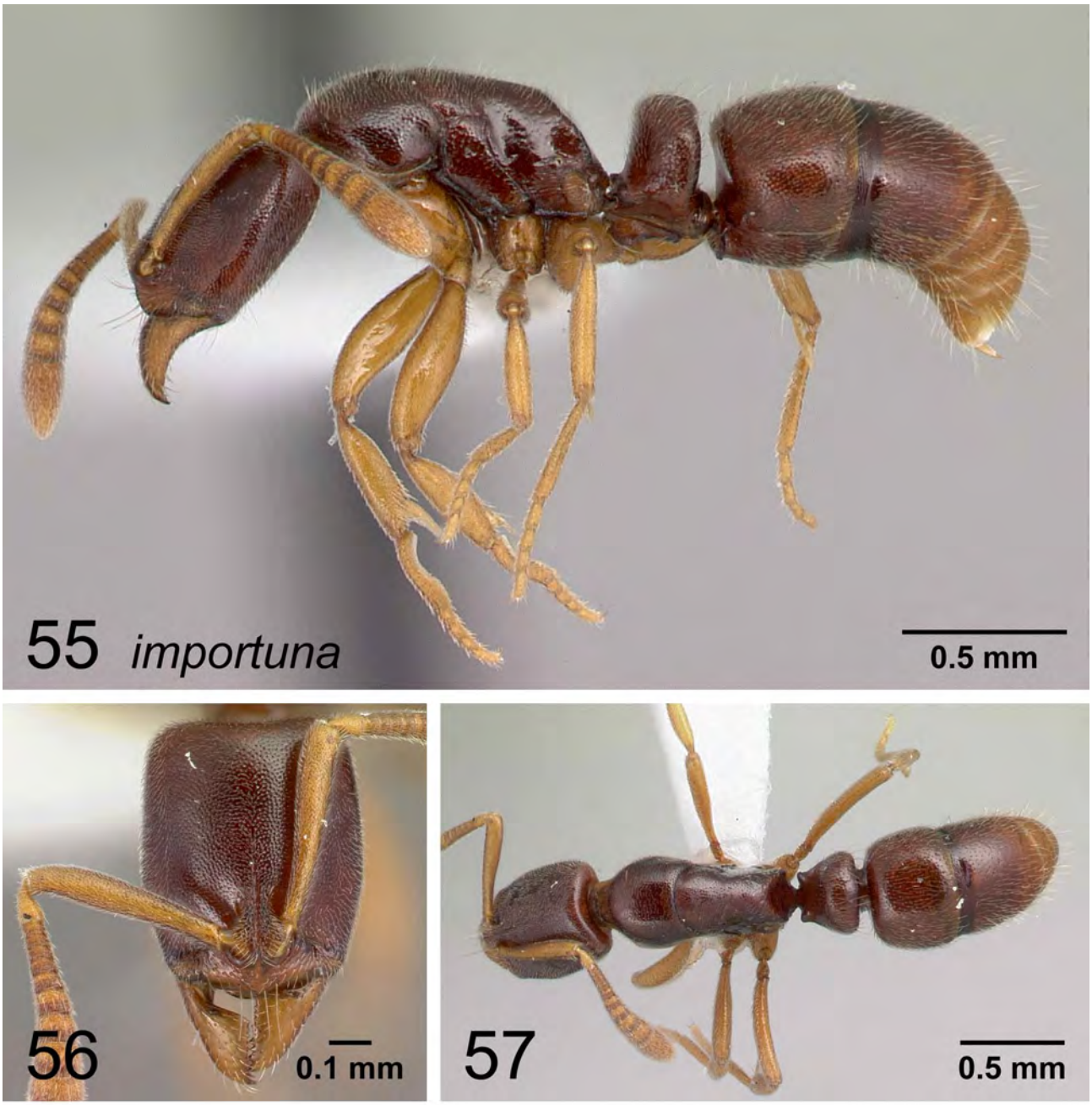
Eyes absent or a small and inconspicuous eye spot present that is often difficult to see against the punctate side of the head. Apex of scape, when laid straight back from its insertion, just fails to reach the midpoint of the posterior margin in full-face view; SL/HL 0.70–0.76. Cephalic dorsum sharply reticulate-punctate. Pronotal dorsum almost smooth, with spaced, minute, superficial punctures, obviously much less strongly and densely sculptured than cephalic dorsum. Metanotal groove absent from dorsum of mesosoma. Mesonotal-mesopleural suture feebly present on side of mesosoma. Propodeum distinctly marginate between declivity and side. Posterior surface of petiole node without short cuticular ridges that radiate upward from the peduncle. Node of petiole in profile tall and relatively thick, the dorsum weakly convex. Subpetiolar process with a distinct ventral angle. Petiole node in dorsal view very broad. Maximum width of first gastral tergite in dorsal view distinctly greater than the width of the second gastral tergite at its midlength. Base of cinctus of second gastral tergite glossy and polished, without trace of cross-ribs. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is less than the width of the segment at its midlength. Disc of second gastral tergite with sharply incised, small punctures that are widely separated by areas of glossy cuticle; the diameters of the punctures are distinctly less than the distances that separate them. First and second gastral tergites dorsally pubescent and with a number of short standing setae that conspicuously project above the level of the pubescence in profile. Full adult colour dark reddish brown.

Holotype worker, **Gabon**: Prov. Ogooue-Maritime, Res. Monts Doudou, 24.3 km. 307° NW Doussala, 2°13.4'S, 10°24.4'E, 375 m., 9.iii.2000, #2200(48)-6, sifted litter (leaf mold, rotten wood) rainforest (*B.L. Fisher*) (CASC).
Paratypes. 8 workers (of which one is teneral and lacking its head), 1 worker-queen intercaste (teneral) and 3 dealate queens, with same data as holotype and all in series #2200; individual pins coded (10)-5, (11)-7 (queen), (11)-8, (13)-4 (queen), (14)-8, (15)-13, (23)-4, (45)-4 (worker and queen on one pin), (45)-6 (intercaste), (47)-4, (49)-4 (CASC, BMNH).

The paratype intercaste has about 12 ommatidia in the eye compared to the holotype, where the eye is a mere spot, and to a genuine queen where the eye has > 50 ommatidia. Also, the intercaste has PeNI 100 (holotype 87, paratype queen 88), and maximum width of first gastral tergite in dorsal view 0.64 (holotype 0.59, paratype queen 0.64). The dealate queen has a full complement of flight sclerites, not developed in the intercaste.

This species is very closely related to *occidentalis*. Their descriptions are very similar and most of their dimensions fall within the same ranges. However, the petiole node in *importuna* is usually strikingly transverse in dorsal view and averages broader both in relation to the width of the pronotum and to the length of the node. In *occidentalis* PeNI is 76–89 (mean value of 82), and DPeI is 150–180 (mean value of 165). By comparison, *importuna* has PeNI 85–95 (mean value of 91) and DPeI 182–200 (mean value of 190). *H. comis* also has a broad petiole, reminiscent of *importuna,* but the size and detailed structure of their petioles differ, as noted in the key; see also under *comis* for other differentiating characters.

Two Kenyan specimens from Bunyangu Nature Reserve (ZFMK, details below) are intercastes. One of them has eyes with 7–8 ommatidia but the other is odd, because the right eye is minute while the left is much larger and consists of an indeterminate number of fused ommatidia.



FIGURES 55–57. Lateral, full face and dorsal view of body. *Hypoponera importuna* holotype worker CASENT0218464.

Non-paratypic material examined. **Gabon**: Res. Monts Doudou, Doussala (*B.L. Fisher*). **Central African Republic**: P.N. Dzanga-Ndoki, Lidjombo (*B.L. Fisher*). **Kenya**: Western Prov., Kakamega For., Colobus (*G. Fis-*

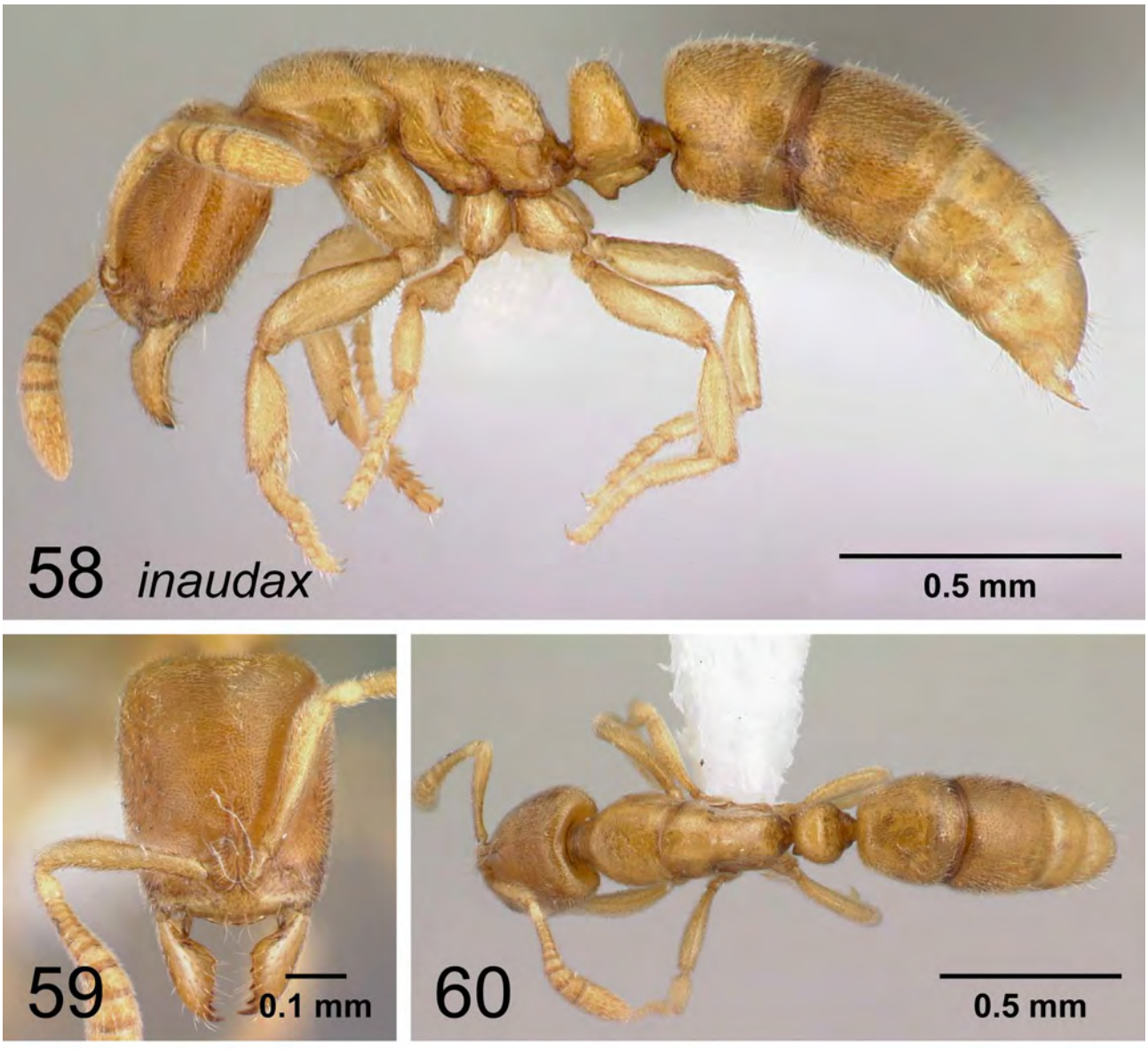
cher); Kakamega For., Yala (*G. Fischer*); Yala River Nat. Res. (*Snelling & Espira*); Kakamega For., Isecheno (*R.R. Snelling*); Isecheno For. Res., Kalunya Glade (*R.R. Snelling*); Bunyangu Nat. Res. nr Salazar Circuit (*Snelling & Espira*).

Hypoponera inaudax (Santschi)
(Figs 58–60)

Ponera inaudax Santschi, 1919: 83. Holotype worker, DEMOCRATIC REPUBLIC OF CONGO: Yambuya, 26.xi., no. 82 (*Bequaert*) (NHMB) [examined]. [Combination in *Ponera (Hypoponera)*: Santschi, 1938: 79; in *Hypoponera*: Bolton, 1995: 214.]

NOTE. The holotype of *inaudax* in mostly lost. Only the head remains on the mount, together with one leg. The mandibles and the anterior clypeal margin are embedded in glue and there is a hole in the vertex. Cephalic dimensions of the holotype are: HL 0.45, HW 0.36, HS 0.405, SL 0.28, CI 80, SI 78, SL/HL 0.62.

WORKER. *Measurements*: HL 0.40–0.46, HW 0.33–0.37, HS 0.365–0.410, SL 0.25–0.28, PrW 0.24–0.27, WL 0.54–0.60, HFL 0.24–0.29, PeNL 0.12–0.14, PeH 0.22–0.25, PeNW 0.16–0.19, PeS 0.167–0.190 (60 measured). *Indices*: CI 77–84, SI 74–82, PeNI 64–73, LPeI 50–59, DPeI 125–150.



FIGURES 58–60. Lateral, full face and dorsal view of body. *Hypoponera inaudax* worker CASENT0192370.

Eyes absent. Apex of scape, when laid straight back from its insertion, conspicuously fails to reach the midpoint of the posterior margin in full-face view; SL/HL 0.60–0.66. Funiculus distinctly with 5 enlarging apical segments. Metanotal groove usually entirely absent from dorsum of mesosoma but in some a vestige of its former path may be visible. Mesonotal-mesopleural suture absent from side of mesosoma or at most represented by an almost effaced faint line. Propodeal declivity separated from sides by bluntly rounded curves or blunt angles; without an acute, raised, sharp carina. Posterior surface of petiole node without short cuticular ridges that radiate from just above the peduncle. Node of petiole in profile short-nodiform, the anterior and posterior faces converge dorsally, usually obviously so; length of node just above anterior tubercle is noticeably greater than length of dorsum. Subpetiolar process conspicuously present in profile, somewhat variable in shape. Usually with a descending anterior face that terminates in a distinct ventral angle, behind which the outline slopes upwards. Maximum width of first gastral tergite in dorsal view is noticeably less than width of second gastral tergite at its midlength. Sides of second gastral tergite shallowly convex in dorsal view. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is less than the maximum width of the segment. Cross-ribs at base of cinctus are short and crowded, but conspicuous. Disc of second gastral tergite with densely crowded small superficial punctures so that the surface appears microreticulate at lower magnifications. First and second gastral tergites dorsally pubescent and with a number of short standing setae that project just above the level of the pubescence. Full adult colour yellow.

This small, yellow species is closely related to *coeca* and both are sometimes recovered from single litter samples. It averages smaller than *coeca* and tends to possess shorter antennal scapes, as reflected in the key characters. Having said that, it seems probable that *inaudax*, as currently defined, contains more than one real species. There are subtle variations in the relative length of the scape, the shape of the petiole and its ventral process that defy analysis here. These may indicate that another species, intermediate between *inaudax* and *coeca*, should properly be recognised, or conversely, that intermediate specimens may eventually prove that the two are in fact extremes of a single species.

Material examined. **Guinea**: Camayenne (*Silvestri*). **Ivory Coast**: Tai For. (*V. Mahnert*); Tai For. (*J. Piart*); Bingerville (*Mahnert & Perret*). **Ghana**: Bunso (*R. Belshaw*); Sui For. Res. (*R. Belshaw*); Kade (*R. Belshaw*); Nkawkaw (*R. Belshaw*); Esunkawkaw (*R. Belshaw*); Southern Scarp For. Res. (*R Belshaw*); Atewa For. Res., nr Kibi (*R. Belshaw*). **Nigeria**: Ibadan, IITA (*A. Russel-Smith*); Ile Ife (*J.T. Medler*). **Cameroun**: Nkoemvon (*D. Jackson*); Mbalmayo (*N. Stork*); Korup N.P., Mundemba (*B.L. Fisher*); N'Kolo, Bondé For., Elogbatindi (*B.L. Fisher*). **Gabon**: La Makandé, For. des Abeilles (*S. Lewis*); Prov. Woleu-Ntem, Minvoul (*B.L. Fisher*); Prov. Ogooue-Maritime, Res. Monts Doudou, nr Doussala (*B.L. Fisher*); Res. Moukalaba, nr Doussala (*B.L. Fisher*); F.C. Mondah (*B.L. Fisher*); For. de Mondah, Cap Esterias (*Bartolozzi & Taiti*). **Democratic Republic of Congo**: Epulu (*S.D. Torti*); Yambuya (*Bequaert*). **Kenya**: Western Prov., Ekero (*G. Fischer*).

Hypoponera jeanneli (Santschi)
(Figs 61–63)

Ponera jeanneli Santschi, 1935: 262, fig. 3c-e. Syntype worker, KENYA: Camp 1 de l'Elgon, M. Elgon, Vers. Est, st. 13, 2100 m, C. Arambourg 1932-33 (*Chappuis & Jeannel*) (NHMB) [examined]. [Combination in *Ponera (Hypoponera)*: Santschi, 1938: 79; in *Hypoponera*: Bolton, 1995: 215.]

Ponera (Hypoponera) jeannebi [sic] st. *abyssinica* Santschi, 1938: 80, fig. 2. Syntype worker and queen, ETHIOPIA: Scoia, Let Marefia, vii.87 (*Ragazzi*) (NHMB) [queen examined]. **Syn. n.** (provisional). [Unresolved junior primary homonym of *Ponera abyssinica* Guérin-Méneville, 1849: 352 (currently in *Pachycondyla*). Raised to species: Bernard, 1953: 205. Combination in *Hypoponera*: Bolton, 1995: 215.] (See note 1.)

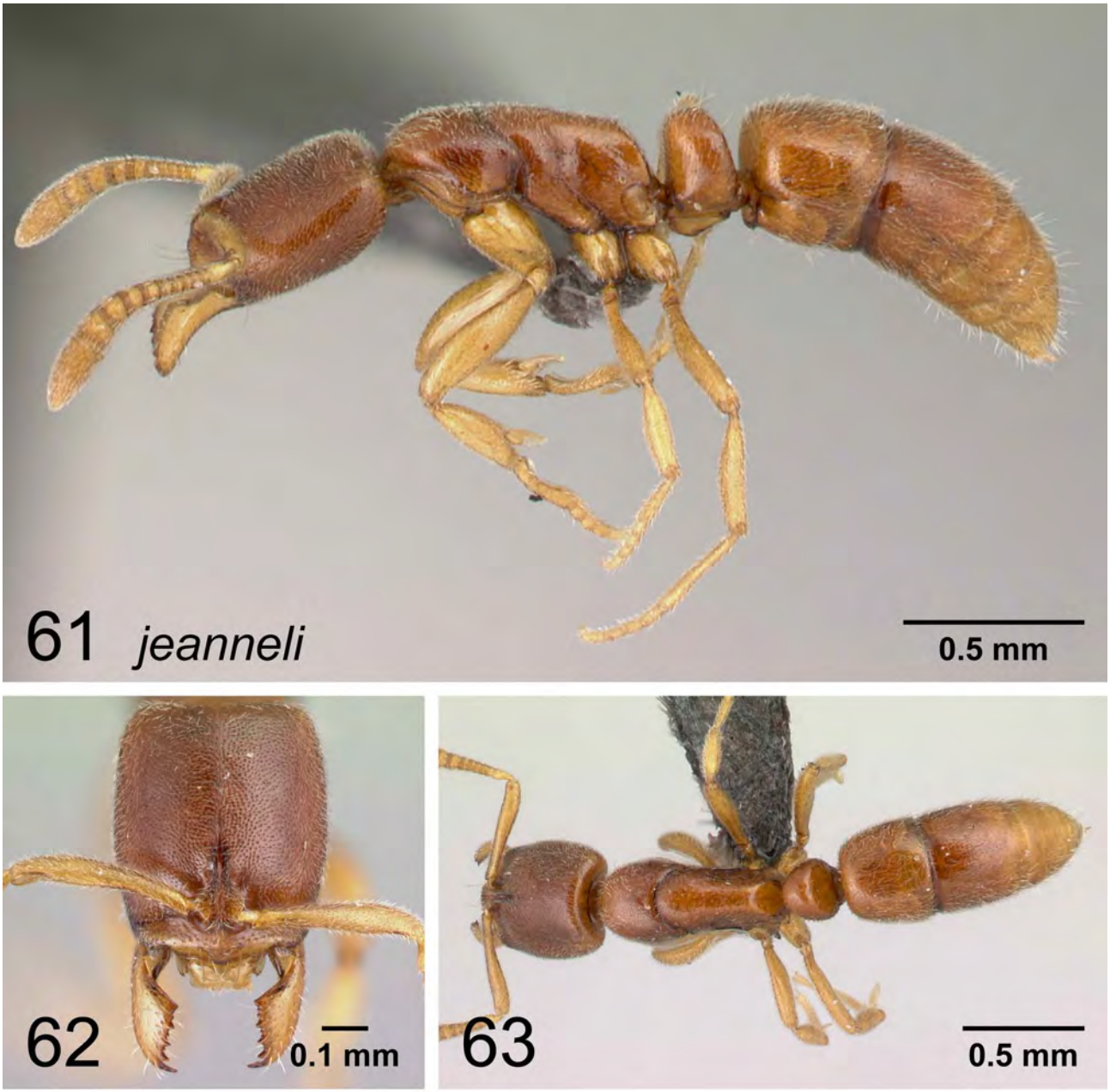
Ponera coarctata subsp. *imatongica* Weber, 1942: 44, fig. 3. Syntype workers, SUDAN: Imatong Mts, Equatoria, 24.vii. - 5.viii.1939, 6100 - 6200 ft, nos. 1387, 1390 (*N.A. Weber*) (MCZC) [examined]. **Syn. n.** [Combination in *Hypoponera* and raised to species: Taylor, 1967: 12.] (See note 2.)

NOTES.

1 From Santschi's original description the impression is gained that *abyssinica* is intermediate between *jeanneli* and *ursa*, but closer to the former. The single worker was very briefly and inadequately described and is not now present in NHMB. The queen has antennal funiculus segments 7–10 relatively narrow, decidedly more reminiscent of *jeanneli* than of *ursa*, but unfortunately the queen of the former is not known, so direct comparison is not possible. When Bernard (1953) elevated *abyssinica* to species-rank he said he had examined the types in the

Santschi collection, and his notes suggest that the worker syntype was in the collection at that time. For the present, *abyssinica* is best regarded as a provisional synonym of *jeanneli*, until there is much better representation of the taxa involved and the situation can be re-examined.

2 Weber's original description is astonishing in its failure to include a single character useful for species diagnosis and gives no comparative notes. It is safe to say that in the absence of type-material this taxon would be utterly unidentifiable. Another specimen labelled as a syntype of *imatongica* is present in MCZC, with the data given above but number 1419 and with the locality Issore written on the underside of the label. This was not mentioned by Weber in the original description and hence is excluded from the type-series; it is conspecific with the syntypes. A third syntype specimen mentioned by Weber, with the same data but number 1313, was not seen. Clearly, *imatongica* bears no relation to *coarctata* (type-species of *Ponera*), the species with which it was originally associated.



FIGURES 61–63. Lateral, full face and dorsal view of body. *Hypoponera jeanneli* worker CASENT0217336.

WORKER. *Measurements*: HL 0.58–0.64, HW 0.46–0.52, HS 0.525–0.580, SL 0.40–0.45, PrW 0.34–0.40, WL 0.75–0.85, HFL 0.39–0.44, PeNL 0.16–0.19, PeH 0.34–0.40, PeNW 0.24–0.28, PeS 0.237–0.283 (39 measured). *Indices*: CI 77–85, SI 82–88, PeNI 65–74, LPeI 43–50, DPeI 137–165.

Eyes usually absent but rarely an eye spot or vestigial ommatidium is discernible. Apex of scape, when laid straight back from its insertion, just fails to reach, or just touches, the midpoint of the posterior margin in full-face view; SL/HL 0.66–0.72. Cephalic dorsum reticulate-punctate. Pronotal dorsum almost smooth, obviously much less strongly and densely sculptured than cephalic dorsum. Metanotal groove absent from dorsum of mesosoma or at most a very superficial and indistinct indentation present that is almost effaced. Mesonotal-mesopleural suture absent from side of mesosoma. Propodeum weakly marginate between declivity and side. Posterior surface of petiole node with a series of very short cuticular ridges that radiate upward from the peduncle. Node of petiole in profile with the anterior and posterior faces weakly convergent dorsally. Subpetiolar process with a ventral angle. In dorsal view petiole node with posterior face transverse; sides and anterior face form a single convex surface, but not thickly D-shaped. Maximum width of first gastral tergite in dorsal view subequal to width of second gastral tergite at its midlength. Cross-ribs at base of cinctus of second gastral tergite strongly developed and conspicuous. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is equal to, or very slightly less than, the width of the segment at its midlength. Disc of second gastral tergite with sharply incised, small punctures that are close-packed but separated by areas of glossy cuticle; the diameters of the punctures are equal to, or slightly less than, the distances that separate the punctures. First and second gastral tergites dorsally pubescent and with a number of short standing setae that project above the level of the pubescence.

Among the Afrotropical species of *Hypoponera*, eleven are defined by the following combination of three characters in the worker: sharply defined metanotal groove absent; posterior face of petiole node with short cuticular ridges above the peduncle; base of cinctus with cross-ribs. Of these, *tecta* has a sharp, triangular denticle that overhangs the midpoint of the anterior clypeal margin in full-face view. *H. exigua* and *traegaordhi* have a transverse dark rim above the cuticular ridges on the posterior petiole, and the ridges lie within a shallow groove whose upper margin is the rim. *H. faex* is a large species (HL 0.88, HW 0.72) with a conspicuously developed eye. *H. faex* and *hebes* both have very coarse sculpture on the lateroventral surfaces of the head and also on most of the pronotum. *H. surda* has sparse, widely spaced small punctures on the disc of the second gastral tergite. The remaining five species, *mixta, jeanneli, jocosa, quaestio* and *ursa*, form a closely related complex in which the eye is usually absent, the pronotal sculpture is markedly less dense and intense than that on the head, and the punctures on the disc of the second gastral tergite are larger and more closely packed than in *surda*. *H. jocosa* is isolated by its tall, slender petiole node and relatively short scapes, as discussed below. *H. mixta* is closely related and very similar to *jeanneli* and *ursa*, but is larger, has a more parallel-sided second gastral tergite and has a relatively slightly longer scape, SI 87–93 as opposed to 82–88 in the other two. The separation of *jeanneli* and *ursa* is currently unsatisfactory, as discussed under the latter name.

H. jeanneli seems quite widely distributed in eastern Africa, usually at altitude. The record from Mt Cameroon appears anomalous, but the specimens, collected at an altitude of 1440 m., match their more eastern counterparts except for being slightly larger (HW 0.52–0.54, SL 0.43–0.46); all indices fall within the ranges noted above.

Material examined. **Cameroun**: Prov. Sud-Ouest, Mt Cameroon, Mapanja (*B.L. Fisher*). **Ethiopia**: Scoia, Let Marefia (*Ragazzi*). **Sudan**: Imatong Mts, Equatoria (*N.A. Weber*). **Uganda**: Ruwenzori, above Kilembe (*Cuccodoro & Erne*); Mt Elgon, Kapkwata (*Cuccodoro & Erne*). **Kenya**: Mt Elgon (*Chappuis & Jeannel*); Nakuru, Lake Naivasha (*V. Mahnert*); Nakuru, Lake Naivasha (*Mahnert & Perret*); Lake Nakuru Nat. Pk (*V. Mahnert*); Nakuru, Lk. Naivasha, Mundui Estate (*Mahnert & Perret*); Embu, Irangi For. Sta. (*Mahnert & Perret*); Kiambu distr., nr Limuru (*Mahnert & Perret*); Nairobi (*V. Mahnert*); Mau For., between Mau summit and Kedowa (*V. Mahnert*); Embu, 10 km. W Ishiara (*Mahnert & Perret*); Western Prov., Kakamega For., Ikuywa (*F. Hita Garcia*); Ikuywa (*S. Maurer*). **Rwanda**: Rangiro (*P. Werner*). **Tanzania**: Kilimanjaro Reg., Kindoroko For. Res. (*Hawkes, Makwati & Mtana*); Morogoro Reg., Mamiwa-Kisara For. Res. (*Hawkes, Makwati & Mtana*), **Zimbabwe**: Umtali, Melsetter (*R. Mussard*).

Hypoponera jocosa Bolton & Fisher **sp. n.**

WORKER (holotype in parentheses). *Measurements*: HL 0.59–0.60 (0.60), HW 0.48 (0.48), HS 0.535–0.540 (0.540), SL 0.39–0.41 (0.40), PrW 0.36–0.38 (0.37), WL 0.76–0.80 (0.78), HFL 0.39–0.40 (0.38), PeNL 0.14–0.15

(0.15), PeH 0.38–0.40 (0.39), PeNW 0.25–0.28 (0.27), PeS 0.257–0.273 (0.270) (3 measured). *Indices*: CI 80–81 (80), SI 81–85 (83), PeNI 69–74 (73), LPeI 35–37 (38), DPeI 179–200 (180).

Eyes absent. Apex of scape, when laid straight back from its insertion, distinctly fails to reach the midpoint of the posterior margin in full-face view; SL/HL 0.66–0.68. Cephalic dorsum densely reticulate-punctate; lateroventral surfaces of head with scattered small punctures that are separated by shining areas of cuticle. Pronotal dorsum obviously much less strongly and less densely sculptured than cephalic dorsum, with scattered small punctures. Metanotal groove absent from dorsum of mesosoma, though a faint vestige of the junction between mesonotum and propodeum remains. Propodeum marginate between declivity and side. Posterior surface of petiole node with about 4 short, inconspicuous cuticular ridges that are restricted to the extreme apex of the peduncle and extreme base of the node. Node of petiole in profile slender, short and high, with the anterior and posterior faces parallel and the dorsum shallowly convex. Petiole node in dorsal view broad relative to its length; posterior face transverse and anterior face convex, the dorsum longest medially and tapering rapidly on both sides. Subpetiolar process with a blunt ventral angle. Maximum width of first gastral tergite in dorsal view slightly greater than width of second gastral tergite at its midlength. Cross-ribs at base of cinctus of second gastral tergite very conspicuous, coarse and densely crowded. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is distinctly less than the width of the segment at its midlength. Disc of second gastral tergite with sharply incised, coarse, conspicuous punctures that are separated by areas of glossy cuticle; the diameters of the punctures are equal to or slightly less than the distances that separate the punctures. First gastral tergite in profile densely pubescent dorsally and with short setae present. Full adult colour: cephalic dorsum black; mesosoma, petiole and gaster dark brown.

Holotype worker, **Ethiopia**: Ilubador Region, Buno Bedele, nr Bedele, 29/31.vii.2002, Museo Zoologico "La Specola", num. MAG 2484 (*A. Sforzi & L. Bartolozzi*) (MSNF).
Paratypes. 2 workers and 1 dealate queen, with same data as holotype (MSNF, BBRC).

Although known from only three worker specimens, *jocosa* is easily distinguished from all other known species in its complex. The species that resemble *jocosa* most closely include *jeanneli*, *mixta*, *quaestio*, *surda* and *ursa* (see under *jeanneli*), but in all of these the petiole node is distinctly less slender in profile and is relatively narrower in dorsal view. LPeI and DPeI in *jocosa* are 35–38 and 179–200 respectively, whereas the indices in the other five together are LPeI 43–50 and DPeI 137–172. In addition, the scapes of *jocosa* are relatively short, with SI 81–85 and SL/HL 0.66–0.68. In *mixta*, *surda* and *ursa* these indices are SI 86–93, SL/HL 0.71–0.75. There is overlap with *jocosa* only in some specimens of *jeanneli*, which has SI 82–88, SL/HL 0.64–0.72, but in this species LPeI is greater than, and DPeI less than, the figures seen in *jocosa*.

The ridges at the base of the posterior face of the petiole are small and inconspicuous. If these are overlooked, *jocosa* specimens will key out at the couplet that contains *molesta* and *venusta*. However, the differently shaped petioles of the three species will quickly separate them. In *molesta* and *venusta* together, their combined LPeI is 47–56, considerably greater than the LPeI 35–37 of *jocosa*. Individually, the PeNI of *molesta* (89–94) is much greater than that of *jocosa* (69–74), while the DPeI of *venusta* (139 – 160) is much lower than that of *jocosa* (179 – 200).

In the known Ethiopian fauna *jocosa* resembles *juxta*. The possibility must be considered that the latter is merely a small representative of the former in which the minute cuticular ridges of the posterior petiole have been lost. However, among the very few specimens currently available the *juxta* holotype is distinctly smaller than the specimens of *jocosa* and has a somewhat differently shaped petiole, as indicated by comparison of their respective measurements and indices. For the present, until more material can be accumulated, these differences are considered sufficient to separate them as separate taxa.

Hypoponera juxta Bolton & Fisher **sp. n.**

HOLOTYPE WORKER. *Measurements*: HL 0.56, HW 0.43, HS 0.495, SL 0.36, PrW 0.31, WL 0.71, HFL 0.34, PeNL 0.14, PeH 0.33, PeNW 0.24, PeS 0.237. *Indices*: CI 77, SI 84, PeNI 77, LPeI 42, DPeI 171.

Matching the description of *fatiga* and with indices in the same range, but size slightly larger (compare measurements). *H. juxta* is immediately distinguished from *fatiga* by the condition of the cross-ribs at the base of the cinc-

tus of the second gastral tergite. In *fatiga* (and also in *lassa*) the cross-ribs are short, fine, delicately constructed and densely packed. In contrast, the cross-ribs of *juxta* are long and thick, coarse and very conspicuous, and are distinctly separated by broad, longitudinal spaces. In addition, in *juxta* the anterior and posterior faces of the petiole node in profile are almost parallel, only minutely convergent dorsally, and the maximum width of the first gastral tergite in dorsal view is equal to the width of the second tergite at its midlength (*ca* 0.38).

Holotype worker. **Ethiopia**: Welega Region, Nekemte, between Nekemte & Gimbi (1350 m.) c/o Kolobo, 26.vii.2002, Museo Zoologico "La Specola", num. MAG. 2484 (*A. Sforzi & L. Bartolozzi*) (MSNF).

H. juxta is known from just a single specimen but is obviously closely related to *fatiga* (and *lassa*); the contrast between their fine, superficial, closely packed, short cross-ribs and the long, strong, widely spaced, coarse cross-ribs of *juxta*, is striking. See also the note under *jocosa*, above.

Hypoponera lassa Bolton & Fisher **sp. n.**
(Figs 64–66)

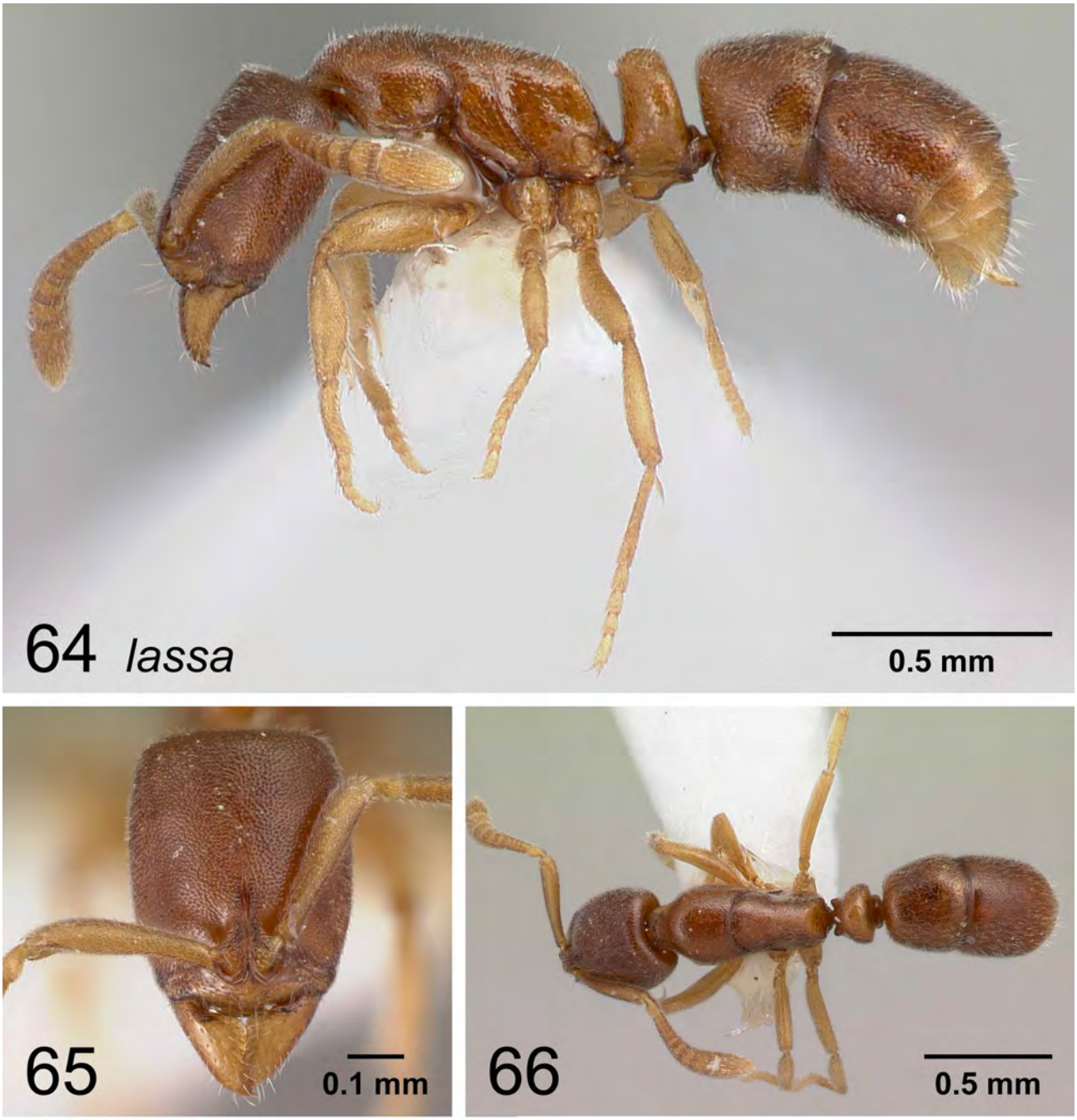
WORKER (holotype in parentheses). *Measurements*: HL 0.51–0.56 (0.54), HW 0.40–0.44 (0.44), HS 0.455–0.495 (0.490), SL 0.34–0.38 (0.37), PrW 0.31–0.35 (0.34), WL 0.66–0.74 (0.72), HFL 0.34–0.40 (0.38), PeNL 0.13–0.16 (0.14), PeH 0.33–0.38 (0.37), PeNW 0.22–0.25 (0.24), PeS 0.227–0.260 (0.250) (10 measured). *Indices*: CI 77–81 (81), SI 84–90 (84), PeNI 70–78 (71), LPeI 37–43 (38), DPeI 155–171 (171).

Eyes absent. Median portion of clypeus with a raised median longitudinal ridge or crest. Apex of scape, when laid straight back from its insertion, distinctly fails to reach the midpoint of the posterior margin in full-face view; SL/HL 0.65–0.71. Reticulate-punctate sculpture on cephalic dorsum fine and dense, the punctures crowded, small and sharply defined. Lateroventral areas of head distinctly punctate, the sculpture almost reticulate-punctate but not as closely packed as on the dorsum. Punctate sculpture on disc of pronotum more diffuse than on lateroventral surface of head. Metanotal groove absent from dorsum of mesosoma. Sides of propodeal declivity marginate but not carinate. Petiole node in dorsal view transverse, the anterior surface more convex than the posterior but not thickly D-shaped. Petiole node in profile tall and slender, with the sides weakly convergent from just above tubercle to apex; anterior face often extremely shallowly concave, dorsum shallowly convex. Posterior surface of petiole node without radiating cuticular ribs above the peduncle. Subpetiolar process with a ventral angle that may be sharp or blunt and a short ascending posterior surface behind the angle. Base of cinctus of second gastral tergite with short, inconspicuous cross-ribs. Disc of second gastral tergite microreticulate to superficially reticulate-punctate; without sharply incised, widely separated punctures. Maximum width of first gastral tergite in dorsal view is less than the width of the second tergite at its midlength. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is slightly less than the maximum width of the segment. Suberect to erect setae on dorsum of first gastral tergite sparse and short, stubbly. Full adult colour light brown, the appendages lighter.

Holotype worker (top specimen of two on pin), **Ghana**: Sagymasi, iii.1992 (*R. Belshaw*) (BMNH).
Paratypes. 2 workers and 1 dealate queen with same data as holotype, one of the workers mounted below the holotype (BMNH).

A small species, currently known only from leaf litter samples from Ivory Coast and Ghana. See notes under *defessa*.

Non-paratypic material examined. **Ivory Coast**: Tai For. (*Mahnert & Perret*); Agboville, Yapo For. Res., nr Yapo-Gare (*I. Löbl*); Sassandra, Monogaga, Monoho Pt (*I. Löbl*); Abidjan, Banco Nat. Pk (*I. Löbl*). **Ghana**: Sui For. Res. (*R. Belshaw*); Bobiri (*R. Belshaw*).



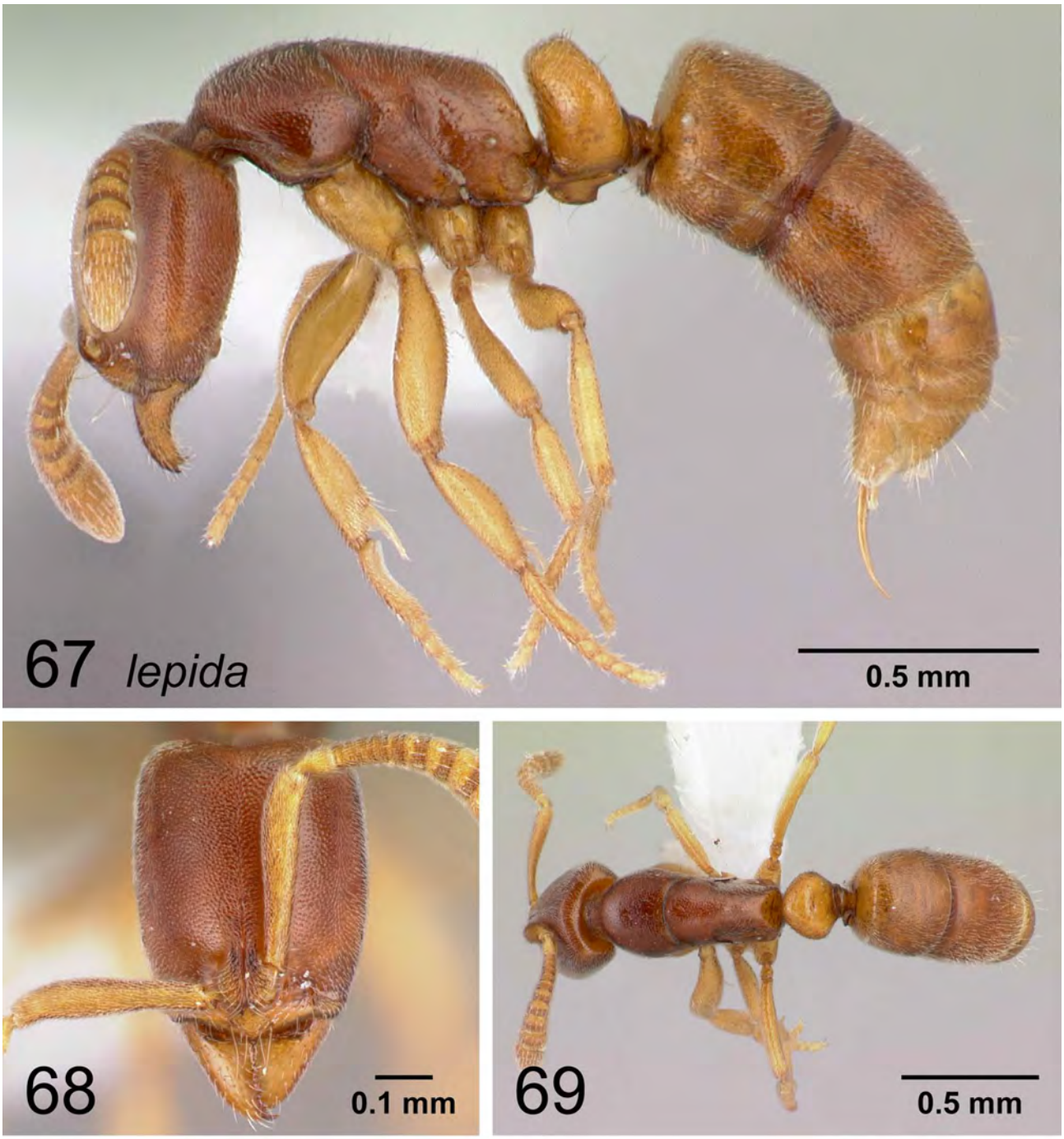
FIGURES 64–66. Lateral, full face and dorsal view of body. *Hypoponera lassa* worker CASENT0226550.

Hypoponera lepida Bolton & Fisher **sp. n.**
(Figs 67–72)

WORKER (holotype in parentheses). *Measurements*: HL 0.53–0.58 (0.53), HW 0.40–0.45 (0.41), HS 0.465–0.515 (0.470), SL 0.34–0.40 (0.36), PrW 0.30–0.40 (0.30), WL 0.66–0.77 (0.67), HFL 0.34–0.40 (0.36), PeNL 0.13–0.17 (0.14), PeH 0.32–0.39 (0.35), PeNW 0.20–0.27 (0.24), PeS 0.220–0.270 (0.243) (30 measured). *Indices*: CI 75–79 (77), SI 81–91 (88), PeNI 70–80 (80), LPeI 38–47 (40), DPeI 145–178 (171).

Eyes frequently absent but often a vestige of a single minute ommaditium may be present; more rarely a fairly distinct single, small ommatidium can be seen. Apex of scape, when laid straight back from its insertion, distinctly fails to reach the midpoint of the posterior margin in full-face view; SL/HL 0.64–0.70. Reticulate-punctate sculpture on cephalic dorsum fine and dense, the punctures crowded, small and sharply defined. Punctate sculpture on dorsum of mesosoma much less strongly defined, sparser and more superficial. Mesonotal-mesopleural suture absent. Metanotal groove entirely absent from dorsum. Sides of propodeal declivity bluntly marginate. Petiole node

in dorsal view relatively narrow, with a convex anterior face and flat to feebly impressed posterior face. Petiole node in profile high and relatively short from front to back; slightly shorter at apex than immediately above level of anterior tubercle. Frequently, the anterior face of the petiole node in profile is very shallowly concave and the posterior face very slightly convex, so that the node has a slight forward curve. This feature is not universal and variation occurs within single series. Subpetiolar process with an obliquely descending anterior face, a ventral angle and a short, ascending posterior surface after the angle. Base of cinctus of second gastral tergite smooth and shining in dorsal view, without cross-ribs. Disc of second gastral tergite appearing microreticulate, the sculpture superficial, the punctures wide and shallow, with feebly raised rims that are more or less confluent to achieve the microreticulate appearance; without sharply incised widely separated punctures. Maximum width of first gastral tergite in dorsal view is subequal to, or slightly less than, the width of the second tergite at its midlength. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is usually slightly less than the maximum width of the segment. Full adult colour light brown to medium brown, the appendages lighter.



FIGURES 67–69. Lateral, full face and dorsal view of body. *Hypoponera lepida* worker CASENT0217340.

FIGURES 70–72. Lateral, full face and dorsal view of body. *Hypoponera lepida* ergatoid queen BLF2328(24)-4.

Holotype worker, **Ghana**: Ashanti, Juaso, 8.ix.1992, leaf litter, cocoa (*R. Belshaw*) (BMNH).
Paratypes. 5 workers with same data as holotype (BMNH, CASC).

The eye is variably developed in this species. In many individuals no trace of an eye can be detected, but sometimes a depigmented spot or small, inconspicuous, single ommatidium can be seen. At its weakest, this ommatidium is easily confused with the surrounding punctate sculpture. From this condition the ommatidium may become gradually slightly larger and more distinctly differentiated, until in some workers it is distinct and darkly coloured, though still only of a single small ommatidium. Degree of development appears to be size-related: in general the largest workers show the most distinct eyes. A single worker-queen intercaste is known, from Korup N.P., in Cameroun (CASC) that has eyes of 10–12 ommatidia (Figs 70–72).

The two specimens recorded below from Banco National Park, Ivory Coast (in MHNG) may represent a close sibling species. The upper specimen on the pin is badly damaged, with its head detached and mounted separately and its gaster missing; but the lower specimen is complete. This is slightly larger than the range given above, with HL 0.60, HW 0.48, SL 0.42, PrW 0.36, PeNL 0.20, PeH 0.42, PeNW 0.31, CI 80, SI 88, PeNI 86, LPeI 48, DPeI 155, and the sculpture on the second gastral tergite is somewhat more sparse and weaker than is usual in *lepida*, with individual punctures rather more isolated and better defined. Because only a single complete specimen is known, which is otherwise almost identical to *lepida*, it has not been described as a separate species here. The situation can be reviewed if more specimens are ever discovered. For the present *lepida* is defined by its lack of a metanotal groove, lack of cross-ribs in the cinctus of the second gastral tergite, and the second gastral tergite at least equal in width to the first and densely, superficially sculptured.

Differentiation of *lepida* from its apparent closest relative, the Zimbabwean *obtunsa*, is discussed under *obtunsa*.

Non-paratypic material examined. **Ivory Coast**: Tai For. (*V. Mahnert*); Abidjan, Banco Nat. Pk (*I. Löbl*). **Ghana**: Poano (*R. Belshaw*); Efiduase (*R. Belshaw*); Sajymasi (*R. Belshaw*); Bunso (*R. Belshaw*); Atewa For. Res., Kibi (*R. Belshaw*); Esunkawkaw (*R. Belshaw*); Tafo (*R. Belshaw*); Kade (*R. Belshaw*); Mampong (*P. Room*). **Nigeria**: Ile-Ife (*J.T. Medler*). **Cameroun**: Mbalmayo (*N. Stork*); Nkoemvon (*D. Jackson*); Prov. Sud, Res. Faune de Campo, Ebodjé (*B.L. Fisher*); Res. Campo, Massif des Mamelles (*B.L. Fisher*); N'Kolo, Bondé For., Elogbatindi (*B.L. Fisher*); Prov. Sud-Ouest, Bimbia For., Limbe (*B.L. Fisher*); Korup N.P., Mundemba (*B.L. Fisher*). **Central African Republic**: Dzanga-Ndoki, Lidjombo (*B.L. Fisher*); Mabéa Bai, Bayanga (*B.L. Fisher*).

Hypoponera meridia Bolton & Fisher **sp. n.**
(Figs 73–75)

WORKER (holotype in parentheses). *Measurements*: HL 0.52–0.54 (0.52), HW 0.38–0.40 (0.40), HS 0.415–0.470 (0.460), SL 0.32–0.34 (0.34), PrW 0.28–0.30 (0.29), WL 0.67–0.70 (0.67), HFL 0.32–0.34 (0.32), PeNL 0.14–0.16 (0.15), PeH 0.28–0.30 (0.29), PeNW 0.20–0.23 (0.21), PeS 0.210–0.230 (0.213) (10 measured). *Indices*: CI 72–77 (77), SI 83–89 (85), PeNI 70–78 (72), LPeI 47–55 (52), DPeI 133–144 (140).

Eyes absent or at most with an indistinct small depigmented spot. In full-face view apex of scape, when laid straight back from its insertion, distinctly fails to reach the midpoint of the posterior margin; SL/HL 0.62–0.65. Reticulate-punctulate sculpture of cephalic dorsum fine; head more densely sculptured than pronotal dorsum. Lateroventral surfaces of head almost smooth, only with very widely separated, minute punctulae. With mesosoma in dorsal view the metanotal groove absent. Propodeal declivity separated from sides by blunt angles or weak marginations. Mesopleuron smooth and shining. Petiole in profile with the node relatively short and of moderate height, the anterior and posterior faces parallel or at most extremely feebly convergent dorsally; dorsal surface shallowly broadly convex. Subpetiolar process usually with a low, blunt ventral angle. Posterior surface of petiole node without a transverse groove or impression above the peduncle, but sometimes a slender transverse carina is present that is immediately adjacent to the peducle. Without cuticular ridges that radiate upwards from the posterior petiolar peduncle. In dorsal view the petiole node distinctly broader than long. Maximum width of first gastral tergite in dorsal view less than the width of the second tergite at its midlength. Base of cinctus of second gastral tergite with short, feeble and indistinct cross-ribs that often appear merely as a row of aligned weak punctures. Posttergite of second gastral segment, from posterior margin of cinctus to apex, distinctly broader than long. Disc of second gastral tergite shallowly reticulate-punctate to microreticulate. With first gastral segment in profile its dorsum with sparse short standing setae. Full adult colour yellow to yellowish brown.

Holotype worker, **South Africa**: Kwazulu Natal, Umtamvuna Nat. Res., 31°02.704'S, 30°10.080'E, 220 m., 15.xi.2000, Winkler bag extraction, leaf litter, Pondoland Coastal Plateau, sour grassland, KW00-W23, CASENT 0395928 (*S. van Noort*) (CASC).

Paratypes. 3 workers and 1 delalate queen, with same data as holotype but coded KW00-W24, CASENT 0395317; KW00-W25, CASENT 0395327; KW00-W25, CASENT 0395328; KW00-W25, CASENT 0395330 (queen) (CASC).

The series from South Africa, Gauteng Prov. (data below, in SAMC, AFRC, BBRC) is extremely close to *meridia* and fits the above description except for being slightly darker and slightly larger than other series exam-

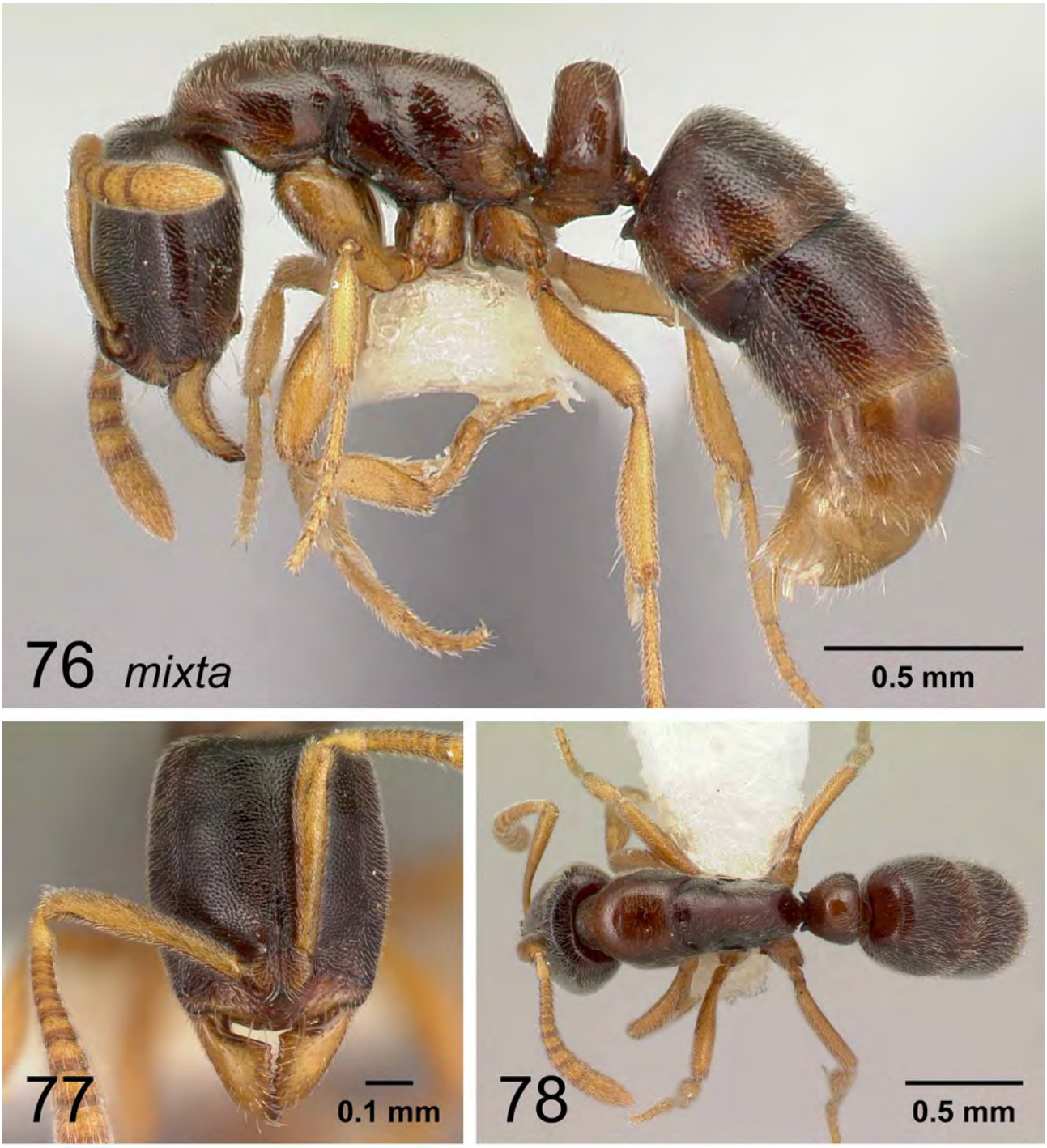
ined, but the LPeI in this series is consistently somewhat higher. *Measurements*: HL 0.54–0.56, HW 0.41–0.42, HS 0.475–0.490, SL 0.34–0.36, PrW 0.32–0.33, WL 0.68–0.70, HFL 0.35–0.36, PeNL 0.18–0.20, PeH 0.30–0.32, PeNW 0.24–0.25, PeS 0.240–0.257 (9 measured). *Indices*: CI 73–77, SI 82–86, PeNI 75–78, LPeI 58–65, DPeI 125–139. Besides this, the cross-ribs at the base of the cinctus of the second gastral tergite are extremely feeble and appear undeveloped in a few specimens; even at their strongest the cross-ribs appear as a row of minute, feeble punctures that may be difficult to see. This Gauteng series is currently maintained as *meridia* because it is by no means certain that separation at species-rank can be justified. The species is run out at two places in the key to reflect the variation of development of the gastral cross-ribs. See also the notes under *natalensis*.

Non-paratypic material examined. **South Africa**: Kwazulu Natal, Umtamvuna Nat. Res. (*S. van Noort*) (several short series); Gauteng Prov., Premier Game Park (*Hawkes & Fisher*).

FIGURES 73–75. Lateral, full face and dorsal view of body. *Hypoponera meridia* holotype worker CASENT0395928.

Hypoponera mixta Bolton & Fisher **sp. n.**
(Figs 76–78)

WORKER (holotype in parentheses). *Measurements*: HL 0.68–0.74 (0.70), HW 0.56–0.60 (0.58), HS 0.620–0.665 (0.640), SL 0.50–0.54 (0.51), PrW 0.45–0.48 (0.47), WL 0.94–1.00 (0.96), HFL 0.52–0.54 (0.52), PeNL 0.20–0.22 (0.20), PeH 0.43–0.46 (0.45), PeNW 0.31–0.34 (0.32), PeS 0.313–0.333 (0.323) (12 measured). *Indices*: CI 78–83 (83), SI 87–93 (88), PeNI 68–72 (68), LPeI 43–49 (44), DPeI 145–170 (160).



FIGURES 76–78. Lateral, full face and dorsal view of body. *Hypoponera mixta* paratype worker CASENT0226552.

Eyes absent. Apex of scape, when laid straight back from its insertion, fractionally fails to reach or just touches the midpoint of the posterior margin in full-face view; SL/HL 0.71–0.75. Cephalic dorsum finely reticulate-punc-

tate. Pronotal dorsum almost smooth, obviously much less strongly and densely sculptured than cephalic dorsum. Metanotal groove absent from dorsum of mesosoma, though there may be a slight change of slope between mesonotum and propodeum. Mesonotal-mesopleural suture vestigial or absent from side of mesosoma. Propodeum weakly marginate between declivity and side. Posterior surface of petiole node with a series of very short cuticular ridges that radiate upward from the peduncle. Node of petiole in profile with the anterior and posterior faces weakly convergent dorsally, the dorsum shallowly convex. Petiole node in dorsal view with posterior face transverse and anterior face broadly convex, not thickly D-shaped. Subpetiolar process rounded or with a blunt ventral angle. Maximum width of first gastral tergite in dorsal view slightly greater than width of second gastral tergite at its midlength. Cross-ribs at base of cinctus of second gastral tergite short but conspicuous. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is slightly less than the width of the segment at its midlength. Disc of second gastral tergite with sharply incised small punctures that are relatively closely packed and separated by areas of glossy cuticle; the diameters of the punctures are equal to or slightly greater than the distances that separate the punctures. First gastral tergite in profile densely pubescent dorsally and with very few short setae that project above the level of the pubescence; the setae inconspicuous and not strongly differentiated from the pubescence.

Holotype worker (top specimen of three on pin), **Kenya**: Nyandarua, 10 km. SE Njabini, nr For. Sta., 2550 m., 9.xi.1977 (*V. Mahnert & J.-L. Perret*) (MHNG).
Paratypes. 8 workers with same data as holotype; 12 workers **Kenya**: Embu, Irangi For. Sta., 2000 m., 11.x.1977 (*V. Mahnert & J.-L. Perret*) (MHNG, BMNH, CASC).

H. mixta is very closely related to *jeanneli* but is larger (compare measurements) and has the first gastral tergite broader in relation to the second. See the notes under *jeanneli* and *surda*.

Non-paratypic material examined. **Kenya**: Nakuru, Lake Naivasha (*V. Mahnert*).

Hypoponera molesta Bolton & Fisher **sp. n.**
(Figs 79–81)

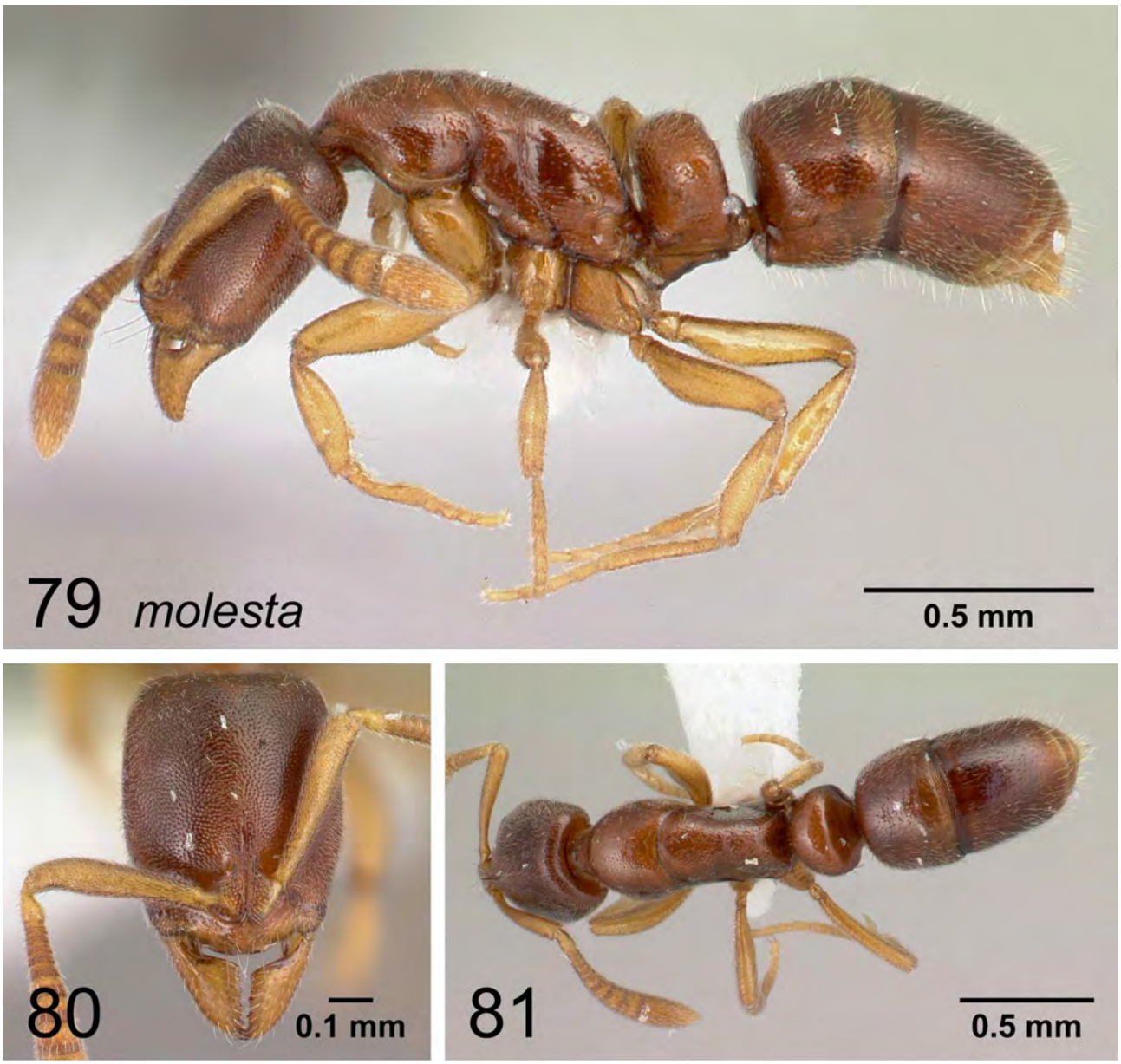
WORKER (holotype in parentheses). *Measurements*: HL 0.60–0.64 (0.60), HW 0.46–0.48 (0.48), HS 0.530–0.555 (0.540), SL 0.40–0.43 (0.40), PrW 0.36–0.38 (0.37), WL 0.80–0.84 (0.80), HFL 0.44–0.45 (0.44), PeNL 0.19–0.20 (0.20), PeH 0.39–0.42 (0.40), PeNW 0.34–0.36 (0.34), PeS 0.307–0.320 (0.313) (6 measured). *Indices*: CI 75–80 (80), SI 83–90 (83), PeNI 89–94 (92), LPeI 48–50 (50), DPeI 170–180 (170).

Eyes of 1–2 small, usually depigmented, ommatidia. Apex of scape, when laid straight back from its insertion, conspicuously fails to reach the midpoint of the posterior margin in full-face view; SL/HL 0.64–0.69. Pronotal dorsum superficially punctate, less densely sculptured than the finely reticulate-punctate cephalic dorsum. Metanotal groove absent from dorsum of mesosoma. Propodeum weakly marginate between declivity and side. Petiole in profile relatively stout, the node quite thick from front to back and with an almost flat to shallowly convex dorsum. In dorsal view the petiole node very broad and relatively long from front to back. Posterior surface of petiole node without cuticular ridges that radiate upward from the peduncle. Subpetiolar process with a blunt ventral angle. Maximum width of first gastral tergite in dorsal view greater than width of second gastral tergite at its midlength. Cross-ribs at base of cinctus of second gastral tergite distinct. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, slightly less than the width of the segment at its midlength. Disc of second gastral tergite with sharply incised, small punctures that are separated by areas of glossy cuticle; the diameters of the punctures are distinctly less than the distances that separate them. First gastral tergite dorsally pubescent, and with numerous conspicuous standing setae that are clearly longer and more erect than the pubescence.

Holotype worker, **Gabon**: Prov. Woleu-Ntem, 31.3 km. 108° ESE Minvoul, 2°04.8'N, 12°24.4'E, 600 m., 11.ii.1998, #1684(47)-4, sifted litter (leaf mold, rotten wood) rainforest (*B.L. Fisher*) (CASC).
Paratypes. 6 workers with same data as holotype but coded #1684(7)-3, #1684(9)-4, #1684(21)-4, #1684(23)-5, #1684(27)-6, #1684(28)-5; 1 dealate queen with same data but coded #1648(49)-7 (CASC, BMNH).

A discernible small eye is present in all the material examined, but given the variation elsewhere in the group it is possible that specimens without eyes may also occur. See the notes under *dema*.

Non-paratypic material examined. **Democratic Republic of Congo**: Epulu (*S.D. Torti*).



FIGURES 79–81. Lateral, full face and dorsal view of body. *Hypoponera molesta* holotype worker CASENT0218482.

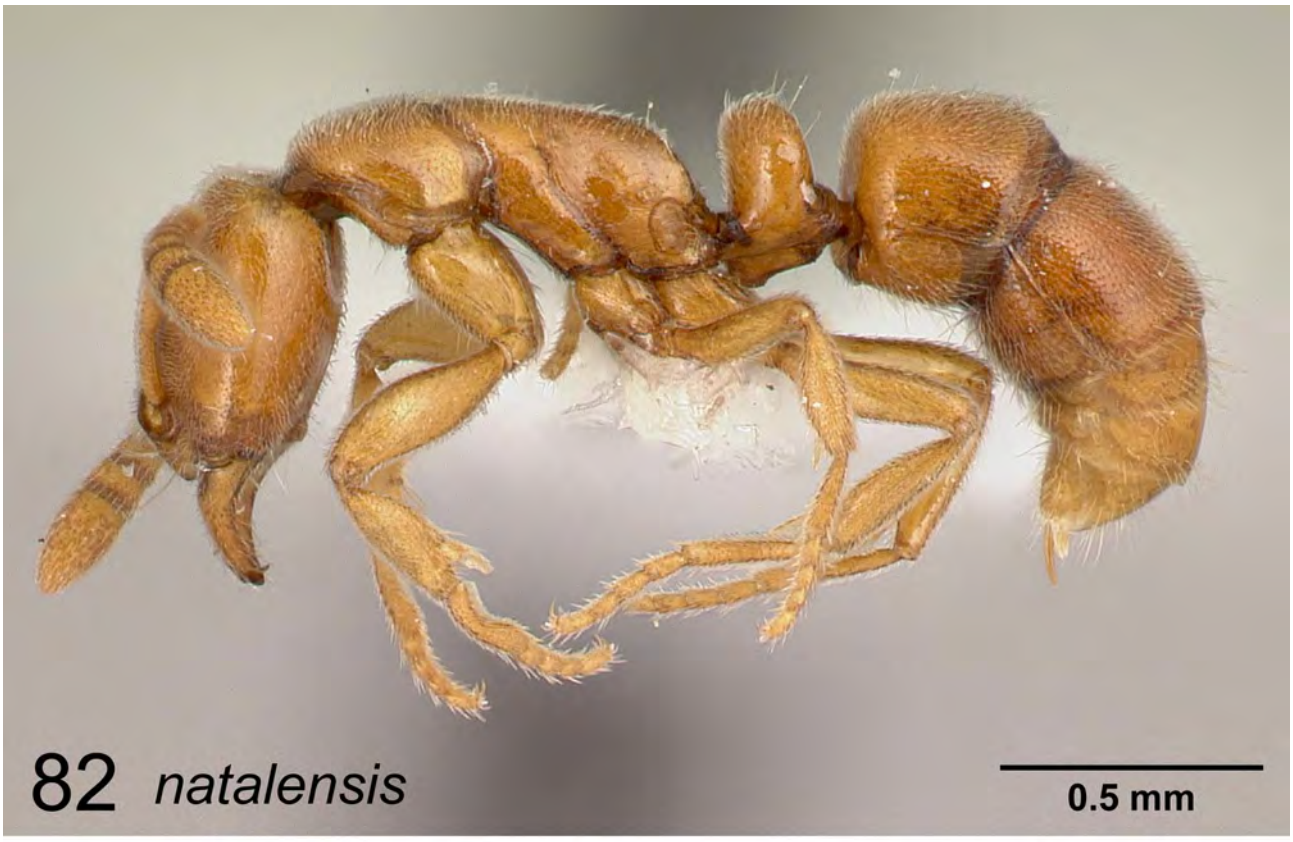
Hypoponera natalensis (Santschi)
(Figs 82–84)

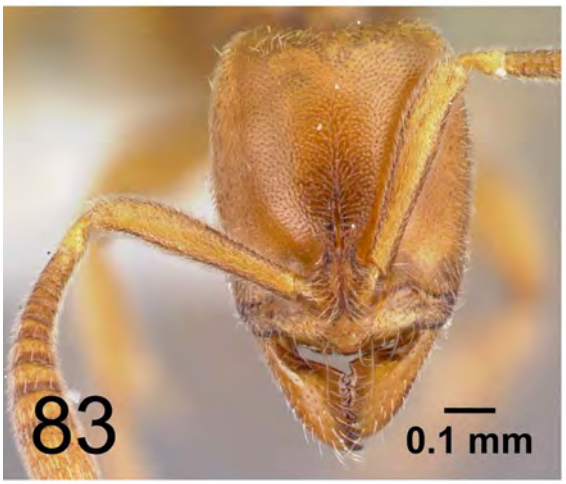
Ponera coarctata st. *natalensis* Santschi, 1914c: 7. Syntype workers, SOUTH AFRICA: Natal, Richmond, 25.iii.05 (*I. Trågärdh*) (NHMB) [examined]. [Combination in *Ponera (Hypoponera)* and raised to species: Santschi, 1938: 79; in *Hypoponera*: Taylor, 1967: 12.]

WORKER. *Measurements*: HL 0.62–0.69, HW 0.48–0.57, HS 0.555–0.630, SL 0.42–0.50, PrW 0.38–0.42, WL 0.82–0.92, HFL 0.40–0.50, PeNL 0.16–0.18, PeH 0.36–0.44, PeNW 0.26–0.32, PeS 0.260–0.313 (12 measured). *Indices*: CI 76–83, SI 84–90, PeNI 68–76, LPeI 41–47, DPeI 160–187.

Eyes vestigial to absent, usually represented by a small, depigmented spot that appears to be the remnant of a single ommatidium; sometimes no trace of an eye spot. In full-face view apex of scape, when laid straight back from its insertion, just fails to reach, or just touches, the midpoint of the posterior margin; SL/HL 0.67–0.73. Reticulate-punctulate sculpture of cephalic dorsum fine, but head more densely sculptured than pronotal dorsum. Lateroventral surfaces of head with extremely feeble punctate sculpture, merely of separated small superficial punctures on an otherwise smooth surface. With mesosoma in dorsal view the metanotal groove is usually, but not

always, vestigially represented by a faint transverse line that indicates the junction of the mesonotum and propodeum, but never with a strong impression that interrupts the surface; sometimes without trace of the metanotal groove. Propodeal declivity separated from sides by blunt marginations. Mesopleuron smooth and shining. Petiole in profile with the node relatively short and high, the anterior and posterior faces parallel, not convergent dorsally; dorsal surface broadly convex. Subpetiolar process with a low, blunt, ventral angle that is usually obtuse. Posterior surface of petiole node with a shallow transverse groove or impression above the peduncle, the upper margin of the impression appears as a transverse dark line or ridge in posterodorsal view. Each end of the impression usually terminates in a short oblique ridge that is visible in profile, but there are no cuticular ridges radiating upwards into the impression from the posterior peduncle. Maximum width of first gastral tergite in dorsal view slightly less than the width of the second tergite at its midlength. Base of cinctus of second gastral tergite with strong, dense cross-ribs. Posttergite of second gastral segment, from posterior margin of cinctus to apex, distinctly broader than long. Disc of second gastral tergite shallowly reticulate-punctate to microreticulate. With first gastral segment in profile the dorsum with sparse short standing setae. Full adult colour yellowish brown to light brown.





FIGURES 82–84. Lateral, full face and dorsal view of body. *Hypoponera natalensis* worker CASENT0218489.

H. natalensis and *austra* share the character of having a transverse impression across the base of the posterior face of the petiole node, above the peduncle. The impression is not deep and may be difficult to discern in direct posterior view, but in posterodorsal view its upper margin appears as a dark line, located well above the peduncle. In *natalensis* the impression terminates at either side in a short oblique cuticular ridge that is usually clearly visible in profile, but this may be missing in *austra*. A similar transverse impression can be seen in *exigua* and *traegaordhi*, but in these the impression is spanned by a series of short cuticular ridges that radiate upward from the posterior peduncle. The radiating ridges of *exigua* and *traegaordhi* are convergent on the species related to *jeanneli* and *hebes*, but in these the ridges are directly on the flat posterior surface and are not confined within an impression that has a sharply delineated upper margin.

H. natalensis and *austra* are best separated by the condition of the petiole, which in *natalensis* is shorter and higher in profile (LPeI 41–47) and distinctly broader in relation to its length in dorsal view (DPeI 160–187), than in *austra* (LPeI 47–56, DPeI 137–150). In more relative features, the metanotal groove often retains a vestigial presence in *natalensis* but is always absent in *austra*, and the cross-ribs of the cinctus of the second gastral tergite are distinctly coarser and more strongly developed in *natalensis* than in *austra*.

A third species in this complex is *meridia*, which although lacking the transverse impression on the posterior surface of the petiole, often exhibits a slender transverse ridge immediately above and adjacent to the posterior peduncle. This is a smaller species, HW 0.38–0.42, SL 0.32–0.36, PeH 0.28–0.32, as compared to the combined measurements of HW 0.46–0.57, SL 0.38–0.50, PeH 0.34–0.44 in *natalensis* and *austra*.

In South Africa there appears to be a size-related morphoclinal reduction in several characters that spans the following species, listed in decreasing order of size: *spei* (and *boerorum*) – *natalensis* – *austra* – *meridia* – *perparva*. Along the cline there is a gradual reduction to loss of eyes, reduction to loss of metanotal groove, reduction in height of petiole and decrease in density and intensity of development of cross-ribs in the cinctus of the second tergite. If this perceived morphocline is real, then obviously the placement of *spei* and *boerorum* in a group separate from the others is artificial.

H. natalensis was raised to species rank by Santschi (1938), without comment or clarification. Needless to say, it is not related to *coarctata*, the species with which it was originally associated.

Material examined. **South Africa**: Natal, Richmond (*I. Trågärdh*); Kwazulu Natal, Karkloof, Leopard Bush Nat. Res. (*B.L. Fisher*); Kwazulu Natal, Good Hope Estate, Boston (*B.L. Fisher*); E. Cape Prov., Grahamstown, Fern Kloof (*W.L. Brown*).

Hypoponera nivariana (Santschi)

Ponera nivariana Santschi, 1908: 518. Holotype worker, SPAIN: Canary Is, Tenerife, Bajamon, 19.ix.1898 (*Cabrera & Diaz*) (NHMB) [examined]. [Combination in *Hypoponera*: Barquin Diez, 1981: 50.]

WORKER (redescription of holotype). *Measurements*: HL 0.56, HW 0.46, HS 0.510, SL 0.38, PrW 0.34, WL 0.66, HFL 0.37, PeNL 0.14, PeH 0.30, PeNW 0.22, PeS 0.220. *Indices*: CI 82, SI 83, PeNI 65, LPeI 47, DPeI 157.

Eyes small but distinct, far forward on side, composed of a low but indeterminate number of partially fused small ommatidia (left eye depigmented). Mid-dorsal longitudinal impression on head terminates immediately behind the frontal lobes and does not extend to the midlength of the vertex or beyond. Apex of scape, when laid straight back from its insertion, fails to reach the midpoint of the posterior margin in full-face view by a distance that is less than the apical scape width; SL/HL 0.68. Cephalic dorsum extremely finely and superficially punctulate. Mesonotal-mesopleural suture absent. Metanotal groove conspicuously incised across dorsum of mesosoma; mesonotum with a well-defined posterior margin. Propodeal declivity bluntly rounded into the sides, without sharp marginations or carinae. Dorsum of mesosoma almost smooth, the minute punctulae that are present are superficial and inconspicuous. Upper half of mesopleuron with very fine superficial sculpture that is weaker than sculpture on side of propodeum; lower half of mesopleuron appears smoother (not clearly visible). Petiole in profile with the anterior and posterior faces of the node almost parallel; faces converge very slightly only at the apex, where they round into the weakly convex dorsum. Subpetiolar process in profile with an obtuse ventral angle. Maximum width of first gastral tergite in dorsal view less than the width of the second tergite at its midlength. Base of cinctus of second gastral tergite smooth and shining in dorsal view, without cross-ribs. Posttergite of second gastral segment, from posterior margin of cinctus to apex, much broader than long. Disc of second gastral tergite minutely superficially punctulate. Full adult colour a uniform dull yellow.

At first glance the holotype of *nivariana* appears to be a small, depigmented version of *eduardi* that has lost most of its sculpture, but whose dimensions fall within the lower end of the *punctatissima* range. It is separated from these two species as follows.

It differs from *eduardi* because in *nivariana* colour is dull yellow, dorsum of mesosoma is almost smooth, sculpture of mesopleuron is feeble and superficial, scape is shorter (SI 83, SL/HL 0.68) and fails to reach midpoint of posterior margin of head in full-face view (for comparison, in *eduardi* SI 86–93, SL/HL 0.72–0.78). Overall size of *nivariana* is smaller (HL 0.56, HW 0.46, SL 0.38) when compared to *eduardi* (HL 0.63–0.70, HW 0.54–0.59, SL 0.47–0.54).

It differs from *punctatissima* because in *nivariana* there is no elongate mid-dorsal cephalic impression, sculpture is present on the mesopleuron, the anterior and posterior faces of the petiole node in profile do not converge towards the apex and the subpetiolar process has an obtuse ventral angle.

H. nivariana is known from only five collections (Barquin Diez, 1981), all from Tenerife in the Canary Islands. The number of specimens from these five collections totals a mere 13 workers and a single queen, so *nivariana* cannot be considered a common or successful species. It may be a Canaries endemic, or an Afrotropical species that has not yet been discovered on the continent; or it may represent a hybrid between *eduardi* and *punctatissima*. This last is highly speculative and without proof, though the fact that it possesses a strange mix of characters found in the two other species is suggestive. Its taxonomic history is short and the name *nivariana* has occurred in the literature very few times following Santschi's original description. Wheeler (1927a), Wellenius (1955) and Hohmann, *et al*. (1993) all merely listed the species as present and endemic in the Canaries. Barquin Diez (1981) redescribed the species, added a few more details of morphology and correctly concluded that it was "close to *eduardi*" but differed by its lighter colour, shorter scapes and more feeble dorsal sculpture.

Hypoponera obtunsa Bolton & Fisher **sp. n.**

WORKER (holotype in parentheses). *Measurements*: HL 0.49–0.50 (0.49), HW 0.40 (0.40), HS 0.445–0.500 (0.445), SL 0.31–0.32 (0.32), PrW 0.28–0.30 (0.28), WL 0.63–0.66 (0.63), HFL 0.34 (0.34), PeNL 0.14–0.15 (0.14), PeH 0.26–0.27 (0.27), PeNW 0.20–0.21 (0.21), PeS 0.200–0.207 (0.207) (5 measured). *Indices*: CI 80–82 (82), SI 78–80 (80), PeNI 67–75 (75), LPeI 52–58 (52), DPeI 135–150 (150).

Eyes absent. Apex of scape, when laid straight back from its insertion, just fails to reach the midpoint of the posterior margin in full-face view; SL/HL 0.63–0.65. Reticulate-punctate sculpture on cephalic dorsum fine and dense. Punctate sculpture on dorsum of mesosoma feeble and superficial. Mesonotal-mesopleural suture absent. Metanotal groove entirely absent from dorsum; propodeal dorsum much narrower than mesonotum. Propodeal declivity separated from sides by blunt angles, not distinctly marginate. Petiole node in dorsal view relatively narrow, with a convex anterior face and flat to feebly impressed posterior face. Petiole node in profile low and quite long, with a rounded convex dorsal surface; slightly shorter at apex than immediately above level of anterior tubercle. Sternite of petiole in profile without a differentiated lobe; with an obliquely descending anterior face that terminates in a blunt ventral angle; this is followed by a more or less flat ventral surface. Base of cinctus of second gastral tergite smooth and shining in dorsal view, without cross-ribs. Disc of second gastral tergite superficially reticulate-punctate, appearing microreticulate in places; without sharply incised, widely separated punctures. Maximum width of first gastral tergite in dorsal view is subequal to, or slightly less than, the width of the second tergite at its midlength. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is slightly less than the maximum width of the segment. Full adult colour yellow.

Holotype worker (top specimen of three on pin), **Zimbabwe** (S. Rhodesia on label): Hillside, Bulawayo, 8.xii.1918 (*G. Arnold*) (BMNH)
Paratypes. 1 worker and 1 dealate queen, mounted below holotype on same pin (BMNH). [Holotype and paratype specimens remounted from a flat card onto points by B. Bolton, iii.2009.]

Of all the species placed in section 1 of the *abeillei* group only two are known, *lepida* and *obtunsa*, that lack cross-ribs at the base of the cinctus of the second gastral (Abd. IV) tergite; the base of the cinctus is smooth and polished in both. The two species should not be confused, as *lepida*, apart from its distribution in West and Central Africa, has a larger petiole (PeS 0.220–0.270) that is distinctly higher and shorter, LPeI 38–47, PeH 0.32–0.39.

Also, the sternite of the petiole in *lepida* has a well-developed ventral process or lobe that has an obliquely descending anterior surface, an angulate to dentiform ventral angle and an ascending posterior surface immediately after the angle that is straight to concave; this structure is absent from *obtunsa*, where there is no ventral angle and no ascending posterior surface. Finally, *lepida* is a larger species with longer scapes, HL 0.53–0.58, SL 0.34–0.40, SI 81–91 and is brown to reddish brown in colour.

The non-paratypic material mentioned below consists of a single square card (BMNH) that carries six poorly mounted workers and an alate male. These are from the same locality as the type-series but are dated 3.xii.1916 on a separate data label. The date is one day different from what is written on the underside of the card, in pencil, "Hillside, Bulawayo, 2.xii.1916, under a stone".

Non-paratypic material examined. **Zimbabwe**: Bulawayo, Hillside (*G. Arnold*).

Hypoponera occidentalis (Bernard)
(Figs 85–87)

Ponera (Hypoponera) occidentalis Bernard, 1953: 205, fig. 3I. Syntype workers, GUINEA: Crête de Nion, 1300 m, 19.iv., st. B6 26 (*Lamotte*) (MNHN) [examined]. [Combination in *Hypoponera*: Bolton, 1995: 215.]

Ponera (Hypoponera) intermedia Bernard, 1953: 206, fig. 3H. Holotype worker (teneral), GUINEA**:** ravin 1 du Mont Tô, st. B1 30 (*Lamotte*) (MNHN) [examined]. **Syn. n.** [Unresolved junior primary homonym of *Ponera piliventris intermedia* Forel, 1900a: 63 (now in *Pachycondyla*). Combination in *Hypoponera*: Bolton, 1995: 215.]

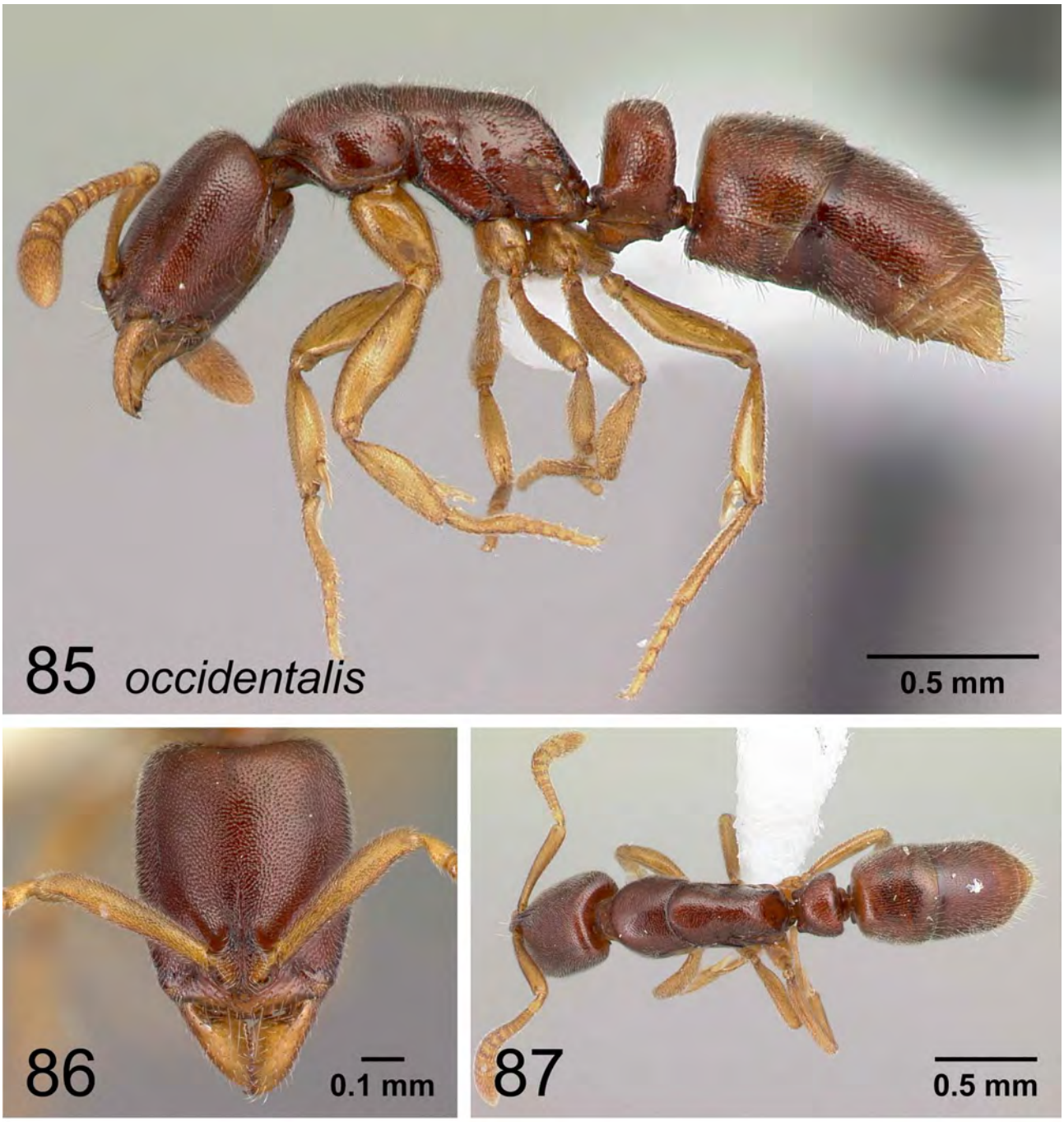
WORKER. *Measurements*: HL 0.61–0.75, HW 0.48–0.60, HS 0.545–0.670, SL 0.44–0.55, PrW 0.38–0.48, WL 0.84–1.08, HFL 0.46–0.58, PeNL 0.20–0.24, PeH 0.42–0.52, PeNW 0.32–0.39, PeS 0.310–0.377 (40 measured). *Indices*: CI 76–82, SI 86–96, PeNI 76–89, LPeI 40–48, DPeI 150–180.

Eyes variably developed; sometimes absent, sometimes a vague eye spot, but frequently with 1 and less commonly with 3–4 small ommatidia discernible. Apex of scape, when laid straight back from its insertion, just fails to reach, or less commonly just touches, the midpoint of the posterior margin in full-face view; SL/HL 0.68–0.75. Cephalic dorsum sharply reticulate-punctate. Pronotal dorsum almost smooth, with spaced, minute, superficial punctures, obviously much less strongly and densely sculptured than cephalic dorsum. Metanotal groove absent from dorsum of mesosoma or at most with a faint impression. Mesonotal-mesopleural suture feebly present to absent on side of mesosoma. Propodeum weakly marginate between declivity and side. Posterior surface of petiole node without short cuticular ridges that radiate upward from the peduncle. Node of petiole in profile tall and relatively thick, with the anterior and posterior faces parallel or very nearly so and the dorsum convex. Subpetiolar process with a distinct ventral angle. Maximum width of first gastral tergite in dorsal view greater than the width of the second gastral tergite at its midlength. Base of cinctus of second gastral tergite glossy and polished, without trace of cross-ribs. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is less than the width of the segment at its midlength. Disc of second gastral tergite with sharply incised, small punctures that are widely separated by areas of glossy cuticle; the diameters of the punctures are less than the distances that separate them. First and second gastral tergites dorsally pubescent and with a number of short, standing setae that conspicuously project above the level of the pubescence in profile.

Seven Afrotropical species are known which have the following characters in combination: metanotal groove absent from dorsum of mesosoma; base of cinctus of second gastral tergite smooth and shining, without cross-ribs; posterior surface of petiole node without vertical cuticular ridges basally; maximum width of first gastral tegite in dorsal view greater than width of second tergite at its midlength; disc of second gastral tergite with spaced, small punctures that are separated by wide areas of polished cuticle. Two species, *aprora* and *dis*, both Tanzanian endemics, are small with maximum dimensions of HL 0.53, HW 0.42, SL 0.36, PeH 0.32, HS 0.470 and PeS 0.250; all other species in the complex are considerably larger than these. A single species, *producta*, has relatively long scapes, with SI 99–108. *H. importuna* and *comis* have the petiole node relatively short and very broad, with DPeI 182–200 (mean of 190). In the other five species combined DPeI is 133–180. Only a very few individuals of *occidentalis* approach the upper limits of this range, but in that species the mean value for DPeI is 165. The final species, *odiosa*, is very closely related to *occidentalis* and is best separated by the characters noted in the key.

No obvious intercastes could be discerned in the *occidentalis* material examined (*i.e.* no worker-like specimens with eyes of 10 or more ommatidia), but it is possible that the specimens with 3–4 ommatidia may represent intercastes with much smaller eyes than is usual.

The series recorded below from Zimbabwe (MHNG, BMNH) is slightly different from the mass of examined material. In these specimens the punctate sculpture on the first gastral tergite, especially on the side just above the tergosternal suture, is fainter and more superficial, but this is more a matter of degree than of actual difference in form. The series is currently retained within *occidentalis*, because the specimens match the diagnostic characters given above, to be reassessed when more samples have accumulated.



FIGURES 85–87. Lateral, full face and dorsal view of body. *Hypoponera occidentalis* worker CASENT0218494.

Material examined. **Guinea**: Créte de Nion (*Lamotte*); Mont Tô (*Lamotte*). **Ivory Coast**: Abidjan, Banco For. (*I. Löbl*). **Ghana**: Bunso (*R. Belshaw*); Atewa For. Res., nr Kibi (*R. Belshaw*). **Cameroun**: Prov. Sud-Ouest, Mnt Cameroon, Mapanja (*B.L. Fisher*); Prov. Sud, N'Kolo, Bondé For., Elogbatindi (*B.L. Fisher*); Prov. Sud, Res. Faune de Campo, Ebodjé (*B.L. Fisher*). **Gabon**: Prov. Ogooue-Maritime, Res. Monts Doudou, Doussala (*B.L. Fisher*); Prov. Estuaire, F.C. Mondah, Libreville (*B.L. Fisher*); For. de la Mondah, Cap Esterias, N. of Libreville (*Bartolozzi & Taiti*). **Equatorial Guinea**: Bioko, Moca (*M. Boko*). **Central African Republic**: Res. Dzanga-

Sangha, Bayanga (*B.L. Fisher*); Dzanga-Ndoki, Lidjombo (*B.L. Fisher*). **Kenya**: Western Prov., Kakamega Forest, Kaimosi (*G. Fischer*). **Tanzania**: Mahale Mts N.P (*M. Kiyono*); Morogoro Reg., Mamiwa-Kisara For. Res. (*Hawkes, Makwati & Mtana*). **Zimbabwe**: Umtali, Melsetter (*R. Mussard*).

Hypoponera odiosa Bolton & Fisher **sp. n.**
(Figs 88–90)

WORKER (holotype in parentheses). *Measurements*: HL 0.58–0.64 (0.61), HW 0.46–0.49 (0.47), HS 0.520–0.565 (0.540), SL 0.38–0.44 (0.44), PrW 0.35–0.40 (0.36), WL 0.80–0.87 (0.84), HFL 0.42–0.47 (0.46), PeNL 0.18–0.22 (0.20), PeH 0.38–0.43 (0.42), PeNW 0.28–0.32 (0.30), PeS 0.287–0.312 (0.307) (15 measured). *Indices*: CI 74–79 (77), SI 85–96 (94), PeNI 75–84 (83), LPeI 47–54 (48), DPeI 143–158 (150).

Eyes absent or represented by a small, inconspicuous spot on side of head. Apex of scape, when laid straight back from its insertion, just fails to reach the midpoint of the posterior margin in full-face view; SL/HL 0.66–0.72. Cephalic dorsum sharply reticulate-punctate. Pronotal dorsum almost smooth, with spaced, minute, superficial punctures, obviously much less strongly and densely sculptured than cephalic dorsum. Metanotal groove absent from dorsum of mesosoma. Mesonotal-mesopleural suture absent or vestigially present on side of mesosoma. Propodeum weakly marginate between declivity and side. Posterior surface of petiole node without short cuticular ridges that radiate upward from the peduncle. Node of petiole in profile tall and relatively thick, with the anterior face vertical and the posterior face feebly convex and weakly converging on the anterior face dorsally; the dorsum flat or very nearly so. Posterodorsal angle of petiole node distinctly more broadly and bluntly rounded than anterodorsal angle in profile. Subpetiolar process with a distinct ventral angle. Maximum width of first gastral tergite in dorsal view greater than the width of the second gastral tergite at its midlength. Base of cinctus of second gastral tergite glossy and polished, without trace of cross-ribs. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is slightly less than the width of the segment at its midlength. Disc of second gastral tergite with sharply incised small punctures that are widely separated by areas of glossy cuticle; the diameters of the punctures are distinctly less than the distances that separate them. First and second gastral tergites dorsally pubescent and with a number of short, standing setae that conspicuously project above the level of the pubescence in profile.

Holotype worker, **Cameroun**: Prov. Sud, Nkolo, Bondé Forest, 27.5 km. 155° SSE Elogbatindi, 40 m., 3°13.3'N, 10°14.8'E, 12.iv.2000, #2323(27)-1, sifted litter (leaf mold, rotten wood) rainforest (*B.L. Fisher*) (CASC).
Paratypes. 18 workers and 5 dealate queens, with same data as holotype and all #2323, but with individual pins coded (01)-6, (03)-3 (queen), (05)-3, (09)-2, (10)-2, (12)-2, (17)-2, (18)-2 (queen), (19)-2, (20)-2, (21)-2, (22)-3, (26)-3, (28)-5, (29)-2, (31)-4, (32)-5 (queen), (34)-5 (queen), (41)-5 (queen), (44)-4, (45)-2, (46)-3, (47)-6 (CASC, BMNH).

H. odiosa is extremely close to *occidentalis* and is mainly separated by subtle, but apparently consistent, details in the shape of the petiole node, which are noted in the key.

A single specimen recorded from Mbalmayo, below (BMNH), appears to be intermediate between *occidentalis* and *odiosa* in most respects, but may represent a separate sibling species. It has a fairly conspicuous sharp, black denticle at the midpoint of the anterior clypeal margin that in full-face view almost spans the width of the dorsal labrum that projects below it. In some *odiosa* the midpoint of the clypeal margin is more sharply triangular than in others, but this character is better developed in the Mbalmayo specimen. As only a single specimen is available it is left as *odiosa* for the present, as the shape of the petiole node corresponds more closely with that species than with *occidentalis*, but the situation should be reviewed if more material is discovered.

Non-paratypic material examined. **Cameroun**: Prov. Sud, Res. de Faune de Campo, Ebodjé (*B.L. Fisher*); Res. Campo, Massif des Mamelles, Ebodjé (*B.L. Fisher*); Mbalmayo (*N. Stork*).

FIGURES 88–90. Lateral, full face and dorsal view of body. *Hypoponera odiosa* holotype worker CASENT0226603.

Hypoponera orba (Emery)

Ponera orba Emery, 1915: 7, fig. 4. LECTOTYPE worker (by present designation), ERITREA: Ghinda, ix.1914 (*F. Silvestri*) (MSNG); paralectotype worker with same data but 2.ix.1914 (MSNG) [examined]. [Combination in *Ponera (Hypoponera)*: Santschi, 1938: 79; in *Hypoponera*: Bolton, 1995: 215.] (See note.)

NOTE. The original description mentions six worker syntypes. Two are in MSNG, now lectotype and paralectotype; the other four are presumed to be in the Silvestri collection at DEUN, which is not currently available for examination. These should also be regarded as paralectotypes. The lectotype bears an earlier label, “Lectotype

Hypoponera orba (Emery). Det. R.W. Taylor, 10.iv.63", and also has labels by Dr Fabio Penati (MSNG) that correctly state that Taylor's designation was never published and is therefore invalid.

LECTOTYPE WORKER (paralectotype in parentheses). *Measurements*: HL 0.52 (0.54), HW 0.39 (0.40), HS 0.455 (0.470), SL 0.36 (0.36), PrW 0.29 (0.29), WL 0.65 (0.66), HFL 0.34 (0.33), PeNL 0.14 (0.14), PeH 0.30 (0.30), PeNW 0.21 (0.22), PeS 0.217 (0.220). *Indices*: CI 75 (74), SI 92 (90), PeNI 72 (76), LPeI 47 (47), DPeI 150 (157).

Eyes absent. Scape relatively long (SI 90–92) but when laid straight back from its insertion its apex distinctly fails to reach the midpoint of the posterior margin; SL/HL 0.67–0.69. Funiculus distinctly with 5 enlarging apical segments. Cephalic dorsum very superficially, minutely reticulate-punctate. Pronotal dorsum almost smooth, obviously less strongly and densely sculptured than cephalic dorsum. Mesonotum and dorsum of propodeum almost smooth, shiny, almost entirely devoid of punctulae. Metanotal groove absent from dorsum of mesosoma. Mesonotal-mesopleural suture absent from side of mesosoma. Propodeum with an angular margin between declivity and side. Posterior surface of petiole node without short cuticular ridges that radiate from just above the peduncle. Node of petiole in profile short-nodiform, the anterior and posterior faces weakly converge dorsally; length of node just above anterior tubercle greater than length of dorsum; dorsal surface is almost flat. Subpetiolar process rounded and simple, without an angular differentiated lobe, without a sharply defined ventral tooth or angle. In dorsal view petiole node with posterior face transverse; sides and anterior face form a single convex surface. Maximum width of first gastral tergite in dorsal view 0.34; width of second gastral tergite at its midlength 0.35. Cross-ribs at base of cinctus of second gastral tergite feebly developed and inconspicuous. Sides of second gastral tergite in dorsal view straight and parallel. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is slightly longer than the maximum width of the segment. Disc of second gastral tergite with densely crowded, small, superficial punctures so that the surface appears microreticulate at lower magnifications. First and second gastral tergites dorsally pubescent and with a number of very short standing setae that project just above the level of the pubescence. Full adult colour yellow.

H. orba is similar in size, colour and general appearance to *camerunensis* and *coeca*, and the three appear to be closely related. However, *camerunensis* and *coeca* occur in leaf litter and rotten wood on the forest floors of Western and Central African countries, mostly in the rainforest zones, where *coeca* at least is relatively common. Morphologically the three are separated mainly by the dimensional characters given in the key, but *orba* also has the margin between the propodeal declivity and its sides more sharply developed than in the other two.

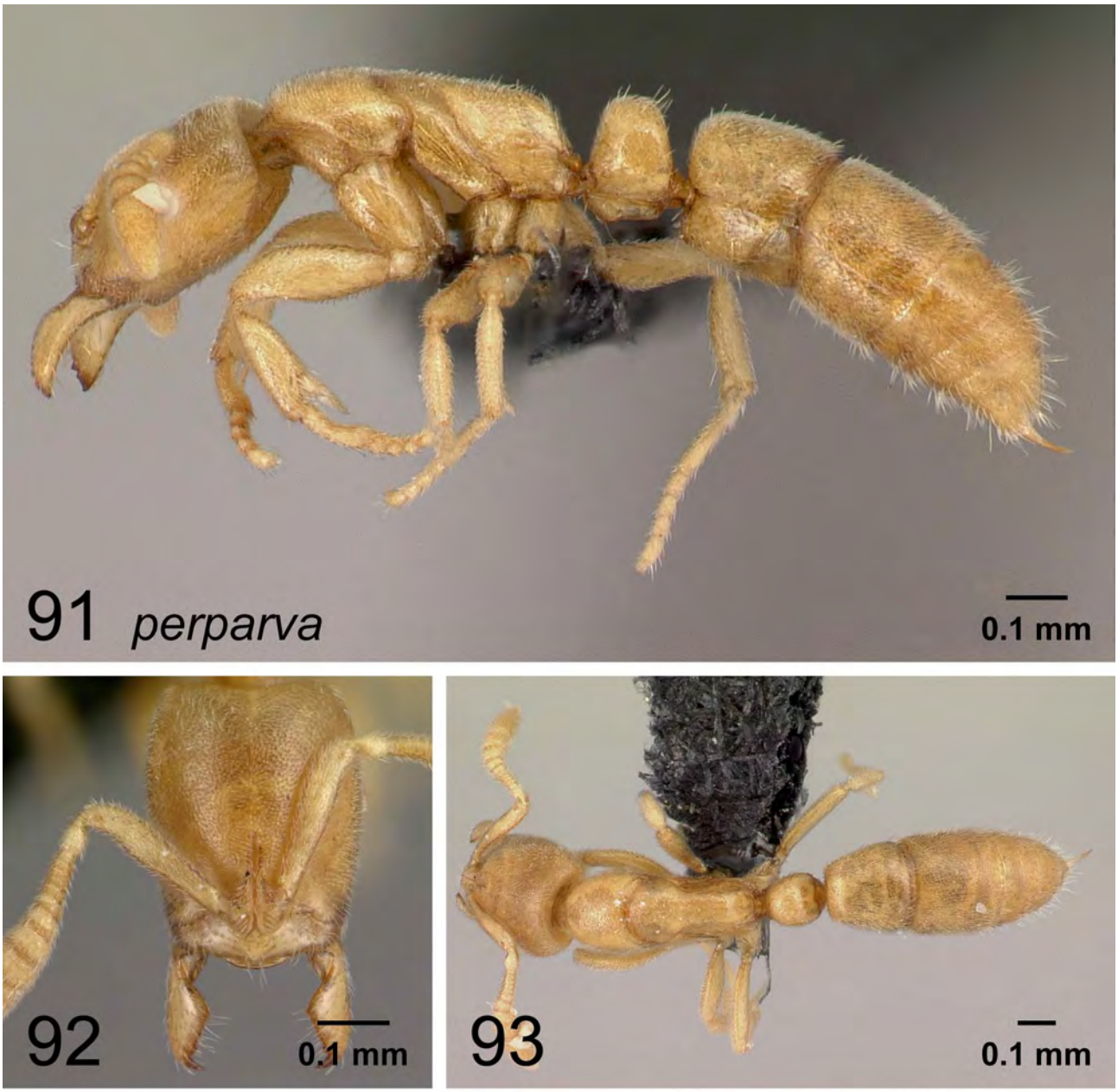
Material examined. **Eritrea**: Ghinda (*F. Silvestri*).

Hypoponera perparva Bolton & Fisher **sp. n.**
(Figs 91–93)

WORKER (holotype in parentheses). *Measurements*: HL 0.40–0.44 (0.42), HW 0.30–0.33 (0.33), HS 0.350–0.385 (0.375), SL 0.24–0.26 (0.24), PrW 0.21–0.25 (0.23), WL 0.48–0.54 (0.54), HFL 0.23–0.25 (0.25), PeNL 0.12–0.13 (0.13), PeH 0.20–0.24 (0.23), PeNW 0.14–0.16 (0.14), PeS 0.155–0.173 (0.167) (10 measured). *Indices*: CI 73–79 (79), SI 73–81 (73), PeNI 61–67 (61), LPeI 52–62 (57), DPeI 108–120 (108).

Eyes absent. Scape very short; when laid straight back from its insertion the apex falls far short of the midpoint of the posterior margin in full-face view (distance *ca* 0.38 × SL); SL/HL 0.57–0.60. Funiculus of antenna only vaguely with five enlarging segments apically; the four apical funicular segments (8–11) enlarged; segment 8 somewhat larger than 7 but distinctly smaller than 9. Cephalic dorsum minutely reticulate-punctate. Mesonotal-mesopleural suture absent. Dorsum of mesosoma without trace of a metanotal groove. Propodeal declivity narrow; declivity rounds into the sides through a blunt angle, without a carina or sharp angle separating them. Pronotal dorsum with very weak, superficial, punctulate sculpture, much weaker and less dense than on the head. Petiole node in dorsal view only very slightly broader than long (DPeI 120 or less). In profile anterior and posterior faces of node convergent dorsally; length of dorsum usually about 0.75 × the length at the level of the anterior tubercle. Subpetiolar process with a low, blunt, obtuse angle in the ventral margin. In dorsal view the maximum width of the first tergite is less than the width of the second tergite at its midlength. Base of cinctus of second gastral tergite with a row of short, longitudinal cross-ribs. Sides of second gastral tergite shallowly convex in dorsal view; midline

length of second gastral posttergite, from posterior margin of cinctus to apex, is less than the maximum width of the segment. Disc of second gastral tergite microreticulate. Dorsal surface of first gastral tergite with short pubescence and with a few very short, projecting setae. Full adult colour yellow.



FIGURES 91–93. Lateral, full face and dorsal view of body. *Hypoponera perparva* holotype worker CASENT0395326.

Holotype worker, **South Africa**: Kwazulu Natal, Umtamvuna Nature Reserve, 31°02.704'S, 30°10.080'E, 220 m., 15.xi.2000, Winkler bag extraction leaf litter, KW00-W25, Pondoland Coastal Plateau, sour grassland, CASENT 0395326 (*S. van Noort*) (CASC).

H. perparva is a minute species that closely resembles *angustata*, but there are very obviously only four enlarged apical funicular segments in that species, whereas in *perparva* there are vaguely five. In this respect *perparva* falls between *angustata* and the remainder of the Afrotropical fauna, where there are usually definitely five enlarging segments but sometimes vaguely six. *H. perparva* is also characterised by its small size, short scapes and relatively long petiole.

A short series of minute workers from Congo (MSNM and MZUF, data below) is tentatively assigned to *perparva* here. These specimens match the holotype in all respects except for some variation in measurements. The Congo workers have HL 0.40–0.41, HW 0.30–0.31, HS 0.350–0.360, SL 0.24, PrW 0.21–0.22, WL 0.48–0.50,

HFL 0.23–0.24, PeNL 0.12–0.13, PeH 0.20–0.21, PeNW 0.14, PeS 0.155–0.160, CI 74–76, SI 77–80, PeNI 64–67, LPeI 60–62, DPeI 108–117 and SL/HL 0.58–0.60. With only a short series available it is impossible to determine the significance of the slightly smaller overall size but slightly longer scape exhibited by the Congo specimens. For the present they are treated as a single species, until the time when more material becomes available for examination.

Non-paratypic material examined. **Congo** ("Rep. Pop. du Congo" on label): Réserve de Tchimpounga, c/o Pointe Noire surr. Lac Foni, 19.iv.- 4.v.2006. Mag. 2786 (*L. Bartolozzi & S.Bambi*). **Tanzania**: Tanga Reg., Kilindi For. Res. (*Hawkes, Makwati & Mtana*); Morogoro Reg., Kanga For. Res. (*Hawkes, Makwati & Mtana*); Morogoro Reg., Mkungwe For. Res. (*Hawkes, Bhoke & Richard*).

Hypoponera producta Bolton & Fisher **sp. n.**
(Figs 94–96)

WORKER (holotype in parentheses). *Measurements*: HL 0.72–0.74 (0.73), HW 0.52–0.55 (0.53), HS 0.620–0.650 (0.630), SL 0.54–0.56 (0.54), PrW 0.42–0.46 (0.44), WL 0.96–1.08 (0.96), HFL 0.55–0.59 (0.58), PeNL 0.22–0.25 (0.22), PeH 0.45–0.50 (0.48), PeNW 0.32–0.37 (0.32), PeS 0.333–0.377 (0.340) (8 measured). *Indices*: CI 72–75 (74), SI 99–108 (102), PeNI 73–83 (73), LPeI 46–53 (46), DPeI 135–155 (145).

Eyes sometimes absent but usually of 1–3 minute ommatidia. Apex of scape, when laid straight back from its insertion, just touches the midpoint of the posterior margin in full-face view; SL/HL 0.74–0.78; the scape relatively long, SI 99 or more. Cephalic dorsum sharply reticulate-punctate. Pronotal dorsum almost smooth, with spaced, minute, superficial punctures, obviously much less strongly and densely sculptured than cephalic dorsum. Metanotal groove absent from dorsum of mesosoma. Mesonotal-mesopleural suture absent to very feebly present on side of mesosoma. Propodeum weakly marginate between declivity and side. Posterior surface of petiole node without short cuticular ridges that radiate upward from the peduncle. Node of petiole tall and relatively thick in profile, with the anterior and posterior faces slightly convergent dorsally and the dorsum weakly convex. Subpetiolar process with a distinct ventral angle. Maximum width of first gastral tergite in dorsal view greater than the width of the second gastral tergite at its midlength. Base of cinctus of second gastral tergite glossy and polished, without trace of cross-ribs. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is less than the width of the segment at its midlength. Disc of second gastral tergite with sharply incised, small punctures that are widely separated by areas of glossy cuticle; the diameters of the punctures are distinctly less than the distances that separate them. First gastral tergite dorsally pubescent and with a number of short, standing setae that conspicuously project above the level of the pubescence in profile.

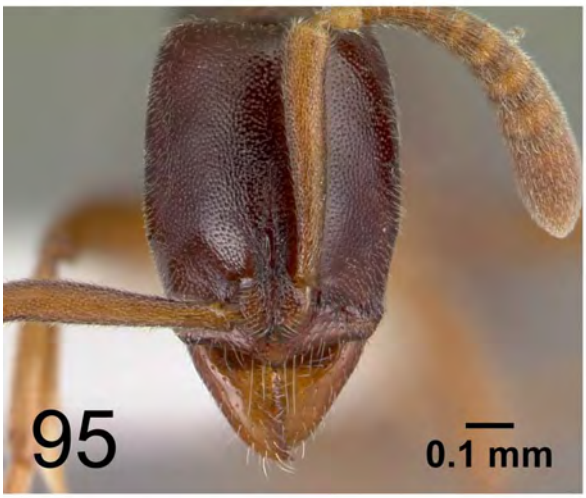
Holotype worker, **Gabon**: Prov. Woleu-Ntem, 31.3 km. 108° ESE Minvoul, 2°04.8'N, 12°24.4'E, 600 m., 11.ii.1998, #1684(13)-4, sifted litter (leaf mold, rotten wood), rainforest (*B.L. Fisher*) (CASC).
Paratypes. 3 workers, 1 worker-queen intercaste, 1 dealate queen, with same data as holotype but coded #1684(10)-3, #1684(11)-5, #1684(42)-5, #1684(39)-6 (intercaste), #1684(14)-10 (queen); 2 workers with same data as holotype but 10.ii.1998 and coded #1678-1, #1678-2, ex rotten log, rainforest (CASC, BMNH).

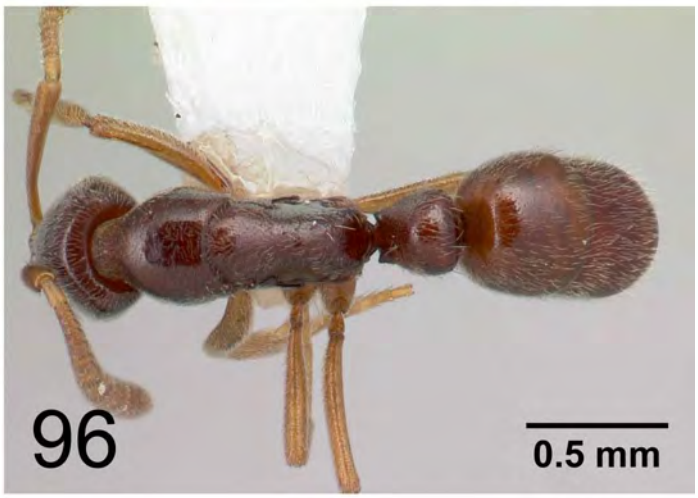
The intercaste in the type-series has the eye with about 20 ommatidia and the mesosoma somewhat more stoutly built than in the worker. Its lateral mesosoma has the mesonotal-mesopleural suture better developed than the worker, and a weak transverse suture is present on the mesopleuron, dividing it into anepisternum and katepisternum. The gaster is also larger, with the maximum width of the first tergite 0.58 in the intercaste, as opposed to a maximum width of 0.54 in the holotype (the full queen has 0.61).

This species is closely related to *occidentalis* but has the longest scapes of any known Afrotropical species that lacks a developed metanotal groove and has the base of the cinctus of the second gastral tergite without cross-ribs. In *occidentalis*, SI is always <100. In addition, *producta* has a slightly longer and narrower head (CI 72–75) and a relatively slightly narrower petiole node (DPeI 135–155); in *occidentalis* these indices are CI 76–82, DPeI 152–180 (mean = 165).

Relative dimensions are also the easiest way to distinguish *producta* from *importuna* because, apart from the shorter scapes of the latter, it also has a much broader petiole node, with PeNI 88–95 and DPeI 182–195, as opposed to PeNI 73–83 and DPeI 135–155 in *producta*.

Non-paratypic material examined. **Cameroun**: Nkoemvon (*D. Jackson*). **Gabon**: For. de la Mondah, Cap Esterias, N. of Libreville (*Bartolozzi & Taiti*).





FIGURES 94–96. Lateral, full face and dorsal view of body. *Hypoponera producta* holotype worker CASENT0226626.

Hypoponera pulchra Bolton & Fisher **sp. n.**

HOLOTYPE WORKER. *Measurements*: HL 0.64, HW 0.51, HS 0.575, SL 0.44, PrW 0.38, WL 0.83, HFL 0.44, PeNL 0.17, PeH 0.38, PeNW 0.25, PeS 0.267. *Indices*: CI 80, SI 86, PeNI 66, LPeI 45, DPeI 147.

Eyes absent. Apex of scape, when laid straight back from its insertion, just fails to reach the midpoint of the posterior margin in full-face view (by a distance *ca* 0.04); SL/HL 0.69. Funiculus distinctly with 5 enlarging apical segments. Dorsum of head finely and densely reticulate-punctate; lateroventral surfaces of head with minute scattered punctures and pronotal dorsum with inconspicuous punctulae, almost smooth. Metanotal groove entirely absent from dorsum of mesosoma, without any trace of its former path. Mesonotal-mesopleural suture absent from side of mesosoma. Propodeal declivity separated from sides by narrowly angular margins; without acutely raised laminae. Posterior surface of petiole node without short cuticular ridges that radiate from just above the peduncle. Node of petiole in profile fairly tall and slender (LPeI 45), the anterior and posterior faces almost parallel for most of their height (*i.e.* PeNL 0.17, node length immediately below dorsal curvature 0.16, length at commencement of dorsal curvature 0.14); dorsal surface is shallowly convex, with the posterodorsal angle longer and distinctly more broadly rounded than the anterodorsal. Subpetiolar process in profile with a recurved, descending anterior face that terminates in a distinct ventral angle. Maximum width of first gastral tergite in dorsal view is only fractionally less than width of second gastral tergite at its midlength (0.44, 0.45 respectively). Sides of second gastral tergite shallowly convex in dorsal view. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is less than the maximum width of the segment (0.43, 0.45). Cross-ribs at base of cinctus of second gastral segment short and closely packed, delicate and fine. Sculpture on disc of second gastral tergite of spaced small punctures, more widely spaced than is usual in section 1 of the *abeillei* group but not as widely separated as is usual in species of section 2. First and second gastral tergites dorsally pubescent and with a few short standing setae that project just above the level of the pubescence. Full adult colour dull yellow.

Holotype worker. **Equatorial Guinea**: Bioko I. ("Spanisch Guinea, Fernando Poo" on label), 16.i.1940 (*Schlüter*) (NHMB). As well as these data, the pin bears a Menozzi determination label "*Ponera coeca*" and a handwritten label in red "*bermanni* n.sp.", on the reverse of which is now written "cleaned/remounted, B. Bolton, ix.2010". The name *bermanni* was never used and has no taxonomic status.

At first glance this species resembles a large specimen of *coeca*, but its head is much larger, HW 0.51 and HS 0.575, as opposed to HW 0.42 or less and HS 0.465 or less in *coeca*. Also, the petiole node in profile has anterior and posterior faces that are almost parallel, rather than faces that obviously converge dorsally as in *coeca* and its immediate allies. In the key, the LPeI 45 places *pulchra* neatly between the species related to *fatiga* (LPeI 37–44) and those related to *coeca* and its allies (LPeI 46–70). Because only a single specimen of *pulchra* is known its range of LPeI cannot be guessed. The species has therefore been keyed through both lugs of the appropriate couplet. On the *fatiga* side of the couplet *pulchra* most closely resembles *fatiga* itself, but the latter is darker in colour, distinctly smaller (HW 0.40 or less, SL 0.33 or less, PeH 0.32 or less, PeS 0.227 or less) and has a higher DPeI (155–180).

Hypoponera punctatissima (Roger)
(Figs 97–102)

Ponera punctatissima Roger, 1859: 246, pl. 7, fig. 7. Syntype workers and queen, POLAND: Rauden (now Rudy, Opole Prov.) and GERMANY: Berlin, in hothouses (*Roger*) (MNHN) [examined]. [Combination in *Hypoponera*: Taylor, 1967: 12.] (See note 1.)

Ponera androgyna Roger, 1859: 246 (footnote). Syntype ergatoid males (not workers), POLAND: Rauden (now Rudy, Opole Prov.) (*Roger*) (ZMHB) [not seen]. [Junior synonym of *punctatissima*: Emery & Forel, 1879: 455; Seifert, 2003: 69.]

Ponera tarda Charsley, 1877: 162. Syntype workers and queen, GREAT BRITAIN: Oxford, 1877 (*R.S. Charsley*) (OXUM) [not seen]. [Junior synonym of *punctatissima*: Dalla Torre, 1893: 41; Seifert, 2003: 69.]

Ponera punctatissima r. *jugata* Forel, 1892: 251. Holotype queen, MADAGASCAR: Prov. d'Imerina (*Sikora*) (MHNG) [not seen]. [Raised to species: Dalla Torre, 1893: 39. Reverted to subspecies of *punctatissima*: Emery, 1899: 268. Combination in *Hypoponera*: Bolton, 1995: 215. Junior synonym of *punctatissima*: Seifert, 2003: 69.]

Ponera ergatandria Forel, 1893: 365. Syntype workers, queens and ergatoid male, SAINT VINCENT I. (Antilles): 41b (*H.H. Smith*). (MHNG, BMNH) [BMNH ergatoid male examined]. [Junior synonym of *punctatissima*: Taylor, 1968: 65. Revived status as species and combination in *Hypoponera*: Kempf, 1972: 122. Reverted to junior synonym of *punctatissima*: Smith, D.R. 1979: 1343, here confirmed.] (See note 2).

Ponera kalakauae Forel, 1899: 115. Syntype worker-queen intercaste (not worker) and queen, HAWAIIAN IS: Kauai I., Lahue, 2000 ft, vii.1896 (*R.C.L. Perkins*) (intercaste), and Honolulu (Oahu I.), xi.1896 (*R.C.L. Perkins*) (queen) (BMNH) [examined]. [Junior synonym of *gleadowi*: Wilson, 1958: 328. Junior synonym of *punctatissima*: Wilson & Taylor, 1967: 29 (in text).] (See note 3.)

Ponera punctatissima subsp. *schauinslandi* Emery, 1899: 439. Syntype queens, HAWAIIAN IS: Laysan I. (now Laycan I.) (*Schauinsland*) (MSNG) [not seen] **Syn. rev.** [Combination in *Hypoponera* and junior synonym of *punctatissima*: Wilson & Taylor, 1967: 28. Revived from synonymy and raised to species: Seifert, 2003: 69.]

Ponera ergatandria subsp. *bondroiti* Forel, 1911: 285. Syntype workers, queen and ergatoid male, BELGIUM: Bruxelles, Jardin Bot., xi.1909, 5.xi.1909, 15.xi.1909 (*Bondroit*) (MHNG) [not seen] **Syn. n.** [Raised to species: Santschi, 1937b: 364. Combination in *Hypoponera*: Onoyama, 1989: 2. Previously junior synonym of *schauinslandi*: Seifert, 2003: 69.]

Ponera dulcis var. *aemula* Santschi, 1911: 351. Lectotype and paralectotype workers (designated by Seifert, 2003: 68), TANZANIA: Kilimandjaro, zone des cultures, Kiboscho, 1400 m, 1904 (*Ch. Alluaud*) (NHMB) [examined] **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 213. Previously junior synonym of *schauinslandi*: Seifert, 2003: 69.] (See note 4.)

Ponera ergatandria st. *cognata* Santschi, 1912: 153. Syntype workers, ANGOLA: Benguela, Cucula (*J. Cruchet*) (NHMB) [examined]. **Syn. n.** [Unresolved junior primary homonym of *Ponera cognata* Emery, 1896: 56 (now in *Pachycondyla*). Raised to species: Bernard, 1953: 202. Combination in *Hypoponera*: Bolton, 1995: 213.] (See note 5.)

Ponera ragusai var. *sordida* Santschi, 1914a: 54. Holotype worker, KENYA: région côtière, Shimoni, st. no. 9, xi.1911 (*Alluaud & Jeannel*) (NHMB) [examined]. **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 216.]

Ponera incisa Santschi, 1914b: 320, fig. 8. Holotype ergatoid male (not worker), NIGERIA: Lagos (*F. Silvestri*) (not in NHMB, presumably in DEUN) [not seen]. **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 214.] (See note 6).

Ponera sulcatinasis r. *durbanensis* Forel, 1914: 213. Syntype workers, SOUTH AFRICA: Natal, Durban, 16.i.1914, no. 323 (*G. Arnold*) (MHNG) [examined]. **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 214.]

Ponera ergatandria r. *petri* Forel, 1916: 397. Holotype worker-queen intercaste (not worker), DEMOCRATIC REPUBLIC OF CONGO: St Gabriel (*Kohl*) (MHNG) [examined]. **Syn. n.** [Raised to species: Santschi, 1938: 78. Combination in *Hypoponera*: Bolton, 1995: 216.]

Ponera brevis Santschi, 1921a: 113, fig. 1a-c. Holotype worker, BENIN (Dahomey on label): Porto Novo (*Le Moult*) (NHMB) [examined]. **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 213.] (See note 7.)

Ponera punctatissima var. *exacta* Santschi, 1923: 134. Syntype workers, TUNISIA: Hammamet (*Santschi*) (NHMB, BMNH) [BMNH syntype examined]. [Junior synonym of *punctatissima*: Atanassov & Dlussky, 1992: 71; Seifert, 2003: 69.]

Ponera mina Wheeler, W.M. 1927b: 131, fig. 2. Syntype workers, queens and ergatoid male, AUSTRALIA: Norfolk I., 1915 (*A.M. Lea*) (MCZC and possibly SAMA) [not seen]. [Junior synonym of *gleadowi*: Wilson, 1958: 329. Revived from synonymy and combination in *Hypoponera*: Taylor & Brown, D.R. 1985: 31. Junior synonym of *punctatissima*: Wilson & Taylor, 1967: 29 (in text); Taylor, 1987: 30.]

Ponera argonautorum Arnol'di, 1932: 66, figs. 6, 7. Holotype queen, RUSSIA: Black Sea Coast, Anapa, 26.viii.1925, Nr. 422 (*K.V. Arnol'di*) (probably in ZMUM) [not seen]. **Syn. n.** (provisional). [Combination in *Hypoponera*: Bolton, 1995b: 213.] (See note 8.)

Ponera mumfordi Wheeler, W.M. 1933: 141. Syntype workers, FRENCH POLYNESIA: Marquesas Is, Uapou; Kohepu (Tekohepu) summit, alt. 3000 ft, 3.xi.1931 (*LeBronnec*) (probably in MCZC) [not seen]. [Junior synonym of *gleadowi*: Wilson, 1958: 328. Junior synonym of *punctatissima*: Wilson & Taylor, 1967: 29 (in text).]

Ponera mesoepinotalis Weber, 1942: 44, fig. 4. Holotype worker, SUDAN: Imatong Mts, 2.viii.1939, 6400 ft, no. 1395 (*N.A. Weber*) (not in MCZC, presumed lost) **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 215.] (See note 9.)

Ponera breviceps Bernard, 1953: 202, fig. 3A. LECTOTYPE dealate queen (by present designation) and two paralectotype dealate queens, GUINEA: Nimba (*Lamotte*) (MNHN) [examined]. **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 213.] (See note 10.)

Ponera ursoidea Bernard, 1953: 203, fig. 3C. LECTOTYPE worker-queen intercaste (not worker) (by present designation), GUINEA: Crête de Nion, 1300 m. (no collector's name, probably *Lamotte*) (MNHN) [examined]. **Syn. n**. [Combination in *Hypoponera*: Bolton, 1995: 216.] (See note 11.)

Ponera sulcitana Stefani, 1970: 1, figs. 1–12. Holotype worker; paratype workers, queens and ergatoid male, ITALY: Sardinia, Grotta dei Fiori presso Carbonia (*A. Serra*) (IZUC) [not seen] **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 216.] (See note 12.)

NOTES.

1 Seifert (2003) refers to each of the *punctatissima* type-specimens he examined as a paralectotype. While there seems no doubt that the material originated in Roger's collection and is type-material, no trace of a lectotype designation can be found. Therefore the two MNHN specimens examined here, and those recorded by Seifert as present in ZMHB and DEIC, revert to syntype status.

2 The BMNH ergatoid male has the data: "41b" and "*Ponera ergatandria* Forel, male type, St. Vincent". This is certainly a minor ergatoid male of *punctatissima* (yellow, eyeless and with 12 antennal segments). In the publication, Forel (1893) gives the following localities for *ergatandria*, all of which are syntypes. 41a: Bowwood Valley, nr Kingston, 800 ft, 15.x.; 41b: Islet fronting Châteaubelais Bay, 31.x.; 41c: Richmond Estate, 31.x.; 41d: Villa Estate, south end of island, 14.x.

3 Wilson (1958: 328-329) recorded the names *decipiens*, *kalakauae*, *mina* and *mumfordi* as junior synonyms of *gleadowi*. In the text of Wilson & Taylor (1967: 29) all these names were transferred to the synonymy of *punctatis-*

sima, but *decipiens* was later reverted to the synonymy of *gleadowi* by Onoyama (1989) following his examination of its holotype. These transfers of synonymy were inadvertently omitted from the Bolton (1995) catalogue.

4 The short history of the name *aemula* amply illustrates the confused nature of the early taxonomy of Afrotropical *Hypoponera*. When introduced, *aemula* was described as an infraspecific form of *dulcis*, now in *H. dulcis* group. At its next appearance (Santschi, 1914a: 53) *aemula* had become an infrasubspecific name attached to *coarctata* subsp. *boerorum*. The first of these names is now in a separate genus (*Ponera*) and *boerorum* is a member of the *H. boerorum* group. The first critical examination of the syntypes of *aemula*, by Seifert (2003), placed it firmly in what is now the *H. punctatissima* group, which is confirmed here.

5 In the original description of *cognata*, Santschi mentions three workers, with the data recorded above. Of these, two are normally mounted and the head of the third is mounted on a small perspex slide, without any remnants of its body. In NHMB are two more workers, also labelled as "types" but from "Benguela, Caconda (*Cruchet*)". These are identical to the Cucula specimens, but because they were not mentioned in the original description they have no type-status.

6 The holotype of *incisa* is not among Santschi's collection in NHMB. If it still exists it is probably in the Silvestri collection at Portici (DEUN), which is not currently available. The original description gives the holotype as a worker, but it seems most likely that it is really an ergatoid male of *punctatissima*. Characters noted or figured by Santschi that point towards this identification include: extremely short scapes (from the drawing SI *ca* 65; measured ergatoid males SI 68–72), coupled with worker-like mandibles; large, rectangular, worker-like head; metanotal groove sharp and deep; gastral segments somewhat enlarged. Unfortunately the apical gastral segments are missing from Santschi's drawing, which may imply that they are absent from the specimen. But the description and figure suggest most strongly that the holotype is an ergatoid male of *punctatissima*. It is also interesting to note that on the same page Santschi (1914b: 320) recorded a queen of *punctatissima*, collected from the same locality as *incisa*.

7 The holotype of *brevis* is in reasonable condition but is flat-mounted on card and much of the lower and posterior petiole, and the base of the gaster, are obscured by glue. Several characters noted by Santschi in the original description and figures are misleading. For instance, the metanotal groove is not shown in his fig. 1c, but in the text it is stated as present and it is conspicuous on the holotype. The propodeum is not marginate between the declivity and the sides. The lower petiole is obscured not only by glue but by the position of the legs. However, the node in profile appears to taper slightly towards the apex and is not "as thick at the summit as at the base".

8 *Ponera argonautorum* was provisionally described as new by Arnol'di, based on a single alate queen discovered flying in a garden at Anapa, on the Russian north-east coast of the Black Sea. Its holotype has not been examined but it seems obvious, from the description and figures, that this is a queen of *punctatissima*. It is provisionally synonymised here to draw attention to our opinion, until the holotype can be examined in detail.

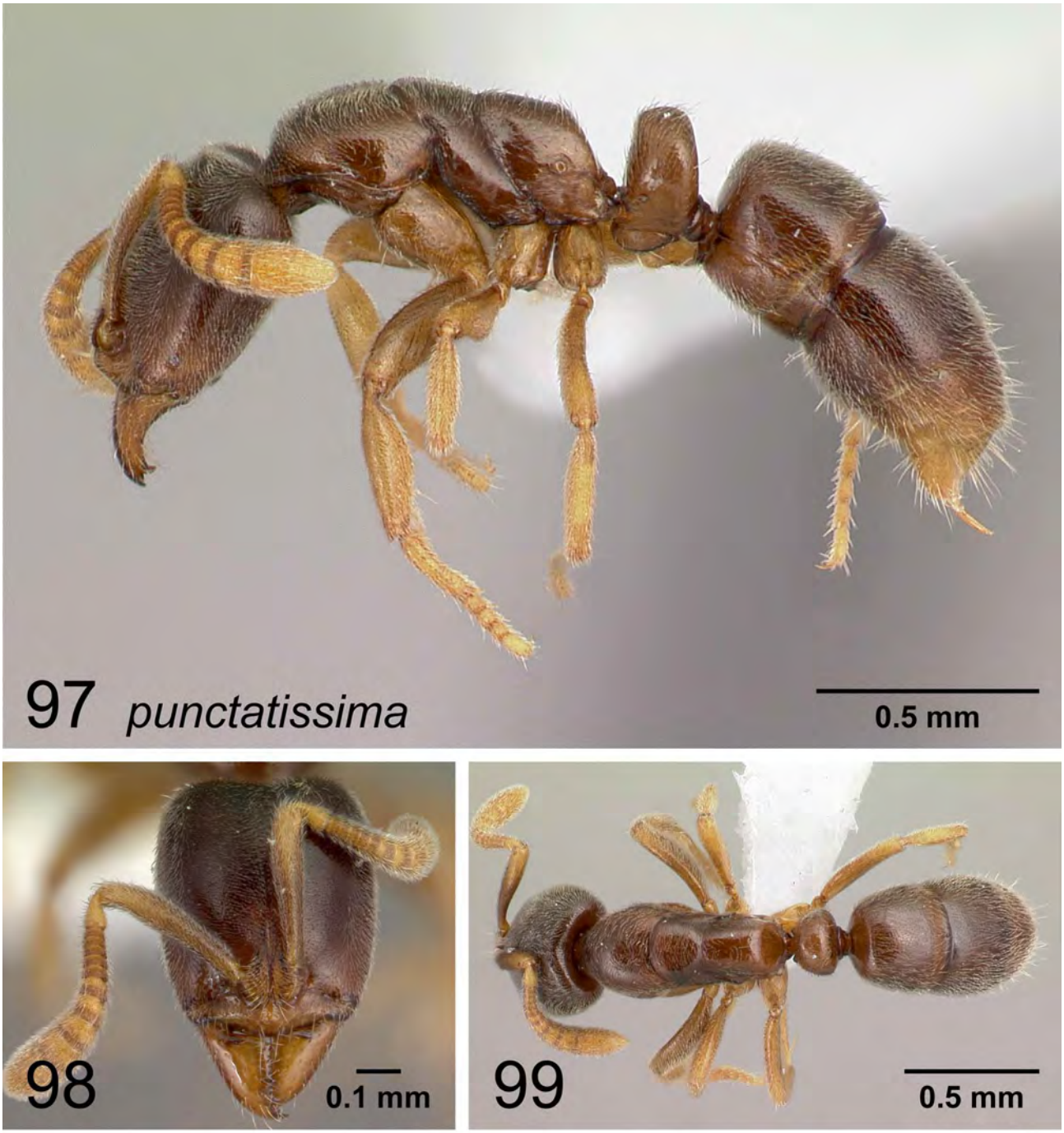
9 Stefan Cover (MCZC) informs us that although the holotype of *mesoepinotalis* is noted in the MCZC type-register, the specimen has disappeared from the collection and cannot be found. Weber's description and figure are sufficient to place the name with considerable confidence as a junior synonym of *punctatissima*.

10 Bernard's syntype series of *breviceps* consisted of four specimens mounted on two pins. The upper specimen on the first pin is a dealate queen of *punctatissima*, with its gaster detached and mounted separately. The lower specimen on this pin is a headless male of a small species of *Leptogenys*; its pectinate pretarsal claw is clearly visible on the right foreleg. This pin bears three additional labels, as follows: "Queen lectotype *Ponera breviceps* Ber. Designated by R.W. Taylor, 10 Aug. 63"; "*Leptogenys* sp. male det. R.W. Taylor, 10 Aug. 63"; "Synonym of *Ponera gleadowi* Forel. Det. R.W. Taylor, 10 Aug. 63". On the second pin both specimens are dealate queens of *punctatissima* and bear a secondary label: "Paralectotypes *Ponera breviceps* Bern. Designated by R.W. Taylor, 10 Aug. 63". Taylor's designations were never published and the lectotype designation is formalised here. The *Leptogenys* specimen is excluded from further consideration.

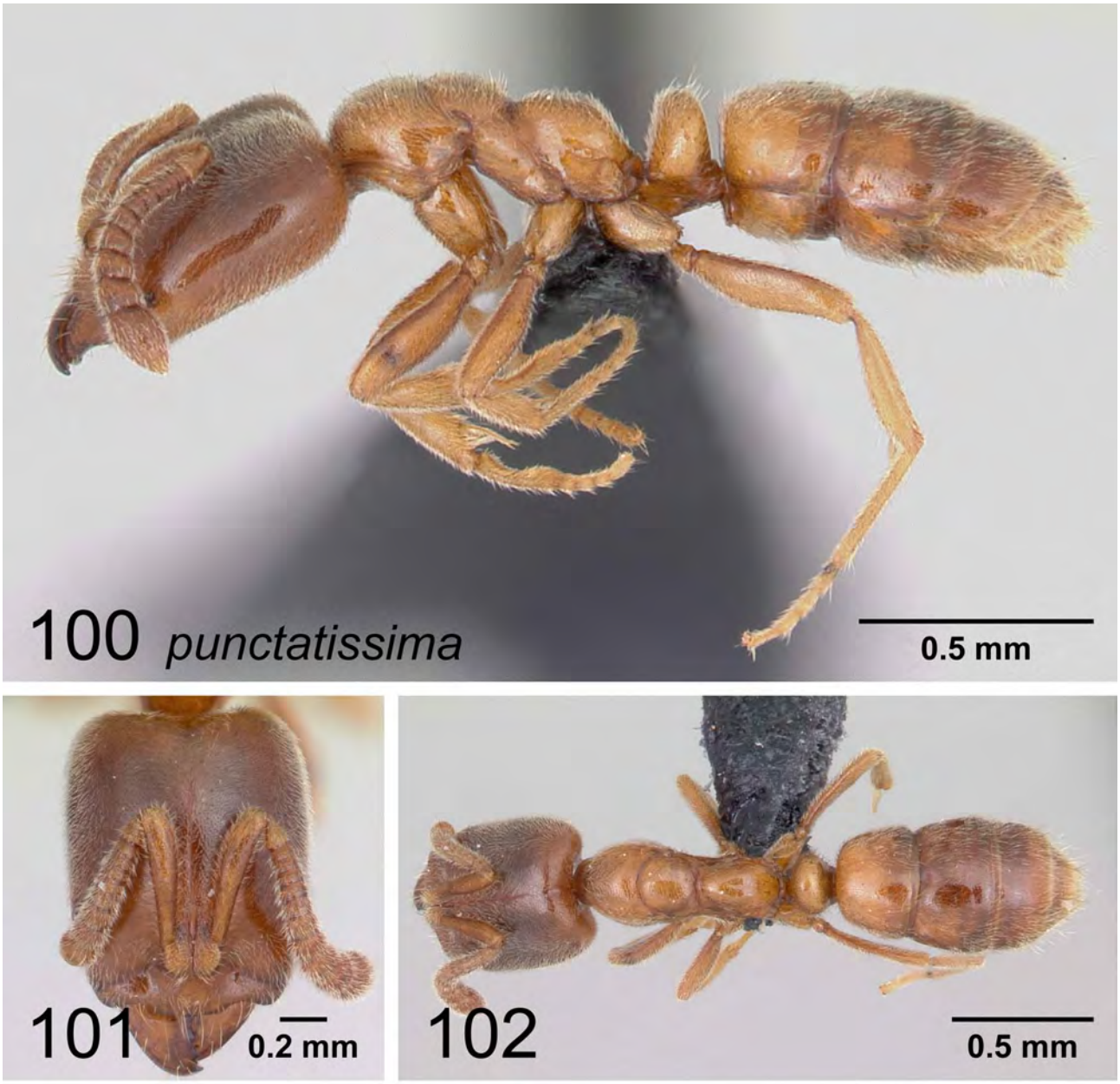
11 Bernard's syntype series of *ursoidea* included three workers and a queen from Guinea: Crête de Nion (all on one pin) and a single worker from Guinea: Nimba (*Lamotte*) on a second pin. On the first pin the top specimen belongs to *punctatissima* but the two workers and the alate queen mounted below it are all *dulcis*. The worker on the Nimba pin is a specimen of *dulcis* that has the right side of its petiole scale damaged by indentation so that it is deformed. Bernard's description contains a mixture of characters from both species. The first pin bears two secondary labels: "Lectotype (top specimen with marked pin) and paralectotypes of *Ponera ursoidea* Ber. Designated by R.W. Taylor", and "A synonym of *Ponera gleadowi* Forel. Det. R.W. Taylor, 10 Aug. 63". The lectotype designa-

tion was never published by Taylor and is now formally established here. The remaining specimens, all *dulcis*, are hereby excluded from the type-series. One small point remains: the lectotype is not a worker but an intercaste, as indicated by its larger than worker-sized eye and the presence of a mesonotal-mesopleural suture, a character absent from genuine workers of this species.

12 There is nothing in Stefani's descriptions and figures of the various sexes and castes of *sulcitana* that separates it from *punctatissima*. The worker description and drawings (figs. 1, 6, 11) show nothing that would detract from this conclusion, and the worker LPeI *ca* 50, estimated from his fig. 1, is within the range of *punctatissima*. Stefani's "apterous queen" (his fig. 3) appears to be a normal dealate gyne, not an intercaste, as the mesosoma seems to have a full complement of flight sclerites. His description and drawing of the ergatoid male makes the synonymy confident as the specimen is said to have 12 antennal segments, worker-like mandibles and minute eyes. Some years ago, Prof. Cesare Baroni Urbani (pers. com.) said that he had tried to obtain specimens from Stefani several times, but without success.



FIGURES 97–99. Lateral, full face and dorsal view of body. *Hypoponera punctatissima* worker CASENT0226650.



FIGURES 100–102. Lateral, full face and dorsal view of body. *Hypoponera punctatissima* ergatoid male CASENT0055828.

WORKER. *Measurements*: HL 0.56–0.72, HW 0.46–0.60, HS 0.515–0.660, SL 0.35–0.48, PrW 0.33–0.43, WL 0.70–0.90, HFL 0.36–0.48, PeNL 0.14–0.20, PeH 0.30–0.39, PeNW 0.22–0.29, PeS 0.223–0.290 (60 measured). *Indices*: CI 79–87, SI 75–84, PeNI 63–74, LPeI 43–53, DPeI 140–165.

Eyes small but conspicuous, of 1–6 often poorly defined or partially fused ommatidia, located far forward on the side of the head. Impression that extends back along midline of head from the frontal lobes reaches at least the midlength of the vertex and usually further. Apex of scape, when laid straight back from its insertion, usually fails to reach or less commonly just touches the midpoint of the posterior margin in full-face view; SL/HL 0.62–0.70. Minute punctulate sculpture of cephalic dorsum extremely fine and superficial. Mesonotal-mesopleural suture absent. Metanotal groove deeply incised across dorsum of mesosoma; mesonotum with a well-defined posterior margin. Propodeal declivity rounds into the sides, without sharp marginations or carinae. In profile the anterior margination of the mesopleuron rounded to very bluntly angular behind base of anterior coxa; without a prominent sharp angle or tooth. Mesopleuron smooth and shining, at most with a few scattered punctures; usually with a small reticulate patch in the extreme posteroventral corner above the mesocoxa. Petiole in profile with the anterior and posterior faces of the node weakly convergent dorsally; node longer just above the anterior tubercle than at the dor-

sum. Sternite of petiole in profile a rounded lobe, without angles anteriorly or posteriorly. Maximum width of first gastral tergite in dorsal view less than the width of the second tergite at its midlength. Base of cinctus of second gastral tergite smooth and shining in dorsal view, without cross-ribs. Posttergite of second gastral segment, from posterior margin of cinctus to apex, much broader than long. Disc of second gastral tergite minutely punctulate, appearing weakly microreticulate in places. Full adult colour varies from dull brownish yellow to very dark brown or almost black. In general, workers at the bottom end of the size range given above tend to be lighter and the colour becomes darker with increasing size, but this is by no means an entirely consistent rule.

Apart from variations in size and colour, all the worker material of this widely distributed species is morphologically uniform and answers the description above. *H. punctatissima* is without doubt the world's most accomplished ponerine tramp-species. Its range incorporates all tropical and subtropical zoogeographical regions, including most oceanic islands, and it also penetrates well into the temperate zones of both hemispheres where it is frequently synanthropic; for a brief synopsis of world distribution see Delabie & Blard (2002); European distribution is summarised in Seifert (2003). As well as the usual workers and alate queens, it also produces worker-queen intercastes (ergatoids) and dimorphic large and small ergatoid males, but never the usual alate male form. Because of its tramping ability, oddly polymorphic sex/caste system and the considerable confusion about the taxonomy within the genus, *punctatissima* has amassed an inordinately large synonymy. A glance at the synonymic synopsis above will illustrate how often intercastes and ergatoid males have been misinterpreted as workers of separate taxa by authors dating back to Roger (1859) and how often supposed infraspecific forms were incorrectly associated with other species.

In a recent analysis, Seifert (2003) reached the conclusion that *punctatissima* actually consisted of two species, *punctatissima* and *schauinslandi*, that were not distinguishable by standard morphology but could be separated by micro-morphometrics subjected to discriminant analysis. He concluded that *punctatissima* had the junior synonyms *androgyna, exacta, jugata* and *tarda* (of which only *exacta* had not been previously proposed as a synonym), and that *schauinslandi* was the senior synonym of *aemula* and *bondroiti*. He stated that he had examined type-material of all the available names that could probably represent *punctatissima* or *schauinslandi*, to ensure that no possible senior name remained unconsidered. Unfortunately, a quick glance at the synopsis above shows that many names associated with *punctatissima* remained unexamined for the Afrotropical region, that several synonyms proposed by Wilson & Taylor (1967) had been omitted, and that one name from the latter publication has the same date as *schauinslandi*. It is not surprising that Seifert failed to detect the Afrotropical relations as their identities could not possibly be assessed based solely on their often inadequate and frequently misleading original descriptions. Taken together, the Afrotropical type-material and the mass of other material examined here did not fall neatly into the two presumed species, or into any one of the two, which raises the possibility that either there are more than two extremely cryptic and virtually inseparable species currently confused here, or that there is only one somewhat variable genuine species present. The possibility remains strong that the discriminant functions applied by Seifert do not isolate discrete species, but rather indicate allopatric populations of the same species, or even different ecomorphs of a single species. The problem could not be completely resolved here, though the ecomorph possibility is favoured, so it was decided that the most parsimonious approach would be to regard all as a single species, under the earliest available name, until a complete analysis of all material, world-wide, becomes feasible. Whether this can be accomplished by morphometrics or must await a DNA analysis of various populations remains to be seen, but a dedicated study is certainly essential.

Therefore, at present, *H. punctatissima* workers are regarded as any specimen that possesses the characters of the *punctatissima* group (see introduction) and fits the description above. Its worker-queen intercastes are very worker-like but have larger eyes (usually 10 to about 20 ommatidia) and a developed mesonotal-mesopleural suture that is absent in the worker. Ergatoid males fall into major (larger, brown and with small eyes present, Figs 100–102) and minor (smaller, yellow and eyeless) categories (Yamauchi, *et al.* 1996) and are again very worker-like, especially in head structure, but have shorter scapes (SI 68–72), only 12-segmented antennae (as do workers, intercastes and queens), and of course fully developed but retractile male genitalia. Alate males have never been seen and it is probably now safe to say are never produced. True queens are alate, with much larger eyes (obviously >50 ommatidia) that have short setae projecting between the ommatidia, and have a full complement of flight sclerites on the mesosoma.

A closely related species, *ragusai*, has been confused (under the name of its junior synonym, *gleadowi*) with *punctatissima* in the past (*e.g.* Wilson, 1958). *H. ragusai* has much the same sex/caste system as *punctatissima*,

including monomorphic ergatoid males which have 13-segmented antennae, as is most frequently the case in male ants. This species is very uncommon in the Afrotropical region and indeed seems rare everywhere. In general the worker of *ragusai* is small and yellowish. Its petiole in profile is lower and longer than in *punctatissima* and in dorsal view its petiole node is longer in relation to its width than in *punctatissima*. For detailed comparative notes see under *ragusai*.

One other Afrotropical species-rank name may also be a synonym of *punctatissima*, *H. lea* (Santschi). Unfortunately, no type-material of this name seems to have survived and its identity has been rendered obscure. For the circumstances of this see under *lea* in the *species inquirendae*.

Finally, the small species described from Guinea as *sinuosa* by Bernard (discussed below) is also related to *punctatissima* and its allies. The single specimen of this species seems distinct from *ragusai* in the form of its petiole, but any revision of those two species should also reconsider *sinuosa*.

H. punctatissima is very widely distributed in sub-Saharan Africa and appears relatively common. It is often retrieved from litter and topsoil samples in forests, and also from rotten wood, but it seems particularly frequent in areas disturbed by human activities, especially in gardens, plantations and crop fields.

Material examined. **Guinea**: Crete de Nion (*Lamotte*); Nimba (*Lamotte*). **Ivory Coast**: Bingerville (*Mahnert & Perret*); Banco (*Delamare-Debouttville*); Abidjan, Banco Nat. Pk (*I. Löbl*); Monogaga (*Mahnert & Perret*). **Ghana**: Legon (*D. Leston*); Poano (*R. Belshaw*). **Togo**: Palimé, Klouto For. (*Vit*). **Benin**: Porto Novo (*Le Moult*). **Cameroun**: Nkoemvon (*D. Jackson*); Mbalmayo (*N. Stork*); Mt Cameroun, Buea (*Ross & Lorenzen*); Victoria Div., Muyuka (*B. Malkin*); Prov. Sud, PN Campo (*B.L. Fisher*); Res. de Campo (*D.M. Olson*); Res. de Faune de Campo, Ebodjé (*B.L. Fisher*). **Gabon**: Makokou (*I. Lieberburg*); Prov. Woleu-Ntem, Minvoul (*B.L. Fisher*); Prov. Ogooue-Maritime, Res. Monts Doudou, Doussala (*B.L. Fisher*); Doudou, Doussala (*S. van Noort*); For. de Mondah, Cap Esterias (*Bartolozzi & Taiti*). **São Tomé & Principe**: São Tomé I., Obo N.P. (*J.M. Ledford*). **Central African Republic**: Dzanga-Sangha, Bayanga (*B.L. Fisher*); Dzanga-Ndoki, Lidjombo (*B.L. Fisher*); Dzanga-Ndoki, Mabéa Bai (*B.L. Fisher*). **Democratic Republic of Congo**: Elisabethville (*Ross & Leech*); Matadi (*Ross & Leech*); Lwiro Riv., Bukavu (*Ross & Leech*); St Gabriel (*Kohl*). **Angola**: Bruco (*P. Hammond*); Villa Arriaga (*Ross & Leech*); Benguela, Cucula (*J. Cruchet*); Benguela, Caconda (*J. Cruchet*). **Ethiopia**: Ilubador Reg., Buno Bedele (*Sforzi & Bartolozzi*). **Rwanda**: Rangiro (*P. Werner*). **Kenya**: Shimoni (*Alluaud & Jeannel*); Likoni (*Alluaud & Jeannel*); Western Prov., Kakamega For., Udo's camp (*S. Maurer*); Ekero (*G. Fischer*); Western Prov., Mwanza (*F. Hita Garcia*); Kakamega For., Colobus (*M. Peters*); Kakamega For., Isecheno (*F. Herchen*); Isecheno (*R.R. Snelling*); Isecheno Nat. Res., Kalunya Glade (*R.R. Snelling*); Western Prov., Bungoma, Nzoia (*F. Herchen*). **Uganda**: Jinja (*Ross & Leech*); Kalinzu For., Bushenyi Distr. (*S. Yamane*). **Tanzania**: Amani (*Ross & Leech*); Kilimandjaro, Kiboscho (*C. Alluaud*); Morogoro Reg., Mkungwe For. Res. (*Hawkes, Bhoke & Richard*). **Zambia**: Lusaka (*W.H. Lange*). **Botswana**: Serowe (*P. Forchhammer*). **Zimbabwe**: Bulawayo (*G. Arnold*); Umtali, Melsetter (*R. Mussard*). **South Africa**: Natal, Durban (*F.B. Marley*); Durban (*G. Arnold*); Zululand, Eshowe (*R.E. Turner*); E. Cape, Mkambati Game Res. (*B.L. Fisher*); Cape Devon, Stellenbosch (*O'Brien & Marshall*); Cape Prov., Oudtshoorn (*B. Malkin*); Cape Prov., Tsitsikamma N.P. (*R.B. Kimsey*). **Comoros**: Anjouan (*Fisher, et al.*); Anjouan, Ntringui (*Fisher, et al.*); Anjouan, Lac Dzialandée (*Fisher, et al.*); Moheli (*Fisher, et al.*); Grand Comore, Karthala (*Fisher, et al.*); Grand Comore, Grillé (*Fisher, et al.*). **Mayotte I**.: Dapani (*Fisher, et al.*); Mont Chongui (*Fisher, et al.*); Sohoa For. Res. (*Fisher, et al.*); Mont Benara (*Fisher, et al.*). **Réunion I**.: Le Port (*F. Blard*); Mare Longue (*Fisher, et al.*); Les Makes (*Fisher, et al.*). **Mauritius**: Le Pouce Mt, Moka Range (*Fisher, et al.*); Cocotte Mt (*Fisher, et al.*); Pieter Both Mt, Moka Range (*Fisher, et al.*); Basin Blanc (*Fisher, et al.*). **Seychelles**: Alphonse I. (*J. Gerlach*). **Poland**: Opole Prov., Rudy (*Roger*). **Germany**: Berlin (*Roger*). **Netherlands**: Mijdrecht (*P.v.d. Wiel*). **Italy**: Sardinia, Villamassargia, Grotta dei Pipistrelli (*S. Puddu*); Sicily, Siracusa Prov., Pachino, Grotta Calafarina (*B. Poldi*). **United Kingdom**: England, Southsea (*H. Donisthorpe*); Oxfordshire, Oxford (*E. Saunders*); Oxford (*P. Harwood*); Middlesex, Old Ford (*Bedwell*); Hertfordshire, Waltham Cross (*W.H. Turner*); Dorsetshire, Holt (*P. Harwood*); Kent, colliery below ground (no collector's name); Yorkshire, Barnsley, Darton (no collector's name); Scotland, Edinburgh (*Godfrey*); Glasgow (Min. of Agiculture); Wales, Cardiff (no collector's name). **Ireland**: Co. Cavan, Coote Hill (*J.H. Cole*). **Madeira I**.: Praia Formosa pr. Funchal (*Lindberg*). **St Helena I.**: (*Wollaston*). **Canada**: Québec (*A. Francoeur*). **Hawaiian Is.**: Kauai I., Lahue (*R.C.L. Perkins*); Oahu I., Honolulu (*R.C.L. Perkins*). **New Zealand**: Wellington, intercepted in quarantine, from Canada (no collector's name). **St Vincent I.** (Antilles): Châteaubelais Bay (*H.H. Smith*).

Hypoponera quaestio Bolton & Fisher **sp.n.**
(Figs 103–105)

HOLOTYPE WORKER. *Measurements*: HL 0.63, HW 0.52, HS 0.575, SL 0.44, PrW 0.41, WL 0.84, HFL 0.44, PeNL 0.18, PeH 0.42, PeNW 0.31, PeS 0.303. *Indices*: CI 83, SI 85, PeNI 76, LPeI 43, DPeI 172.

FIGURES 103–105. Lateral, full face and dorsal view of body. *Hypoponera quaestio* holotype worker CASENT0192421.

Eyes minutely present, each appearing to consist of one slightly larger and two very small ommatidia. Apex of scape, when laid straight back from its insertion, just fails to reach the midpoint of the posterior margin in full-face view; SL/HL 0.70. Cephalic dorsum densely reticulate-punctate. Pronotal dorsum superficially but quite densely

punctate except for midline which is smooth; pronotum obviously much less strongly and densely sculptured than cephalic dorsum. Metanotal groove absent from dorsum of mesosoma but with a slight change of slope between mesonotum and propodeum. Propodeum weakly marginate between declivity and side. Posterior surface of petiole node with a series of about 8–9 very short cuticular ridges that radiate upward from the peduncle. The outer ridge on each side is visible in profile as a short, vertical carina that ascends the posterolateral edge of the node above its base. Node of petiole in profile with the anterior and posterior faces approximately parallel. Subpetiolar process with a ventral angle. In dorsal view petiole node with posterior face transverse; sides and anterior face form a single convex surface, but not thickly D-shaped. Maximum width of first gastral tergite in dorsal view (*ca* 0.48) subequal to width of second gastral tergite at its midlength (*ca* 0.47). Cross-ribs at base of cinctus of second gastral tergite strongly developed and conspicuous. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is less than the width of the segment at its midlength. Disc of second gastral tergite with sharply incised punctures that are quite close-packed but separated by areas of glossy cuticle; the diameters of the punctures are equal to, or slightly less than, the distances that separate the punctures. First and second gastral tergites dorsally pubescent but without standing setae that project above the level of the pubescence. Colour brown.

Holotype worker, **Tanzania**: Kilimanjaro Region, Kindoroko Forest Reserve, 1739 m., 5-8.ix.2005, 3.74520S, 37.64267E, CEPF-TZ-5.2-F03, primary forest leaf litter, Winkler (*P. Hawkes, J. Makwati, R. Mtana*) (SAMC).

Described here from a single specimen, *quaestio* is extremely close to *jeanneli* and may eventually prove to represent an extreme variant of that species. However, the holotype is darker in colour than any *jeanneli* examined and appears to lack distinct setae on the first and second gastral tergites except at the posterior margin of each segment. In profile, short, slightly elevated pubescence is conspicuous on both tergites but the one or two minute standing components appear to be pubescent hairs that are slightly more elevated, not distinct setae. In dorsal view the sides of the second tergite of *quaestio* lack projecting setae. Conversely, in unabraded specimens of *jeanneli*, the first and second tergites, in profile, show a number of short, standing setae that are distributed over each sclerite that are distinct from the pubescence, and similar projecting setae occur on the sides of the second tergite in dorsal view. Most measurements and indices of *quaestio* fall within the range of *jeanneli*, but its petiole is slightly higher in profile and broader in dorsal view, which results in slightly higher values of PeS, PeNI and DPeI.

Hypoponera ragusai (Emery)

Ponera ragusai Emery, 1894: 28. Syntype worker, ITALY: Sicily (*E. Ragusa*) (MSNG) [examined]. [Species also described as new by Emery, 1895: 65. Combination in *Hypoponera*: Baroni Urbani, 1971: 18.] (See note 1.)

Ponera gleadowi Forel, in Emery, 1895: 60 (footnote; also in key). Syntype workers and worker-queen intercastes, INDIA: Poona, XVII/1 and XI/3 (*R.C. Wroughton*) (MHNG) and INDIA: 91–76 (*R.C. Wroughton*) (BMNH) [examined] **Syn. n.** [*Ponera gleadowi* Emery, 1893: 242; *nomen nudum*, attributed to Forel. Combination in *Hypoponera*: Taylor, 1967: 12.] (See note 2.)

Ponera gleadowii r. *decipiens* Forel, 1899: 118. Holotype worker, HAWAIIAN IS: Kauai I., on coast (*R.C.L. Perkins*) (MHNG) [not seen]. **Syn. n.** [Previously junior synonym of *gleadowi*: Onoyama, 1989: 5.] (See note 3.)

Ponera gleadowi subsp. *aethiopica* Forel, 1907b: 132. Syntype alate queen, ETHIOPIA: Tchafianani, 1905 (*M de Rothschild*) (MHNG) [examined] **Syn. n.** [Unresolved junior primary homonym of *Ponera aethiopica* Smith, F. 1858: 91 (now in *Streblognathus*). Raised to species: Bernard, 1953: 199 (in key). Combination in *Hypoponera*: Bolton, 1995: 213.] (See note 4.)

Ponera ragusai var. *santschii* Emery, 1909: 371, fig. 9. Syntype workers, worker-queen intercastes, queens and ergatoid male, TUNISIA: Kairouan, 2.x.1906 (*F. Santschi*); syntype worker, ALGERIA: Biskra (*Noualhier*); syntype worker, ISRAEL: Haifa ("Syrien, Kaifa," on data label) (*Reitter*) (MSNG, NHMB, BMNH) [NHMB and BMNH examined]. **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 216.] (See note 5.)

Ponera japonica r. *formosae* Forel, 1913b: 186. Syntype workers, TAIWAN: Anping (*H. Sauter*) (MHNG) [not seen]. **Syn. n.** [Previously junior synonym of *gleadowi*: Taylor, 1967: 76.]

Ponera lesnei Bondroit, 1916: 212, fig. Holotype worker, FRANCE: Dept. de la Seine, Bécon-sur-Bruyères (*Lesne*) (MNHN) [examined]. [Junior synonym of *ragusai*: Bernard, 1967: 88.] (See note 6.)

Ponera parva Bondroit, 1918: 85. Holotype worker, FRANCE: Marseille (*A. Grouvelle*) (not in MNHN, presumed lost). [Junior primary homonym of *Ponera parva* Forel, 1909: 244. Junior synonym of *ragusai*: Bernard, 1967: 88.] (See note 7.)

Ponera massiliensis Bondroit, 1920: 158. [Replacement name for *Ponera parva* Bondroit, 1918: 85. Junior synonym of *ragusai*: Bernard, 1967: 88.]

Ponera gyptis Santschi, 1921c: 435. [Unnecessary (second) replacement name for *parva* Bondroit, 1918: 85. Junior synonym of *ragusai*: Bernard, 1967: 88.]

Ponera oblongiceps Smith, M.R., 1939: 76, figs. 1–3. Syntype workers, queens and ergatoid males, U.S.A.: Maryland, Priest Bridge (*A.B. Gurney*) (USNM) [not seen]. **Syn. n.** [Previously junior synonym of *gleadowi*: Taylor, 1968: 65.]

NOTES.

1 Emery (1894) mentions two worker syntypes of *ragusai* but only one remains in MSNG and unfortunately the specimen lacks its head. A detached *Hypoponera* head, found by Dr Fabio Penati (MSNG) in the same box as the *ragusai* syntype, together with some other *Hypoponera* species, is not associated with the *ragusai* body. It is certain that the detached head does not belong to *ragusai* because, compared to the illustrations of *ragusai* in Emery (1909), the scapes are very long (SI 110), and about 10% of the scape length projects beyond the midpoint of the posterior margin of the head in full-face view. Also, the eye consists of 4 ommatidia and is located more posteriorly than is seen in any member of the *punctatissima* group. Measurements of the headless *ragusai* syntype are: PrW 0.34, WL 0.74, PeNL 0.18, PeH 0.30, PeNW 0.22, PeS 0.233, PeNI 65, LPeI 60, DPeI 122.

2 Forel, in Emery (1895) mentioned three Indian localities and three collectors for the syntype series of *gleadowi*: Poona (*Wroughton*), Orissa (*Taylor*) and Thana (*Gleadow*). Only the first series appears to be extant, in MHNG and BMNH; the locations of the other two series are not known and they do not appear to have survived. The syntypes in MHNG consist of two pins. The first pin bears a complete worker on an upper mount and its card has a star drawn on it; the lower mount has an almost destroyed worker specimen of which only a few leg fragments and apex of gaster remain. The second pin has a broken worker on the upper mount, which has the petiole and gaster missing, the mesosoma is at the apex of the mount and the head is detached and glued down closer to the pin. The lower mount carries a complete worker-queen intercaste. The BMNH syntypes consist of 10 workers and a worker-queen intercaste glued in a row on a single card. The data label reads, "India. R.C. Wroughton 91–76", below which is a folded handwritten label "*Ponera gleadowi*". The BMNH Accessions Register for 1891, no. 76 records that these specimens arrived at the museum in alcohol and were "collected by the donor and determined by M. Forel."

An alate queen and a male described by Forel (1900b: 327) as the sexuals of *gleadowi* were examined in this study (MHNG). These specimens were not collected with workers, and Forel's assumption that they were conspecific with the *gleadowi* worker syntypes now appears incorrect. Emery (1909) remarked that he could not satisfactorily separate workers of *ragusai santschii* and *gleadowi*, but that the queens of the two indicated that they were separate species. The conclusion reached here is that *ragusai santschii* and *gleadowi*, based on their type-material, represent a single species (the first available name for which is *ragusai*), but that the Indian queen and male assumed by Forel (1900b) to be *gleadowi* and accepted as such by Emery (1909), are something different and should be excluded from further consideration of this species. The possibility that workers of *ragusai* and *gleadowi* represented a single species was first raised by Forel (1899), and a direct comparison of their syntypes made in this study confirms that his speculation was correct.

3 The synonymic history of *decipiens* is complex. The name was first synonymised with *gleadowi* by Wilson (1958: 328). It was later transferred to the synonymy of *punctatissima* by Wilson & Taylor (1967: 29, in text). Finally, the holotype was examined by Onoyama (1989: 5), who re-established *decipiens* as a junior synonym of *gleadowi*. These references were inadvertently omitted from the catalogue of Bolton (1995).

4 From the original description of *aethiopica* more than one specimen would be expected, as two measurements are provided. However, only a single syntype specimen remains in MHNG, and that is lacking its head. Comparison of this *aethiopica* syntype with queens included in the type-series of *santschii* indicates that treatment as a single species is the most parsimonious conclusion.

5 The Tunisian material collected by Santschi forms almost the entire type-series of *ragusai santschii*, added to which is a single worker from Algeria that had previously been referred to as *gleadowi* by Emery (1895), and some unspecified material from Syria. The Tunisian series had earlier been described by Santschi (1907) as *ragusai* and was later made type-material of *santschii* by Emery (1909). Material from the Syrian locality is not referred to in the text and no information about it is given. However, a single worker in BMNH bears the data, "Syrien, Kaifa (*Reitter*). *Ragusai* det. Emery. Collection G. Mayr." This appears to belong to the "Syria" material mentioned by Emery (1909) and has been labelled as such. The modern geography would be Haifa, in Israel.

Many years ago, R.W. Taylor recognised the equivalence of *ragusai santschii* with *gleadowi*, as in 1964 he placed a determination label "*gleadowi*" upon a pin of *santschii* syntypes.

6 The holotype of *lesnei* has a slightly broader head than in other material measured, with HW 0.50, CI 82, as opposed to HW 0.43–0.47, CI 74–79 in the others. However, *lesnei* is extremely close to the range maxima given

by Onoyama (1989) for Japanese worker specimens, HW 0.45–0.49, CI 75–81, and is near his dimensions for an intercaste (HW 0.51, CI 81). The holotype of *lesnei* is treated as a worker here, but it may represent some form of intercaste. The critical petiolar measurements and indices of *lesnei* (LPeI 60, DPeI 133) are all within the normal range of *ragusai* workers.

7 Dr Claire Villemant (MNHN) informs us that the holotype of *parva* (= *massiliensis*, = *gyptis*) is not present in the collection. We can find no reason to doubt Bernard's synonymy and so we allow it to stand here.

WORKER. *Measurements*: HL 0.56–0.62, HW 0.42–0.50, HS 0.490–0.555, SL 0.36–0.43, PrW 0.32–0.38, WL 0.68–0.78, HFL 0.34–0.42, PeNL 0.16–0.18, PeH 0.26–0.30, PeNW 0.20–0.24, PeS 0.203–0.247 (17 measured). *Indices*: CI 74–82, SI 81–87, PeNI 62–68, LPeI 55–61, DPeI 120–140.

Answering the general description of *punctatissima* and superficially very similar to the smallest workers of that species, but the shape and relative dimensions of the petiole node are consistently different.

1 In profile the petiole node of *ragusai* is more blocky, lower and relatively longer, with PeH 0.26–0.30 and LPeI 55–61. (In *punctatissima*, PeH 0.30–0.39 and LPeI 43–53.)

2 In dorsal view the petiole node of *ragusai* is longer and relatively narrower, DPeI 120–140. (In *punctatissima*, DPeI 140–165.)

In addition to these differences in the shape of the petiole node, *ragusai* workers are always yellow to light brownish yellow, fall at the bottom end of the known size range of *punctatissima* (*e.g*. HW 0.42–0.50, *versus* 0.46–0.60 in *punctatissima*) and have heads that average relatively slightly narrower and scapes that are relatively slightly longer than in *punctatissima*; compare CI and SI above with CI 79–87 and SI 75–84 in *punctatissima*. Finally, the queen of *ragusai* is considerably darker in colour than her workers, whereas in *punctatissima* the two castes have the same colour.

Under the name *H. ragusai* this species is recorded by scattered small collections, usually of only one or two workers, and at first glance is distributed over an enormous geographical range. In a recent paper, Tinaut (2001) newly recorded the species from Spain (but see below) and summarised the known distribution of *ragusai* as Italy (Sicily), southern France, Algeria, Tunisia, Syria, central Sahara and eastern Africa. In addition, Dorow (1995) has recorded it from the Seychelles and Collingwood & Agosti (1996) have noted it in Saudi Arabia. Tinaut, quoting Mei (1992), said that, "it is doubtful that all these records refer to the same species", a comment with which we fully agree because the entire group is plagued with misidentifications. The records from "eastern Africa" probably refer only to the catalogued names *ragusai bulawayensis* from Zimbabwe, and *ragusai sordida* from Kenya, but it is now known that neither of these is correctly associated with *ragusai*. *H. bulawayensis* is a valid species in an entirely different species group (*abeillei* group) and *ragusai sordida* is a junior synonym of *punctatissima*. The same problem of confused identity appears also to affect Tinaut's (2001) paper itself, because his fig. 1, supposedly of the petiole of *ragusai*, has an LPeI *ca* 46, which is within the range of *punctatissima* but considerably below that of *ragusai* (LPI 55–61). He also notes the presence of two castes of ergatoid male, eyed and eyeless, which are known for *punctatissima* but not elsewhere. It is most probable that his *ragusai* material consists of misidentified specimens of *punctatissima*. Thus, the only genuine earlier records for the circum-Mediterranean area include the original descriptions and those summarised in Baroni Urbani (1971) for Italy (Sicily), Bernard (1967) for France, and Emery (1909) for Tunisia, Algeria and Syria. The later records from Seychelles and Saudi Arabia await confirmation.

On a world-wide scale, *ragusai* is better known by its junior synonym, *gleadowi*, which was generally considered to be primarily Oriental, but obviously with well-developed tramping ability. Imai, *et al*. (2003) gave the known distribution of *gleadowi* as India, Korean Peninsula, Japan, Taiwan, Hawaii and the continental U.S.A. More recently, Evenhuis (2007) listed it from Fiji, but this identity remains unconfirmed. *H. ragusai* (= *gleadowi*) is not recorded from Polynesia by Wilson & Taylor (1967), but in view of the fact that Onoyama (1989) has shown that *decipiens*, from Hawaii and treated by Wilson & Taylor as a junior synonym of *punctatissima*, belongs to this species, it is likely to be present but misidentified among their *punctatissima* material. Indeed, Wilson & Taylor (1967: 29) hint at this possibility. In all places and under both names the species appears to be rare, or perhaps collectors have mostly missed its favoured habitat.

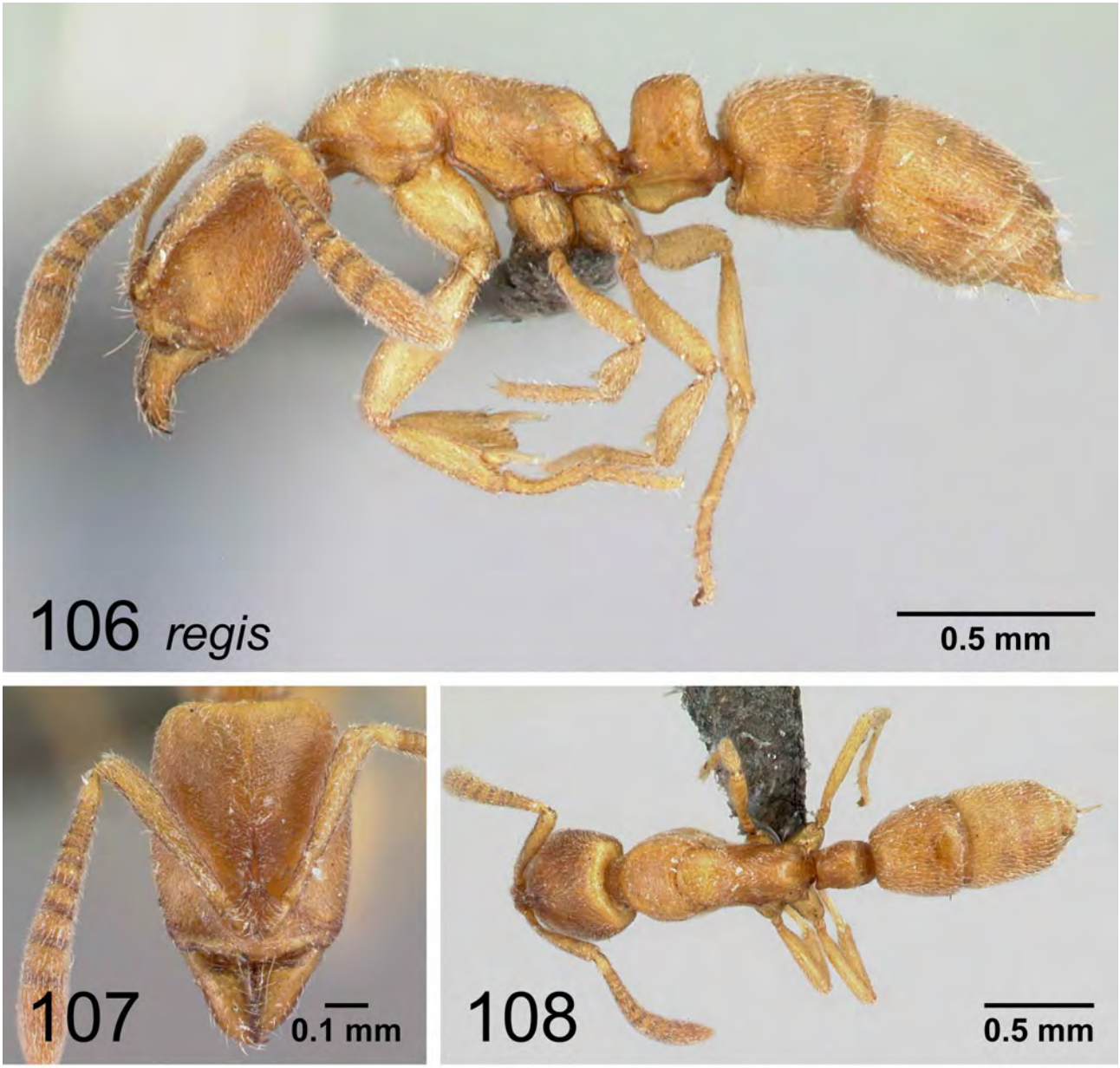
The worker-queen intercaste in the syntype series of *gleadowi* has eyes with 12–15 ommatidia. The ergatoid male resembles that of *punctatissima* as it has a very worker-like head and mandibles, but it has 13 antennal segments as opposed to 12 in *punctatissima*. *H. gleadowi* workers from Japan were redescribed by Onoyama (1989)

and an intercaste was also mentioned by him. A reasonable photograph of *ragusai* (as *gleadowi*) is provided by Imai, *et al*. (2003: 194) and the approximate LPeI from this photograph is 59, the same as the *gleadowi* worker syntype.

Material examined. **Italy**: Sicily (*E. Ragusa*). **France**: Dept. de la Seine, Bécon-sur-Bruyères (*P. Lesne*). **Tunisia**: Kairouan (*F. Santschi*). **Egypt**: Cairo, Pyramids (*W. Wittmer*); Sinai, Wadi Feran (*W. Wittmer*). **Ethiopia**: Tchafianani (*M de Rothschild*). **Kenya**: Western Prov., Kakamega Forest, Kisere For. (*F. Hita Garcia*). **India**: Poona (*Wroughton*).

Hypoponera regis Bolton & Fisher **sp.n.**
(Figs 106–108)

HOLOTYPE WORKER. *Measurements*: HL 0.64, HW 0.49, HS 0.565, SL 0.46, PrW 0.39, WL 0.80, HFL 0.46, PeNL 0.21, PeH 0.36, PeNW 0.21, PeS 0.260. *Indices*: CI 77, SI 94, PeNI 54, LPeI 58, DPeI 100.



FIGURES 106–108. Lateral, full face and dorsal view of body. *Hypoponera regis* holotype worker CASENT0192423.

Eyes absent. Apex of scape, when laid straight back from its insertion, just fails to reach the midpoint of the posterior margin in full-face view; SL/HL 0.72. Funiculus with 5 enlarging apical segments. Metanotal groove entirely absent from dorsum of mesosoma. Mesonotal-mesopleural suture absent from side of mesosoma. Propodeal declivity separated from sides by blunt angles; without acute raised margins or a sharp carinae. Posterior surface of petiole node without short cuticular ridges that radiate from just above the peduncle. Node of petiole in dorsal view as long as broad (DPeI 100), the anterior face convex and the posterior transverse. Petiole in profile higher than long, the anterior face of the node extremely feebly inclined posteriorly and the anterodorsal angle more broadly rounded than the posterodorsal; length of node just above anterior tubercle is slightly greater than length of dorsum. Subpetiolar process in profile with a blunt, obtuse, ventral angle. Maximum width of first gastral tergite in dorsal view is less than width of second gastral tergite at its midlength. Sides of second gastral tergite shallowly convex in dorsal view. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is fractionally less than the maximum width of the segment. Cinctus of second gastral tergite strongly developed and conspicuous, broad and deep, with numerous weak cross-ribs at its base. Disc of second gastral tergite with crowded superficial punctures so that the surface appears microreticulate at lower magnifications. First and second gastral tergites dorsally pubescent and with a number of short, fine, standing setae that project well above the level of the pubescence. Full adult colour yellow.

Holotype worker, **Tanzania**: Tanga Region, Kilindi Forest Reserve, 1015 m., 27-30.viii.2005, CEPF-TZ-3.1-F34, 5.57934S, 37.57971E, primary forest, pitfall trap (*P. Hawkes, J. Makwati & R. Mtana*) (SAMC).

Only four species of the *abeillei* group in Africa have workers with a DPeI < 120: *angustata, bulawayensis, perparva* and *regis*. Of these four, *angustata* and *perparva* are minute, with combined measurements of HL 0.38 – 0.45, HW 0.27–0.35, SL 0.20–0.26, as opposed to the markedly larger *regis* measurements of HL 0.64, HW 0.49, SL 0.46. Separation of *regis* from *bulawayensis* is relatively simple and is given in the key.

Hypoponera rigida Bolton & Fisher **sp.n.**

HOLOTYPE WORKER. *Measurements*: HL 0.46, HW 0.34, HS 0.400, SL 0.28, PrW 0.26, WL 0.56, HFL 0.26, PeNL 0.13, PeH 0.24, PeNW 0.17, PeS 0.180. *Indices*: CI 74, SI 82, PeNI 65, LPeI 54, DPeI 131.

Eyes absent. In full-face view apex of scape, when laid straight back from its insertion, conspicuously fails to reach the midpoint of the posterior margin by a distance that is *ca* 0.25 × SL; SL/HL 0.61. Reticulate-punctulate sculpture of cephalic dorsum fine and superficial, but distinct; pronotal dorsum with minute scattered punctulae, mostly smooth. Lateroventral surfaces of head with widely separated minute punctulae. With mesosoma in dorsal view the metanotal groove absent. Propodeal declivity separated from sides by weak margins. Mesopleuron unsculptured. Petiole in profile quite low, with the node relatively long in proportion to its height, the anterior and posterior faces almost parallel, the anterior face vertical and the posterior face only very weakly inclined towards it; dorsal surface extremely feebly convex. In profile the anterodorsal and posterodorsal angles of the petiole node are about equally rounded. Subpetiolar process with a low, obtuse, ventral angle. Posterior surface of petiole node without a transverse groove or impression above the peduncle and lacking cuticular ridges that radiate upwards from the posterior petiolar peduncle. In dorsal view the petiole node about one-third broader than long. Maximum width of first gastral tergite in dorsal view about equal to the width of the second tergite at its midlength (*ca* 0.30). First gastral tergite in dorsal view slightly broader than long, narrower across the anterior margin (*ca* 0.20) than across the posterior margin (*ca* 0.30) and with the sides distinctly divergent posteriorly. Base of cinctus of second gastral tergite with distinct cross-ribs. Sides of second gastral segment parallel for most of their length in dorsal view; narrowing extremely feebly only at the cinctus anteriorly and the apex posteriorly. Posttergite of second gastral segment, from posterior margin of cinctus to apex, very slightly broader than long. Disc of second gastral tergite shallowly reticulate-punctate. Full adult colour brown.

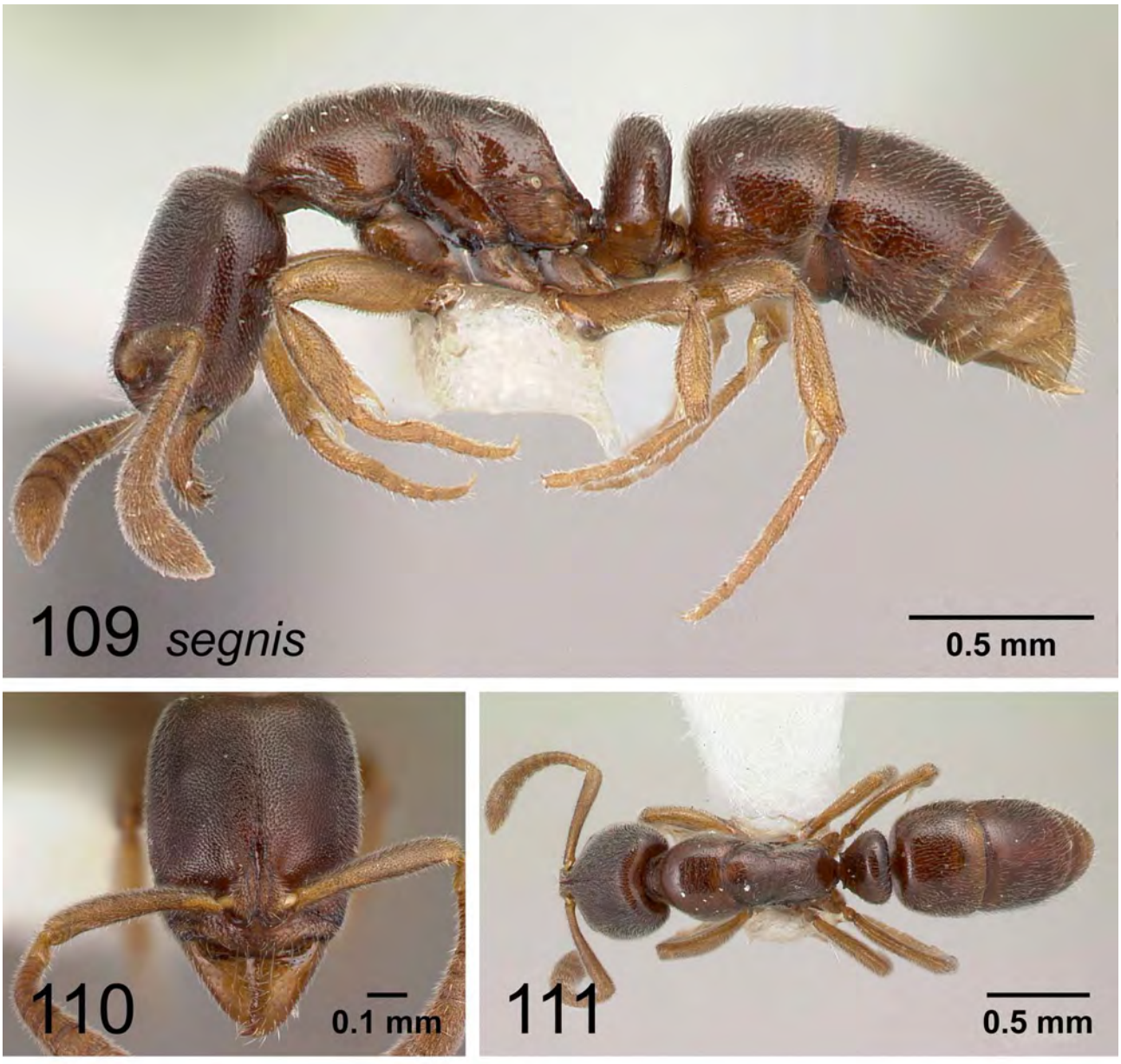
Holotype worker, **Uganda**: nr Queen Elizabeth N.P., 2.x.2006, UG06-SKY-144, bush (*S. Yamane*) (KUIC).
Apical funicular segments of right antenna missing from holotype.
Paratype. 1 alate queen with same data as holotype (KUIC).

Known from only a single worker, *rigida* seems closely related to *meridia* and *abeillei*, but is distinctly darker in colour than these. In the key *rigida* is grouped together with *meridia* and *abeillei* as in these three species the

anterior face of the petiole node in profile is vertical. In *meridia* and *abeillei* the posterior face is also vertical so that the anterior and posterior faces are parallel and the node is columnar. However, in *rigida* the anterior face is vertical but the posterior face converges very slightly upon it from the level of the anterior tubercle to the dorsal angle. In *orba*, *camerunensis* and their relatives, either both faces of the node in profile are inclined and converge dorsally, or it is the posterior face that approaches verticality and is converged upon by the obviously sloped anterior face.

Hypoponera segnis Bolton & Fisher **sp.n.**
(Figs 109–111)

WORKER (holotype in parentheses). *Measurements*: HL 0.65–0.77 (0.70), HW 0.50–0.60 (0.55), HS 0.605–0.680 (0.625), SL 0.46–0.58 (0.50), PrW 0.38–0.48 (0.44), WL 0.88–1.08 (0.95), HFL 0.47–0.60 (0.52), PeNL 0.17–0.20 (0.18), PeH 0.45–0.57 (0.47), PeNW 0.32–0.40 (0.35), PeS 0.320–0.380 (0.333) (20 measured). *Indices*: CI 76–81 (79), SI 86–98 (91), PeNI 77–86 (80), LPeI 32–43 (38), DPeI 180–220 (194).



FIGURES 109–111. Lateral, full face and dorsal view of body. *Hypoponera segnis* paratype worker CASENT0226545.

Eyes absent or at most a single, poorly defined and very small ommatidium. Apex of scape, when laid straight back from its insertion, just fails to touch the midpoint of the posterior margin in full-face view; SL/HL 0.68–0.77. Pronotal dorsum almost smooth, obviously much less strongly and densely sculptured than the densely reticulate-punctate cephalic dorsum. Metanotal groove absent from dorsum of mesosoma or at most with a vestigial faint remnant. Propodeum marginate between declivity and side. Petiole in profile tall and slender, the node short from front to back and with a shallowly rounded dorsum. Posterior surface of petiole node without cuticular ridges that radiate upward from the peduncle. Subpetiolar process with an obtuse ventral angle. In dorsal view petiole node short and broad, with posterior face transverse and anterior face convex; node not thickly D-shaped. Maximum width of first gastral tergite in dorsal view slightly greater than width of second gastral tergite at its midlength. Cross-ribs at base of cinctus of second gastral tergite short but distinct. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, slightly less than the width of the segment at its midlength. Disc of second gastral tergite with sharply incised small punctures that are separated by areas of glossy cuticle; the diameters of the punctures are equal to, or slightly less than, the distances that separate the punctures. First gastral tergite dorsally pubescent, without conspicuous standing setae that are clearly more erect and strongly project above the level of the pubescence; the few setae that are present are only fractionally longer than the pubescence and are indistinct.

Holotype worker (top specimen of three on pin), **Rwanda**: Kayove, 2100 m., 23.iv.1973 (*P. Werner*) (MHNG). Paratypes. 11 workers with same data as holotype; 12 workers with same data but 15.v.1973; 15 workers with same data but 12.viii.1973 (MHNG, BMNH, CASC).

H. segnis is very close to *tristis*, which is also from Rwanda and has the same type-locality. At present the two are separated only by the shape of the petiole, which is shorter in profile and distinctly broader in dorsal view in the former (compare indices). The differences in shape are consistent in the sparse material available. The relationship of these two nominal species should be reassessed when more material is available. See also the notes under *dema*.

Non-paratypic material examined. **Democratic Republic of Congo**: Manyema, Sibatwa Kilengwe (*Gérard*). **Rwanda**: Gisovu (*P. Werner*); Rangiro (*P. Werner*); Kayove (*P. Werner*). **Kenya**: Embu, Irangi For. Sta. (*Mahnert & Perret*).

Hypoponera sinuosa (Bernard)

Ponera sinuosa Bernard, 1953: 204, fig. 3E. LECTOTYPE worker (by present designation), GUINEA: ravin 1 de la forêt du Mont Tô, 21.ii. (*Lamotte*) (MNHN) [examined]. [Combination in *Hypoponera*: Bolton, 1995: 216.] (See note.)

NOTE. Bernard's original syntype series of *sinuosa* consisted of one worker and one queen from Guinea, mounted on a single pin with the locality data given above, and a separate worker with the data: Ivory Coast: Banco, H 31, 30.viii.1945 (*Delamare-Deboutteville*). The Guinea pin bears a secondary label: "Lectotype worker, paralectotype queen *Ponera sinuosa* Ber. Det. R.W. Taylor, 11 July 63". This information was never published by Taylor so the worker is formally designated as lectotype here. The queen is omitted from the type-series as its petiole and gaster are missing and confirmation of its conspecificity with the worker cannot be assured. The gaster of the lectotype worker is detached and mounted separately and most of its legs are missing. The single Ivory Coast worker is a teneral of *punctatissima*; the cuticle of its head and gaster is much collapsed and very pale in colour. This specimen is excluded from further consideration of *sinuosa*. Bernard's description of *sinuosa* appears to be a mixture of the Guinea (*sinuosa*) and Ivory Coast (*punctatissima*) workers.

LECTOTYPE WORKER. *Measurements*: HL 0.52, HW 0.43, HS 0.475, SL 0.37, PrW 0.33, WL 0.74, HFL 0.38, PeNL 0.14, PeH 0.30, PeNW 0.22, PeS 0.220. *Indices*: CI 83, SI 86, PeNI 67, LPeI 47, DPeI 157.

Eyes at first glance absent, but appropriate lighting conditions and viewing angle reveal a blister-like minute ommatidium, about 0.11 from the anterolateral clypeal margin. Apex of scape, when laid straight back from its insertion, just touches the midpoint of the posterior margin in full-face view; SL/HL 0.71. Funiculus with 5 enlarging segments. Mesonotal-mesopleural suture entirely absent. Anterior margin of mesopleuron obtusely angulate, almost rounded, without a projecting angle or tooth. Metanotal groove distinct on dorsum, transverse; in profile not impressed. Sides of propodeum in dorsal view bilaterally pinched just posterior to the metanotal groove. In profile the pinched side appears as a broad, shallow depression that extends from the posterior margin of the mesopleuron

about half-way to the propodeal spiracle. Propodeal declivity and side meet in a distinct angle, but no carina is present. In profile base of lateral margin of propodeal declivity curves anteriorly to metapleural gland bulla. Petiole node in profile with anterior and posterior faces markedly convergent dorsally, the dorsal surface narrowly rounded; in profile the dorsal length of the node is less than half the length just above the anterior tubercle of the petiole. In dorsal view the petiole node broader than long, with posterior face transverse and anterior face convex. Posterior surface of node smooth, without vertical cuticular ridges above the peduncle. First gastral tergite with quite dense decumbent pubescence and apparently with a few short, standing setae also present (condition of gaster is poor). Disc of second gastral tergite microreticulate. In dorsal view second gastral tergite at its midlength is broader than the maximum width of the first tergite. Full adult colour yellow.

Only a single damaged worker specimen of this strange little species is known and no other specimen that approaches the *sinuosa* lectotype has been seen. In general there is some resemblance to workers of *coeca* and *inaudax*, but in those common species there is never a developed metanotal groove on the dorsal mesosoma. Bernard's description is misleading on several counts. His fig. 3E, showing a widely sinuate propodeal declivity, is inaccurate as only its lateral margin curves in towards the metapleural gland bulla at its base. He also says that the mandible has six spaced teeth where in reality the left mandible has a total dental count of 9 and the right mandible has 8. The petiole in profile is not shaped as indicted in his fig. 3E. In reality the anterior and posterior faces are markedly convergent dorsally and the LPeI is 47; in the figure the faces are nearly parallel and the LPeI obtained from the sketch is about 39.

The position of *sinuosa* in the key is conjectural. In the single worker available, the base of the cinctus of the second gastral tergite cannot be seen. The tergites of gastral segments one and two are jammed very tightly together and disturbing them could cause even more damage to the unique lectotype. However, because of its overall similarlity to *punctatissima* and *ragusai*, cross-ribs are assumed to be absent. Thus two assumptions are made to place *sinuosa* in the key. First, that the detached and separately mounted gaster is actually associated with the head and mesosoma, and second, that because cross-ribs are absent in related species on the tergal cinctus, they will also be absent here.

Hypoponera spei (Forel)
(Figs 112–114)

Ponera spei Forel, 1910: 423. Holotype worker, SOUTH AFRICA: Montagnes du Natal (*Wroughton*) (MHNG) [examined]. [Combination in *Hypoponera*: Bolton, 1995: 216.]

Ponera spei r. *devota* var. *sancta* Forel, 1914: 213. Workers from SOUTH AFRICA: Natal, Durban (*G. Arnold*). Unavailable name (Bolton, 1995: 216).

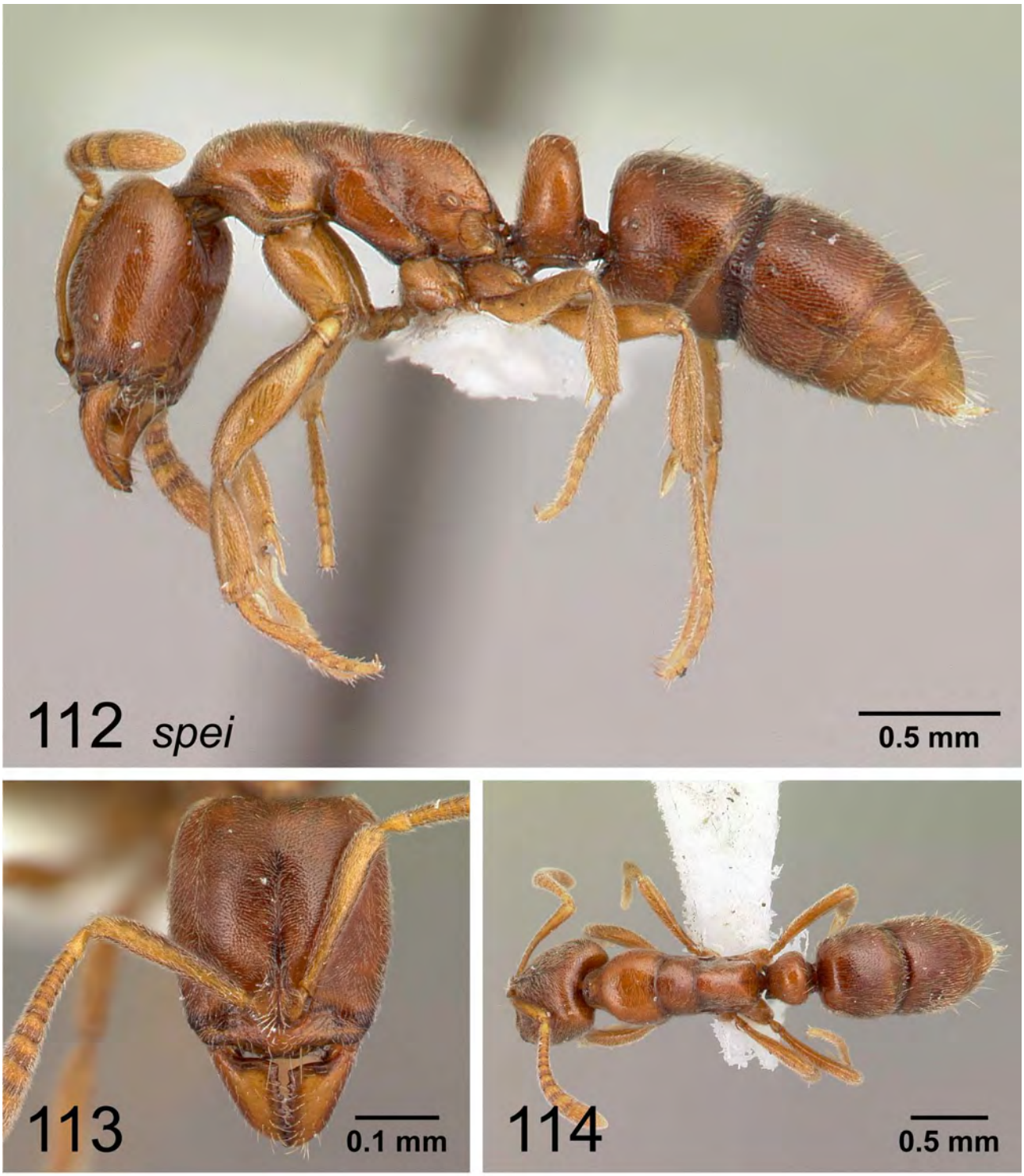
Ponera spei var. *fidelis* Santschi, 1926: 207, fig. 1C. Syntype worker and queen, SOUTH AFRICA: Natal, Krantz Kloof, 21.i.1914 (*H.D. Marley*) (NHMB) [queen examined]. **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 214.]

WORKER. *Measurements*: HL 0.70–0.87, HW 0.61–0.74, HS 0.655–0.815, SL 0.48–0.59, PrW 0.43–0.56, WL 0.94–1.18, HFL 0.52–0.66, PeNL 0.19–0.24, PeH 0.44–0.55, PeNW 0.30–0.39, PeS 0.310–0.387 (20 measured). *Indices*: CI 82–89, SI 77–85, PeNI 68–76, LPeI 40–46, DPeI 150–180.

Eyes present, of 1–7 ommatidia that may be depigmented or partially fused. In full-face view apex of scape, when laid straight back from its insertion, fractionally fails to reach, or just touches, the midpoint of the posterior margin; SL/HL 0.66–0.76. Reticulate-punctulate sculpture of cephalic dorsum fine, but head more densely sculptured than pronotal dorsum. Propodeal dorsum smooth, with only faint traces of scattered, minute punctulae. Mesonotal-mesopleural suture absent or with a weak vestige still visible. Metanotal groove distinctly incised on dorsum of mesosoma; mesonotum with a well-defined posterior margin. Propodeal declivity separated from side by a blunt angle or a weak margination, without sharp carinae. Mesopleuron smooth and shining. Petiole in profile with the anterior and posterior faces of the node convergent dorsally; node distinctly longer just above the anterior tubercle than at the dorsum. Subpetiolar process variable in shape: at one extreme an elongate lobe with a sharp posteroventral angle, at the other a more bluntly rounded, shorter lobe; intermediates between these two extremes are present. Anterior margin of subpetiolar process, near its base, with a conspicuous pit, from which a sensory seta arises. In dorsal view the petiole node distinctly broader than long. Maximum width of first gastral tergite in dorsal view slightly less than the width of the second tergite at its midlength. Base of cinctus of second gastral tergite with

strong cross-ribs. Posttergite of second gastral segment, from posterior margin of cinctus to apex, distinctly broader than long. Punctures on disc of second gastral tergite distinct, dense but not appearing microreticulate. With first gastral segment in profile its dorsum with elongate fine standing setae, the longest of which are only fractionally shorter than those at the apex of the tergite. Full adult colour yellowish brown to medium brown.

In most worker specimens of *spei* the eye consists of 1–4 ommatidia but commonly up to about 7 may be observed. At minimum there is only a single ommatidium, and it is often depigmented and poorly defined. Where several ommatidia occur they are often partially fused, so that the limits of individual ommatidia are obscured and the eye appears blister-like under low magnification.



FIGURES 112–114. Lateral, full face and dorsal view of body. *Hypoponera spei* worker BLF1791(21)-6.

Extremely closely related to *boerorum*. In fact, the two may eventually prove to be conspecific; see the notes and discussion under *boerorum* and *natalensis.*

Material examined. **South Africa**: Natal (*Wroughton*); Natal, Durban (*G. Arnold*); Natal, Krantz Kloof (*H.D. Marley*); Kwazulu Natal, Karkloof, Leopard Bush Nat. Res. (*B.L. Fisher*); Kwazulu Natal, Boston, Good Hope Estate (*B.L. Fisher*); Kwazulu Natal, Umtamvuna Nat. Res. (*S. van Noort*); W. Cape Prov., Diepwalle, nr Knysna (*B.L. Fisher*); Sinclair Forest, nr Knysna (*B.L. Fisher*); E. Cape, Mkambati Game Res. (*B.L. Fisher*).

Hypoponera sulcatinasis (Santschi)
(Figs 115–117)

Ponera sulcatinasis Santschi, 1914c: 4. Syntype workers and queen, SOUTH AFRICA: Natal, Richmond (*I. Trågärdh*) (NHMB) [examined]. [Combination in *Hypoponera*: Bolton, 1995: 216.]

Ponera spei st. *devota* Santschi, 1914c: 5. Syntype worker (teneral), SOUTH AFRICA: Natal, Richmond (*I. Trågärdh*) (NHMB) [examined] **Syn. n.** [Combination in *Hypoponera*: Bolton, 1995: 214.]

NOTE. It is suspected that type-material of *sulcatinasis* and *devota* had their origins in a single collection and were only separated because of the teneral nature of the latter.

WORKER. *Measurements*: HL 0.78–0.82, HW 0.65–0.70, HS 0.715–0.760, SL 0.60–0.65, PrW 0.48–0.54, WL 1.08–1.20, HFL 0.61–0.66, PeNL 0.22–0.24, PeH 0.50–0.56, PeNW 0.36–0.41, PeS 0.360–0.400 (15 measured). *Indices*: CI 82–85, SI 88–96, PeNI 72–79, LPeI 42–44, DPeI 164–178.

Eyes present, small but distinct, of about 4–6 ommatidia. In full-face view apex of scape, when laid straight back from its insertion, touches or slightly exceeds the midpoint of the posterior margin; SL/HL 0.75–0.80. Reticulate-punctulate sculpture of cephalic dorsum strong and conspicuous. Pronotal dorsum punctate, less densely so than head, the individual punctures distinct and more widely spaced. Lower half of side of pronotum much less densely sculptured than dorsum. Propodeal dorsum reticulate-punctate, the sculpture covering the entire surface; the sculptured dorsum contrasts strongly with the smooth, shining declivity. Mesonotal-mesopleural suture absent to vestigially present, and sometimes with a weak remnant of a transverse suture on the mesopleuron. Metanotal groove distinctly incised on dorsum of mesosoma; mesonotum with a well-defined posterior margin. Propodeal declivity separated from side by an angle or a weak margination, without sharp carinae. Mesopleuron mostly unsculptured but there may be weak sculpture peripherally. Petiole in profile with the anterior and posterior faces of the node usually very weakly convex and weakly convergent dorsally; node distinctly longer just above the anterior tubercle than at the dorsum. Subpetiolar process a lobe with a sharp or blunt ventral angle. Anterior margin of subpetiolar process, near its base, with a conspicuous pit from which a sensory seta arises. Maximum width of first gastral tergite in dorsal view subequal to or slightly greater than the width of the second tergite at its midlength. Base of cinctus of second gastral tergite with strong cross-ribs. Posttergite of second gastral segment, from posterior margin of cinctus to apex, distinctly broader than long. Disc of second gastral tergite reticulate-punctate to microreticulate, the sculpture strong and conspicuous. With first gastral segment in profile its dorsum usually without standing setae except at the apex of the tergite; occasionally one or two very short, inconspicuous setae may be present. Full adult colour dark brown, blackish brown, or mostly black; sometimes with reddish areas.

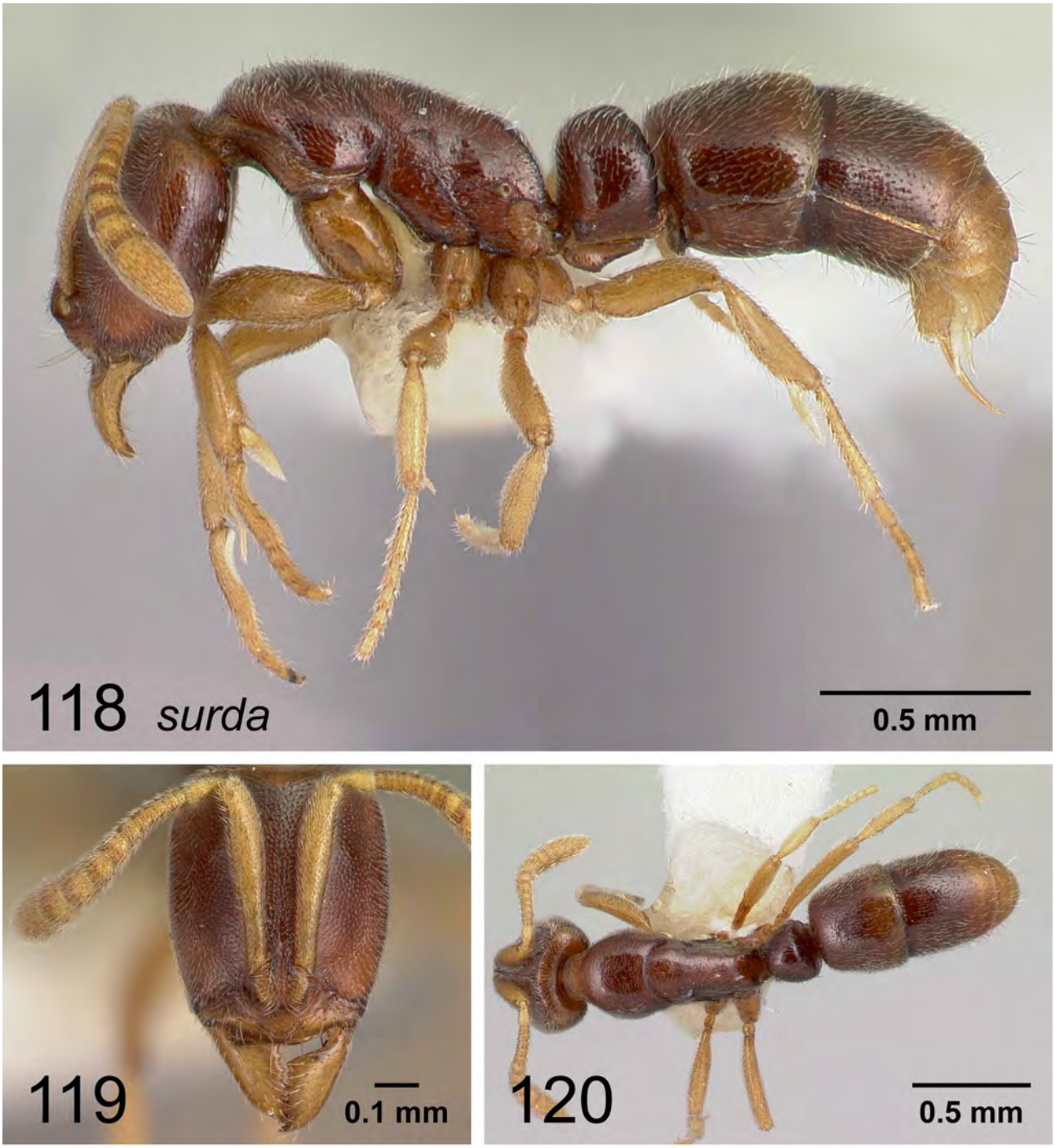
This large, darkly coloured species is immediately recognisable by its densely sculptured propodeal dorsum, which is easily the most strongly sculptured in the *boerorum* group. In the region as a whole the propodeal sculpture of *sulcatinasis* is approached only by *hebes*, but that species belongs to the *abeillei* group.

Material examined. **South Africa**: Natal, Richmond (*I. Trågärdh*); Natal, Ekombe, nr Kranskop (*Ross & Leech*); Kwazulu Natal, Karkloof, Leopard Bush Nat. Res., Howick (*B.L. Fisher*); Kwazulu Natal, Good Hope Estate, Boston (*B.L. Fisher*).

FIGURES 115–117. Lateral, full face and dorsal view of body. *Hypoponera sulcatinasis* worker BLF1791(21)-5.

Hypoponera surda Bolton & Fisher **sp. n.**
(Figs 118–120)

WORKER (holotype in parentheses). *Measurements*: HL 0.63–0.68 (0.66), HW 0.52–0.56 (0.54), HS 0.585–0.620 (0.600), SL 0.46–0.48 (0.48), PrW 0.40–0.42 (0.42), WL 0.86–0.90 (0.88), HFL 0.48 (0.48), PeNL 0.19–0.21 (0.20), PeH 0.40–0.45 (0.45), PeNW 0.28–0.30 (0.30), PeS 0.297–0.317 (0.317) (5 measured). *Indices*: CI 82–83 (82), SI 86–91 (89), PeNI 69–71 (71), LPeI 44–50 (44), DPeI 140–150 (150).



FIGURES 118–120. Lateral, full face and dorsal view of body. *Hypoponera surda* paratype worker CASENT0226544.

Eyes absent. Apex of scape, when laid straight back from its insertion, just fails to reach, or just touches, the midpoint of the posterior margin in full-face view; SL/HL 0.71–0.75. Cephalic dorsum finely reticulate-punctate. Pronotal dorsum almost smooth, obviously much less strongly and densely sculptured than cephalic dorsum. Metanotal groove absent from dorsum of mesosoma. Mesonotal-mesopleural suture absent from side of mesosoma. Propodeum weakly marginate between declivity and side. Posterior surface of petiole node with a series of very short cuticular ridges that radiate upward from the peduncle. Node of petiole in profile with the anterior and posterior faces parallel, the dorsum shallowly convex. Petiole node in dorsal view thickly D-shaped, posterior face transverse and anterior face strongly and quite narrowly convex. Subpetiolar process blunt or with a feeble ventral angle. Maximum width of first gastral tergite in dorsal view greater than width of second gastral tergite at its midlength. Cross-ribs at base of cinctus of second gastral tergite conspicuous. Midline length of second gastral post-

tergite, from posterior margin of cinctus to apex, is about equal to the width of the segment at its midlength. Disc of second gastral tergite with small punctures that are relatively widely spaced and separated by areas of glossy cuticle; the diameters of the punctures are less than the distances that separate the punctures. First and second gastral tergites dorsally pubescent and with a number of short standing setae that project above the level of the pubescence.

Holotype worker (upper of two specimens on pin), **Kenya**: Embu, Kirimiri For. W. of Runyenje, 1550 m., 3.x.1977 (*V. Mahnert & J.-L. Perret*) (MHNG).
Paratypes. 8 workers with same data as holotype (MHNG, BMNH, CASC, BBRC).

Among the species that possess cuticular ridges at the base of the posterior face of the petiole node, *surda* is fairly distinct. The two species *faex* and *hebes* have very coarse cephalic and pronotal sculpture, whereas in *surda* the cephalic sculpture is fine and almost effaced on the pronotum. In addition, *faex* is much larger (HW 0.72) and has well-developed eyes, while *hebes* has a broader petiole node (PeNI 80–84) and very obvious long, standing setae on the first and second gastral tergites dorsally; these are much longer and more conspicuous than those of *surda*. The remaining species, *mixta*, *jeanneli*, *jocosa*, *quaestio* and *ursa*, have more densely packed punctate sculpture on the disc of the second gastral tergite, and have petiole nodes that are not distinctly thickly D-shaped in dorsal view. See also the notes under *jeanneli*.

Hypoponera tecta Bolton & Fisher **sp. n.**
(Figs 121–123)

HOLOTYPE WORKER. *Measurements*: HL 0.60, HW 0.48, HS 0.540, SL 0.44, PrW 0.37, WL 0.84, HFL 0.44, PeNL 0.16, PeH 0.36, PeNW 0.26, PeS 0.260. *Indices*: CI 80, SI 92, PeNI 70, LPeI 44, DPeI 163.

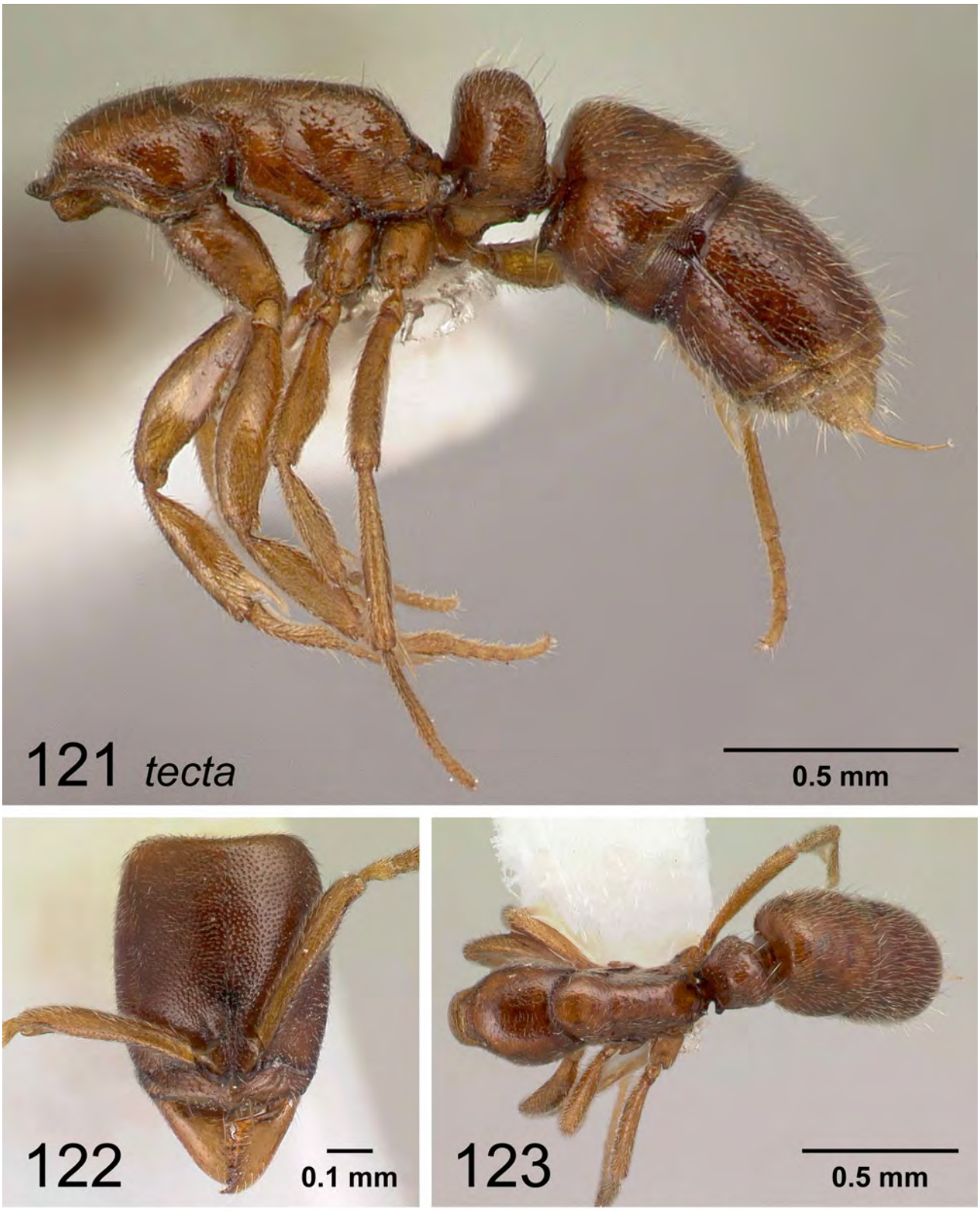
Eyes absent. With the head in full-face view the mid-point of the anterior clypeal margin is overhung by a small but acute, very conspicuous denticle; in profile the denticle can be seen as the apex of the sharp mid-clypeal ridge. Apex of scape, when laid straight back from its insertion, just touches the midpoint of the posterior margin in full-face view; SL/HL 0.73. Cephalic dorsum reticulate-punctate; lateroventral surfaces of head with small, spaced punctures that are separated by areas of smooth cuticle. Pronotal dorsum almost smooth, obviously much less strongly and densely sculptured than cephalic dorsum. Metanotal groove absent from dorsum of mesosoma but a slight change of slope between the mesonotum and propodeum is retained. Mesonotal-mesopleural suture weakly present on side of mesosoma. Propodeum marginate between declivity and side, above level of metapleural gland bulla. Posterior surface of petiole node with a series of short, inconspicuous cuticular ridges that radiate from the peduncle; in the holotype the ridges are more strongly developed on the right-hand side. Node of petiole in profile with the anterior and posterior faces almost parallel, only minutely convergent dorsally, so that the length of the dorsum (0.14) is only fractionally less than PeNL 0.16. Subpetiolar process with a blunt ventral angle. In dorsal view petiole node with posterior face transverse; sides of anterior face converge medially and meet through a broad, bluntly rounded, median angle. Prora in profile a long and deep outcurved flange that is very distinct; upper margin of prora conceals the junction of the helcium sternite with the gaster. Maximum width of first gastral tergite in dorsal view subequal to width of second gastral tergite at its midlength. Cross-ribs at base of cinctus of second gastral tergite short but conspicuous. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is equal to the width of the segment at its midlength. Disc of second gastral tergite with sharply incised small punctures that are quite close-packed but separated by areas of glossy cuticle; the diameters of the punctures are equal to, or slightly less than, the distances that separate the punctures. First and second gastral tergites dorsally pubescent and with a number of conspicuous, stiff, standing setae that project considerably above the level of the pubescence.

Holotype worker, **Kenya**: Western Prov., Mwanza, Western Kenya Sugar, Transect 27, 1650 m., 11.ix.2007, 34°49’40.8’’E, 00°22’45’’N (*F. Hita Garcia*) (CASC).

The holotype was damaged during mounting and its head is mounted separately from the body, upon the same card point.

In the complex of species related to *jeanneli*, *tecta* is unique in its possession of an anterior median clypeal denticle. The denticle is not actually on the anterior margin itself, but arises from the midline of the clypeus imme-

diately behind the margin. The only other species with such a development is *dema*, a much larger species (HW 0.64–0.68, SL 0.55–0.61) that lacks short ribs at the base of the posterior surface of the petiole, and has the petiole node wider in relation to the pronotum (PeNI 82–89).



FIGURES 121–123. Lateral, full face and dorsal view of body. *Hypoponera tecta* holotype worker CASENT0226551.

Hypoponera traegaordhi (Santschi)

Ponera traegaordhi Santschi, 1914c: 6. Syntype worker, SOUTH AFRICA: Natal, Pietermaritzburg, 21.iii.05 (*I. Trågärdh*) (NHMB) [examined]. [Combination in *Ponera (Hypoponera)*: Santschi, 1938: 79; in *Hypoponera*: Bolton, 1995: 216.]

WORKER. *Measurements*: HL 0.55, HW 0.43, HS 0.490, SL 0.36, PrW 0.33, WL 0.70, HFL 0.34, PeNL 0.14, PeH 0.30, PeNW 0.22, PeS 0.220. *Indices*: CI 78, SI 84, PeNI 67, LPeI 47, DPeI 157.

Eyes absent. Apex of scape, when laid straight back from its insertion, conspicuously fails to reach the midpoint of the posterior margin in full-face view; SL/HL 0.65. Gap between apex of scape and midpoint of margin 0.22 × SL, about the apical width of the scape. Cephalic dorsum finely and quite superficially reticulate-punctate. Punctate sculpture on dorsum of mesosoma faint and superficial, the punctures smaller and much less dense than on the head. Mesonotal-mesopleural suture absent. Mesopleuron smooth, its anterior margin bluntly angulate behind the anterior coxa. Metanotal groove entirely absent from dorsum. Dorsa of mesonotum and propodeum with scattered, minute punctures on a glossy surface. Declivity of propodeum separated from sides by blunt angles, not sharply marginate or carinate. Posterior surface of petiole node with a distinct series of short, cuticular ridges that radiate upward from the posterior peduncle across its width. The cuticular ridges terminate dorsally in a darkly coloured, arched transverse rim or carina, much more darkly coloured than the surrounding cuticle. This transverse rim marks the upper boundary of a transverse depression, within which the cuticular ridges are located. With petiole node in profile the anterior and posterior faces are extremely feebly convergent dorsally. Subpetiolar process with an obliquely descending anterior face, a blunt ventral angle and a straight ventral surface that slopes upwards posteriorly. Base of cinctus of second gastral tergite with a continuous row of cross-ribs. Maximum width of first gastral tergite in dorsal view is distinctly less than the width of the second tergite at its midlength. Midline length of second gastral posttergite, from posterior margin of cinctus to apex, is distinctly less than the maximum width of the segment. Disc of second gastral tergite with minute punctures that are relatively close-packed but separated by smooth cuticle, the sclerite appears vaguely microreticulate only in places. First gastral tergite in profile with very short standing setae that project above the level of the decumbent pubescence. Full adult colour yellow.

H. traegaordhi appears to be very close to the Ethiopian species *exigua*. The two uniquely share the presence of a transverse impression that contains cuticular ridges at the base of the posterior surface of the petiole node. These two are separated by the characters given in the key and under *exigua*. *H. traegaordhi* also appears to be related to the South African species *natalensis* and *austra*, which also possess a transverse impression on the posterior surface of the petiole node, but these lack cuticular ridges within the impression, the scapes are longer and when laid back reach much closer to the midpoint of the posterior margin, the subpetiolar process has a shallow lobe with a defined ventral angle, the disc of the second gastral tergite is more obviously microreticulate, and a weak eye-spot is usually present, though it is generally no more than a tiny featureless disc. The presence of radiating cuticular ridges on the posterior surface of the petiole brings *traegaordhi* out in the key together with *jeanneli*, *hebes* and their relatives, but this appears to be a convergent development because none of these has a transverse impression on the posterior surface of the petiole.

In the original description Santschi says that *traegaordhi* has “eyes indistinct, reduced to a small point in the anterior quarter”. In the surviving syntype no trace of an eye can be seen and it is suspected that Santschi misinterpreted part of the punctate sculpture.

Hypoponera transvaalensis (Arnold)

Ponera transvaalensis Arnold, 1947: 132, fig. 2. Holotype worker, SOUTH AFRICA: Transvaal, Mariepskop (*J.C. Faure*) (SAMC) [not seen]. [Combination in *Hypoponera*: Bolton, 1995: 216.]

WORKER. *Measurements*: HL 0.88, HW 0.74, HS 0.810, SL 0.70, PrW 0.56, WL 1.26, HFL 0.70, PeNL 0.26, PeH 0.58, PeNW 0.40, PeS 0.413. *Indices*: CI 84, SI 95, PeNI 71, LPeI 45, DPeI 154.

A large, darkly coloured species, very closely related to *sulcatinasis* and answering the general description of that species, but differing as follows.

1 Dorsum of propodeum weakly sculptured anteriorly; the sculpture fades out posteriorly so that the posterior half is almost smooth. In *sulcatinasis* the entire propodeal dorsum is uniformly reticulate-punctate.

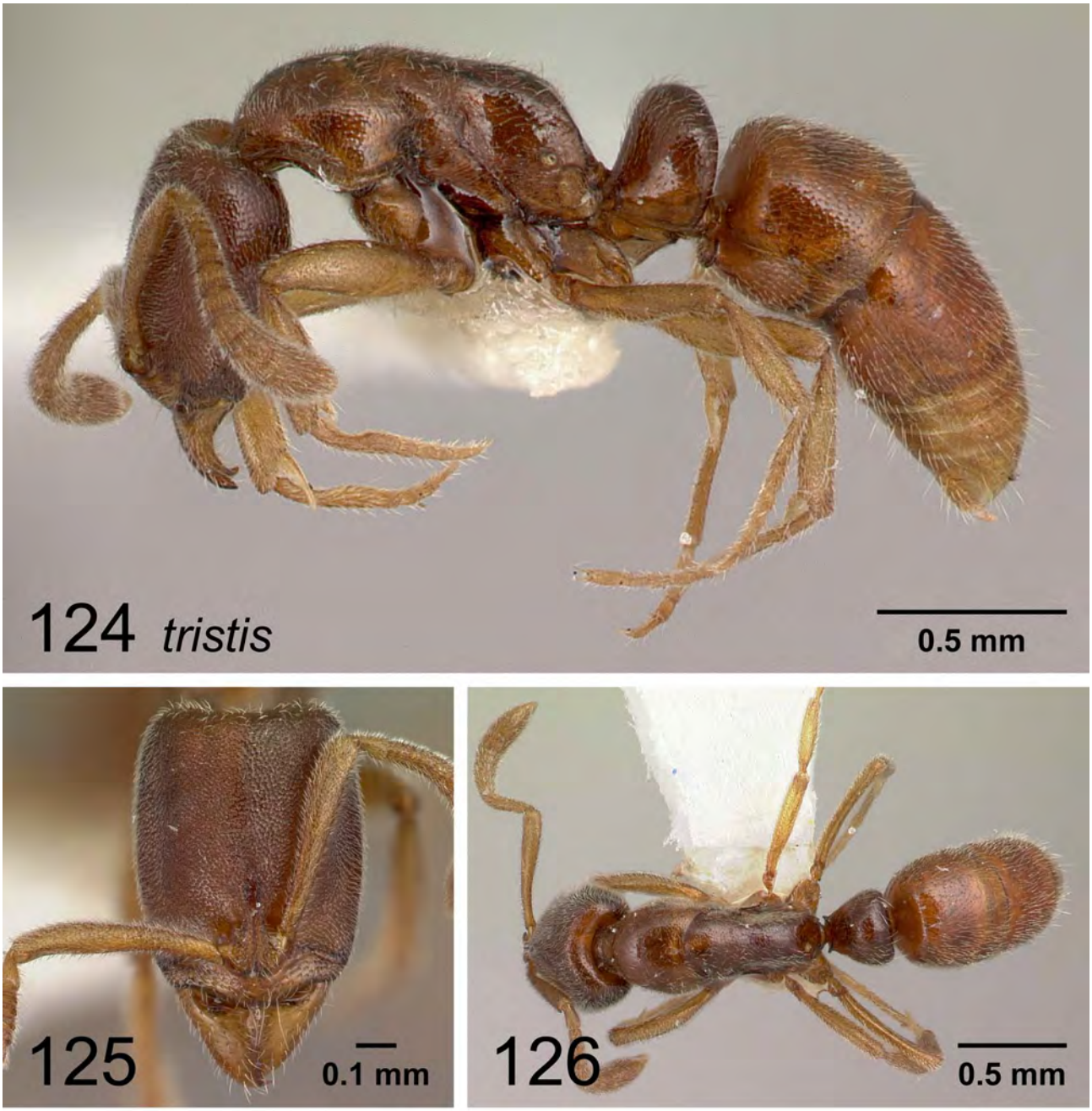
2 Propodeum without a sharply defined boundary between dorsum and declivity that is brought about by an abrupt loss of sculpture. In *sulcatinasis* the boundary between propodeal dorsum and declivity is strongly demarcated by the abrupt disappearance of sculpture at the junction of dorsum and declivity.

3 Punctate sculpture of pronotal and mesonotal dorsa weak and superficial; punctures very small and widely separated. In *sulcatinasis* the punctures on the pronotal and mesonotal dorsa are dense, sharply incised and conspicuous.

4 Metanotal groove with weakly defined anterior and posterior sutures, so that a narrow metanotal sclerite is present on the mesosomal dorsum. In *sulcatinasis* merely a groove is present.

It seems probable that *sulcatinasis* and *transvaalensis* may eventually prove to be nothing more than two geographical variants of a single species. But because the little material available can be separated by the characters given above, they are maintained as separate for the present.

Material examined. **South Africa**: Transvaal, Pilgrim's Rest, Mt Sheba Forest (*S. Zoia*).



FIGURES 124–126. Lateral, full face and dorsal view of body. *Hypoponera tristis* paratype worker CASENT0226554.

Hypoponera tristis Bolton & Fisher **sp. n.**
(Figs 124–126)

WORKER (holotype in parentheses). *Measurements*: HL 0.67–0.79 (0.79), HW 0.54–0.60 (0.59), HS 0.615–0.695 (0.690), SL 0.46–0.56 (0.55), PrW 0.42–0.46 (0.46), WL 0.95–1.08 (1.03), HFL 0.48–0.58 (0.58), PeNL 0.21–0.24 (0.22), PeH 0.44–0.49 (0.48), PeNW 0.34–0.38 (0.36), PeS 0.340–0.367 (0.353) (10 measured). *Indices*: CI 75–80 (75), SI 88–93 (93), PeNI 77–85 (78), LPeI 46–50 (46), DPeI 152–170 (164).

Answers the description of *segnis* in all respects except for relative size of petiole. In *segnis* the petiole node is absolutely and relatively shorter in profile, PeNL 0.17–0.20 and LPeI 35–43, and is distinctly broader in dorsal view, with DPeI 180–211.

Holotype worker (top specimen of three on pin), **Rwanda**: Kayove, 2100 m., 15.v.1973 (*P. Werner*) (MHNG).
Paratypes. 8 workers with same data as holotype (MHNG, BMNH, CASC).
See comment under *segnis* and notes under *dema*.

Non-paratypic material examined. **Uganda**: Kibale For. Res. (*M.R. Orr*); Kalinzu N.P., Musanga For. (*M. Kiyono*); Kalinzu For., Bushenyi Distr. (*S. Yamane*). **Rwanda**: Kayove (*P. Werner*); Rangiro (*P. Werner*).

Hypoponera ursa (Santschi)

Ponera ursa Santschi, 1924: 197. Syntype workers and queen, DEMOCRATIC REPUBLIC OF CONGO: Ruwenzori, 2000 m (*Bequaert*) (NHMB) [examined]. [Combination in *Ponera (Hypoponera)*: Santschi, 1938: 79; in *Hypoponera*: Bolton, 1995: 216.] (See note.)

NOTE. Both syntype workers of *ursa* are damaged. The head and prothorax of one is broken from the remainder of the mesosoma and petiole and mounted separately. The gaster of this specimen is on a separate card, mounted above the second syntype. The latter has the head detached, with much of the right hand side embedded in glue. The only funiculus that remains for examination is on this second specimen and is in the glue, which has probably saved it from damage. Santschi (1935: 262) presented figures supposed to represent *ursa* (figs 3a,b) and *jeanneli* (figs 3c–e). Of these, fig. 3c is supposed to represent the antenna of *jeanneli*, which is depicted with very broad funicular segments. This is supported in the text by the statement that "funicular segments 2 to 10 are about twice broader than long." This statement does not match the available syntype of *jeanneli*, but does correspond to the shape seen in the syntype of *ursa* that retains a complete funiculus. It is interesting to note that on the previous page, Santschi (1935: 261) records *ursa* from Mt Elgon, also the type-locality of *jeanneli*, and it is suspected that he may have confused his specimens when he came to describe *jeanneli*. The Mt Elgon specimen of *ursa* was not found in the course of this study, but *jeanneli* is now known to be quite common in Kenya.

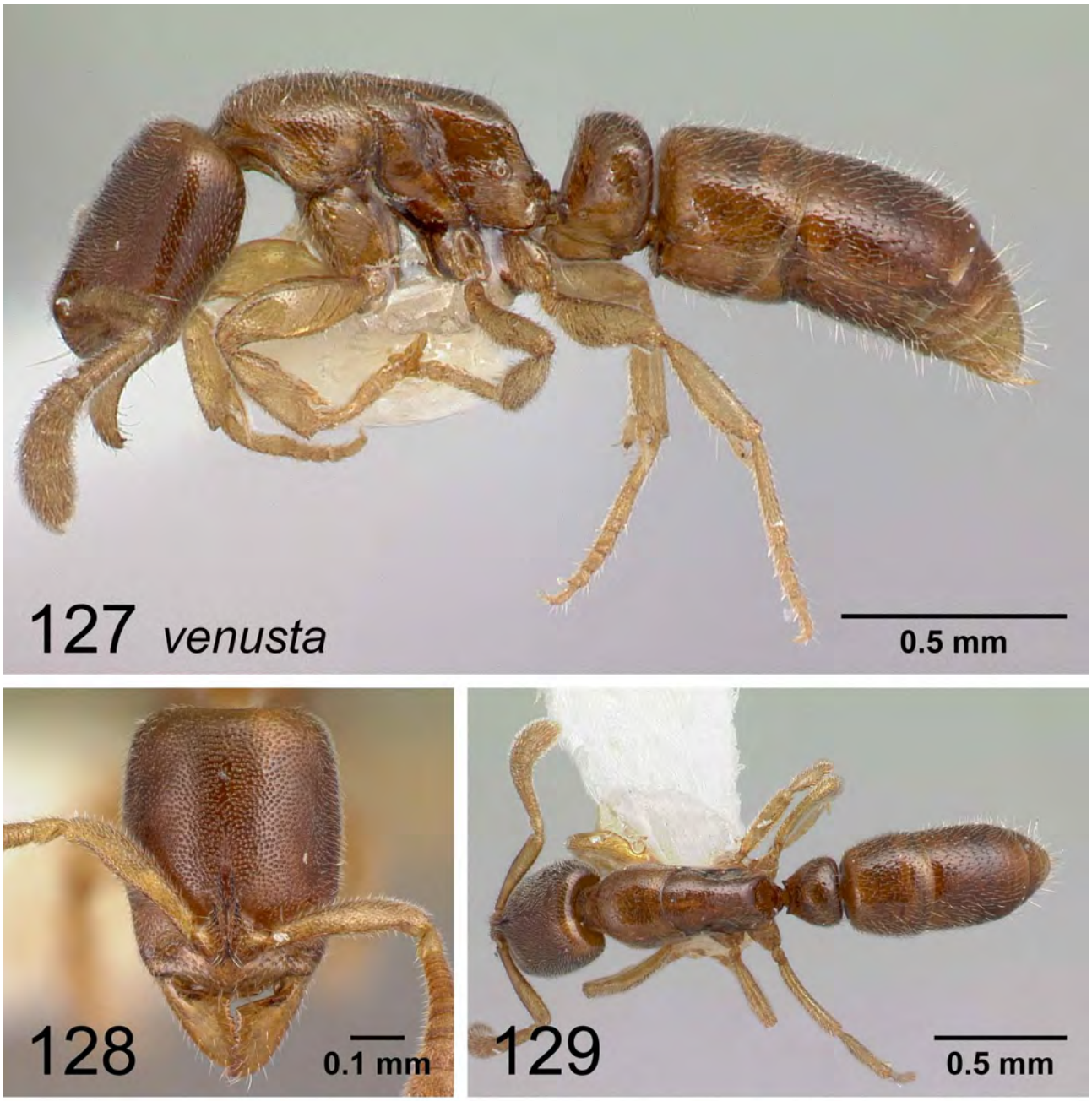
WORKER. *Measurements*: HL 0.62, HW 0.51, HS 0.565, SL 0.44, PrW 0.38, WL 0.80, HFL 0.42, PeNL 0.18, PeH 0.39, PeNW 0.26, PeS 0.277. *Indices*: CI 82, SI 86, PeNI 68, LPeI 46, DPeI 156.

Answers the description of *jeanneli* and apparently is only separated from it by the proportions of the funicular segments, as noted in the key. This is not satisfactory because the degree of telescoping and variation of this character in *ursa* cannot be assessed, and also the view of its funiculus is somewhat distorted by the glue in which it is embedded. For the present it is regarded, somewhat arbitrarily, as dividing the two taxa and this status will have to suffice until the fauna is better known. In *ursa* the sum of the lengths of funicular segments 7–10, divided by the sum of their widths, gives a ratio of about 1.68 in the syntype. In *jeanneli* and the closely related *quaestio* the ratio is 1.20–1.46.

Hypoponera venusta Bolton & Fisher **sp. n.**
(Figs 127–129)

WORKER (holotype in parentheses). *Measurements*: HL 0.53–0.56 (0.53), HW 0.40–0.43 (0.42), HS 0.470–0.495 (0.475), SL 0.32–0.36 (0.34), PrW 0.32–0.34 (0.32), WL 0.68–0.74 (0.68), HFL 0.33–0.36 (0.34), PeNL 0.17–0.18

(0.17), PeH 0.32–0.36 (0.33), PeNW 0.25–0.28 (0.26), PeS 0.253–0.273 (0.253) (14 measured). *Indices*: CI 74–80 (79), SI 77–86 (81), PeNI 76–82 (81), LPeI 47–56 (52), DPeI 139–160 (153).



FIGURES 127–129. Lateral, full face and dorsal view of body. *Hypoponera venusta* paratype worker CASENT0226548.

Eyes absent. Apex of scape, when laid straight back from its insertion, conspicuously fails to reach the mid-point of the posterior margin in full-face view; SL/HL 0.61–0.65. Pronotal dorsum almost smooth, obviously much less strongly and densely sculptured than the finely reticulate-punctate cephalic dorsum. Metanotal groove absent from dorsum of mesosoma. Propodeum weakly marginate between declivity and side. Petiole in profile relatively low and stout, the node quite thick from front to back and with a shallowly rounded dorsum. Posterior surface of petiole node without cuticular ridges that radiate upward from the peduncle. Subpetiolar process usually rounded and without a sharply developed ventral angle; at most a very low, blunt and very obtuse weak angle is present. In dorsal view petiole node broad and quite long, with posterior face shallowly concave and anterior face convex. Maximum width of first gastral tergite in dorsal view slightly greater than width of second gastral tergite at its mid-length. Cross-ribs at base of cinctus of second gastral tergite short but distinct. Midline length of second gastral

posttergite, from posterior margin of cinctus to apex, slightly less than the width of the segment at its midlength. Disc of second gastral tergite with sharply incised, small punctures that are separated by areas of glossy cuticle; the diameters of the punctures are equal to, or slightly less than, the distances that separate the punctures. First gastral tergite dorsally pubescent, with numerous conspicuous, standing, bristly setae that are clearly more erect and strongly project above the level of the pubescence.

Holotype worker (top specimen of three on pin), **Rwanda**: Rangiro, 1800 m., 10.vii.1973 (*P. Werner*) (MHNG).
Paratypes. 14 workers with same data as holotype; 9 workers with same data but 6.viii.1973 (MHNG, BMNH, CASC, BBRC).
See the notes under *dema*.

Non-paratypic material examined. **Rwanda**: Rangiro, ix.73 (*P. Werner*); Kayove (*P. Werner*).

Species inquirendae

Hypoponera lea (Santschi)

Ponera lea Santschi, 1937a: 73, fig. 2. Syntype worker (leg fragments only), SIERRA LEONE: Njala, 21.xii.26, on palm (*E. Hargreaves*) (NMHB) [examined]. [Redescribed and refigured: Santschi, 1938: 78, fig. 1. Combination in *Hypoponera*: Bolton, 1995: 215.]

In the original description Santschi states that there are three workers in the type-series of this taxon. Only one is now present in NHMB and the specimen unfortunately was destroyed at some time in the past so that only a few fragments of legs remain on the mount. The whereabouts of the other two syntypes are not known. From the original description and figure it could easily be argued that *lea* is yet another synonym of *punctatissima*, but the conclusion is rendered insecure by the redescription and new figure issued by Santschi in 1938, supposedly based on the same specimens. In the original (1937) figure there is no mesonotal-mesopleural suture indicated and the petiole node in profile appears relatively lower, longer and more broad-topped, generally resembling *punctatissima*. In the later (1938) figure, a mesonotal-mesopleural suture is very conspicuous and the node in profile appears higher, shorter and more narrowly rounded dorsally, altogether more like *dulcis*. Despite Santschi's (1938) statement that *lea* is closely related to *cognata* (a junior synonym of *punctatissima*), a large element of doubt remains, because while the mesonotal-mesopleural suture is absent in workers of *punctatissima*, it is present in those of *dulcis*. The possibility cannot be dismissed that the original syntype series of *lea* was mixed, and that Santschi has drawn one of each in his two mentions of the species. It is therefore necessary to treat *lea* as a *species inquirenda* until one or both of the other syntypes can be located, a lectotype designated, and the name placed in the synonymy of one or the other species.

Hypoponera petiolata (Bernard)

Ponera petiolata Bernard, 1953: 203, fig. 3D. Holotype worker, GUINEA: Sérengbara, B6-6 (*Lamotte*) (not in MNHN, presumed lost). [Combination in *Hypoponera*: Bolton, 1995: 216.]

Except for a couple of details, the original description would appear to indicate a specimen of *punctatissima*. The exceptions that confuse the issue are:

1 The mesosoma is said to have fine transverse rugulae ("fines rides transversales"). If this is correct, it would make *petiolata* unique in *Hypoponera*. No Afrotropical specimen of the genus has been seen that has such sculpture, nor has it been observed in any of the species, collected from around the world, that are stored in BMNH. Bernard's descriptions are often inaccurate, but the statement was made and must be provisionally accepted.

2 The petiole appears large in profile and in dorsal view its node is relatively long. From the sketch that is Bernard's fig. 3D, a DPeI of about 125 is obtained, which is well outside the measured range of *punctatissima* (DPeI 140–165). However, a comparison of his drawings of other species with his actual specimens shows that the drawings are not reliable.

The general similarity of the original description to *punctatissima*, coupled with its DPeI *ca* 125, suggest some similarity with the examined material of *ragusai*, which has DPeI values of 120–140. However, neither species has any trace of transverse rugulae on the mesosoma.

Although *petiolata* must be regarded strictly as a *species inquirenda*, an attempt has been made to incorporate it in the key. The sculpture character mentioned above has been used to differentiate *petiolata* from other *punctatissima* group species, but there is really no way of knowing whether it is accurate. Because the description is reminiscent of *punctatissima* the assumption has been made that the base of the cinctus on the second gastral tergite of *petiolata* is likely to be the same, a point reflected by its position in the key.

The colour quoted by Bernard for *petiolata* may imply that the specimen is teneral, a developmental grade that he did not seem to recognise, but as he initially gives the colour as "entirely dark yellow", then later states that it has "pale colour", it is difficult to be certain.

Extralimital species

Hypoponera gibbinota (Forel)

Ponera opaciceps var. *gibbinota* Forel, 1912: 52. Holotype worker, GREAT BRITAIN: London, Kew Gardens, in hothouse (*H. Donisthorpe*) (MHNG) [examined]. [Combination in *Hypoponera*: Bolton, 1995: 214. Raised to species: Seifert, 2003: 74 (not directly stated).]

WORKER. *Measurements*: HL 0.75, HW 0.62, HS 0.685, SL 0.60, PrW 0.46, HFL 0.62, WL 0.92, PeNL 0.20, PeH *ca* 0.43, PeNW 0.34. *Indices*: CI 83, SI 97, PeNI 74, LPeI *ca* 47, DPeI 170. [PeH and LPeI approximated as hind coxae obscure sternal area of petiole.]

The single specimen described by Forel as *opaciceps gibbinota*, from a tropical plant house in Kew Gardens, was examined to check if it was an introduction from the Afrotropical region, which it is not. Although *gibbinota* is superficially similar to *opaciceps* and *eduardi* in size and sculpture, it is in fact quite distinct from both of them. The anterior clypeal margin of the holotype has a distinct semicircular median impression and the anterior margin of the labrum that is visible in full-face view is also concave. Its petiole node in profile is columnar, high and narrow, with parallel anterior and posterior faces and a flat transverse dorsum. This is the only species encountered in the course of this study to have the clypeal margin modified in this way.

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