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**Molecular and morphological recognition of species boundaries in the
neglected ant genus *Brachymyrmex* (Hymenoptera: Formicidae): towards a
taxonomic revision**

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ABSTRACT

Brachymyrmex is a neglected genus of Formicinae because of its small body size, soft mesosoma and superficially monotonous external morphology. These features have complicated the documentation of morphological variation, resulting in poorly-defined and incompletely described species. Consequently, the taxonomy of the genus is complex and problematic, which has impeded research and conservation efforts. Here we integrate molecular and morphological data to recognize species boundaries in *Brachymyrmex* and to guide its long-overdue revision. Specifically, we (1) redefine the limits of all described species, subspecies and varieties based on intra- and interspecific morphological variation in workers; (2) document this variation quantitatively by constructing morphospace occupation and statistically analyzing measurements; (3) synthesize our findings on diagnostic traits in a dichotomous, illustrated identification key,

and (4) examine the significance of our morphological identification system with molecular evidence from four genes (EF1aEF1, EF1aEF2, WG and COI). We recognize 40 species, of which four are new to science: *B. bahamensis*, *B. bicolor*, *B. iridescens* and *B. sosai*. Furthermore, *Brachymyrmex attenuatus* and *B. bonariensis* are raised to species, and we propose 25 new synonyms. Morphometrics indicated that even poorly distinguishable species pairs show statistically significant differences in some traits, and that taxonomically problematic cases relate to taxa that demonstrate large intraspecific trait variance. Our molecular analysis supports the monophyly of the genus based on increased taxon sampling, and of the 19 species that were included 18 were retrieved as monophyletic. The single case of incongruence was also flagged in morphological analyses and requires extended geographic sampling before it can be resolved. In conclusion, the molecular work corroborates the morphologically-recognized species boundaries. We also document the presence of worker dimorphism and putative worker-queen intercastes in several *Brachymyrmex* species, which indicates that the genus may present a promising study system to understand caste evolution in ants.

Keywords. *Brachymyrmex*, Formicinae, phylogeny, taxonomy, neotropics, morphometrics.

INTRODUCTION

Brachymyrmex is a neglected genus of Formicinae that consists of minute ants (maximum length ~3 mm), which are morphologically diagnosed by the presence of an acidopore and antennae with 9 segments lacking a club (Bolton 2003). The combination of their small body size, soft metasoma, and at least superficially monotonous external morphology complicate the observation and interpretation of morphological variation. *Brachymyrmex* is native to America and predominantly Neotropical. It ranges from the south of Canada to Argentina and Chile, including

the Caribbean islands (Kempf 1972; Brandão 1991; Bolton 1995; Bolton 2007). Creighton (1950) pointed out that these tiny ants are easily transported with living plants, and beyond the native distribution some species have been introduced to, among others, various places in Africa (Forel 1895a; Dejean et al. 2010), Europe (Forel 1874), and Asia (Guénard 2018; Yoshimura pers. comm.). *Brachymyrmex heeri* and *B. longicornis*, for example, were described by Forel (1874; 1907) from ant colonies in European greenhouses and *B. cordemoyi* was described from Réunion (Forel 1895a). Some *Brachymyrmex* species, like *B. patagonicus*, are notorious invaders which are considered pests in the southern United States (MacGown et al. 2007) and probably beyond.

The only complete taxonomic treatment of *Brachymyrmex* was published by Santschi (1923a) and included 27 species and 15 subspecies and varieties. The work was based on worker morphology, but unfortunately the identification key is difficult to use because it includes polytomous steps with strongly overlapping character suites. Furthermore, character descriptions are regularly ambiguous and contain contradictions. As a result, species, subspecies and varieties are often poorly defined and incompletely described (De Zolessi et al. 1978). The small size and taxonomic ambiguity prompted Creighton (1950) to label *Brachymyrmex* as a “miserable little genus” in his treatment of the ants of North America, and for more than a century colleagues (Wheeler 1903; Kusnezov 1959; Wilson and Taylor 1967) have raised warnings on the taxonomic challenges in this genus. Since Santschi (1923a), Alayo (1974) examined the species from Cuba and Wheeler and Wheeler (1978) those from the United States. More recently, Quirán and collaborators (Quirán et al. 2004; Quirán 2005, 2007) reported on the *Brachymyrmex* species from Argentina, and Ortiz and Fernández (2014) reviewed the species with tumuliform metathoracic spiracles. Additionally, Wilson et al. (2016) documented the male genitalia of *Brachymyrmex*. Currently 44 species with 17 subspecies and varieties are attributed to the genus

in the online catalog of the ants of the world (Bolton 2018). However, the biology, diversity and phylogeny of the genus remain poorly understood and a comprehensive revision is long-overdue (see Wilson and Taylor 1967).

A detailed account of opinions on the phylogenetic position of *Brachymyrmex* within Formicinae is provided by Wilson et al. (2016). Agosti (1991) divided the subfamily in four groups based on morphological characters, with *Brachymyrmex* included in the ‘*Pseudolasius* genus group’ based on the widely separated hind coxae, the petiole that is ventrally u-shaped and the simple helcium that is antero-ventrally often concealed by the anteriorly-fused sternite and tergite, which meet laterally. Bolton (2003), also based on morphology, assigned *Brachymyrmex* (and *Pseudolasius*) to the Plagiolepidini, which is one of three tribes of the lasiine group. More recently, Blaimer et al. (2015) obtained strong support for a sister group relationship between *Brachymyrmex* and *Myrmelachista* upon analysis of ultraconserved elements (UCEs), and these genera form a well-supported sister group to all other formicines. Therefore, Ward et al. (2016) resurrected the tribe Myrmelachistini (= Brachymyrmicini) for these two genera. This tribe is morphologically characterized by 9-10 antennal segments, five mandibular teeth, an anteriorly inclined petiole with a long posterior peduncle, and an anterior tergosternal fusion of the third abdominal segment.

Here, we work towards a comprehensive revision of *Brachymyrmex* by 1) redefining the limits of all of the described species, subspecies and varieties in light of intra- and interspecific morphological variation in workers; 2) documenting this variation both qualitatively and quantitatively; 3) summarizing these findings on diagnostic traits with a new, dichotomous, illustrated identification key to increase reproducibility and to make the diversity of

Brachymyrmex more accessible for future research; and 4) examining the significance of our morphological identification system and the monophyly of the genus in light of molecular evidence. Finally, we also report on the biogeographical distribution of the recognized species and how our taxonomic framework compares with previous studies.

In summary, we recognize a total of 40 species, four of which are newly described here. We also synonymize 25 previously described species/subspecies and raise two former subspecies to species status. The proposed species delimitations follow a new, dichotomous identification key that is supported by quantitative morphological studies. More importantly, we tested our morphological identification system with molecular data for half of the recognized species and found strong congruence (18 of the 19 included species were retrieved as monophyletic), indicating its overall validity. During our studies, it also became clear that several samples contain specimens that presumably belong to undescribed species, but we prefer to await more material before formal description. This remark includes, but is not limited to, several potentially new species from Central America. We also observed that some species have dimorphic workers and others a possible intercaste between worker and queen. However, confirming the presence of an intercaste necessitates distinguishing it from ergatoid queens, which requires dissections of the ovaries and demographic data (Peeters 1991). Unfortunately, such confirmation is not usually possible based on the museum specimens studied here, but we discuss the issue where relevant. In general, it warrants further study and for now, we highlight such specimens as putative intercastes. If intercastes would be confirmed in the future beyond dimorphic workers, *Brachymyrmex* would present a promising study system to understand caste evolution in ants (Ortiz and Fernández 2014).

MATERIAL AND METHODS

Material and repositories.

Authors of previous taxonomic studies of *Brachymyrmex* (e.g. Santschi 1923a; Creighton 1950; Quirán et al. 2004; Quirán 2005, 2007) have mainly or exclusively focused on the morphology of workers, for which abundant material is available in existing museum collections. Consequently, we adopt the same focus here. A comparative framework is largely lacking for queens and males, because they are not available for all species, and even when collections exist they are often poorly preserved. Nevertheless, we provide a genus-level diagnosis of queens and males with selected pictures for illustrative purposes. The morphological terminology used follows Bolton (1994), that for hair inclination Kugler (1994), and for sculpture Harris (1979).

We examined a total of 1303 *Brachymyrmex* samples. This material belongs to the following institutions, and it includes all relevant types and many additional specimens; most collection acronyms follow Ward (1989). In some collections not all specimens have individual voucher numbers. In such cases, we assigned an identifier (either a personal code or number, such as CMOS 000032, or a Smithsonian database reference number, such as USNMENT00757197) to the relevant specimen, preceded by the acronym of the proprietary institution. These unique identifiers are used here for traceability.

ALWC Alex L. Wild Personal Collection, University of Texas, Austin,, TX, USA.

CASC California Academy of Sciences, San Francisco, CA, USA.

CPDC Laboratório de Mirmecologia do Centro de Pesquisas do Cacau, Comissão Executiva do Plano da Lavoura Cacaueira (CEPLAC), Itabuna, Bahia, Brazil.

IAvH Instituto Humboldt, Claustro San Agustín, Villa de Leyva, Boyacá, Colombia.

144	ICN	Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá D.C.,
145		Colombia.
146	INBC	Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica.
147	INSUE	Instituto Superior de Entomología, Universidad Nacional de Tucumán, San Miguel
148		de Tucumán, Argentina.
149	JTLC	John Longino Collection, the University of Utah, Salt Lake City, UT, USA.
150	MACN	Museo Argentino de Ciencias Naturales Bernardino Rivadavia, Buenos Aires,
151		Argentina.
152	MCZC	Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA.
153	MCSN	Museo Civico di Storia Naturale “Giacomo Doria”, Genoa, Italy.
154	MfNB	Museum für Naturkunde, Berlin, Germany.
155	MLP	Museo de La Plata, Buenos Aires, Argentina.
156	MHNG	Muséum d’Histoire Naturelle, Genève, Switzerland.
157	MPEG	Museu Paraense “Emílio Goeldi”. Belém, Pará, Brazil.
158	MZSP	Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil.
159	NHMB	Naturhistorisches Museum, Basel, Switzerland.
160	NHMW	Naturhistorisches Museum, Wien, Austria.
161	PSWC	Philip S. Ward Collection, University of California, Davis, CA USA.
162	RBINS	Royal Belgium Institution of Natural Sciences, Bruxelles, Belgium.
163	UFUC	Universidade Federal de Uberlândia, Uberlândia, Minas Gerais, Brazil.
164	UNMSM	Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima,
165		Peru.
166	USNM	Department of Entomology, National Museum of Natural History Smithsonian
167		Institution, Washington DC, USA.

WEMC William and Emma MacKay, Personal Collection, El Paso Texas, TX, USA.

Georeferencing and mapping.

Although we tried to georeference all studied samples, some were excluded because locality information was too ambiguous for georeferencing (e.g., when only a country name was available). Furthermore, specimens from the same collecting event were sometimes separated over replicate samples. After removing such ‘duplicates’, 747 georeferenced localities remained, of which 736 represented specimens from the native range. These were mapped in R v3.2.1. (R Core Team 2015) using the packages maps v3.0.1. (Brownrigg et al. 2015) and mapdata v2.2-5 (Brownrigg 2015), and subsequently projected on the ETOPO1 global topographic map of Amante and Eakins (2009).

Images.

Photographs were taken in dorsal, lateral and full-face view. At the MCZC we used an imaging system that consisted of a Leica MZ16 stereomicroscope equipped with a Leica DCF 420 digital camera, software from Leica Application Suite 3.7 and Helicon Focus 5.1 for auto-montage; at the USNM the imaging system consisted of a Leica Z16APO stereomicroscope with a JVC KY-F75U digital camera mounted to the Leica motor-focus system. Composite images made with this system were assembled using Auto-Montage Pro Version 5.03.0018 BETA (Synoptics Ltd.); at the MZSP the imaging system consisted of a Leica M250c stereomicroscope and Auto-Montage Professional software LAS3.6.0. Some images were obtained from www.antweb.org, which is specified in the figure captions. Images were processed with Adobe Photoshop CS5.

Analysis of measurements and indices.

Measurements were made using an Advanced Optical microscope, a Leica Z16 APO microscope, and a Zeiss StereoDiscovery V20 in combination with an ocular micrometer. All measurements were taken at 80-120 \times magnification and are reported in mm to an accuracy of 2 decimal places. Indices were calculated from these measurements following Ortiz and Fernández (2014) (Fig. 1).

Head Length₁ (HL₁): The maximum length of the head excluding the mandibles in full-face view. HL₁ is measured as the straight-line distance from the mid-point of the anterior margin of the clypeus to the mid-point of the posterior (= vertexal) margin of the head (for major workers the posterior mid-point is located at the middle of the virtual line between the posterior apices of the head).

Head Length₂ (HL₂): Distance from the posterior margin of the frontal triangle (see Bolton, 1994, p. 192) to the vertexal margin in full-face view.

Head Length₃ (HL₃): Measurement of the gena in lateral view; this measurement equals the distance from the anterior margin of the eye to the posterior edge of the clypeus, parallel to the longest axis of the eye.

Head Width (HW): The maximum width of the head measured in full-face view. Eyes are included in the measurement if they project laterally from the head.

Scape Length (SL): The maximum length of the scape, excluding the basal constriction just distal to the condylar bulb.

Eye Length (EL): Maximum diameter of the compound eye.

Weber's Length (WL): The diagonal length of the mesosoma in lateral view, i.e. from the anterior-most point of the pronotum to the posterior-most basal angle of the metapleuron (this measurement excludes the cervical neck of the pronotum).

Pronotum Length (PnL): The length along the midline between the anterior and posterior edges of the pronotum in dorsal view (this measurement excludes the cervical neck of the pronotum).

Pronotum Width (PnW): The maximum width of the pronotum in dorsal view.

Mesonotum Length (ML): The length between the anterior edge of the mesonotum and the mesometanotal suture in dorsal view.

Mesonotum Width (MW): The maximum width of the mesonotum in dorsal view.

Cephalic Index (CI): $(HW/HL_1) \times 100$.

Scape Index₁ (SI₁): $(SL/HW) \times 100$.

Scape Index₂ (SI₂): $(SL/HL_2) \times 100$.

Ocular Index₁ (OI₁): $(EL/HW) \times 100$.

Ocular Index₂ (OI₂): $(HL_3/HL_1) \times 100$.

Ommatidia: The number of facets in the compound eye along its maximal diameter.

In total 347 specimens of 38 species were measured. In some cases, it was not possible to reliably measure all features, e.g. because of the preservation of the specimen or the way it was mounted. The ranges of the obtained measurements are described in the systematic treatment, but we also performed a statistical analysis of morphometric variables.

First, we ordinated these data with non-metric multidimensional scaling (nmMDS) using functions of *vegan* v2.3-0 (Oksanen et al. 2015) and *MASS* v7.3-41 (Venables and Ripley 2002). As this rank-based method does not allow missing data, we selected only specimens for which all measurements were taken, i.e. a subset of 240 individuals for 38 species. We converted this dataset into a Euclidean distance matrix and ordinated it in two dimensions using 1,000 random starting configurations to find the solution with minimal stress without getting trapped in local minima. The resulting stress value obtained, i.e. the goodness-of-fit, was multiplied by 100 and evaluated using the criteria of Kruskal (1964) and Clarke (1993). We also examined how individual morphometric variables (i.e. the measurements, indices and counts) contributed to the morphospace occupation with the ‘*envfit*’ function of *vegan* using 1,000 permutations.

Subsequently, we conducted statistical tests for the univariate morphometric variables on all species that were represented with at least 5 specimens, resulting in a subset of 286 specimens for 20 species. (Specimens with missing data were allowed for these tests.) Given that the data of several species differed significantly from a normal distribution, we used non-parametric Dunn’s tests to test pairwise differences between species for each measurement and index. These tests were performed in R using functions of the package *dunn.test* v1.3.4. (Dinno 2017), and the resulting *p*-values were adjusted with a Benjamini-Hochberg correction, i.e. using the false discovery rate (Benjamini and Hochberg 1995). These results were represented with boxplots, featuring letters to indicate significance levels of comparisons.

Molecular phylogenetics.

We examined the monophyly of the genus with a dataset that has substantially enhanced taxon sampling compared to previous efforts (Brady et al. 2006; Moreau et al. 2006; Blaimer et al. 2015), and we examined the molecular support of the here proposed morphological identification system. The specimens used for genetics are indicated in Supplementary material table S1, i.e. 82 specimens covering 19 *Brachymyrmex* species and 6 specimens of 5 *Myrmelachista* species (the sister-genus of *Brachymyrmex* [Blaimer et al. 2015]). *Acanthoponera minor*, *Manica rubida* and *Rhytidoponera metallica* were used as outgroups.

DNA extraction, amplification, and sequencing were carried out at the Laboratories of Analytical Biology (LAB) of the Smithsonian National Museum of Natural History, Washington, DC. Genomic DNA was extracted using the Qiagen DNEasy Tissue Kit. Fragments of four protein-coding genes were amplified, i.e. one fragment for each of the nuclear genes elongation factor 1-alpha paralog F1 (EF1 α F1), elongation factor 1-alpha paralog F2 (EF1 α F2) and wingless (wg), and two of the mitochondrial gene cytochrome oxidase subunit 1 (COI). Primer sequences used for polymerase chain reaction (PCR) amplification are those used by LaPolla et al. (2010). PCR products were sequenced on an ABI sequencer (ABI 377 or ABI 3100) using Big Dye Cycle Sequencing chemistry. Fragments were sequenced bidirectionally, and the resulting chromatograms were assembled and edited with SEQUENCHER v.4.8.

Furthermore, our dataset includes unpublished sequences that are available in GenBank by the International Barcode of Life Consortium. These sequences are provided without species identification, but they are linked to an image database, and we included specimens for which

unambiguous identification was possible based on the available images. Additional sequences with specimen images were kindly provided by David Donoso and John Longino, and we used the same criteria for inclusion as for GenBank sequences.

Sequences for each gene fragment were aligned using MAFFT v.7 (Katoh and Standley 2013) and results were visually inspected in MESQUITE v.2.10 (Maddison and Maddison 2017) to determine codon positions. We tested for substitutional saturation using DAMBE v.5.5.9 (Xia 2013) but none of the gene fragments used were saturated. Models of sequence evolution were fit with PARTITION FINDER v.1.1.1 (Lanfear et al. 2012) to individual gene fragments accounting for potential differences between codon positions. The resulting model fit was examined with a corrected Akaike Information Criterion (AICc). Subsequently, the data for the individual fragments was concatenated into a total dataset with seven partitions (Supplementary material table S2) and phylogenetically analysed with maximum parsimony (MP), maximum likelihood (ML) and Bayesian inference (BI). MP analyses were performed in PAUP* v.4.0b0.10 for Windows (Swofford 2002) with gaps treated as fifth state, 10 000 bootstrap replicates and tree-bisection-reconnection branch swapping. ML analyses were performed with the RAxML BlackBox (Stamatakis et al. 2008) with 100 replicates and the implemented GTR + Γ model, individually parameterized for each of the 7 partitions. BI analyses were executed in MrBayes v.3.2.6 (Ronquist et al. 2012) as implemented in CYPRES v.3.3 (Miller et al. 2010). Two independent Markov chain Monte Carlo (MCMC) runs were conducted for 20 million generations and sampled every 1,000 generations. Each run was distributed across four chains with a heating parameter of 0.2 and 25% of the samples were discarded as burnin. Convergence between runs was examined using the sump command and by inspecting effective sample sizes for the parameters in TRACER v.1.6 (Rambaut et al. 2013). The maximum clade credibility tree

was visualized with FigTree v.1.4.0 (Rambaut 2012) and the bootstrap support for clades retrieved under MP and ML was added. Sequences are deposited in GenBank and accession numbers are indicated in Supplementary table S1.

Automated species delimitation.

We identified hypothetical species entities from sequence data with an automated procedure. Our specific aim was to evaluate the congruence of automated species delimitation and our morphological identification system, and thus to test the reliability of that identification system. Multiple such methods exist (Pons et al. 2006; Leliaert et al. 2014; Da Silva et al. 2018) and results may vary considerably among methods (Da Silva et al. 2018) related to the size of the dataset, the methodological procedures adopted, variation in underlying population genetic parameters and evolutionary processes. Many of the potentially influencing biological factors are poorly known for *Brachymyrmex*. We used the automatic barcode gap discovery method (ABGD; Puillandre et al. 2011), i.e. a fast single-locus method, on the barcoding fragment of COI, because of the exceptional suitability of this fragment for species identification as well as species delimitation and discovery in Metazoa (Hebert et al. 2003). The ABGD method is generally considered to be conservative as to the number of hypothetical species lineages it detects (Da Silva et al. 2018). We performed the analysis on the ABGD website (<http://www.wabi.snv.jussieu.fr/public/abgd/abgdweb.html>, accessed 8 October 2018) using default parameters except for relative gap width, which was set to 1.0.

RESULTS AND DISCUSSION

Systematic treatment.

***Brachymyrmex* Mayr**

Plagiolepis (in part): Roger (1863: 162).

Brachymyrmex Mayr, 1868: 163. Type species: *B. patagonicus*, by monotypy.

Brachymyrmex subgenus *Brysha* Santschi, 1923a: 652.

Brachymyrmex senior synonym of *Brysha*: Smith (1979: 1424).

Brachymyrmex: Kempf (1972), Bolton (1995; 2003; 2018).

Diagnosis. *Brachymyrmex* differs from most other formicine genera by having workers with nine antennal segments. Some species of *Myrmelachista* also have nine antennal segments, but these have a well-defined antennal club, whereas such a club is absent in *Brachymyrmex*. Some *Agraulomyrmex* species from Africa also have 9 antennal segments without club (unpublished results), but *Brachymyrmex* differs from these by the presence of a mesometanotal suture.

Workers are monomorphic to dimorphic; some species have a putative worker-queen intercaste.

Worker. Head. Usually longer than wide, cordate in some species, with sparse to dense pubescence and hairs in variable orientation (appressed, decumbent, erect). Mandibles with five teeth, of which intercalar (central) and basal teeth are smaller than the others and the apical tooth is largest. Maxillary palps and labial palps with 6 and 4 segments, respectively. Maxillary palps usually reach the occiput and bear several long ventral hairs. The clypeus has a rounded anterior margin or in some taxa, notably *B. nebulosus*, its medio-anterior portion forms a “lip”. In monomorphic species the clypeus bears five long, erect hairs of which one usually conspicuous hair is near the anterior margin, two are in mediolateral position and the other two close to the toruli; other hairs are markedly shorter and appressed or decumbent. In dimorphic species the clypeus is larger and with a row of long thick hairs near the anterior margin. Toruli either touch

the posterior clypeal margin in oblique anterodorsal view or surpass it. Compound eye conspicuous, positioned usually on the cephalic midline or anterior to it; with 3-14 ommatidia along its maximal diameter. Number of ocelli either 0, 1 or 3, but when present often inconspicuous. Antennae with 9 segments, without antennal club; flagelomeres sometimes gradually increasing apically in diameter; scapes variable in length, with appressed, decumbent or erect hairs.

Mesosoma. With sparse or dense pubescence and hairs in variable orientation. The pronotum and mesonotum typically bear two erect hairs each, but sometimes additional suberect hairs on one or both are present, or erect hairs may be absent from the mesonotum. The pronotum is slightly to strongly convex, and the promesonotal suture, i.e. the line of junction between the pronotum and mesonotum, is always present. The mesonotum may bulge dorsally above the propodeum, and the mesometanotal suture, i.e. the line of junction between the mesonotum and the metanotum, is usually conspicuous, although the mesonotum and metanotum appear fused in some species. The metanotum is reduced to a transverse groove, the metanotal groove, which separates the mesonotum from the propodeum on the mesosomal dorsum. The metanotal groove is variable, from absent to wide and deep. The metathoracic spiracles are dorsal near the midline or dorsolateral, and not, slightly or very strongly protruding, i.e. tumiliform. The propodeal suture, i.e. the line of junction between either the mesonotum (if the metanotal groove is absent) or the metanotal groove anteriorly and the propodeum posteriorly, is present as a dorsal fold with variable lateral extension. Dorsum of the propodeum flat or convex and usually shorter than the propodeal slope. Propodeal spiracles circular and positioned near the posterior propodeal margin. Petiole usually with a low scale, reduced to a narrow subcylindrical segment that is overhung from behind by the gaster, but in dimorphic species the scale of the petiole may be high and visible in dorsal view. Hairs on the legs may be appressed, decumbent or erect.

Gaster. Of variable size, with five segments that bear sparse or dense pubescence and usually erect hairs, mainly but not exclusively along the posterior edges of the segments.

Color and sculpture. Body color ranges from light yellow to dark brown and black; most often it is uniform, but some species display markedly contrasting patterns, e.g. with the head and/or the gaster darker than the rest of the body. Body usually smooth and shiny, but in some species the head and/or mesonotum bear microsculpture.

Queen (Fig. 2) Head wider than long, with abundant, fine pubescence, and with long erect hairs; eyes large, located laterally along the cephalic midline; 3 ocelli present; frontal lobes well-developed; scapes usually extending beyond the posterior margin of the head; palpal formula: 6,4. Mesosoma with moderately dense, fine pubescence and several erect hairs; anepisternum and katepisternum separated by a distinct suture. Anterior wing with a single dark brown cell, i.e. pterostigma, the first submarginal cell is closed, others open. Posterior wing with five to seven hamuli. Gaster with moderately dense, fine pubescence, and erect hairs along the posterior edges of the segments. Body color ranges from yellow to dark brown, and it is uniform or sometimes with the head and/or gaster darker than the rest of the body.

Male (Fig. 3). Head wider than long, with fine, sparse pubescence, lacking erect hairs except on mouthparts, and with smooth, shiny integument; maxillary palps with four segments, labial palps with two; mandibles unidentate; frontal lobes reduced; ocelli and eyes well-developed; antennae with 10 segments. Mesosoma with sparse pubescence and shiny integument, without erect hairs. Gaster shiny, lacking pubescence, with scattered erect hairs on the last few segments. Head dark brown to almost black, rest of body, including appendages, very light brown or concolorous. Wilson et al. (2016) described the morphology of the male genitalia in detail.

Distribution. Neotropical and Nearctic, with introductions elsewhere. The native distribution of *Brachymyrmex* is illustrated in Fig. 4.

Biology. *Brachymyrmex* is commonly collected from leaf-litter and some species occur in association with epiphytes; nests are found under stones, among plant roots, in trees, in rotten wood (Wheeler 1942; LaPolla and Longino 2006), and in urban buildings (MacGown et al. 2007). The biology and natural history of the genus are poorly known although habitat information exists for some species, such as the arboreal *B. nebulosus* (LaPolla and Longino 2006). As mentioned, some *Brachymyrmex* species are notorious invaders which are considered pests (MacGown et al. 2007).

Interestingly, *Brachymyrmex* species occur sometimes in association with other insects. Santschi (1923a) mentioned associations of *Brachymyrmex depilis*, *B. giardi* and *B. heeri* with mealybugs (Hemiptera: Coccidae) and observed that some species live in or very close to termite nests (*B. fiebrigi*, *B. modestus*, *B. myops*, *B. termitophilus*). Moretti et al. (2011), suggested a possible association between *B. cordemoyi* and the cockroach *Pycnoscelus surinamensis* (Blaberoidea: Blaberidae), whereas Delssine (pers. comm.) found a staphylinid beetle in a nest of *B. modestus* in Ecuador.

Synonymy of species.

***B. admotus* Mayr, 1887**

= *B. longicornis* var. *immunis* Forel, 1908 **n. syn.**

***B. antennatus* Santschi, 1929**

***B. aphidicola* Forel, 1909**

- 431 = *B. heeri* var. *fallax* Santschi, 1923a
- 432 = *B. longicornis* var. *hemiops* Santschi, 1923a **n. syn.**
- 433 ***B. attenuatus* Santschi, 1929 n. st.**
- 434 ***B. australis* Forel, 1901**
- 435 = *B. australis* var. *curta* Santschi, 1922 **n. syn.**
- 436 = *B. longicornis* Forel, 1907 **n. syn.**
- 437 ***B. bahamensis* n. sp.**
- 438 ***B. bicolor* n. sp.**
- 439 ***B. bonariensis* Santschi, 1933 n. st.**
- 440 ***B. brasiliensis* Ortiz & Fernández, 2014**
- 441 ***B. bruchi* Forel, 1912a**
- 442 = *B. bruchi* var. *rufipes* Forel, 1912a
- 443 = *B. giardi* var. *nitida* Santschi, 1922 **n. syn.**
- 444 = *B. laevis* var. *andina* Santschi, 1923a **n. syn.**
- 445 ***B. cavernicola* Wheeler, 1938**
- 446 ***B. coactus* Mayr, 1887**
- 447 = *B. coactus* var. *nictitans* Emery, 1906 **n. syn.**
- 448 = *B. constrictus* Santschi, 1923a **n. syn.**
- 449 = *B. coactus* var. *robustus* Santschi, 1923b **n. syn.**
- 450 ***B. cordemoyi* Forel, 1895a**
- 451 = *B. laevis* var. *fuscula* Emery, 1906 **n. syn.**
- 452 = *B. brevicornis* Emery, 1906 **n. syn.**
- 453 = *B. patagonicus* var. *brevicornoeides* Forel, 1914 **n. syn.**
- 454 = *B. cordemoyi* var. *nigricans* Santschi, 1916

- 455 = *B. cordemoyi* var. *distinctus* Santschi, 1923a **n. syn.**
- 456 ***B. degener* Emery, 1906**
- 457 = *B. admotus* r. *niger* Forel, 1912a **n. syn.**
- 458 = *B. incisus* Forel, 1912a **n. syn.**
- 459 = *B. luederwaldti* Santschi, 1923a **n. syn.**
- 460 ***B. delabiei* Ortiz & Fernández, 2014**
- 461 ***B. depilis* Emery, 1893**
- 462 = *B. depilis* subsp. *flavescens* Grundmann, 1952
- 463 = *B. nanellus* Wheeler, 1903.
- 464 ***B. donisthorpei* Santschi, 1939**
- 465 ***B. feitosai* Ortiz & Fernández, 2014**
- 466 ***B. fiebrigi* Forel, 1908**
- 467 = *B. fiebrigi* var. *funicularis* Santschi, 1922 **n. syn.**
- 468 = *B. fiebrigi* var. *fumida* Santschi, 1923a **n. syn.**
- 469 ***B. flavidulus* Roger, 1863**
- 470 ***B. gagates* Wheeler, 1934**
- 471 ***B. gauchio* Santschi, 1917**
- 472 ***B. giardi* Emery, 1895**
- 473 = *B. melensis* De Zolessi, Abenante & Gonzalez, 1978 **n. syn.**
- 474 ***B. heeri* Forel, 1874**
- 475 = *B. goeldii* Forel, 1912a **n. syn.**
- 476 = *B. giardi* var. *cordobensis* Santschi, 1929 **n. syn.**
- 477 = *B. physogaster* Kusnezov, 1960 **n. syn.**
- 478 ***B. iridescens* n.sp.**

479 *B. micromegas* Emery in Santschi, 1923a

480 *B. minutus* Forel, 1893

481 *B. modestus* Santschi, 1923b

482 *B. musculus* Forel, 1899

483 *B. myops* Emery, 1906

484 *B. nebulosus* LaPolla & Longino, 2006

485 *B. obscurior* Forel, 1893

486 *B. oculatus* Santschi, 1919

487 *B. patagonicus* Mayr, 1868

488 = *B. laevis* Emery, 1895 n. syn.

489 = *B. patagonicus* var. *atratura* Santschi, 1923a

490 *B. pictus* Mayr, 1887

491 = *B. heeri* var. *basalis* Wheeler, 1921. n. syn.

492 = *B. pictus* subsp. *balboae* Wheeler, 1942 n. syn.

493 *B. pilipes* Mayr, 1887

494 *B. santschii* Menozzi, 1927

495 *B. sosai* n. sp.

496 *B. termitophilus* Forel, 1895b

497 *B. tristis* Mayr, 1870

498

499 **Identification key to *Brachymyrmex* species.**

500 **1** Clypeus with a single long apical hair near the anterior margin, two lateral hairs medially and

501 two hairs near the toruli (**Fig. 5.a1**); monomorphic **2**

502	- Clypeus with a row of long thick hairs near the anterior margin (Fig. 5.a2), remaining pilosity not	
503	as above; dimorphic	39
504		
505	2(1) Metathoracic spiracles tumuliform (i.e. strongly protruding dorsally) (Fig. 6a1); known only	
506	from Brazil	3
507	- Metathoracic spiracles not (Fig. 6.a2) or slightly protruding but not tumiliform (Fig. 6.a3);	
508	naturally occurring throughout the Neotropics	5
509		
510	3(2) Toruli surpassing the posterior clypeal margin in oblique anterodorsal view (Fig. 5.a3); head	
511	and mesosoma smooth and shiny	4
512	- Toruli touching the posterior clypeal margin but never surpassing it in oblique anterodorsal view	
513	(Fig. 5.a2); head and mesosoma finely punctate and opaque	<i>B. brasiliensis</i>
514		
515	4(3) Mesosoma without erect hairs; gaster with scattered long erect hairs, except for the first	
516	segment which has dense yellowish pubescence	<i>B. feitosa</i>
517	- Mesosoma with two erect hairs on pronotum and two on mesonotum; gaster with scattered long	
518	erect hairs, also on the first segment	<i>B. delabiei</i>
519		
520	5(2) Dorsum of the head, mesosoma and gaster with thick erect black hairs (as in <i>Nylanderia</i>) that	
521	contrast with the body color (head and gaster may be darker than mesosoma) <i>B. cavernicola</i>	
522	- Dorsum of the head, mesosoma and gaster without hairs, or with thin hairs that do not contrast	
523	with the body color.....	6
524		

525	6(5) Eyes positioned below the cephalic midline (Fig. 5.b1), with 3 or 4 ommatidia along the	
526	maximal diameter of the eye (EL) (Fig. 5.c1).....	7
527	- Eyes usually positioned on the cephalic midline (Fig. 5.b2), with more than 4 ommatidia along	
528	the maximal diameter of the eye (Fig. 5.c2)	9
529		
530	7(6) Mesonotum not bulging dorsally above the pronotum in lateral view (Fig. 6.b1).....	8
531	- Mesonotum bulging dorsally above the pronotum in lateral view (Fig. 6.b2)	
532	.....<i>B. modestus</i>	
533		
534	8(7) Scapes short, just reaching the posterior margin of the head or surpassing it by a length shorter	
535	than the maximal diameter of the eye (Fig.5.d1,d2).....	
536	.....<i>B. donisthorpei</i>	
537	- Scapes long, surpassing the posterior margin of the head by a length approximately equal to the	
538	maximal diameter of the eye (Fig. 5.d3).....	<i>B. myops</i>
539		
540	9(6) Two erect hairs between the metathoracic spiracles	10
541	- Without erect hairs between the metathoracic spiracles	11
542		
543	10(9) Scapes surpass the posterior cephalic margin by a length of approximately 1.5× the maximal	
544	diameter of the eye (Fig. 5.d3: 2A ≤ B); hairs on scapes decumbent; body uniform in color (usually	
545	dark brown)	<i>B. admotus</i>
546	- Scapes surpass the posterior cephalic margin by a length of approximately 1.0× the maximal	
547	diameter of the eye (Fig. 5.d3: 2A > B); hairs on scapes appressed; head and mesosoma light brown,	
548	gaster darker	<i>B. bonariensis n. st.</i>

549		
550	11(9) Dorsal margin of the mesosoma having a marked sinusoidal shape (Fig. 6.c)	12
551	- Dorsal margin of the mesosoma not sinusoidal or only of sub-sinusoidal shape (Figs.	
552	6.a2,a3,b1,b2,d1,d2,e1,e2)	13
553		
554	12(11) Clypeus with its medial anterior portion forming a “lip” (Fig. 5.e1); head and mesosoma	
555	partially or completely alveolate (sometimes alveolate-strigate); dorsum of the mesosoma with	
556	many erect hairs; body uniform in color	<i>B. nebulosus</i>
557	-Clypeus without anteromedial “lip” (Fig. 5.e2); entire body non-alveolate; dorsum of the	
558	mesosoma without erect hairs; head and gaster black; mesosoma yellowish	
559	.....	<i>B. bicolor</i> n. sp.
560		
561	13(11) Head with strong alveolate sculpture	14
562	- Head without alveolate sculpture	15
563		
564	14(13) Metanotal groove wider than the diameter of the metathoracic spiracles (Fig. 6.f1 : $A \leq B$);	
565	scapes surpassing the posterior margin of the head by approximately 1.0× the maximal diameter of	
566	the eye (Fig. 5.d3); gaster with scattered pubescence (Fig. 6.g1)	<i>B. santschii</i>
567	- Metanotal groove narrower than the diameter of the metathoracic spiracles (Fig. 6.f2 : $A > B$);	
568	scapes just reaching the posterior margin of the head (Fig. 5.d2); gaster with dense pubescence	
569	(Fig. 6.g2)	<i>B. iridescens</i> n. sp.
570		
571	15(13) Mesometanotal suture inconspicuous (Fig. 6.d1)	16
572	- Mesometanotal suture readily visible (Fig. 6.d2)	17

573		
574	16(15) Pronotum without erect hairs; scapes short or reaching the posterior margin of the head	
575	(Fig. 5.d1,d2); gaster with dense pubescence (Fig. 6.g2)	<i>B. flavidulus</i>
576	- Pronotum with two erect hairs (Fig. 6.d1); scapes surpassing the posterior margin of the head	
577	(Fig. 5.d3); gaster without dense pubescence, but with scattered appressed hairs (Fig. 6.g1) ..	
578	.....	<i>B. minutus</i>
579		
580	17(15) Gaster with dense appressed or decumbent pubescence (Fig. 6.g2)	18
581	- Gaster with sparse pubescence, but with scattered, appressed hairs (Fig. 6.g1)	28
582		
583	18(17) Metanotal groove absent or when present shallow and narrower than the diameter of the	
584	metathoracic spiracles (Fig. 6.f2: A > B).....	19
585	- Metanotal groove deep and wider than the diameter of the metathoracic spiracles (Fig. 6.f1: A ≤	
586	B).....	26
587		
588	19(18) Mesonotum bulging dorsally above the pronotum in lateral view (Fig. 6.b1)	20
589	- Mesonotum not bulging dorsally above the pronotum in lateral view (Fig. 6.b2)	22
590		
591	20(19) Scapes just reaching the posterior margin of the head or surpassing it by a length of less	
592	than 1.0× the maximal diameter of the eye (Fig. 5.d2,d3: A > B)	21
593	- Scapes surpassing the posterior margin of the head by a length of approximately 1.0× the maximal	
594	diameter of the eye (Fig. 5.d3: A ≈ B).....	<i>B. heeri</i>
595		

596	21(20) Body usually dark brown; eye with on average 9 ommatidia along its maximal diameter;	
597	scapes on average >0.5 mm; known only from South America	<i>B. giardi</i>
598	- Body yellowish; eye with on average 6 ommatidia along its maximal diameter; scapes on average	
599	<0.5 mm; known only from Canada, Mexico, USA	<i>B. depilis</i>
600		
601	22(19) Body yellowish	23
602	- Body dark brown.....	25
603		
604	23(22) Scapes not or barely reaching the posterior margin of the head (Fig. 5.d1,d2)	
605	.....	<i>B. fiebrigi</i>
606	- Scapes surpassing the posterior margin of the head (Fig. 5.d3)	24
607		
608	24(23) About 6 erect hairs on the pronotum and two on the mesonotum, each hair with a length of	
609	about 2.0× the maximal diameter of the eye; known only from the Bahamas. <i>B. bahamensis</i> n. sp.	
610	- Two erect hairs on the pronotum and two on the mesonotum, each with a length shorter than the	
611	maximal diameter of the eye; widespread.....	<i>B. termitophilus</i>
612		
613	25(22) Dorsum of the head and mesosoma with light-colored, dense pubescence; gaster with dense	
614	appressed pubescence; eye with on average 11 ommatidia along its maximal diameter, head on	
615	average long (HL1 > 0.5 mm) and wide (HW > 0.4 mm).....	<i>B. cordemoyi</i>
616	- Dorsum of the head and mesosoma with less conspicuous dense pubescence; gaster with dense	
617	decumbent pubescence; eye with on average 9 ommatidia along its maximal diameter, head on	
618	average short (HL1 < 0.5 mm) and narrow (HW < 0.4 mm)	<i>B. obscurior</i>
619		

- 620 **26(18)** Dorsum of the mesosoma without conspicuous sculpture; metathoracic spiracles fully dorsal
 621 in position; dorsal margin of the mesonotum strongly antero-posteriorly inclined (**Fig. 6.e1**) **B.**
 622 ***sosai* n.sp.**
- 623 - Dorsum of the mesosoma with imbricate sculpture; metathoracic spiracles in dorsolateral
 624 position; dorsal margin of the mesonotum not or slightly antero-posteriorly inclined (**Fig. 6.e2**)
 625 **27**
- 626
- 627 **27(26)** Second segment of the antennal funiculus shorter than the first antennal segment (**Fig. 5.g1:**
 628 $S2 < S1$); scapes with appressed hairs; metathoracic spiracles protruding slightly dorsally, but not
 629 tumiliform (**Fig. 6.a3**); hairs lighter in color than the body, which is brownish
 630 ***B. attenuatus* n.st**
- 631 - Second segment of the antennal funiculus as long or longer than the first antennal segment (**Fig.**
 632 **6.g2:** $S2 \geq S1$); scapes with decumbent hairs; methatoracic spiracles not protruding (**Fig. 6.a2**)
 633 hairs darker in color than the body, which is yellowish ***B. antennatus***
- 634
- 635 **28(17)** Eyes large, with a maximal diameter $>1/4$ th of the length of the head (HL_1), usually with
 636 >14 ommatidia along their maximal diameter ***B. oculus***
- 637 - Eyes small, with a maximal diameter of approximately $1/4$ th the length of HL_1 , typically with
 638 <14 ommatidia along their maximal diameter **29**
- 639
- 640 **29(28)** Metanotal groove absent, or, when present, shallow and narrower than the diameter of the
 641 metathoracic spiracles (**Fig. 6.f2:** $A > B$)..... **30**
- 642 - Metanotal groove deep and wider than the diameter of the metathoracic spiracles (**Fig. 6.f1:** $A \leq$
 643 B .) **34**

644		
645	30(29) Head and thorax yellowish; gaster black or yellowish with a black spot, OI ₂ usually >27	
646	<i>B. pictus</i>	
647	- Body of uniform color, OI ₂ usually <25	31
648		
649	31(30) Body yellowish, usually with a narrow mesonotum (MW ~ 16) and 8-9 ommatids along the	
650	maximum diameter of the eye	32
651	- Body brownish or dark brown, usually with a wide mesonotum (MW ~ 20 or more) and 10 or	
652	more ommatids along the maximum diameter of the eye	33
653		
654	32(31) Scapes surpassing the posterior margin of the head by a length exceeding the maximal	
655	diameter of the eye (Fig. 5.d3 : A < B)	<i>B. aphidicola</i>
656	-Scapes surpassing the posterior margin of the head by a length smaller than or equal to the maximal	
657	diameter of the eye (Fig. 5.d3 : A ≥ B)	<i>B. australis</i>
658		
659	33(31) Scapes surpassing the posterior margin of the head by a length smaller than the maximal	
660	diameter of the eye (Fig. 5.d3 : A > B); usually with two erect hairs on the pronotum and two on	
661	the mesonotum	<i>B. patagonicus</i>
662	- Scapes surpassing the posterior margin of the head by a length approximately equal to the	
663	maximal diameter of the eye (Fig. 5.d3 : A ≈ B); usually with more than two erect or decumbent	
664	hairs on the pronotum and two erect hairs on the mesonotum	<i>B. bruchi</i>
665		
666	34(29) Legs and antennae with erect hairs; second segment of the antennal funiculus as long as or	
667	longer than the first (Fig. 5.g2 : S ₂ ≥ S ₁)	<i>B. gaucho</i>

668	- Legs and antennae with decumbent or appressed hairs; second segment of the antennal funiculus	
669	shorter than the first (Fig. 5.g1 : S2 < S1)	35
670		
671	35(34) Mesonotum not bulging dorsally above the pronotum in lateral view (Fig. 6.b2);	
672	metathoracic spiracles low, not protruding dorsally (Fig. 6.a2)	<i>B. musculus</i>
673	- Mesonotum bulging dorsally above the pronotum in lateral view (Fig. 6.b1); metathoracic	
674	spiracles protruding slightly in lateral view but not tumiliform in shape (Fig. 6.a3)	36
675		
676	36(35) Head and thorax yellow or brown, gaster darker	<i>B. coactus</i>
677	- Body uniform in color.....	37
678		
679	37(36) Head with dense decumbent pubescence (Fig. 5.f1)	<i>B. tristis</i>
680	- Head with sparse decumbent pubescence (Fig. 5.f2).....	38
681		
682	38(37) Mesonotum laterally extended and therefore oval in dorsal view (Fig. 6.h1); body light	
683	brown	<i>B. degener</i>
684	-Mesonotum almost circular in dorsal view (Fig. 6.h2); body dark brown or black	
685	.....	<i>B. gagates</i>
686		
687	39(1) Mesosoma mostly smooth and shiny, except for longitudinal striations restricted to the	
688	metapleura; body uniform light brown.....	<i>B. micromegas</i>
689	-Mesosoma entirely covered with fine longitudinal striations; gaster darker than the rest of the	
690	body.....	<i>B. pilipes</i>
691		

Species accounts.

Brachymyrmex admotus Mayr

(Fig. 7, supplementary material Fig. S1)

Brachymyrmex admotus Mayr, 1887: 523 (w.q.). **Lectotype worker** (NHMW: USNMENT00757197) and **paralectotype workers, queen** (NHMW: USNMENT00757196, 00757198-00757200; **here designated**): 5 workers, 1 queen [examined]. **BRAZIL: Santa Catharina.** Other relevant descriptions: Wheeler and Wheeler (1982: 178) (l.). See also: Santschi (1923a: 669); Quirán (2005: 762).
 =*Brachymyrmex longicornis* var. *immunis* Forel, 1908: 400 (w.q.m.). (MHNG: USNMENT00757148): 2 workers [examined]. **BRAZIL:** São Paulo. See also: Forel (1911: 308); Santschi (1923a: 668) **n. syn.**

Additional material examined. ARGENTINA: Misiones: Est. Ex. Loreto, A.A. Oglobin, 3 workers (NHMB: USNMENT00758065 - 00758067). **BRAZIL: Bahia:** Itacaré, -14.30917 - 39.01944, 26 June 1998, Santos, J.R.M. dos, 2 workers (CPDC: USNMENT00757769); Ituberá, 08 May 1994, 4815, J.H.C. Delabie, 3 workers (CPDC: USNMENT00757772); **Mato Grosso do Sul:** 8 km SE Ponta Pora, 15 Oct. 1989, W.P. MacKay #12523, 2 workers (WEMC: USNMENT00759009); **Minas Gerais:** Alfenas, 05 May 2011, 1 worker (ICN: USNMENT00759050); Cristina, Luederwaldt, 9 workers (NHMB: USNMENT00758053, 00758059, 00758061); Cristina, MP17192, 2 workers (MZSP: USNMENT00757765, 00757819); Cocal das Estrelas, -19.73333 -43.41667, 19-22 June 2007, D.L. Braga #5512, 1 worker (CPDC: USNMENT00757768); Serra Caraça, 1380 m, Nov. 1961, Kloss, Lemko, 2713, Martins & Silva, 9 workers, 3 males (MCZC: USNMENT00757252, 00757253, 00757764); Viçosa, Mata do

715 Paraiso, Dec. 1993-1994, P.S.F. Ferreira, 3 workers (CPDC: USNMENT00757770); **Paraná:**
 716 Antonina, Parque Estadual do Pauôco, -25.57597 -48.88875, 6-11 May 2002, R.R. Silva & B.H.
 717 Dietz, 24 workers (ICN: MZSP016, 018, 019); Río Negro, Goeldi, 2 workers (MCZC:
 718 USNMENT00757235); **Rio de Janeiro:** Reischensperger, 8 workers (NHMB:
 719 USNMENT00758056-00758058); Goeldi, 1 worker (NHMB: USNMENT00758050); Floresta de
 720 Tijuca, D. Federal, 16 Dec. 1959, C.A.C Seabra, 5 workers (MZSP: USNMENT00757766);
 721 Itatiaia, 17 Oct. 1933, 1 worker (NHMB: USNMENT00758068); Petropolis 77 9, T. Borgmeier,
 722 5 workers, 1 queen (MCZC: USNMENT00757233, 00757234, 00757236); **Santa Catarina:**
 723 Blumenau, Reichensperger, 9 workers (NHMB: USNMENT00758055, 00758060, 00758064);
 724 Blumenau, Rev PM Witte, 2 workers (NHMB: USNMENT00758063); Blumenau, Rev Wittz, 19
 725 workers (NHMB: USNMENT00758051, 00758052, 00758062); Palhoça, PE Serra do Tabuleiro,
 726 -27.74111 -48.69722, 02-10 June 2003, R.R. Silva, B.H. Dietz & A. Tavares, 25 workers (ICN:
 727 MZP030, 031, 035, 040); São Bento do Sul, APA Rio Vermelho, -26.36417 -49.27111, 30 Mar.-
 728 04 Apr. 2001, R.R Silva & Eberhardt, 27 workers (ICN: MZP043, 134, 137); São Bento do Sul,
 729 APA Rio Vermelho, -26.36417 -42.27111, 30 Mar.-04 Apr. 2001, R.R. Silva & R.M. Feitosa, 5
 730 workers (ICN: MZP044); **São Paulo:** Agudos, 24 Jan. 1955, W.S. Kempf leg 1337, 3 workers
 731 (MZSP: USNMENT00757767); Barueri, n 297, 17 Dec. 1957, K. Lenko, 5 workers (MZSP:
 732 USNMENT00757775); Iguape, EE Jureia-Itatins, Nucleo Rio Verde, -24.54417 -47.23556, 5-14
 733 Mar. 2001, A.A. Tavares, 13 workers (ICN: MZP157, 158); Ipiranga Ihering, 4 workers
 734 (MHNG); Ipiranga (x.60), Ihering, 2 workers (MHNG); Jardim Botânico, Agua Funda, wet
 735 Forest, 08 Feb. 1967, W.L. Brown, 5 workers, 1 queen, 1 male (MCZC: USNMENT00757961,
 736 00757771, 00757773, 00757774, CMOS00148, 00153); Jundiai, Serra Do Japi, 03 Jan. 2009, S.
 737 Diniz, 4 workers (ICN: USNMENT00759039); Miracatu, Serra do Mar, Clube pesca & Cia, 04-
 738 07 Sep. 2004, R.M. Feitosa, 11 workers (ICN: MZP092, 097); Picinguaba, PE Serra do Mar, -

23.33611 -44.83758, 30 Mar.-04 Apr. 2001, Brandão C.R.F. & Eq, 52 workers, 1 queen (ICN: MZP060 - 062, 064); Picinguaba, PE Serra do Mar, -23.33611 -44.83758, 30 Mar.-04 Apr. 2001, Brandão, Albuquerque & Silva, 15 workers (ICN: MZP063); Piedade, Floresta Atlantica "Theomar", Mar 2010, G. Bieber, 1 worker (ICN: USNMENT00759040); Piedade, Floresta Atlantica, Jurupará, Apr. 2009, G. Bieber, 1 worker (ICN: USNMENT00759041); Serra du Cantareira, Horto Florestel, 20 Feb. 1967, R. Crozier, 9 workers (MCZC: USNMENT00757774, CMOS000089, 000090); **PANAMA: Colon Province:** San Lorenzo Forest, 9-16 Feb. 2004, Springate & Pinzon, 1 worker, (PSWC: USNMENT00757747). **PARAGUAY: Canindeyú:** Reserva Natural, Bosque Mbaracayú, Jejuimi, -24.10000 -55.50421, 15 Aug. 1996, A. Wild #AW0295, 3 workers (ALWC: USNMENT00757763).

Diagnosis. *Brachymyrmex admotus* morphologically resembles *B. bonariensis* **n. st.**, because both species have long scapes, a conspicuous metanotal groove, a pair of thin erect hairs between the metathoracic spiracles, and a gaster with scarce pubescence. However, *B. admotus* is usually more uniform brownish in color, it has longer scapes (i.e. the scapes surpass the posterior cephalic margin with a length of approximately 1.5× the maximal diameter of the eye) with decumbent hairs, and its metathoracic spiracles are positioned more dorsally. *Brachymyrmex admotus* also resembles *B. cavernicola* in having a pair of erect hairs between the dorsal metathoracic spiracles, but these hairs are thinner in *B. admotus* and they are not darker in color than the body.

Lectotype measurements (mm). HL₁ 0.51; HL₂ 0.35; HL₃ 0.12; HW 0.45; SL 0.49; EL 0.10; WL 0.49; PnL 0.14; PnW 0.31; ML 0.08; MW 0.18; *Indices* CI 88.46; SI₁ 108.70; SI₂ 138.89; OI₁ 21.74; OI₂ 23.08.

Paralectotypes measurements (mm) (n=3). HL₁ 0.51-0.57; HL₂ 0.35-0.39; HL₃ 0.12-0.14; HW 0.45-0.49; SL 0.55-0.59; EL 0.10; WL 0.53-0.59; PnL 0.14-0.21; PnW 0.31-0.35; ML 0.08-0.12; MW 0.18-0.21; *Indices* CI 86.21-92.59; SI₁ 112.00-121.74; SI₂ 140.00-155.60; OI₁ 20.00-21.74; OI₂ 23.08-25.93.

Additional material examined measurements (mm) (n=16). HL₁ 0.46-0.57; HL₂ 0.30-0.43; HL₃ 0.11-0.14; HW 0.43-0.51; SL 0.47-0.57; EL 0.09-0.13; WL 0.46-0.61; PnL 0.16-0.22; PnW 0.29-0.34; ML 0.09-0.13; MW 0.17-0.21; *Indices* CI 87.72-96.6; SI₁ 105.26-120.00; SI₂ 131.91-155.88; OI₁ 18.87-26.92; OI₂ 21.43-28.30.

Description. Head. Slightly longer than wide in full face view, with scattered appressed hairs except for two frontal rows of erect hairs; posterior cephalic border slightly concave. Dorsum of the head with sparse appressed pubescence. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous apical hair is near the anterior margin, two lateral hairs in medial position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. Scapes extend beyond the posterior cephalic margin by a length of ~1.5× the maximum eye diameter or more. The scapes typically have appressed, sometimes decumbent, but never erect hairs. A single central ocellus is present, but sometimes inconspicuous. Eyes are positioned on the cephalic midline and have 7-9 ommatidia along their maximal diameter.

Mesosoma. Usually with two erect hairs on the pronotum and two on the mesonotum; sometimes with additional suberect hairs on both. In lateral view, the mesonotum is not or slightly inflated

and it does not or only slightly bulge dorsally above the pronotum. Metanotal groove deep and wider than the diameter of the metathoracic spiracles. Metathoracic spiracles fully dorsal and slightly protruding, they are closer to the propodeal than to the mesometanotal suture, but not touching any suture. Between the metathoracic spiracles two simple erect hairs are present, which are shorter than those on the pronotum and mesonotum. Dorsum of the propodeum flat and ~1/3th of the length of the propodeal slope. Propodeal spiracles circular, positioned ventrally of the posterior propodeal margin slightly posterior of the middle of the propodeal slope. Legs with appressed and scattered hairs. Petiole short and inclined forward.

Gaster. With scattered pubescence and scattered long suberect hairs.

Color and sculpture. Body overall smooth and shiny, except for the sometimes slightly imbricate sculpture on the dorsum of the mesosoma; body typically uniform dark brown in color, although in some specimens the head and mesosoma may be light brownish and the gaster darker brown.

Distribution (Supplementary material Fig, S1). *Brachymyrmex admotus* is mainly known from Argentina, Brazil, and Paraguay, but we also examined a specimen from Panamá that appears to belong to this species.

Biology. This species makes nests in rotting wood [USNMENT00757763] and it has been collected from below rocks [USNMENT00759009].

Remarks. We synonymize *B. longicornis* var. *immunis* Forel, 1908 under *B. admotus*, because the workers have all morphological characteristics of *B. admotus*, although they are slightly larger and of somewhat darker color. Forel (1908) did not specify a holotype for *B. longicornis* var. *immunis* but considered it to differ from *B. longicornis* in color, size and the position of the

metathoracic spiracles. The similarity between *B. admotus* and *B. longicornis* var. *immunis* was previously pointed out by Santschi (1923a) and Quirán (2005), who suggested that the main difference between both relates to the size and position of the metathoracic spiracles. However, these traits appear to be variable among populations and we have not found consistent differences between both taxa. For example, Santschi's collection (MHNB) includes syntype specimens of *B. longicornis* var. *immunis* that match the diagnostic traits of *B. admotus* entirely. Hence, synonymization seems appropriate.

Quirán (2005) indicated that *B. admotus* has 3 small ocelli, but in the samples that we studied we only observed one central ocellus, although this trait is inconspicuous.

Brachymyrmex antennatus Santschi

(Fig. 8, supplementary material Fig. S2)

Brachymyrmex (*Brysha*) *antennatus* Santschi, 1929: 312 (w.q.). **Lectotype worker** (NHMB: USNMENT00758161) and **paralectotype worker, queen** (NHMB: USNMENT00758161; **here designated**): 2 workers, 1 queen (without USNMENT number) [examined]. **Brazil**: Paraná, Rio Negro.

Additional material examined. ARGENTINA: Misiones: loc. IGUAZU: PNI, Garganta, 28 Feb.-03 Mar. 2009, -25.70323 -54.42992, P.E. Hanisch & C.I Paris, Bait T4S10a, 1 worker (MACN-Bar-Ins-3120). **BRAZIL: Ceará:** Meruoca (Baixa, Gnd), ±970 m, -3.550 -40.467, July 2003, Y. Quinet, 3 workers (CPDC: USNMENT00757781). **São Paulo:** Ubatuba, P.E. Serra do Mar, N. Picinguaba, -23.297 -44.789, 800 m, 03-14 Mar. 2008, armadilha subterrânea #4, F.A. Esteves & R.M. Feitosa, 3 workers (MZSP: USNMENT00757777, 00757591). **COLOMBIA:**

Quindio: Génova, Vereda El Cedral, Finca Buenos Aires, 1600 m, 4.235 -75.775, 26 Oct. 1999, E. Gonzales & J. Sossa, 1 worker (IAvH-E 74166). **ECUADOR: Napo:** Carlos Julio Arosemena Tola, -1.150 -77.883, 500 m, 11 Dec. 2003. A. L. Wild #AW2300, 1 worker (ALWC: USNMENT00757782). **FRENCH GUIANA:** Petit, Satn Basse vie, June-July 2000, S. Durou, J. Delabie, A. Dejean & A. Gibernau, 2 workers (CPDC: USNMENT00757779, 00757780). **PERU: Madre de Dios:** Reserva Nacional Tambopata, Centro Sachacavayoc, -12.85583 - 69.36194, 210 m, 19-31 July 2012, 2 workers (ICN: USNMENT00757627). Prov. Tambopata, Cuzco Amazónico, 15 km NE Puerto Maldonado, 24 June 1989, 200 m, S.P. Cover & J.E. Tobin, CA-115, 1 worker, 1 queen (MCZC: USNMENT00757630). **SURINAME:** Maripahewel, IX-1959 14–XX–29 I.v.d. Drift, 1 worker (MZSP: USNMENT00757778).

Diagnosis. *Brachymyrmex antennatus* morphologically resembles *B. gaucho*, because both species have legs and antennae with suberect hairs and both have an antennal funiculus with the second segment as long as or longer than the first. However, they differ from one another because *B. antennatus* has abundant, suberect hairs on the dorsum of the head and mesosoma, its gaster has dense pubescence and its body is lighter and yellowish. *Brachymyrmex antennatus* also resembles *B. cavernicola* in having suberect hairs on the mesosoma that are generally darker in color than the tegument, but *B. antennatus* has a more elongated head, a longer second segment of the antennal funiculus, as mentioned above, thinner hair on its body and denser pubescence on the gaster.

Lectotype and paralectotype measurements (mm) (n=2). HL₁ 0.68-0.71; HL₂ n.a.; HL₃ 0.19-0.23; HW 0.68-0.71; SL 0.68-0.80; EL 0.15; WL 0.87; PnL 0.31-0.33; PnW 0.45; ML 0.21; MW 0.27; *Indices* CI 95.50-95.80; SI₁ 100.00-123.00; SI₂ n.a.; OI₁ 22.22-23.25; OI₂ 27.94-31.41.

Additional material examined measurements (mm) (n=5). HL₁ 0.54-0.60; HL₂ 0.38-0.41; HL₃ 0.12-0.16; HW 0.54-0.58; SL 0.52-0.63; EL 0.09-0.14; WL 0.60-0.71; PnL 0.15-0.22; PnW 0.35-0.40; ML 0.14-0.18; MW 0.20-0.24; *Indices* CI 92.31-100.00; SI₁ 93.33-130.23; SI₂ 130.23-155.56; OI₁ 15.38-26.67; OI₂ 21.67-29.03.

Description. Head. Longer than wide in full face view; posterior cephalic border concave. Dorsum of the head with scattered decumbent hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous apical hair is near the anterior margin, two lateral hairs in medial position and two more near the toruli; other hairs on the clypeus are conspicuously shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin (in oblique anterodorsal view). Scapes surpass the posterior cephalic margin by a length of 1.5× the maximum eye diameter or more. The second segment of the antennal funiculus is as long as the first or longer. The scapes typically have suberect and erect hairs. Three ocelli present. Eyes are positioned on the cephalic midline and have 7-9 ommatidia along their maximal diameter.

Mesosoma. With conspicuous, thin erect hairs of darker color than the tegument. Pronotum anteroposteriorly elongated. The mesonotum is slightly antero-posteriorly inclined, weakly inflated, and it does not bulge dorsally above the pronotum in lateral view. Metanotal groove deep and wider than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position and slightly protruding, closer to the propodeal than to the mesometanotal suture, but not touching any suture. Dorsum of propodeum flat and equal in length to the propodeal slope. Propodeal spiracles circular, situated ventral of the posterior propodeal margin. Legs with suberect and erect hairs. Petiole short and inclined forward.

Gaster. With dense pubescence and scattered long suberect hairs, mainly at the edges of the segments.

Color and sculpture. Body typically uniformly light brown, although some specimens may be light brownish with the head and gaster darker brown.

Distribution (Supplementary material Fig. S2). Known from Argentina, Brazil, Colombia, Ecuador, French Guiana, Perú and Suriname.

Biology. Unknown.

Remarks. The ant at the top of pin USNMENT00758161 is designated here as lectotype and the one immediately below as paralectotype. Santschi's collection (MHNB) contains three additional pins with four workers from the same locality but they are not considered to be part of the type collection as they have no type label. Santschi (1929) described the queen from a sample that does not contain any workers but expressed confidence that it belongs to *B. antennatus*; the issue may require verification from independent material. Substantial variation exists in the body size of workers of *B. antennatus* from various locations that were studied here, and the cause of this variation remains uncertain.

***Brachymyrmex aphidicola* Forel**

(Fig. 9, supplementary material Fig. S3)

Brachymyrmex heeri var. *aphidicola* Forel, 1909: 263 (w.). **Lectotype worker** (MHNG: USNMENT00757130) and **paralectotype workers** (MHNG: USNMENT00757129, 00757130,

00758121-00718123; **here designated**): 11 workers [examined]. **PARAGUAY**: San Bernardino.

Other relevant descriptions: Forel (1912a: 62) (q.). (MHNG: USNMENT00757128): 1 queen.

BRAZIL: Santa Catarina: Blumenau. Raised to species: Wild (2007: 43).

= *B. heeri* var. *fallax* Santschi, 1923a: 665 (w.). (NHMB: USNMENT00757697): 1 worker [examined]. **PARAGUAY**. Junior synonym of *B. aphidicola*: Wild (2007: 43).

= *B. longicornis* var. *hemiops* Santschi 1923a: 668 (w.). (NHMB: USNMENT00757188-00757190) 11 workers, 3 queens [examined]. **BRAZIL**: São Paulo, Ypiranga. **n. syn.**

Additional material examined. ARGENTINA: Entre Ríos: 8.63 km W Concordia, -31.42048 - 58.11700, 16 m, 27 Dec. 2007, W. & E. MacKay, 1 worker, 1 male (WEMC: USNMENT00757975). **Misiones**: Parque Provincial Cañadón de Profundidad, -27.56020 - 55.70988, 160 m, 29 Dec. 2007, W. & E. MacKay leg #22710, #22711, #22712, #22724, #22732, 10 workers (WEMC: USNMENT00757617, 00757897, 00757901, 00757924, 00757925, 00757929, 00757930, 00757956, 00757992). **BOLIVIA: Santa Cruz**: Parque Nacional Noel Kempff, Mercado, -18.800 -60.383, 700 m, 04 Dec. 1993, P.S. Ward #12285-46, 2 workers, 1 queen (PSWC: USNMENT00757910). **BRAZIL: Amazonas**: 61 km N Manaus, om Caracá Rd, “caatinga”, 10 June 1972, W.L. & D.E. Brown, 3 workers (MCZC: UNSMENT00757619).

Goiás: Anapolis, 12 Feb. 1958, W. Kempf, 2 workers (MZSP: USNMENT00757921). Ouro Verde, Faz Boa Vista, -16.29847 -49.21183, 01-07 Aug. 2005, R.R. Silva & R.M. Feitosa, 5 workers (ICN: MZSP123). **Mato Grosso**: Chapada dos Guimarães, -15.43333 -55.44874, 740 m, 03 Sep. 1996, P.S. Ward leg #13203-7, 3 workers (PSWC: USNMENT00757911). **Mato Grosso do Sud**: 24 km W Campo Grande, 07 Oct. 1989, W. MacKay, 2 workers (WEMC: USNMENT00758000). 48 km E Campo Grande, 12 Oct. 1989, S. Porter #12791, 2 workers (WEMC: USNMENT00759011). 8 km SE Punta Bora, 15 Oct. 1989, W.P. MacKay #12508, 2

931 workers (WEMC: USNMENT00759003). Río de Alegría, 17 Oct. 1989, W.P. MacKay #12950, 2
 932 workers (WEMC: USNMENT00759022). **Pará:** Melgaço, Caxiuanã-ECFPn, 27 June-03 Dec.
 933 2001, I. Andrade, 5 workers (MPEG: USNMENT00757674, 00757927, 00758030, 00759030).
 934 Melgaço, Caxiuanã-ECFPn, -1.78155 -51.59758, 30 Oct. 2003, A.Y. Harada, E.P. Fagundes,
 935 C.J.M. Ribeiro, C.E.D. Sanhudo, C.A.R. Moura, J.L.P. Souza, C. Renato, 2 workers (MPEG:
 936 AYH112, 127). Serra Norte, Calderiã, 20 Oct. 1980, 2 workers (MPEG:
 937 MPEG_HYM11505158, USNMENT00757902). **Rio de Janeiro:** Teresópolis, P.N. Serra dos
 938 Orgãos, -22.45333 -42.99806, 23-28 Nov. 1999, Dietz, Silva & Rocha, 8 workers (ICN:
 939 MZSP130). **Rondônia:** Ouro Preto do Oeste, 03 Apr. 1985, Linha 212 N°0375, 339, W. França,
 940 4 workers (MPEG: USNMENT00757899, 00757914, 00757915, 00758999). Ouro Preto do
 941 Oeste, 04 May 1985, Linha 212 N°0375, 0413, W. França, 3 workers (MPEG:
 942 USNMENT00757913, 00757938, 00758038). Ouro Preto do Oeste, 25 Mar. 1985,
 943 ResINPA0035, J. Dias, 2 workers (MPEG: USNMENT00757914, 00757936). **São Paulo:**
 944 Ipiranga, 2371, 2 workers (MZSP: USNMENT00757926]. Itirapina, Dec. 2008, D.P. Silva, 1
 945 worker (MPEG: AYH008). **COLOMBIA: Cundinamarca:** Bogotá-Villavicencio Km 88
 946 (Susumuko), 1100 m, 28 June 1976, W.L. & D.E. Brown, 1 worker, 1 queen (MCZC:
 947 USNMENT00757746). Caqueza, 29 Dec. 1975, W. & E. MacKay #945, 2 workers (WEMC:
 948 USNMENT00757686). **Huila:** 4 km NE Rivera, 30 Dec. 1986, W. & E. MacKay, 3 workers
 949 (WEMC: USNMENT00757903). La Vega, A280, 14-17 Jul 1975, W. MacKay, 1 worker, 1 male
 950 (WEMC: USNMENT00757912). **Magdalena:** 4 km San Pedro, 10.95 -74.05, 550 m, 14 Aug.
 951 1985, P.S. Ward #17912-36, 3 workers (PSWC: USNMENT00757585). **Meta:** San Juan de
 952 Arama, RNN La Macarena, Caño La Curía, 580 m, 13 July 1992, Est. U. Nacional, 1 worker
 953 (ICN: USNMENT00758035). **Tolima:** Mendez, 15 Nov. 1995, F. Fernández, 1 worker (IAvH:
 954 USNMENT00759058). **Valle del Cauca:** Medio Calima, 24 June 1989, E. MacKay #11746

955 (WEMC: USNMENT00758041). **COSTA RICA: Heredia:** Estación biológica La Selva, 10.417
 956 -84.000, 50 m, 21 Oct. 1991, J. Longino #3126-s, 1 worker, 1 queen (JTLC:
 957 INBIOCRI001238064). **ECUADOR: Loja:** Estación San Francisco, 2200 m, 14 Sep. 2011, 14
 958 workers (ICN: USNMENT00759036, 00759037). Estación San Francisco, 17 sep. 2011, 2
 959 workers (ICN: USNMENT00759034). **Napo:** 11 km SE Consaga, -0.66667 -77.80000, 1640 m,
 960 09 Dec. 2003, A.L. Wild #AW2263, 4 workers (ALWC: USNMENT00757586, 00757928).
 961 **GUATEMALA:** Alta Vera Paz, Parque Nacional Las Victorias, 15.47492 -90.37528, 206 m, 18
 962 July 2004, W. & E. MacKay, 1 worker (WEMC: USNMENT00758018). **GUYANA: Karto:** Pt.
 963 Mazaruni-Potaru Dist. J. Weintraub, 2 workers, 1 queen (MCZC: USNMENT00757931).
 964 **MEXICO: Guanajuato:** Highway 57, Km 306, Rancho Jardin, 10 Aug. 1965, Cornell
 965 University, 2 workers, 1 queen (MCZC: USNMENT00759002). Yuriria, 03 Feb. 1964, P. Reyes
 966 C. & H. Romero, 1 worker (MZSP: USNMENT00757616). **NICARAGUA: Río San Juan:**
 967 Bartola, 8 km SE El Castillo, 10.97303 -84.33897, 47 m, 12 July 2003, W. & E. MacKay #20187,
 968 2 workers (WEMC: USNMENT00758029). **PANAMA: San Blas:** Nusegandi, 08 June 1992,
 969 L.E. Tennant, 1 worker, 1 queen (MZSP: USNMENT00757923). **PARAGUAY: Amambay:**
 970 Parque Nacional Cerro Corá, -22.650 -56.017, 13 May 1997, A. Wild #AW0563, 1 worker
 971 (ALWC: USNMENT00757625). **Canindeyu:** Reserva Natural del Bosque, Mbaracayù, Jejuimi, -
 972 24.1 -55.5, 19 Sep. 1996, A. Wild #AW0563, 6 workers (ALWC: USNMENT00757584,
 973 00757895). Reserva Natural del Bosque, Mbaracayù, Jejuimi, -24.1 -55.5, 16-23 May 1996,
 974 A.C.F. Costa, 1 worker (ALWC: USNMENT00757868). Reserva Natural del Bosque,
 975 Mbaracayù, Jejuimi, -24.1 -55.5, 11 Oct 1996, A. Wild #AW0334, 1 worker (ALWC:
 976 USNMENT00757893). Reserva Natural del Bosque, Mbaracayù, Jejuimi, -24.1 -55.5, 28 Jan.
 977 1997, A. Wild #AW384, 3 workers (ALWC: USNMENT00757894). Reserva Natural del
 978 Bosque, Mbaracayù, Jejuimi, -24.1 -55.5, 12 Mar. 1997, A. Wild #AW0490, 3 workers (ALWC:

USNMENT00757896). **PERU: Huanuco:** 42 km E. Tingo Maria, 1100 m, 10 Dec. 1954, 1 worker (CASC: CASENT0196020). **Madre de Dios:** Reserva Nacional Tambopata, Centro Sachavacayoc, -12.85583 -69.36194, 19-31 July 2012, Curso de hormigas, 7 workers (ICN: CAB-120725-1). Reserva Nacional Tambopata, Centro Sachavacayoc, casa camping, -12.85583 -69.36194, 198 m, 26 July 2012, GSNMBU, 1 worker (ICN: USNMENT00757613). **USA: Louisiana:** East Baton Rouge Par. Baton Rouge, Kennilworth & Perkins Rd. BREC Perkins Park, 03 Apr. 2003, S.T. Dash, 1 worker (WEMC: USNMENT00759023). **VENEZUELA: Bolivar:** Canaima, Orchid Is, 14 Oct. 1988, W. MacKay #11159, 1 worker (WEMC: USNMENT00757906).

Diagnosis. *Brachymyrmex aphidicola* is morphologically similar to *B. australis*, *B. minutus* and *B. termitophilus*, because all of them typically have smooth and shiny yellowish bodies, their mesonotum does not bulge dorsally above the pronotum, their eyes are positioned on the cephalic midline, and the metanotal groove is either absent or narrower than the diameter of the metathoracic spiracles. However, *B. aphidicola* differs from *B. australis* by having scapes that surpass the posterior margin of the head by a length longer than the maximal diameter of the eye; from *B. minutus* by having a well-differentiated mesometanotal suture and by the presence of two erect hairs on the pronotum and two on the mesonotum; and from *B. termitophilus* by having scattered pubescence on the gaster.

Lectotype measurements (mm). HL₁ 0.41; HL₂ 0.29; HL₃ 0.10; HW 0.37; SL 0.39; EL 0.10; WL 0.41; PnL 0.10; PnW 0.25; ML 0.08; MW 0.18; *Indices* CI 90.48; SI₁ 105.26; SI₂ 133.33; OI₁ 26.32; OI₂ 23.81.

Paralectotype measurements (mm) (n=4). HL₁ 0.43-0.45; HL₂ 0.27-0.31; HL₃ 0.10; HW 0.37; SL 0.39-0.41; EL 0.10; WL 0.41-0.43; PnL 0.14-0.17; PnW 0.23-0.29; ML 0.08-0.10; MW 0.16-0.18; *Indices* CI 82.61-86.36; SI₁ 105.26-110.53; SI₂ 125.00-142.86; OI₁ 26.32; OI₂ 21.74-22.73.

Additional material examined measurements (mm) (n=20). HL₁ 0.36-0.55; HL₂ 0.26-0.37; HL₃ 0.08-0.13; HW 0.33-0.51; SL 0.32-0.54; EL 0.09-0.12; WL 0.35-0.58; PnL 0.09-0.18; PnW 0.24-0.36; ML 0.07-0.12; MW 0.14-0.20; *Indices* CI 84.21-95.65; SI₁ 94.74-112.5; SI₂ 117.14-157.89; OI₁ 21.82-28.57; OI₂ 20.62-28.89.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin flat or slightly concave. Dorsum of the head with scattered appressed hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior margin of the head by a length larger than the maximal diameter of the eye, and typically bear appressed, sometimes decumbent, but never erect hairs. Three ocelli usually present, but sometimes inconspicuous. Eyes are positioned on the cephalic midline and have 7-10 ommatidia along their maximal diameter.

Mesosoma. Typically with two erect hairs on the pronotum and two on the mesonotum. In lateral view the mesonotum is not or weakly inflated and does not bulge dorsally above the pronotum. Metanotal groove absent or shallow and narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, not protruding, and usually touching the propodeal suture. Dorsum of propodeum slightly convex and ~1/3th of the length of the

propodeal slope. Propodeal spiracles circular, positioned ventrally of the posterior propodeal margin, and slightly posterior of the middle of the propodeal slope. Legs with appressed and scattered hairs. Petiole short and inclined forward.

Gaster. With scattered pubescence and scattered long suberect hairs, especially along the posterior edges of the segments.

Color and sculpture. Body smooth and shiny, yellowish.

Distribution (Supplementary material Fig. S3). *Brachymyrmex aphidicola* is widely distributed and known from Argentina, the Bermudas, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Guyana, Mexico, Nicaragua, Panama, Paraguay, Peru, the United States, and Venezuela.

Biology. Specimens of this species have been found under stones, in rotten wood, on epiphytes (USNMENT00757619), and on *Conostegia setosa* (USNMENT00757923). *Brachymyrmex aphidicola* nests underground or in organic litter, and it appears to be abundant in Paraguayan forests (Wild, 2007).

Remarks. Some specimens from Argentina have expanded gasters and Forel (1912a) highlighted a worker identified as *B. aphidicola* from Santa Catharina (Brazil) that also has a somewhat expanded gaster, but this specimen has not been studied and its identification remains to be confirmed. The original description of Forel (1909) indicates *B. aphidicola* to occur in both Paraguay and the Bermudas, however, a type locality is not designated. In the type series of Forel's collection (NHMG) only specimens from Paraguay are present. Nevertheless, Santschi's collection (NHMB) contains a decapitated specimen from Bermudas that is labeled as the type of

B. aphidicola. Given this complication, only the specimens from Forel's collection are designated here as lectotype and paralectotypes.

We concur with Wild (2007) that *B. heeri* var. *fallax* is a junior synonym of *B. aphidicola*. The workers of the type series of this variation have all the diagnostic characteristics of *B. aphidicola*. The description of *B. longicornis* var. *hemiops* (Santschi, 1923a) only specifies color and the smaller size of the body and eyes of this variation in comparison to *B. longicornis*, however, detailed study of the syntype renders it indistinguishable from *B. aphidicola*.

***Brachymyrmex attenuatus* Santschi NEW STATUS**

(Fig. 10, supplementary material Fig. S4)

Brachymyrmex luederwaldti st. *attenuatus* Santschi, 1929: 310 (w.). **Lectotype worker** (NHMB: USNMENT00757177) and **Paralectotype worker** (NHMB: USNMENT00757177; **here designated**) 2 workers [examined]. **BRAZIL**, Santa Catarina, Blumenau.

Diagnosis. *Brachymyrmex attenuatus* **n. st.** morphologically resembles *Brachymyrmex degener*, because both have long scapes that extend beyond the posterior margin of the head, they have faint sculpture on the mesosomal dorsum, and dorsally positioned, slightly protruding metathoracic spiracles. *Brachymyrmex attenuatus* **n. st.** differs from *B. degener*, however, by having a gaster with dense pubescence.

Lectotype worker measurements (mm) HL₁ 0.47; HL₂ 0.28; HL₃ 0.11; HW 0.43; SL n.a.; EL 0.12; WL 0.52; PnL 0.09; PnW 0.31; ML 0.12; MW 0.21; *Indices* CI 90.74; SI₁ n.a.; SI₂ n.a.; OI₁ 28.57; OI₂ 23.15.

Paralectotype worker measurements (mm) HL₁ 0.43; HL₂ 0.31; HL₃ 0.11; HW 0.39; SL 0.45; EL 0.13; WL 0.46; PnL 0.14; PnW 0.29; ML 0.11; MW 0.15; *Indices* CI 91.84; SI₁ 113.33; SI₂ 145.71; OI₁ 33.33; OI₂ 25.51.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin slightly concave. Dorsum of head with scattered appressed hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are substantially shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes extend beyond the posterior cephalic margin by a length approximately equal to the maximum diameter of the eye (and not more than 1.5× this diameter), and have decumbent hairs. A single central ocellus seems to be present but is inconspicuous. Eyes are positioned on the cephalic midline and have 7-9 ommatidia along their maximal diameter.

Mesosoma. Typically with two erect hairs on the pronotum and two on the mesonotum, sometimes with additional suberect hairs, mainly on pronotum. In lateral view, the mesonotum is inflated, but it does not bulge dorsally above the pronotum. Metanotal groove deep and wider than the diameter of the metathoracic spiracles. Metathoracic spiracles fully dorsal in position, slightly protruding and not touching the mesometanotal or propodeal sutures. Dorsum of propodeum slightly convex and shorter than the propodeal slope. Propodeal spiracles circular, positioned ventrally of the posterior propodeal margin, and slightly posteriorly of the middle of the propodeal slope. Legs with appressed and scattered hairs. Petiole short and inclined forward.

Gaster. With appressed dense pubescence and several scattered long erect hairs.

Color and sculpture. Body overall smooth and shiny, with faint sculpture on mesosomal dorsum.

Body uniformly light or dark brownish, but the legs and antennae are yellowish.

Distribution (Supplementary material Fig. S4). *Brachymyrmex attenuatus* is currently only known from Brazil.

Biology. Unknown.

Remarks. Here we designate the lectotype as the specimen closest to the pin (USNMENT00757177); the paralectotype has lighter brownish color in comparison with the lectotype. This species was described by Santschi (1929) as a subspecies of *B. luederwaldti* that has a smaller body size in comparison with *B. luederwaldti*. Additionally, *B. attenuatus* has weaker sculpture, a shinier body, especially on pronotum, a more concave posterior cephalic border, smaller eyes and a more convex mesonotum than *B. luederwaldti*. All these characteristics are somewhat subjective, because they represent differences in intensity rather than state and as such it is difficult to determine clear boundaries. A more marked difference is the presence of pubescence on the gaster, which is clearly present in *B. attenatus* **n. st.**, but absent in *B. luederwaldti*. The presence or absence of pubescence is an important trait to delimit other *Brachymyrmex* species, and hence we raise *B. attenatus* **n. st.** to species level.

***Brachymyrmex australis* Forel**

(Fig. 11, supplementary material Fig. S5)

1123 *Brachymyrmex minutus* r. *australis* Forel, 1901b: 302 (w.). **Lectotype worker** (MHNG:
 1124 USNMENT00757156) and **paralectotype worker** (MHNG: USNMENT00758102; **here**
 1125 **designated**): 2 workers [examined]. **BRAZIL**, Rio Grande do sul, Pelotas. Raised to species:
 1126 Santschi (1922: 260). See also: Santschi (1923a: 662).
 1127 = *Brachymyrmex australis* var. *curta* Santschi, 1922: 260 (w.q.m.). (NHMB:
 1128 USNMENT00757700 - 00757703, 00758069 - 00758071): 17 workers, 2 queens, 7 males
 1129 [examined]. **ARGENTINA**: Cordoba, Alta Gracia [Also described as a new variety in Santschi
 1130 (1923a: 663)]. **n. syn.**
 1131 = *Brachymyrmex longicornis* Forel, 1907: 9 (w.). (MHNG: USNMENT00757144): 2 workers
 1132 [examined]. **BRAZIL**: Porto Alegre. Other relevant descriptions: Forel (1912a: 62) (q.).
 1133 (MHNG: USNMENT00757145): 1 queen [examined]. **BRAZIL**: São Paulo. **n. syn.**
 1134
 1135 **Additional material examined. ARGENTINA: Santa Cruz**: O. Bondensköld, 3 workers
 1136 (MCZC: USNMENT00759000). **Tucumán**: 11 km N Tañi Viejo, -26.63333 -65.23333, 820 m,
 1137 01 Feb. 1995, P.S. Ward #12826-25, 3 workers (PSWC: USNMENT00757628). **BAHAMAS**:
 1138 Exumas: unnamed cay, 175 m N of NW tips of Obrien's Cay, 05 May 1995, J. W. Morrison 321-
 1139 92, 2 workers (PSWC: USNMENT00758991). **BRAZIL: Bahia**: Ilheus, CEPEC, Antonio 455E,
 1140 2 workers, 2 queens (CPDC: USNMENT00757922). Lençóis, Chap. Diamantina, -12.55 -41.38,
 1141 25 Mar. 2001, Santos, J.R.M. dos, 2 workers, 1 queen (CPDC: USNMENT00757909). **Goiás**:
 1142 Ouro verde, Faz Boa Vista, -16.29847 -49.21183, 01-07 July 2005, R.R. Silva & R.M. Feitosa, 4
 1143 workers (ICN: MZSP122). **Minas Gerais**: Alfenas, Porto, 06 Oct. 2011, I.A. Dos Santos, 6
 1144 workers (ICN: USNMENT00759048, 00759049). **Pará**: Melgaço, Caxiuanã, ECFPn, -1.73584 -
 1145 51.48762, II: transecto (4-600), 23-25 Oct. 2005, Equipe A.Y. Harada, 3 workers (MPEG:
 1146 AYH036). **Rio de Janeiro**: Teresópolis, P.N. Serra dos Orgãos, -22.45333 -42.99806, 23-28

1147 Nov. 1999, Dietz, Silva & Rocha, 6 workers (ICN: MZSP130). **Santa Catarina:** São Bento do
 1148 Sul, APA Rio Vermelho, -26.36417 -42.99806, 30 Mar.–04 Apr. 2001, R. Silva & Eberhardt, 5
 1149 workers (ICN: MZSP134 135). **São Paulo:** Ilha da Vitória, 16-27 Mar. 1964, Exp. Dep. Zool.
 1150 3592, 5 workers, 1 queen (MCZC: USNMENT00757932); Itirapina, 10 Feb. 2009, S. Sendoya,
 1151 20 workers (ICN: USNMENT00759046); Jundiai, Sierra Do Japi, Apr. 2009, S. Diniz, 3 workers
 1152 (ICN: USNMENT00759043); Piedade, Floresta Atlantica, "Cristo", Mar. 2010, G. Bieber, 3
 1153 workers (ICN: USNMENT00759045); Tapirai, -24.03208 -47.46556, 08-14 Jan. 2001, R. Silva
 1154 & Eberhard, 4 workers (ICN: MZSP170). **COLOMBIA: Bolivar:** Zambrano, Hacienda
 1155 Monterrey, 9.617 -74.900, 9-75 m, 04 Aug. 1992, A. Molano, 3 workers (ICN:
 1156 USNMENT00757898). **Caldas:** Municipio Aranzazu, Vereda Alegrias, Finca Betania, La
 1157 Esperanza, 5.29811 -75.49047, 1990 m, L.E. Franco & J. Cruz, 2 workers (IAvH: IAvH27305);
 1158 Municipio Aranzazu, Vereda Alegrias, Finca Villa Rosita, 5.30603 -75.48492, 1825 m, 06-08
 1159 Aug. 2003, L.E. Franco & J. Cruz, 1 worker (IAvH: IAvH25467). **Caquetá:** PNN Serranía de
 1160 Chiribiquete, Cuñané-Anuí, 26 Feb. 2001, 2 workers (IAvH: IAvH-E71471). **Cauca:** El
 1161 Hortigal, Holanda, Mar. 2002, Valderrama, 1 worker (ICN: USNMENT00757937).
 1162 **Cundinamarca:** Fusagasugá, 08 Dec. 1975, W. & E. MacKay, 2 workers (WEMC:
 1163 USNMENT00757907). **Guajira:** Serrania de Macuira, 6-8 km S Nazareth, 70-200 m, 13 June
 1164 1957, W.L. Brown & Kugler, 2 workers (IAvH: IAvH-E74171). **Huila:** 21 Km W La Plata
 1165 Gallego, 03 Jan. 1984, W.P. MacKay #7153, 6 workers (WEMC: USNMENT00757623,
 1166 00757624, 00759014); Neiva, 05 Dec 1975, W. & E. MacKay, 2 workers (WEMC:
 1167 USNMENT00757620). **Magdalena:** PNN Tayrona, Cañaveral, 11.33 -74.03, 30 m, 20-27 Apr.
 1168 2000, C. Sarmiento, 1 worker (IAvH: USNMENT00759056). **Meta and Cundinamarca**
 1169 **border:** 28 Dec. 1975, W. & E. Mackay, 4 workers (WEMC: USNMENT00757917, 00757939).
 1170 **Meta:** Puerto Gaitán, 21 Dec. 1975, W. & E. MacKay #783, 2 workers (WEMC:

1171 USNMENT00757672). **Quindío:** Buenavista, Vereda El Infierno, Finca Guadalajara, 4.3767 -75.
 1172 7694, 1160 m, 16 Nov. 1999, E. Gonzalez, 2 workers (IAvH: IAvH-E74165); Municipio
 1173 Filandia, Vereda Cruces, Finca Los Micos, 4.70424 75.65917, 12-13 July 2002, E. Jimenez &
 1174 L.E. Franco, 1 worker (IAvH: IAvH27232). **Risaralda:** Apia La Felisa, Cafetal de sol (S-I), 5.13
 1175 -75.95, 1480 m, 29 Oct. 2001, 1 worker (IAvH: IAvH-E74174). **Valle del Cauca:** Dagua, 07 Jan.
 1176 1976, W. & E. MacKay, 5 workers (WEMC: USNMENT00758993); Medio Calima, 24 June
 1177 1989, E. MacKay #11740 #11743 #11744, 2 workers (WEMC: USNMENT00757738, 00759005,
 1178 00757908, 00759012). **Vichada:** Municipio Cumaribo, Corregimiento Santa Rita, PNN El
 1179 Tuparro, 5.3075 -67.9500, 135 m, 14-16 Feb. 2004, I. Quintero & E. Gonzalez, 2 workers (IAvH:
 1180 USNMENT00759057). **COSTA RICA: Guanacaste:** Provincia Maritza field Station, 03 May
 1181 1995, R. Anderson #17716, 3 workers (WEMC: USNMENT00757671). **Puntarenas:** Pen. Osa.
 1182 Par. Nat. Corcovado, Llorona, 8.58 -83.70, 5 m, 30 Dec. 1981, J. Longino, 1 worker (JTLCLC:
 1183 JTLCLC000005948). **CUBA:** Holguín: 6 km S Yamanigüey, 20.55 -74.73, 25 m, 23 Aug. 2001,
 1184 P.S. Ward #14437-19, 3 workers (PSWC: USNMENT00757919). **DOMINICAN REPUBLIC:**
 1185 16 km ENE Pedernales, 18.11667 -71.62361, 800 m, 9 Sep. 1992, P.S. Ward #11726-22, 3
 1186 workers (PSWC: USNMENT00757959); Prov. La Vega, Jarabacoa to El Rio, shady ravine, 80-
 1187 1500 m, Feb. 1975, W.L. & D.E. Brown, 2 workers (MCZC: USNMENT00757736).
 1188 **ECUADOR:** Guayaquil, 10 m, Dec. 1997, Forero, 2 workers (IAvH: USNMENT00759054).
 1189 **FRENCH GUIANA:** Petit Saut Basse Vie II/III, 2001, A. Dejean, 1 worker (CPDC:
 1190 USNMENT00757734); Reserve Naturel de Nouragues- Inselbery forest, Oct. 2009, Sara Groc, 4
 1191 workers (ICN: USNMENT00759033). **GUATEMALA: El progreso:** 5 km W El Rancho,
 1192 14.91667 -90.06666, 400 m, 17 Nov. 2003, A.L. Wild #AW2002, 3 workers (ALWC:
 1193 USNMENT00757957). **Suchitepéquez:** Cocal (Mpio. San Antonio), 14.39206 -91.19347, 242
 1194 m, 31 Aug. 2004, W & E. MacKay #20820, 1 worker (WEMC: USNMENT00758995).

GUYANA: Demerara-Mahaica: Wales, 6.67 -58.25, 50 m, 23 Jan. 1981, 2 workers, 1 queen (JTLC: JTLC000005920); Rupununi, Karanambo, 3.75 -59.3, 100 m, 01 Jan. 1981, 1 worker (JTLC: JTLC000005926). **MAURITIUS:** Mgne. Brise Fer, -20.37 57.43, 600 m, 07 May 1989, P.S. Ward #10518-2, 3 workers (PSWC: USNMENT00757934). **MEXICO: Chiapas:** 10 km S Palenque, 30 May 1988, 31 May 1988, W. MacKay #10611 #10613, 8 workers (WEMC: USNMENT00757588, 00757677, 00757678). **Veracruz:** Los Tuxtlas, 26 July 1974, R.L. Jeanne, 1 worker (MCZC: USNMENT00757735). **Yucatan:** 25.7 km E Progreso, 12 Apr. 1982, Smalley Thien & Bradburn, 1 worker (MCZC: USNMENT00757618). **PARAGUAY: Boquerón:** Enciso, -21.20 -61.67, 03-06 Nov 2001, M. LePonce & T. Delsinne, 2 workers (ALWC: USNMENT00757904). **Central:** Areguá, CHP center, -25.30 -57.38, 01 Oct. 1995, A. Wild #AW 0059, 1 worker (ALWC: USNMENT00757905). **Presidente Hayes:** Monte Lindo, -23.86667 -58.46667, 800-1500 m, Feb. 1975, W.L. & D.E. Brown, 2 workers (MCZC: USNMENT00757736). **PERU: Madre de Dios:** Reserva Nacional Tambopata, Centro Sachavacayoc, Centre, -12.85583 -69.36194, 209 m, 19-31 Jul 2012, R. Feitosa, 1 worker (ICN: USNMENT00757611). **URUGUAY:** Montevideo, L. Pastre, 1 worker (CPDC: USNMENT00757684).

Diagnosis. *Brachymyrmex australis* is very similar in morphology to *B. aphidicola*, *B. minutus* and *B. termitophilus*, because all these species have a mesonotum that does not bulge dorsally above the pronotum in lateral view, their bodies are smooth, shiny and yellowish, and their eyes are positioned on the cephalic midline. However, *B. australis* differs from *B. aphidicola* by somewhat shorter scapes, although they still reach to the posterior margin of the head or surpass it by a length equal to or smaller than the maximal diameter of the eye; it differs from *B. minutus* by having a well-marked mesometanotal suture and two erect hairs on the pronotum and two on

the mesonotum; finally, it has scattered pubescence on the gaster whereas that of *B. termitophilus* is dense.

Lectotype worker measurements (mm) HL₁ 0.37; HL₂ 0.27; HL₃ 0.10; HW 0.29; SL 0.29; EL 0.10; WL 0.35; PnL n.a.; PnW 0.23; ML 0.08; MW 0.17; *Indices* CI 78.95; SI₁ 100.00; SI₂ 107.14; OI₁ 33.33; OI₂ 26.31.

Additional material examined measurements (mm) (n=13). HL₁ 0.32-0.54; HL₂ 0.21-0.38; HL₃ 0.08-0.15; HW 0.29-0.53; SL 0.26-0.48; EL 0.08-0.14; WL 0.29-0.55; PnL 0.08-0.20; PnW 0.21-0.32; ML 0.06-0.11; MW 0.14-0.20; *Indices* CI 82.61-97.09; SI₁ 89.09-104.54; SI₂ 114.29-135.29; OI₁ 15.38-30.91; OI₂ 19.35-28.33.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin slightly concave. Dorsum of the head with scattered appressed hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes extend beyond the posterior margin of the head by a length equal to or smaller than the maximal diameter of the eye; they typically have appressed, sometimes decumbent, but never erect hairs. Three inconspicuous ocelli. Eyes on the cephalic midline, with 7-14 ommatidia along their maximal diameter.

Mesosoma. Typically with two erect hairs on the pronotum and two on the mesonotum. The mesonotum is not inflated and it does not bulge dorsally above the pronotum in lateral view. Metanotal groove absent or shallow and narrower than the diameter of the metathoracic spiracles.

Metathoracic spiracles in dorsolateral position, not protruding, and usually touching both the mesometanotal and propodeal sutures. Dorsum of the propodeum flat or weakly convex and ~1/3th of the length of the propodeal slope. Propodeal spiracles circular, positioned ventrally of the posterior propodeal margin slightly posterior of the middle of the propodeal slope. Legs with appressed and scattered hairs. Petiole short and inclined forward.

Gaster. With scattered pubescence and scattered long suberect hairs.

Color and sculpture. Body smooth and shiny, uniform yellowish in color.

Distribution (Supplementary material Fig. S5). *Brachymyrmex australis* is known from Argentina, the Bahamas, Brazil, Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, French Guiana, Guatemala, Guyana, Mexico, Paraguay, Peru and Uruguay. It has also been introduced in Mauritius.

Biology. Some specimens have been found under stones and among leaf litter. The type material of *B. longicornis* (here considered a junior synonym of *B. australis*) was collected from orchids.

Remarks. Forel (1901b) described *B. australis* as a variety of *B. minutus* but did not indicate diagnostic traits to separate it from typical *B. minutus*. Subsequently, Santschi (1922) raised *B. australis* to species level, described a new variety to it (*B. australis* var. *curta*), again without clear motivation, although he pointed out morphological similarities between the males of *B. australis* and *B. fiebrigi*. Later, Santschi (1923a) indicated that *B. australis* has a conspicuous mesometanotal suture, and *B. minutus* does not, and that *B. australis* var. *curta* is smaller and shinier than typical *B. australis*.

The type material of *B. australis* var. *curta* and *B. longicornis* share the same diagnostic traits and display only minor variation in body size and the length of the scapes compared with *B. australis*. Most of the specimens of *B. longicornis* we studied are yellowish, but one was brownish, and the nature of this variation remains to be documented. In any case, Forel (1907) originally described *B. longicornis* as “yellowish brown”. Considering our observations *B. australis* var. *curta* and *B. longicornis* are synonymized here to *B. australis*. Santschi (1923a) identified a specimen (1 worker, NHMB) from a termite nest in Sao Leopoldo, Rio Grande do Sul, Brazil, i.e. the type locality of *B. termitophilus* (which has also been recored from termite nests), as *B. australis* but this specimen has the diagnosis traits of *B. fiebrigi*; additional specimens (2 workers, NHMB) from Uruguay, Nueva Helvetia (Mme.v. Steiger) that he identified as *B. australis* var. *curta* have the diagnostic traits of *B. termitophilus*.

Brachymyrmex bahamensis NEW SPECIES

(Fig. 12, supplementary material S6)

Holotype worker (MCZC: USNMENT00757689) and **Paratype workers** (MCZC: USNMENT00757689, PSWC: USNMENT00757726): 5 workers. **BAHAMAS:** Exuma, unnamed cay, 175 m S of Staniel Cay, 21 May 1990, L.W. Morrison 101-90.

Additional material examined. BAHAMAS, Andros Island, May-June 1904, col. W.M. Wheeler, 13 workers, 2 queens (MCZC: USNMENT00757690).

Etymology: In reference of the type locality.

Diagnosis. *Brachymyrmex bahamensis* resembles *B. termitophilus* because both species have scapes that are surpass the posterior margin of the head by a length smaller than the maximal diameter of the eye, their mesonotum does not bulge dorsally above the pronotum, they have erect or suberect hairs on the mesosoma, a gaster with dense pubescence, and yellowish body color. However, the unique feature of *B. bahamensis* is that it has approximately 6 erect hairs on the pronotum and two on the mesonotum that are very long, i.e. about twice the length of the maximal diameter of the eye. *Brachymyrmex bahamensis* also resembles *B. heeri*, but this latter species has a mesonotum that bulges out dorsally above the pronotum.

Holotype measurements (mm). HL₁ 0.46; HL₂ 0.31; HL₃ 0.13; HW 0.41; SL 0.38; EL 0.09; WL 0.45; PnL 0.13; PnW 0.29; ML 0.09; MW 0.19; *Indices* CI 88.46; SI₁ 91.30; SI₂ 120.00; OI₁ 21.74; OI₂ 28.85.

Paratype measurements (mm) (n=2). HL₁ 0.47-0.48; HL₂ 0.32; HL₃ 0.14; HW 0.43-0.44; SL 0.39-0.40; EL 0.09-0.10; WL 0.47-0.49; PnL 0.13-0.16; PnW 0.30-0.31; ML 0.09-0.12; MW 0.21; *Indices* CI 90.57-90.74; SI 91.67-91.84; SI₂ 122.22-125.00; OI₁ 22.45-25; OI₂ 27.78-28.30.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin slightly concave. Dorsum of head with appressed hairs and with two rows of erect hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior cephalic margin by a length smaller than the maximal diameter of the eye; they typically have

appressed, sometimes decumbent but never erect hairs. Ocelli absent. Eyes are positioned on the cephalic midline and have 8–9 ommatidia along their maximal diameter.

Mesosoma. Approximately 6 long, erect hairs on the pronotum and two on the mesonotum, each having a length of about twice the maximal diameter of the eye. In lateral view, the mesonotum is not inflated and it does not bulge dorsally above the pronotum. Metanotal groove absent or shallow and narrower than the diameter of the metathoracic spiracles. Dorsum of the propodeum is flat and $\sim 1/3$ th of the length of the propodeal slope. Metathoracic spiracles in dorsolateral position, not protruding, and usually touching the propodeal suture, but not the mesometanotal suture. Propodeal spiracles circular, positioned ventrally of the posterior propodeal margin, posterior of the middle of the propodeal slope. Legs with appressed and scattered hairs. Petiole short and inclined forward.

Gaster. With dense pubescence and several scattered conspicuous long erect hairs.

Color and sculpture. Body usually smooth and shiny, yellowish.

Distribution (Supplementary material S6). Currently exclusively known from the Bahamas.

Biology. Unknown.

Remarks. The holotype is located at the top of pin USNMENT00757689, with the two paratypes below.

***Brachymyrmex bicolor* NEW SPECIES**

(Fig. 13, supplementary material S7)

Holotype worker (USNM: CASENT0615272) and **Paratypes** (USNM: CASENT0615274 (putative worker-queen intercaste); CASENT0615277, 0615294, 0617077 (destroyed) (3 workers); ANTWEB: CASENT0615273 (putative worker-queen intercaste), 0615276 (1 worker), 0615292 (1 queen)): 5 workers, 1 queen, 2 putative worker-queen intercastes. **HONDURAS: Comayagua:** PN Cerro Azul Meambar, 14.87092, -87.89917, 1120 m, 20 May 2010, LLAMA#Wa-C-04-1-31.

Etymology: The epithet *bicolor* reflects the conspicuous body coloration with black head and gaster and yellow mesosoma.

Diagnosis. The conspicuous color pattern allows distinguishing *B. bicolor* from any other *Brachymyrmex* species.

Holotype measurements (mm). HL₁ 0.43; HL₂ 0.30; HL₃ 0.10; HW 0.38; SL 0.44; EL 0.11; WL 0.48; PnL 0.12; PnW 0.28; ML 0.10; MW 0.16; *Indices* CI 88.78; SI₁ 114.94; SI₂ 147.06; OI₁ 27.59; OI₂ 22.45.

Paratype measurements (mm). HL₁ 0.43; HL₂ n.a.; HL₃ 0.10; HW 0.41; SL 0.45; EL 0.11; WL 0.48; PnL 0.12; PnW 0.28; ML 0.11; MW 0.15; *Indices* CI 94.90; SI₁ 109.68; SI₂ n.a.; OI₁ 25.81; OI₂ 22.45.

Worker description. Head. Slightly longer than wide in full face view; posterior cephalic margin slightly convex. Dorsum of the head with appressed hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the

anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are clearly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior margin of the head by a length larger than the maximal diameter of the eye and have appressed pubescence. Three conspicuous ocelli. Eyes are positioned on the cephalic midline and have 8 ommatidia along their maximal diameter.

Mesosoma. Without erect hairs and in lateral view approximately hour-glass shaped (this condition is absent in the presumed intercast) with a constriction between the bulging promesonotum and propodeum. In lateral view, the mesonotum is anteriorly inclined, but it does not bulge dorsally above the pronotum. Metanotal groove present and wider than the diameter of the metathoracic spiracles. Dorsum of the propodeum is convex and shorter than the propodeal slope. Metathoracic spiracles in dorsal position, not protruding, not touching any sutures. Propodeal spiracles circular, positioned just ventrally of the posterior propodeal margin slightly posterior of the middle of the propodeal slope. Legs with appressed and scattered hairs. Petiole short and inclined forward.

Gaster. With scarce pubescence and several scattered long erect hairs at the edge of the segments.

Color and sculpture. Body smooth and shiny, with a conspicuous bicolored pattern. The head and gaster are blackish in color, however, the mandibles, the labial and maxillary palps, the bulbi and bases of the antennae, the terminal antennomeres and hairs are conspicuously yellow in color. Additionally, the mesosoma and legs are yellowish, with the tibia of the second and third pairs of legs being dark brownish, like most of the scape.

Intercaste description. The presumed worker-queen intercaste differs from the worker mainly by its larger body size, the shape of the mesosoma in lateral view, and its dense pubescence on

the gaster. The dorsum of the head bears two rows of erect hairs. Eyes have around 10 ommatidia along their maximal diameter; the promesonotum is bluntly angular, with the mesonotum being not inflated or bulging out dorsally above the pronotum in lateral view, mesonotum in dorsal view posteriorly extended along the midline. Metanotal groove absent. Dorsum of the propodeum is flat and shorter than the length of the propodeal slope. Metathoracic spiracles in dorsolateral position, not protruding, not touching any sutures. Gaster with dense pubescence and several scattered long erect hairs at the edges of the segments.

Distribution (Supplementary material S7). Currently exclusively known from Honduras.

Biology. Specimens were collected from leaf litter in cloud forest.

Remarks. Further comments on the putative worker-queen intercaste in *Brachymyrmex* are provided in the remarks on *B. giardi*.

Brachymyrmex bonariensis Santschi NEW STATUS

(Fig. 14, supplementary material Fig. S8)

Brachymyrmex constrictus st. *bonariensis* Santschi, 1933: 122 (w.). **Lectotype worker** (NHMB: USNMENT00757706) and **paralectotype worker** (NHMB: USNMENT00757705; **here designated**): 2 workers [examined]. **ARGENTINA: Buenos Aires:** Buenos Aires, 08 Mar. 1803, C. Bruch. **n. st.**

Diagnosis. *Brachymyrmex bonariensis* **n. st.** resembles *B. admotus* because they both have scapes that surpass the posterior margin of the head, a pair of simple erect hairs between the dorsal methathoracic spiracles, a wide metanotal groove, and a gaster with scarce pubescence. However, in *B. bonariensis* **n. st.** the head and mesosoma are light brownish in color, and the gaster is darker, whereas the body of *B. admotus* is uniformly colored. The scapes of *B. bonariensis* are shorter than those of *B. admotus* and surpass the posterior margin of the head with a length approximately equal to the maximal diameter of the eyes. The metathoracic spiracles of *B. bonariensis* are furthermore positioned more laterally and are not protruding. Like *B. admotus*, *B. bonariensis* could be confused with *B. cavernicola* because this latter species also has a pair of erect hairs between the methathoracic spiracles, however in *B. cavernicola* these hairs are very thick, and they are darker in color than the body.

Lectotype measurements (mm) HL₁ 0.53; HL₂ 0.36; HL₃ 0.15; HW 0.48; SL 0.49; EL 0.13; WL 0.50; PnL 0.14; PnW 0.31; ML 0.12; MW 0.20; *Indices* CI 90.00; SL₁ 102.78; SL₂ 134.55; OI₁ 22.78; OI₂ 27.50.

Paralectotypes measurements (mm). HL₁ 0.53; HL₂ 0.35; HL₃ 0.15; HW 0.50; SL 0.50; EL 0.13; WL 0.53; PnL 0.18; PnW 0.34; ML 0.11; MW 0.18; *Indices* CI 92.59; SL₁ 101.33; SL₂ 143.40; OI₁ 26.67; OI₂ 27.16.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin slightly concave. Dorsum of head with scattered, appressed hairs and usually two rows of erect hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position, and two more

near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent.

Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior margin of the head by a length approximately equal to the maximal diameter of the eyes. Ocelli appear to be present but are inconspicuous. Eyes are positioned on the cephalic midline and have 8-9 ommatidia along their maximal diameter.

Mesosoma. With two erect hairs on the pronotum and two on the mesonotum. In lateral view, the mesonotum is somewhat inflated, but it does not bulge dorsally above the pronotum. Metanotal groove wider than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, not protruding, but touching the propodeal suture. Between the metathoracic spiracles two thin erect hairs are present, but they are shorter than those on the pronotum and mesonotum. Dorsum of the propodeum flat and $\sim 1/3$ th of the length of the propodeal slope. Propodeal spiracles circular, positioned on the posterior propodeal margin slightly posterior of the middle of the propodeal slope. Legs with appressed and scattered hairs. Petiole short and inclined forward.

Gaster. With scattered pubescence, and scattered suberect hairs, mainly along the edges of the segments.

Color and sculpture. Body overall smooth and shiny, except for the slightly imbricate sculpture on the dorsum of the mesosoma in some specimens. Head and mesosoma light brown, gaster darker in color.

Distribution (Supplementary material Fig. S8). Exclusively known from Argentina.

Biology. Unknown.

Remarks. *Brachymyrmex bonariensis* was first described by Santschi (1933) as a variety of *B. constrictus* because it has the thorax less strongly strangled, a little wider head and more concave posterior margin of the head in comparison with *B. constrictus*. However, in our opinion *B. bonariensis* is morphologically very different than *B. constrictus*: it has a mesonotum that does not bulge dorsally above the pronotum in lateral view whereas that of *B. constrictus* does; *B. constrictus* does not have erect hairs between the metathoracic spiracles and moreover it has a uniformly dark brownish body. As mentioned before, *B. bonariensis* resembles *B. admotus* more closely (see diagnosis).

***Brachymyrmex brasiliensis* Ortiz & Fernández**

(Fig. 15, supplementary material Fig. S9)

Brachymyrmex brasiliensis Ortiz and Fernández, 2014: 22, Figs. 19, 20, 21 (w). **Holotype worker** (MZSP: USNMENT00757748) and **paratype worker** (UFUC: USNMENT00757833): 2 workers. **BRAZIL: Rio de Janeiro:** Nova Friburgo, Fazenda Barreto, -22.161242 -42.524302, 1068 m, 11–12 June 2011, T.M.S. Mesquita

Additional material examined. **BRAZIL: Goiás:** Anapolis, 12 Feb. 1958, W. Kempf, 1 worker (MZSP: USNMENT00757820). **ECUADOR: Zamora:** Chinchipe, -3.98228 -79.083528, 1 worker (RBINS: 4048410).

Diagnosis. *Brachymyrmex brasiliensis* differs from other *Brachymyrmex* species by having tumuliform metathoracic spiracles, in combination with a smooth and shiny gaster as well as an opaque head and mesosoma.

Description. See Ortiz and Fernández (2014).

Brachymyrmex bruchi Forel

(Figs. 16, 17, supplementary material Fig. S10)

Brachymyrmex bruchi Forel, 1912a: 64 (w.m.). **Lectotype worker** (MHNG: USNMENT00757159), and **paralectotype workers, males** (MHNG: USNMENT007157-007159, 00758104, 00758149-00758181; **here designated**): 21 workers, 3 males [examined].
ARGENTINA: Catamarca: Aconquija, Filo blanco, 4300 m, Bruch. Santschi (1929: 309) (q.).
 = *Brachymyrmex bruchi* var. *rufipes* Forel, 1912a: 65 (w.). (MHNG: USNMENT00757160, 00757161): 3 workers [examined]. **ARGENTINA: Catamarca:** Huasan; synonymy by Quirán et al. (2004: 279). See also: Santschi (1923a: 660).
 = *Brachymyrmex giardi* var. *nitida* Santschi, 1922: 261 (w.). (NHMB: USNMENT00757182): 1 worker [examined]. **CHILE:** Los Lagos, Petrohué, 1922, Schiller. Snelling and Hunt (1975: 114) as junior synonym of *Brachymyrmex giardi*. **n.syn.**
 = *B. laevis* var. *andina* Santschi, 1923a: 659 (w.). (NHMB: USNMENT00758161, 00757186, 00757187; MHNG: USNMENT00758129): 16 workers [examined]. **ARGENTINA: Jujuy:** Puna, 4000 m, D. Witter. **n. syn.**

Additional material examined. ARGENTINA: Entre Ríos: 8.63 km W Concordia, -31.42303 - 58.11672, 16 m, 26 Dec. 2007, W. & E. MacKay, 7 workers, 1 male, 1 queen (WEMC: USNMENT00757969, 00757997, 00758001, 00758003, 00758004, 00758013, 00759019) **Santa Fe:** 10 km E Santa Fe, -31.6666 -60.5833, 12 Oct. 2002, A.L. Wild & N. Helle, 1 worker

1505 (ALWC: USNMENT00757998). **Tucumán:** Lara, 4000 m, Feb. 2003, G.A. Baer, 2 workers
1506 (MCSN: USNMENT00757709). **BOLIVIA: Santa Cruz:** Perforación, 68 km ESE Charagua, -
1507 19.91667 -62.56667, 470 m, 11 Dec. 1993, P.S. Ward, 3 workers (PSWC:
1508 USNMENT00758008). **BRAZIL:** Brasilia D.F., Aug. 1996, R.M. Oliveira, 6 workers (CPDC:
1509 USNMENT00758011). **CHILE:** Temuco, 24 Nov. 1967, W.W. Kempf, 6 workers (PSWC:
1510 USNMENT00758015-00758022). **COLOMBIA: Quindío:** Génova, Vereda El Cedral, Finca
1511 Venecia, 4.2275 -75.7586, 1800 m, 19 Oct. 1999, E. González & J. Sossa, 1 worker (IAvH:
1512 IAvH-E74162). **COLOMBIA: Risaralda:** Apia, La Clarita, 3.13 -75.95, 1550 m, 26 Oct. 2001,
1513 I. Armbrecht, 1 worker (IAvH: IAvH-E74173). **DOMINICAN REPUBLIC:** 28 km SSE
1514 Constanza, 18.7 -70.9, 2220 m, 11 Nov. 1992, P.S. Ward #11757, 3 workers (PSWC:
1515 USNMENT00758034). **La Vega:** Reserva Valle Nuevo, 18.81667 -70.68333, 2240 m, 01 Sep.
1516 2001, A.L. Wild #AW1348, 2 workers, 1 queen (ALWC: USNMENT00757682); Cervantía,
1517 18.85 -70.70, 1730 m, 01 Sep. 2001, A.L. Wild, 2 workers (ALWC: USNMENT00757988).
1518 **ECUADOR: Napo:** near Dureno, 0.0780 -76.7307, 287 m, 20 July 2005, W. & E. MacKay
1519 #21277, 2 workers (WEMC: USNMENT00759007). **GUATEMALA: Sacatepéquez:** Finca El
1520 Pilar, near Antigua, 14.55 -90.72, 1700 m, 13 Nov. 2003, A.L. Wild, 3 workers (ALWC:
1521 USNMENT00757963). **PARAGUAY: Boquerón:** Filadelfia, -22.35 -60.03, 22 Sep. 1994, B.
1522 Garcete, 1 worker (ALWC: USNMENT00758005). **Canindeyú:** Reserva Natural Bosque
1523 Mbaracayú Lagunita, -24.13 -55.43, 12 Feb. 1997, A. Wild, 3 workers (ALWC:
1524 USNMENT00757999). **Concepción:** Concepción centro, -23.42 -57.35, 7 Feb. 1998, A. Wild, 3
1525 workers (ALWC: USNMENT00757976). **Presidentes Hayes:** Villa Hayes, -25.10 -57.57, 21
1526 Sep. 1994, B. Garcete, 2 workers (ALWC: USNMENT00757996). **UNITED STATES:**
1527 **Arizona:** Pima Co. Tucson International Airport, 32.11667 -110.93333, 800 m, 07 Aug. 2001,
1528 P.S. Ward #14412, 2 workers (PSWC: USNMENT00757972). **Florida:** Florida Gulf Co.

Wewahitchka Steele Rd/GCI Bond, 30.1 -85.2, 13.6 m, 23 Dec. 2000, Corrie Saux, 1 worker (MCZC: USNMENT00758014). **Lousiana:** Audubon Park, New Orleans, 29 Apr. 1995, A.L. Wild, 2 workers (ALWC: USNMENT00757979); Baton Rouge, 01 Oct. 2000, B. Raphaël, 5 workers (CPDC: USNMENT00757980); E. Baton Rouge Par. Baton Rouge. Kenniloworth & Perkins Rd. BREC Perkins Park, 03 Apr. 2003, J. Rosson, 1 worker (CPDC: USNMENT00757967). Plaquemines Co. St. Bernard St. Pk., 22 Aug. 1987, W. MacKay, 22 Aug. 1987, W. MacKay, 2 workers (WEMC: USNMENT00757970). **Texas:** Austin, Travis Co., 30.25167 -97.76722, 160 m, 21 Nov. 2006, A.L. Wild, 3 workers (ALWC: USNMENT00757977). **URUGUAY:** Montevideo, Nov. 2000, L. Pastre, 2 workers (CPDC: USNMENT00757978). Salto: Salto Parque Municipal Benito Solari, 25 Dec. 2007, W. & E. MacKay, 1 worker (WEMC: USNMENT00758047).

Diagnosis. *Brachymyrmex bruchi* is morphologically most similar to *B. patagonicus* and *B. oculatus* because these species have scapes that surpass the posterior margin of the head, typically two erect hairs on the mesonotum, their metanotal groove is either absent or narrower than the diameter of the metathoracic spiracles, their mesonotum does not bulge dorsally above the pronotum in lateral view, their gaster has several scattered long erect hairs and sparse pubescence, and they have brownish bodies. However, *B. bruchi* differs from *B. patagonicus* by having a larger body size, abundant suberect hairs on the dorsum of the pronotum, and scapes that surpass the posterior margin of the head by a length approximately equal to the maximal diameter of the eye. It differs from *B. oculatus* by having smaller eyes with less than 14 ommatidia along the maximal diameter, which approximately equal only a quarter of the length of the head (HL₁).

Lectotype and paralectotypes measurements (mm) (n= 4). HL₁ 0.58-0.64; HL₂ 0.41-0.45; HL₃ 0.14-0.18; HW 0.57-0.60; SL 0.55-0.62; EL 0.16-0.18; WL 0.64-0.78; PnL 0.20-0.25; PnW 0.39-0.45; ML 0.18-0.21; MW 0.27-0.31; *Indices* CI 90.63-100.00; SI₁ 93.33-103.45; SI₂ 130.43-142.86; OI₁ 26.67-31.03; OI₂ 21.88-28.13.

Additional material examined measurements (mm) (n=25). HL₁ 0.41-0.61; HL₂ 0.29-0.42; HL₃ 0.09-0.16; HW 0.37-0.60; SL 0.31-0.59; EL 0.10-0.20; WL 0.40-0.72; PnL 0.10-0.20; PnW 0.25-0.44; ML 0.09-0.20; MW 0.16-0.29; *Indices* CI 70.98-96.97; SI₁ 78.13-136.36; SI₂ 106.67-156.76; OI₁ 23.91-45.45; OI₂ 19.23-28.00.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin slightly concave. Dorsum of the head with sparse and appressed hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior cephalic margin with a length that approximately equals the maximal diameter of the eye; they typically have appressed and decumbent hairs. Three inconspicuous ocelli present. Eyes are positioned on the cephalic midline and have 8–13 ommatidia along their maximal diameter.

Mesosoma. Typically with two erect hairs on the pronotum and two on the mesonotum, sometimes with additional suberect hairs, mainly on the pronotum. The mesonotum is not inflated and does not bulge dorsally above the pronotum in lateral view. Metanotal groove absent or narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, not protruding, but touching the propodeal suture. Dorsum of the propodeum slightly

convex and shorter than the posterior slope. Propodeal spiracles circular, positioned on the posterior propodeal margin at the middle of the propodeal slope. Legs with appressed and scattered hairs. Petiole short and inclined forward.

Gaster. With sparse pubescence and several scattered long erect hairs.

Color and sculpture. Body overall smooth and shiny, except for the sometimes slightly imbricate sculpture on the dorsum of the mesosoma; typically brownish.

Distribution (supplementary material Fig. S10). *Brachymyrmex bruchi* is known from Argentina, Bolivia, Brazil, Chile, Colombia, the Dominican Republic, Ecuador, Guatemala, Paraguay, Uruguay, and the United States.

Biology. Unknown.

Remarks. The here designated lectotype is the specimen at the top of pin MHNG: USNMENT00757159, and the ants below are paralectotypes. The type material of *B. bruchi*, *B. giardi* var. *nitida*, *B. laevis* var. *andina*, and *B. bruchi* var. *rufipes* shares a common set of diagnostic characters, i.e. the brownish body color, scapes that surpass the posterior cephalic margin by a length that approximately equals the maximal diameter of the eye, the metanotal groove is lacking or narrow, and scattered pubescence on the gaster. As such, these species and varieties are synonymized here.

Brachymyrmex giardi var. *nitida* was considered to be a junior synonym of *B. giardi* by Snelling and Hunt (1975), however we disagree with this synonymization taking in account both the description of Santschi (1922) and our own observations of important differences in diagnostic

traits: *B. giardi* var. *nitida* differs from *B. giardi* by having erect hairs on the pronotum, a darker body color and scarce pubescence on the body.

Quirán et al. (2004) suggested *B. bruchi* var. *rufipes* to be a junior synonym of *B. bruchi* based on the original description by Forel (1912a), which only specifies a difference in body color. Quirán et al. (2004) argued that this difference is not taxonomically informative and therefore they proposed synonymization. We agree that body color is variable in several *Brachymyrmex* species, and therefore we follow the suggestion of Quirán et al. (2004) here. Nevertheless, it is noteworthy that some individuals of *B. bruchi* var. *rufipes* have somewhat denser pubescence on the gaster than pointed out in our description above (see Fig. 40 d, f). Such moderately dense pubescence on the gaster has been also observed in some of the examined specimens of *B. laevis* var. *andina*. Future studies on *B. bruchi* and its geographical variation is required.

Forel (1912a) indicated that *B. bruchi* and *B. patagonicus* are very similar as to their mesosoma, and Santschi (1923a) likewise compared *B. laevis* var. *andina* with *B. patagonicus* var. *atrátula*, which has been synonymized with *B. patagonicus* (Quirán et al. 2004). We concur with these authors that *B. bruchi* and *B. patagonicus*, including their type material, are morphologically very similar, but as noted in the diagnosis above, consistent differences also exist between both species. Furthermore, our morphometric and phylogenetic analyses tentatively confirm these taxa to be distinct, although further studies on the morphology and phylogenetics of these species as well as their ecology and biology are admittedly needed.

Santschi (1929) and Quirán et al. (2004) also referred specimens from Jujuy: Pueblo Viejo (Weiser), Catamarca: Aconquija and Tucuman (Argentina) to *B. bruchi*, however, this material was not studied here.

***Brachymyrmex cavernicola* Wheeler**

(Figs. 18, supplementary material Fig. S11)

Brachymyrmex cavernicola Wheeler, 1938: 252 (w.m.). **Lectotype worker** (USNM: USNMENT00529073) and **Paralectotype workers, male** (USNM: USNMENT00529073; MCZC: M.C.Z. Cotype 17-19 22428, M.C.Z. Cotype 11-13 22428, M.C.Z. Cotype 23-25 22428, M.C.Z. Cotype 14-16 22428, M.C.Z. Cotype 1-3 22428, M.C.Z. Cotype 5-7 22428, M.C.Z. Cotype 4 22428; **here designated**): 21 workers, 1 male [examined]. **MEXICO: Yucatan**, Chichenitza, Balaam Canche Cave, H.S. Pearse, 13 June 1936.

Additional material examined. BRAZIL: Amazonas: Manaus, BR.174 km 45 EEST-S1, 12 Nov. 1990, Eq. A. Y. Harada, A. G Baineira, 1 worker (MPEG: USNMENT00757857]. **Pará:** Melgaço, Caxiuanã ECFPn, -1.73584 -51.48762, 12-14 Oct. 2006, Equipe A.Y. Harada, 1 worker (MPEG: AYH051). Melgaço, Caxiuanã ECFPn, -1.75444 -51.52241, 28 Oct. 2003, A.Y. Harada, E.P. Fagundes, C.J.M. Ribeiro, C.E.D. Sanhudo, C.A.R. Moura, J.L.P. Souza, C. Renato, 1 worker (MPEG: AYH067). Melgaço, Caxiuanã ECFPn, -1.73584 -51.48762, 30 Oct. 2003, A.Y. Harada, E.P. Fagundes, C.J.M. Ribeiro, C.E.D. Sanhudo, C.A.R. Moura, J.L.P. Souza, C. Renato, 3 workers (MPEG: AYH086, AYH088, AYH126). Serra Norte, Est. Do. Mang, 6 Sep. 1983, 12 Sep. 1983, 29 Feb. 1984, 12 May 1984, 15 May 1984, 22 May 1984, Lote: 2105, 2108, 2195, 2197, 2208, 2213, 2214, 2223, 2227, 2231, 2232, 2235, 11 workers (MPEG: MEPEG_HYM11505683, 11505907, 11505913, 11505945, 11505960, 11505969, 11505999, 11506007, 11506023, 11506030, 11506036). **COLOMBIA: Cauca:** Isla Gorgona, 17 Sep. 1989, M. Baena #GQA-05, 1 worker (WEMC: USNMENT00757854). Isla Gorgona, 16 Jan. 1990, M. Baena #Gacd-19, 2 workers (WEMC: USNMENT00757855, 00757856). **Cundinamarca:** La Vega, R.N. Natautá, 5.00 -74.33, 1040 m, 10 Nov. 2010, F. Fernández, 2 workers (IAvH:

1648 USNMENT00757859). **Nariño:** Barbacoas, Tajadas, 100 m, 1 worker (ICN:
1649 USNMENT00757858). **Quindío:** Buenavista, Finca Ceilán, Bs., 4.35833 -75.78472, 1100 m, 15
1650 Nov. 1999. E. Gonzalez, 1 worker (IAvH: IAvH-E744170). **COSTA RICA: Guanacaste:** Prov.
1651 Maritza field, Sta., 800 m, 03 May 1995, R. Anderson #17714, 4 workers (WEMC:
1652 USNMENT00757844, 00757845). **Heredia:** Estación Biológica, La Selva, 10.433 -84.017, 50-
1653 150 m, 01 June 1993, INBio-OET, 1 worker (JTLC: INBIOCRI001276875). Puerto Viejo, #733,
1654 25 June 1979, J. Raich, 7 workers (MCZC: USNMENT00757273, 00757275). **ECUADOR:**
1655 **Endesa:** Forest Reserve Pichincha Province, 25 Jan. 1994, L.E. Tennant, 1 worker (MCZC:
1656 USNMENT00757274). **Pichincha:** La Unión del Río Toachi, -0.31889 -78.95442, 770 m, 15
1657 Jul. 2005, W. & E. MacKay #21169, 2 workers (WEMC: USNMENT00757841, 00757842).
1658 **MEXICO: Chiapas:** 8.8 km SE Salto de Agua, 17.51328 -92.29515, 50 m, 14 July 2007, J.L.
1659 Cozar ANTC#4225, 1 worker (JTLC: CASENT0600011). 10 km S Palenque, 30 May 1988, A.
1660 Rabeles, 2 workers (WEMC: USNMENT00757848). 10 km S Palenque, 30 May 1988, W.
1661 MacKay #10563, #10571, #10627, #10674, 15 workers (WEMC: USNMENT00757849,
1662 00757850, 00757851, 00757852, 00757853, 00758028). 10 km S Palenque, 30 May 1988, VIAL,
1663 D. Gonzalez, 1 worker (WEMC: USNMENT00757846). **Veracruz:** Los Tuxtlas, 10 km NNW
1664 Sontecomapan, 18.583 -95.083, 500 m, 21 Mar. 1985, P.S. Ward #7366, 3 workers (PSWC:
1665 USNMENT00757843). **PERU: Madre de Dios:** Prov. Tambopata, Cuzco Amazónico, 15 km
1666 NE Puerto Maldonado, CA-130, 200 m, 13 June 1989, S.P. Cover & J.E. Tobin, 6 workers
1667 (MCZC: USNMENT00757260, 00757269, 00757270). Prov. Tambopata, Cuzco Amazónico, 15
1668 km NE Puerto Maldonado, CA-601 JT79, CA-601 JT80, CA-365, CA-659 JT138, CA-116, CA-
1669 141, June 1989, S.P. Cover & J.E. Tobin, 17 workers (MCZC: USNMENT00757260-00757272).
1670

Diagnosis. The feature that allows distinguishing *B. cavernicola* from all other *Brachymyrmex* species is the presence of conspicuous thick black hairs on the head, mesosoma and gaster, which contrast strongly with the yellowish body, a condition reminiscent of *Nylanderia*. *Brachymyrmex antennatus* also has erect hairs on the mesosoma that are darker than the tegument, however these are not as thick as those of *B. cavernicola*, and in other features these species are very different.

Additional material examined measurements (mm) (n=10). HL₁ 0.51-0.57; HL₂ 0.35-0.41; HL₃ 0.13-0.18; HW 0.45-0.51; SL 0.54-0.63; EL 0.09-0.10; WL 0.51-0.63; PnL 0.19-0.21; PnW 0.29-0.35; ML 0.10-0.13; MW 0.18-0.22; *Indices* CI 83.33-91.67; SI₁ 118.18-134.62; SI₂ 139.53-166.67; OI₁ 17.54-20.83; OI₂ 25.00-31.25.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin slightly concave. Thick hairs cover the front of the head. Clypeus with a rounded anterior margin and five long, erect hairs of which a single hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior cephalic margin by a length of approximately 2.0× the maximal diameter of the eyes and bear appressed or decumbent hairs. Ocelli are absent or one central ocellus is present. Eyes are positioned on the cephalic midline and have 7-8 ommatidia along their maximal diameter.

Mesosoma. With several thick erect hairs on the promesonotum (>2), and two between the metathoracic spiracles, but none on the propodeum. The mesonotum is not inflated and does not bulge dorsally above the pronotum in lateral view. Metanotal groove wider than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, not protruding, and not

touching any suture. Dorsum of the propodeum is weakly convex and shorter than the posterior slope. Propodeal spiracles circular, positioned just ventrally of the posterior propodeal margin slightly posterior of the middle of the propodeal slope. Legs with appressed and scattered suberect hairs. Petiole short and inclined forward.

Gaster. With scarce pubescence but densely covered by thick, erect hairs.

Color and sculpture. Body smooth and shiny, except for the dorsum of the mesosoma which sometimes has slightly imbricate sculpture. The body color is typically yellowish, although the head and gaster are sometimes darker than the mesosoma. Tegument color contrasts with the thick black hairs.

Distribution (Supplementary material Fig. S11). *Brachymyrmex cavernicola* is known from Argentina, Brazil, Colombia, Costa Rica, Ecuador, Mexico and Peru.

Biology. Nests of this species have been found in the soil under stones.

Remarks. The lectotype is the top specimen on pin USNMENT00759073, whereas the specimens below are the paralectotypes. As indicated in the diagnosis and pointed out before by Wheeler (1938), *B. cavernicola* resembles *Nylanderia* species by its thick hairs that cover the entire body.

Brachymyrmex coactus Mayr

(Figs. 19, 20, supplementary material Fig. S12)

1718 *Brachymyrmex coactus* Mayr, 1887: 523 (w.q.m.). **Lectotype worker** (NHMW:
 1719 USNMENT00757191) and **paralectotype workers, males, queens** (NHMW:
 1720 USNMENT00757191- 00757195; **here designated**): 3 workers, 3 males, 2 queens [examined].
 1721 **BRAZIL: Santa Catharina** (Hetscko). See also: Santschi (1923a: 669); Santschi (1923b: 272).
 1722 = *Brachymyrmex coactus* var. *nictitans* Emery 1906: 178 (w.). (MCSN: USNMENT 00757209):
 1723 1 worker [examined]. **COSTA RICA**. See also: Santschi (1923a: 670). **n. syn.**
 1724 = *Brachymyrmex constrictus* Santschi 1923a: 671, Figs. 5, 38, 61 (w.). (NHMB:
 1725 USNMENT00758087): 1 worker [examined]. **BOLIVIA: La Paz**: Mapiri. **n. syn.**
 1726 = *Brachymyrmex coactus* var. *robustus* Santschi 1923b: 272 (w.). (NHMB:
 1727 USNMENT00757224): 4 workers [examined]. **BRAZIL: Santa Catharina**: Encano alto;
 1728 (NHMB: USNMENT00758085, 00758086): 6 workers [examined]. **BRAZIL: Santa Catharina**:
 1729 Blumenau. **n. syn.**
 1730
 1731 **Additional material examined. ARGENTINA**: “Fives Lile”, 4 workers, 5 queens, 1 male
 1732 (NHMB: USNMENT00758083, 00758084). **BRAZIL: Alagoas**: Maceió – Emilia Flores, Hm
 1733 For 68, For 91, 18 Mar. 2005, 04 June 2005, #5460, M.C.C. Diniz, 8 workers (CEPLAC:
 1734 USNMENT00757552, 00757553, 00757555); **Bahia**: Barreiras, Serra do Mimo, 24 Apr. 2010, S.
 1735 Souza & B. Santos, 3 workers (CEPLAC: USNMENT00757564); Esplanada, Baixio, -12.11444 -
 1736 37.69944, June– Oct. 2010, M.L.O. Travassos, 1 worker (CEPLAC: USNMENT00757556);
 1737 Porto Seguro, Troncoso, 12 June 1991, J. Delabie 4451, 3 workers (CEPLAC:
 1738 USNMENT00757559); UNA-ESMAI, Estação Experimental Lemos Maia, Em coqueiro-anão,
 1739 Oct. 2005, J.R.M. Santos, 8 workers (CEPLAC: USNMENT00757558, 00757559, 00757562);
 1740 **Goiás**: Ouro Verde, Faz Boa Vista, -16.29847 -49.21183, 01-07 July 2005, R.R. Silva & R.M.
 1741 Feitosa, 3 workers (ICN: MZSP123); **Santa Catharina**: Blumenau, M. Witte #150, 9 workers

1742 (MCZC: USNMENT00757238, 00757239, 00757251); **Paraíba:** Independencia, Mann & Heath,
 1743 -7.15194 -34.90556, 3 workers, 1 queen (MZUSP: USNMENT00757240); **São Paulo:**
 1744 ANHEMBI, Faz B. Rio, 14 Feb. 1969, W. Kemf, J.C. Mahalhães, L.T.F., M. Kulmann, 2
 1745 workers, 1 queen (MZUSP: USNMENT00757563); Sete Barras, PE Carlos Bothelo, -24.20833 -
 1746 47.97056, 200 m, 11-15 May 2009, F. Esteves leg, 2 workers (MZUSP: USNMENT00757560).
 1747 **COSTA RICA: Puntarenas:** Sirena, Corcovado National Park, 8.48333 -83.60000, 10 m, 24
 1748 Dec. 1981, J. Longino, 1 worker, 1 male (JTLC: JTLC000005905); Peninsula Osa, 8.46667 -
 1749 83.58333, 50 m, 24 Dec. 1981, J. Longino, 1 worker, 1 male (MCZC: USNMENT00757243).
 1750 **ECUADOR: Zamora-Chinchipe:** Copalinga, -4.09122 -69.93591, Jacquemin, Col id 5087, 1
 1751 worker (RBINS) **GUYANA: Rupunini:** Kananambo, 16 Jan. 1981, 3.75 -59.3, 100 m, J.
 1752 Longino, 1 worker (JTLC: JTLC000005907). **PANAMA: Barro Colorado I:** Canal Zone, B50,
 1753 Jan 1960, W.L. Brown, E.S. McCluskey, 3 workers (MCZC: CMOS0000097). **PARAGUAY:**
 1754 Fortin mayor infante Rd, trans Chaco locality 1, 01 Oct. 2004, T. Delsinne, 1 worker (RBINS:
 1755 Coll.RIScNB SID SPM_ID 30833); **Boquerón:** Enciso, -21.20 -61.67, 3-6 Nov. 2001, M.
 1756 LePonce & T. Delsinne, Dry Chaco, Pitfall trap, 3 workers (ALWC: USNMENT00757554);
 1757 **Boquerón:** Enciso, -21.20609 -61.65748, 04-06 Nov. 2001, 23-25 Sep. 2004, M. LePonce, T.
 1758 Delsinne, Col ID4132, Col ID 13623, 2 workers (RBINS: Coll.RIScNB SID SPM_ID 22607,
 1759 ID27462); Nueva Asunción, -20.69190 -61.92925, 02-06 Nov 2001, M. Leponce, Col ID 3948, 1
 1760 worker (RBINS: Coll.RIScNB SID SPM_ID 30542); **Canindeyú:** Reserva Natural Bosque
 1761 Mbaracayú, Jejuimi, -24.10 -61.67, 02 Apr. 1996, A.L. Wild, 3 workers (ALWC:
 1762 USNMENT00757561); **Cordillera:** Caacupé, Camp. J. Noment, -25.36667 -57.08333, 19 Jan.
 1763 1994, B. Garcete #AW0395, 1 worker (ALWC: USNMENT00757567); **Misiones:** 8 km SE San
 1764 Juan Bautista, -26.71666 -57.06667, 150 m, 10 Dec. 2002, A.L. Wild & B. Garcete #AV1781, 1
 1765 worker (ALWC: USNMENT00757570). **PERU: Madre de Dios:** Reserva Nacional Tambopata,

Centro Sachavacayoc, -12.85583 -69.36194, 210 m, 19-31 July 2012, R.M. Feitosa, 2 workers
 (ICN: USNMENT00757614, 00757612); Reserva Nacional Tambopata, Centro Sachavacayoc, -
 12.82667 -69.37056, 198 m, 26 July 2012, GSNMBU, 2 workers (ICN: USNMENT00757615,
 00757838).

Diagnosis. *Brachymyrmex coactus* is morphologically very similar to *B. degener* as both species
 have scapes that surpass the posterior margin of the head, faint sculpture on the mesosoma, a
 mesonotum that is inflated and bulges dorsally above the pronotum in lateral view, a wide
 metanotal groove, metathoracic spiracles that are slightly protruding dorsally, and a gaster with
 scarce pubescence. However, *B. coactus* has a brown yellowish head and mesosoma, but a darker
 gaster, whereas *B. degener* has a uniformly brownish body.

Lectotype and paralectotypes measurements (mm) (n=3). HL₁ 0.72-0.84; HL₂ 0.44-0.55; HL₃
 0.21-0.25; HW 0.64-0.82; SL 0.68-0.80; EL 0.16-0.21; WL 0.53-0.88; PnL 0.21; PnW 0.43-0.55;
 ML 0.14-0.20; MW 0.23-0.35; *Indices* CI 94.29-97.67; SI₁ 97.62-106.06; SI₂ 144.00-152.17; OI₁
 24.24-28.57; OI₂ 29.73-31.43.

Additional material examined measurements (mm) (n=10). HL₁ 0.52-0.88; HL₂ 0.34-0.60; HL₃
 0.16-0.25; HW 0.50-0.82; SL 0.51-0.82; EL 0.13-0.21; WL 0.53-0.98; PnL 0.18-0.25; PnW 0.36-
 0.57; ML 0.13-0.23; MW 0.18-0.35; *Indices* CI 93.33-101.45; SI₁ 92.86-105.36; SI₂ 126.67-
 165.38; OI₁ 23.53-35.71; OI₂ 26.67-32.5.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin flat or
 slightly concave. Dorsum of the head has scattered appressed hairs. Clypeus with a rounded

anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes extend beyond the posterior margin of the head by a length that is equal to the maximal diameter of the eye or larger, and they bear appressed and decumbent hairs. Three ocelli are present. Eyes are positioned on the cephalic midline and have 10-14 ommatidia along their maximal diameter.

Mesosoma. Typically with two erect hairs on the pronotum and two on the mesonotum; sometimes with additional suberect hairs, mainly on pronotum. Dorsum of the mesosoma with imbricate sculpture. The mesonotum is inflated and bulges dorsally above the pronotum in lateral view. Metanotal groove wider than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, slightly protruding and not touching any sutures. Dorsum of the propodeum strongly convex and shorter than the propodeal slope. Propodeal spiracles conspicuous and circular, positioned on the propodeal margin, anterior of the middle of the propodeal slope. Legs with appressed hairs. Petiole short and inclined forward.

Gaster. With scattered pubescence and several scattered long erect hairs.

Color and sculpture. Head and gaster are smooth and shiny, but the dorsum of the mesosoma usually has imbricate sculpture. Head and mesosoma are brown yellowish, whereas the gaster is darker.

Distribution (Supplementary material Fig. S12). *Brachymyrmex coactus* occurs in Argentina, Bolivia, Brazil, Costa Rica, Guyana, Panama, Paraguay and Peru.

Biology. The specimens from UNA-ESMAI in Bahia (Brazil) were found in dwarf coconuts (CEPLAC: USNMENT00757557, 00757558), those from Canindeyú (Paraguay) on shrubs (ALWC: USNMENT00757561), and those from St. Catharina underneath bark in association with a beetle of the genus *Claviger* (Mayr 1887).

Remarks. The worker on pin USNMENT00757191 is designated here as lectotype. Emery (1906) considered *B. coactus* var. *nictitans* to be a separate variety because it has smaller eyes than *B. coactus*, but he also expressed doubt on the level of consistency of this difference. Santschi (1923a) did not provide a motivation to distinguish *B. constrictus* from *B. coactus* but indicated that *B. constrictus* has more finely imbricate sculpture on the mesosoma and smaller metathoracic spiracles. Subsequently, he (Santschi 1923b) reported that his original description (Santschi 1923a) of *B. coactus* refers to *B. coactus* var. *robusta*. This variety has a larger body size, more sculpture on the mesosoma, and a somewhat bigger head than the ‘typical’ form of *B. coactus*. Both varieties of *B. coactus* were described from the same type locality, however. After examining specimens of all these varieties and *B. constrictus*, we consider the main morphological differences to relate to variation in body size. This trait is, however, very variable even within localities (including among specimens mounted on the same pin). As these taxa all have the same diagnostic features we here synonymize *B. coactus* var. *nictitans*, *B. coactus* var. *robustus*, and *B. constrictus* with *B. coactus*.

***Brachymyrmex cordemoyi* Forel**

(Figs. 21, 22, 23, supplementary material Fig. S13)

- 1836 *Brachymyrmex patagonicus* var. *cordemoyi* Forel, 1895a: 49 (w.). (MHNG) [not examined].
- 1837 **REUNION.** See also: Emery (1906: 180) (q.m.). Raised to species: Emery (1906: 179).
- 1838 Subspecies of *Brachymyrmex patagonicus*: Forel (1908: 399); Forel (1912b: 165); Santschi
- 1839 (1912: 533). Revived status as species: Wheeler (1922: 1036); Emery (1925: 41). See also Forel
- 1840 (1912a: 62).
- 1841 = *Brachymyrmex laevis* var. *fuscus* Emery, 1906: 178 (w.q.). (MCSN: USNMENT00757216,
- 1842 00757217; MHNG00758131 - 00758133): 10 workers, 1 queen [examined]. **ARGENTINA:**
- 1843 **Mendoza:** Mendoza, Punta de vacas; (MCSN: USNMENT00757215): 8 workers [examined].
- 1844 **ARGENTINA: Buenos Aires:** Buenos Aires. **n. syn.**
- 1845 = *Brachymyrmex brevicornis* Emery, 1906: 180, Figs. 38, 40, 41 (w.q.m.). (MCSN:
- 1846 USNMENT00757210 - 00757214): 16 workers, 1 queen, 1 male [examined]. **ARGENTINA:**
- 1847 **Buenos Aires:** Santa Catalina. See also Quirán (2005: 765). **n. syn.**
- 1848 = *Brachymyrmex patagonicus* var. *brevicornoides* Forel, 1914: 287 (w.q.m.). (MHNG:
- 1849 USNMENT00758141 - 00758143): 4 workers, 3 males [examined]. **ARGENTINA: Buenos**
- 1850 **Aires:** Tapalquén. Junior synonym of *Brachymyrmex nigricans*: Santschi (1923a: 657).
- 1851 [*Brachymyrmex brevicornoides* has priority as senior name, *Brachymyrmex nigricans* is its
- 1852 junior synonym: Bolton (1995: 81)]. **n. syn.**
- 1853 = *Brachymyrmex cordemoyi* var. *nigricans* Santschi, 1916: 395 (w.). (NHMB:
- 1854 USNMENT00758081): 3 workers [examined]. **ARGENTINA:** Río de la plata, Isla Martín
- 1855 García; (NHMB: USNMENT00758078, 00758080): 10 workers. **ARGENTINA: Buenos Aires:**
- 1856 Buenos Aires. [First available use of *Brachymyrmex patagonicus cordemoyi nigricans* Santschi
- 1857 (1912: 533) unavailable name]. Raised to species: Santschi (1923a: 657). Junior synonym of
- 1858 *Brachymyrmex nigricans*: Santschi (1923a: 657) [As mentioned above *Brachymyrmex*
- 1859 *brevicorneoides* has priority over *B. nigricans*].

1860 = *Brachymyrmex cordemoyi* var. *distincta* Santschi, 1923a: 658, Figs. 6, 50, 59 (w.q.). (NHMB:
 1861 USNMENT00757178, 00757179): 3 workers [examined]. **ARGENTINA: Santa Cruz;**
 1862 (NHMB: USNMENT00758089): 9 workers [examined]. **ARGENTINA:** Delta del Paraná. **n.**
 1863 **syn.**
 1864
 1865 **Additional material examined. ARGENTINA: Buenos Aires:** Buenos Aires, E.V. Steigen, 3
 1866 workers (MZUSP: USNMENT00759023); Buenos Aires, Universidad de Buenos Aires, 18
 1867 workers (ICN: USNMENT00759032); La Plata, Silvestri, 4 workers (NHMB:
 1868 USNMENT00758088), 8 workers (MCZC: USNMENT00757244); **Entre Ríos:** 8.63 km
 1869 Concordia, -31.41667 -58.11667, 16 m, 26 Dec. 2007, W. & E. MacKay #22670, 1 worker
 1870 (WEMC: USNMENT00757638); Isla frente Puerto Victoria, -32.63333 -60.16667, 10 m, 29 Oct.
 1871 2002, A.L. Wild & N. Heller, 1 worker (ALWC: USNMENT00757966); **Misiones:** 48.93 km N
 1872 Campinas de America, -25.8565 -53.9939, 360 m, 03 Jan. 2008, W. & E. MacKay #22794, 1
 1873 worker (WEMC: USNMENT00757728); **San Juan:** 8.59 km S Villa Aberastain, -31.72528 -
 1874 68.55447, 592 m, 10 Jan. 2008, W. MacKay #22879, 1 worker (WEMC: USNMENT00757737).
 1875 **BRAZIL: Bahia:** Boa Vista do Tupim, 06 Dec. 2010, V.M.S. Cameiro & J.J. Resende, 1 worker
 1876 (CEPLAC: USNMENT00757887); **Mato Grosso do Sul:** ~70 km E Corumbá, Faz. Maria
 1877 Bonita, -19.16666 -57.16666, 22 Aug. 1998, A. L. Wild #AW0657, 1 worker (ALWC:
 1878 USNMENT00759025); 10 km Posto Chapadao, 18 Oct. 1989, S. Porter, 3 workers (WEMC:
 1879 USNMENT00758994); 3 km Anastácio, 17 Oct. 1989, W. MacKay #12605, 3 workers (WEMC:
 1880 USNMENT00757652); Passo da Lontra, -19.53333 -57.01667, 80 m, 08 Sep. 1996, P.S. Ward
 1881 #13222, 1 worker, 1 male (MCZC: CMOS000020); **Para:** Santarem, Taperinha, -2.9 -54.3, July
 1882 1975, R.L. Jeanne, 440, 4 workers (MCZC: CMOS000015, CMOS000016); **Rio Grande do**
 1883 **Norte:** Ceará, Mirim, W.M. Mann, 10 workers (MCZC: CMOS000124, CMOS000125);

1884 **Rondonia:** Ji Parana, 27 Aug. 1984, W. Overal, 2 workers (MPEG: USNMENT00757583,
1885 00757964); Ouro Preto do Oeste, 25 Mar. 1985, W. França, Res INPA 0050, 3 workers (MPEG:
1886 USNMENT00757984, 00758043); **São Paulo:** Aguas de São Pedro, May-June 1985, S. Silva, 1
1887 worker (ICN: USNMENT00757670); Caraguatatuba, Res. Florest rain for, 40-80 m 18-22 May
1888 1971, W.L. & D.E. Brown, 6 workers (MCZC: CMOS000017, CMOS000019, CMOS000021);
1889 José Bonifacio, 17 Nov. 1970, J. Diniz, 2 workers, 1 queen (MZUSP: USNMENT00757582).
1890 **COLOMBIA: Caqueta:** Florencia, 2 workers (ICN: LEV127); **Huila:** 17 km NW, La Plata, 03
1891 Jan. 1984, W. & E. MacKay #7138, 2 workers (WEMC: USNMENT00757673); **Meta:** 65 km E
1892 Puerto Lopez, 30 Jan. 1973, W.P. MacKay #7365, 3 workers (WEMC: USNMENT00757636);
1893 Villavicencio, 17 Dec. 1975, W. & E. MacKay, 2 workers (WEMC: USNMENT00757648);
1894 Vista Hermosa, 25 Dec. 1975, W. & E. MacKay #75812, #815, 7 workers, 1 queen, 1 male
1895 (WEMC: USNMENT00757653, 00757675, 00757985). **COSTA RICA: Limón:** Guapiles, R.
1896 Toro Amarillo vic., 15 Feb.-09 Mar. 1966, W.L. Brown, 3 workers (MCZC:
1897 USNMENT00757647); **Puntarenas:** 8 km WNW Potrero Grande, 9.03 -85.26, 200 m, 01 Aug.
1898 1985, P.S. Ward #7791, 3 workers (PSWC: USNMENT00757877). **CUBA: Guantanamo:**
1899 Baracoa, 20.35 -74.5, 20 m, 26 Aug. 2001, P.S. Ward #14462-14, 3 workers (PSWC:
1900 USNMENT00757881); **Pinar del Río:** Viñales del Río, 14 June 1953, E.O. Wilson #11, 3
1901 workers (MCZC: CMOS000018). **DOMINICAN REPUBLIC:** 28 km SSE Constanza, -9.29576
1902 -75.99786, 11 Sep. 1992, P.S. Ward #11757, 1 worker, 1 queen (PSWC: USNMENT00758016).
1903 **ECUADOR: Loja:** Estación San Francisco, 2200 m, 11 & 14 Sep. 2011, F. Fernandez, 46
1904 workers (ICN: USNMENT00759034, 00759036, 00759037); **Napo:** near Dureno, 0.07778 -
1905 76.73056, 287 m, 20 July 2005, W. & E. MacKay #21273 #21277, 4 workers (WEMC:
1906 USNMENT00757581, 00757637); **Pichincha:** Mitad del Mundo, 00.00 -78.45, 2483 m, 07 Dec.
1907 2003, A.L. Wild & J.M. Vieira #AW 2235, 1 worker (ALWC: USNMENT00757888). **EL**

1908 **SALVADOR: La Libertad:** Quezaltepeque, 500 m, 19 June 1963, D.Q. Cavagnaro & M.E.
1909 Irwin, ANTC 10258, 1 worker (CASENT: CASENT0196000). **GUATEMALA: Suchitepéquez:**
1910 Finca Tarrales, 12.3 km N Patulul, 14.52256 -91.13642, 740 m, 30 July 2004, W. & E. Mackay
1911 #20782, 3 workers (WEMC: USNMENT00758045, 00758046). **GUYANA:** Kartabo, July-Aug.
1912 1920, W.M. Wheeler, 16 workers (MCZC: CMOS000022-000027). **MEXICO: Morelos:**
1913 Cuernavaca, 25 May 1989, W. MacKay #11418, 2 workers (WEMC: USNMENT00757981);
1914 **Oaxaca:** 45 km N. San Pedro Pochutla, 1000 m, 03 June 1988, W. MacKay #10755, 6 workers
1915 (WEMC: USNMENT00758032, 00757649); **Veracruz:** Los Tuxtlas, 10 June 1994, L. Quiroz, 2
1916 workers (ICN: USNMENT00757661). **NEW CALEDONIA:** Kuto Penin. Ile des Pins, -22.6666
1917 167.4333, 5 m, 11 May 1980, P.S. Ward #4294-9, 3 workers (PSWC: USNMENT00757882);
1918 Noumea, 0-100 m, N.L.H. Krauss, 1 worker (CASENT: CASENT0196015). **PARAGUAY:**
1919 **Central:** Guarambaré, -25.48 -57.45, 25 Apr. 1997, A. Wild #AW0514, 1 worker (ALWC:
1920 USNMENT00757645); **Guairá:** Roque Gonzalez, -25.88333 -57.28333, 14 Jan. 1995, B.
1921 Garcete #AW0457, 1 worker (ALWC: USNMENT00759028). **PERU: Madre de Dios:**
1922 Tambopata, Cuzco Amazónico, 15 km NE Puerto Maldonado, June 1989, S.P. Cover & J.E.
1923 Tobin, CA-275, 6 workers, 1 queen (MCZC: USNMENT00757276-00757279); **San Martin:**
1924 Con. Mun. Zona Barreal 23 km S Picota, -7.09111 -76.31361, 335 m, 06-15 Mar. 2005, M.E.
1925 Irwin & J.D. Vasquez, ANTC1447, 1 worker (CASENT: CASENT0066404). **SEYCHELLES:**
1926 La Dique Island, 1 m, 09 Nov 1993, Alpert et al., 2 workers (MCZC: USNMENT00757245).
1927 **SOLOMON ISLAND:** Guadalcanal, Honiara, 0-100 m, Mar 1986, N.L.H. Krauss, ANTC
1928 10277, 1 worker (CASENT: CASENT0196019). **SURINAME:** Dirkshoop, May 1959, I. V. d.
1929 Drift, 3 workers (MPEG: USNMENT00757580). **USA: Arizona:** Pima Co. Tucson, 32.23417 -
1930 110.96666, A.L. Wild #AW2826 (ALWC: USNMENT00757958). **VANUATU:** Tafea, Tanna, 0-
1931 100 m, Dec. 1985, N.L.H. Krauss, ANTC 10270, 10271, 2 workers (CASENT:

CASENT0196012, 0196013). **VENEZUELA: Lara:** Barquisimeto, to Carora km 19, 29 June 1971, W.L.& D.E. Brown, 2 workers (MCZC: USNMENT00757884); **Miranda:** D.F Inst Estud. Avan. Caracas, 10 Oct 1988, W. MacKay #11144-2 #11146-6, 4 workers (WEMC: USNMENT00757654, 00757744).

Diagnosis. *Brachymyrmex cordemoyi* strongly resembles *B. obscurior* and to some extent also *B. patagonicus*. All these species have scapes that reach or surpass the posterior cephalic margin, but by less than the maximal diameter of the eye; their mesonotum does not bulge dorsally above the pronotum in lateral view, and the metanotal groove is absent or narrower than the diameter of methathoracic spiracles. In general, *B. cordemoyi* has a longer pronotum and mesonotum than *B. obscurior* and *B. patagonicus*, but these characters show important intraspecific variation. Furthermore, it differs from *B. patagonicus* by having considerably denser pubescence on the gaster, and from *B. obscurior* by having a larger head, more ommatidia along the maximal diameter of the eye, and lighter-colored pubescence which is denser on the dorsum of the entire body and appressed on the gaster instead of decumbent in *B. obscurior*.

Additional material examined measurements (mm) (n=20). HL₁ 0.39-0.62; HL₂ 0.27-0.41; HL₃ 0.10-0.16; HW 0.33-0.59; SL 0.27-0.53; EL 0.08-0.16; WL 0.37-0.60; PnL 0.10-0.20; PnW 0.23-0.39; ML 0.08-0.18; MW 0.16-0.29; *Indices* CI 84.38-96.78; SI₁ 82.35-106.38; SI₂ 100.00-142.86; OI₁ 23.33-34.69; OI₂ 20.00-29.63.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin slightly concave. Dorsal hairs dense and appressed. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs

are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. Scapes reach the posterior cephalic margin or surpass it by a length up to the maximal diameter of the eye; they have appressed hairs. Three inconspicuous ocelli are usually present. Eyes are positioned on the cephalic midline and have 10–12 ommatidia along their maximal diameter.

Mesosoma. Typically with two erect hairs on the pronotum and two on the mesonotum; sometimes with additional suberect hairs, mainly on the pronotum. The mesonotum is not inflated and does not bulge dorsally above the pronotum in lateral view. Metanotal groove absent or narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, not protruding, and typically touching the mesometanotal and propodeal sutures. Dorsum of the propodeum slightly convex and shorter than the posterior slope. Propodeal spiracles circular, positioned on the posterior propodeal margin, slightly posterior of the middle of the propodeal slope. Legs with appressed hairs. Petiole short and inclined forward.

Gaster. With dense yellowish pubescence and several scattered and sub-erect hairs, mainly but not exclusively along the edges of the segments.

Color and sculpture. Body smooth, shiny, and brownish in color.

Distribution (Supplementary material Fig. S13). *Brachymyrmex cordemoyi* is widespread and known from Argentina, Brazil, Colombia, the Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Mexico, Paraguay, Peru, Suriname, the United States, Venezuela and it has been introduced in New Caledonia, Seychelles, Vanuatu, Solomon Island, Saudi Arabia (Sharaf et al., 2016), Europe and Asia (Ortiz-Sepulveda, pers. obs.).

Biology. Some specimens were collected from under stones (PSWC: USNMENT00757877, 00757881; MCZC: CMOS000020), or on cacti (WEMC: USNMENT00757981).

Remarks. We refrain from designating a lectotype because we did not come across the type series of *B. cordemoyi* at the MHNG. However, we studied the original description and the type series of its varieties (i.e. *distincta*, *nigricans*) (Santschi 1916; Santschi 1923a). Hence, the taxonomic decisions made here are based on these data together with the overall morphological framework we developed for the genus.

The type series of *B. cordemoyi* was collected in Reunion, and Forel (1895a) already suggested that it represents an introduction from the Neotropics. Forel (1895a) indicated that *B. cordemoyi* resembles *B. patagonicus*, and originally described it as a variety of the latter species that has more pubescence. Such dense pubescence is also observed in *B. patagonicus* var. *brevicornoeides*. Forel (1914) did not provide diagnostic features to distinguish *B. patagonicus* var. *brevicornoeides* and typical *B. patagonicus*. However, he suggested that the scapes in *B. patagonicus* var. *brevicornoeides* resemble those of *B. brevicornis*, but are slenderer, and that *B. patagonicus* var. *brevicornoeides* has somewhat larger eyes than *B. brevicornis*. Before, Emery (1906) had suggested that *B. brevicornis* is closely related to *B. cordemoyi* because they have similar integument and pubescence, although the integument is slightly more lucid in *B. brevicornis*. Furthermore, the head and antennal funiculi of *B. brevicornis* are somewhat longer than those of *B. cordemoyi*, the clypeus slightly more prominent, and the eyes smaller. However, many of these differences could represent geographic variation rather than specific differences. It is noteworthy that *B. cordemoyi* is variable in most of these features, and therefore we synonymize *B. patagonicus* var. *brevicornoeides* and *B. brevicornis* to it here. Quirán (2005) redescribed *B. brevicornis* but did not compare or relate it to other *Brachymyrmex* species.

Another example of the variability within *B. cordemoyi* represents *Brachymyrmex cordemoyi* var. *distinta*, which was obtained from various places in Argentina, and which has somewhat shorter scapes than specimens of the typical *B. cordemoyi* (Santschi 1923a). Beyond this feature, the only difference that Santschi (1923a) remarked is the body color of queens. Santschi (1923a) also synonymized *B. patagonicus* var. *brevicornoeides* with *B. nigricans*, which he previously (Santschi 1916) considered a variety of *B. cordemoyi*. Studying the type material of *B. nigricans* we agree with this taxonomic decision, but *brevicornoeides* has taxonomic priority over *nigricans* (Bolton 1995: 81), so that *B. nigricans* is also synonymized to *B. cordemoyi* here.

The type specimens of *B. laevis* var. *fuscus* are morphologically more similar to *B. cordemoyi* than they are to *B. laevis*, and the only difference Emery (1906) described between *B. laevis* and *B. laevis* var. *fuscus* is body color, however, from our observations both differ also in other traits, notably the pubescence of the gaster, resulting in their synonymization to *B. patagonicus* and *B. cordemoyi*, respectively.

In summary, *B. cordemoyi* has several diagnostic features, however, we also observed considerable intraspecific variation in various traits. This variation may hint to a potential species complex. *Brachymyrmex cordemoyi* is very widespread and a more comprehensive study of the variation within and between its populations would be required to fully resolve the taxonomic status of this species.

***Brachymyrmex degener* Emery**
(Figs. 24, 25, supplementary material Fig. S14)

2026 *Brachymyrmex coactus* subs. *degener* Emery, 1906: 177 (w.). **Lectotype worker** (MCSN:
 2027 USNMENT00757208) and **paralectotype workers** (MCSN: USNMENT 00757207, MCZC:
 2028 M.C.Z. Cotype 01435; **here designated**): 4 workers [examined]. **BRAZIL: Matto Grosso:**
 2029 Cuiaba. Raised to species: Santschi (1923a: 670).
 2030 = *Brachymyrmex admotus* r. *niger* Forel, 1912a: 62 (w.). (MHNG: USNMENT00757162,
 2031 00757163, 00758155): 7 workers [examined]. **BRAZIL: Ceara.** Assigned as *B. degener* st. *niger*
 2032 by Santschi (1923a: 671). **n. syn.**
 2033 = *Brachymyrmex incisus* Forel, 1912a: 63 (w.m.). (MHNG: USNMENT00758134 -00758139,
 2034 00757141-00757143; NHMB: USNMENT00758096): 24 workers, 1 male [examined].
 2035 **COLOMBIA: Naranjo. n. syn.**
 2036 = *Brachymyrmex luederwaldti* Santschi, 1923a: 672, Figs. 36, 66 (w.). (NHMG:
 2037 USNMENT00758140; NHMB: USNMENT00758097, 00758098): 6 workers [examined].
 2038 **BRAZIL: São Paulo: Alcatrazes. n. syn.**
 2039
 2040 **Additional material examined. BRAZIL: Bahia:** Canavieiras, -15.69028 -39.00722, 17 July
 2041 1998, J.C.S. Carmo & J.R.M. Santos, 4 workers (CEPLAC: USNMENT00757566); **Para:** Serra
 2042 Norte, Serraria, -6.08276 -50.16666, 22 Oct. 1984 (MPEG: MPEG_HYM11506088).
 2043 **COLOMBIA: Caldas:** Aguadas, Cañón del Río Arma, 5.61472 -75.45972, 1995, C. Sarmiento
 2044 CES096, 3 workers (IAvH: USNMENT00757575); **Guajira:** Quebrada Guacoche, nr. Don
 2045 Diego, forest, 10.72305 -72.96972, 10 m, 22 July 1976, W.L. Brown & R.C. Kugler, 8 workers
 2046 (MCZC: USNMENT00757565, CMOS000094-CMOS000096); **Huila:** 4 km NE Rivera, 30 Dec.
 2047 1986, W. MacKay #9023, 3 workers (WEMC: USNMENT00758026); **Tolima:** Cunday, vereda
 2048 “El Eden”, 4.08333 -74.66667, 450 m, 01 Oct. 1999, Mejia et al., 2 workers (ICN:
 2049 MPUJ_ENT0000416); **Valle del Cauca:** 08 Jan. 1976, W. & E. MacKay, 2 workers (WEMC:

USNMENT00758162). **GUATEMALA: El Progreso:** 5 km W Morazan, 14.93 -90.20, 800 m,
 19 Nov. 2003, A.L. Wild #AW2121, 2 workers (ALWC: USNMENT00757576). **FRENCH**
GUIANA: Basse Vie-foret, 04 July 1999, S. Durou, 2 workers, 1 queen (CEPLAC:
 USNMENT00757568); Petit Saut, May 2003, J. Orivel & J. Le Breton, 3 workers (CEPLAC:
 USNMENT00757573). **PANAMA: Barro Colorado,** Canal Zone, Jan. 1960, W.L. Brown &
 E.S. McCluskey, 3 workers (MCZC: USNMENT00758033). **PARAGUAY: Amambay:** Parque
 Nacional Cerro Corá, -22.65 -56.05, 13 May 1997, A. Wild #AW0576, 3 workers (ALWC:
 USNMENT00757569); **Boqueron:** Enciso N.P. (Southern side), -21.20609 -61.65748, 01-02
 Oct. 2002, T. Delsinne, 2 workers (RBINS: Coll.RIScNB SID SPM_ID11523); Enciso N.P.
 (Southern side), -21.20609 -61.65748, 01-02 Oct. 2002, M. Leponce, 1 worker (RBINS:
 Coll.RIScNB SID SPM_ID31985); Estancia Maria Vicenta, -20.92130 -61.39321, T. Delsinne, 1
 worker (RBINS: Coll.RIScNB SID SPM_ID26822); **Canindeyú:** Residencias, 6 km N Ygatimi, -
 24.06667 -55.63333, 21 Feb. 1997, A. Wild #AW0451, 1 worker (AWLC:
 USNMENT00757577). **TRINIDAD AND TOBAGO:** Cumuto, 24 Apr. 1929, Darlinhton, 1
 worker (MCZC: USNMENT00757578).

Diagnosis. *Brachymyrmex degener* morphologically resembles *B. coactus* as both species have
 scapes that surpass the posterior margin of the head, they have faint sculpture on the mesosoma, a
 mesonotum that is inflated and that bulges dorsally above the pronotum in lateral view, a wide
 metanotal groove, metathoracic spiracles that are slightly protruding dorsally, and their gasters
 have sparse pubescence. However, *B. degener* has a uniformly brownish body, whereas the gaster
 is conspicuously darker than the rest of the body in *B. coactus*.

2073 *Lectotype and paralectotypes measurements* (mm) (n=3). HL₁ 0.51-0.55; HL₂ 0.35-0.41; HL₃
 2074 0.16; HW 0.49-0.55; SL 0.37-0.53; EL 0.12-0.14; WL 0.55-0.68; PnL 0.16-0.20; PnW 0.31-0.37;
 2075 ML 0.12-0.16; MW 0.20-0.23; *Indices* CI 96.15-100.00; SI₁ 76.00-96.43; SI₂ 105.56-135.00; OI₁
 2076 21.43-25.93; OI₂ 28.57-30.77.

2077
 2078 *Additional material examined measurements* (mm) (n=24). HL₁ 0.53-0.70; HL₂ 0.29-0.49; HL₃
 2079 0.12-0.20; HW 0.51-0.73; SL 0.55-0.68; EL 0.12-0.20; WL 0.60-0.79; PnL 0.14-0.23; PnW 0.33-
 2080 0.50; ML 0.12-0.21; MW 0.20-0.31; *Indices* CI 87.50-112.50; SI₁82.22-117.86; SI₂137.04-
 2081 233.33; OI₁ 20.00-30.30; OI₂ 22.22-33.33.

2082
 2083 **Description. Head.** Slightly longer than wide in full face view; posterior cephalic margin slightly
 2084 concave. Dorsum of the head has scattered appressed hairs. Clypeus with a rounded anterior
 2085 margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior
 2086 margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the
 2087 clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal
 2088 margin in oblique anterodorsal view. The scapes surpass the posterior cephalic margin by a
 2089 length smaller or equal to the maximal diameter of the eye, and they bear appressed and
 2090 decumbent hairs. Three ocelli are present. The eyes are positioned on the cephalic midline and
 2091 have 8-14 ommatidia along their maximal diameter.

2092 **Mesosoma.** Typically with two erect hairs on the pronotum and two on the mesonotum;
 2093 sometimes with additional suberect hairs, mainly on the pronotum. The mesonotum is inflated
 2094 and bulges dorsally above the pronotum in lateral view. Metanotal groove wider than the
 2095 diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, slightly
 2096 protruding, and not touching any sutures. Dorsum of the propodeum strongly convex and shorter

than the posterior slope. Propodeal spiracles conspicuous and circular, positioned on the propodeal margin or just dorsal of it, at the anterior margin of the propodeal slope. Legs with appressed hairs. Petiole short and inclined forward.

Gaster. With scattered pubescence and several scattered long erect hairs.

Color and sculpture. Body shiny and uniformly brownish in color. Head and gaster smooth whereas the dorsum of the mesosoma usually bears imbricate sculpture.

Distribution (supplementary material Fig. S14). *Brachymyrmex degener* occurs in Brazil, Colombia, Guatemala, French Guiana, Trinidad and Tobago.

Biology. Unknown.

Remarks. The lectotype of *B. degener* is the top specimen on pin USNMENT00758155, whereas the others on that pin are paralectotypes.

Brachymyrmex degener was first described as a subspecies of *B. coactus* by Emery (1906) and Santschi (1923a) subsequently raised it to species. *Brachymyrmex degener* indeed resembles *B. coactus* closely, and in retrospect we are uncertain that it represents a separate species. However, the issue of *B. degener* and *B. coactus* is taxonomically very complex and involves several other previously described species and subspecies that warrant synonymization too. Perhaps this process is best performed incrementally, which is the approach taken here.

One of these other taxa involved is *B. admotus* r *niger* which was described by Forel (1912a) with the following diagnostic traits: the metanotal groove is deep, the mesonotum bulges out dorsally above the pronotum (in lateral view), the body is shiny and the head and gaster smooth whereas faint sculpture is present on the mesosoma. Upon examination, the type specimens of *B.*

admotus r *niger* have the diagnostic traits of *B. degener*, but lack some of those for *B. admotus*, such as the presence of a pair of thin erect hairs between the methathoracic spiracles, which are positioned fully dorsal instead of dorsolaterally, and the absence of sculpture on the mesosoma. These criteria that motivated Santschi (1923a) to reclassify the race as *B. degener* st. *niger*, and whereas we agree with this reclassification, we do not consider there to be sufficient differences to prevent synonymization of *niger* to *B. degener*.

In the description of *B. incisus* Forel (1912a) likewise indicated similarities to *B. coactus* and *B. admotus*, but again some of the diagnostic traits of *B. admotus* are absent. Moreover, whereas the specimens resemble *B. coactus* closely they do not have a gaster that is conspicuously darker in color than the head and mesosoma, and hence *B. incisus* is here synonymized to *B. degener*.

As to *B. luederwaldti*, Santschi (1923a) indicated similarities to *B. coactus*, and even more so to *B. admotus* r. *niger* (Forel 1912a), from which he distinguished *B. luederwaldti* mainly by its fainter propodeal suture. We consider this variation to be intraspecific here and consequently also synonymize *B. luederwaldti* to *B. degener*.

Upon describing *degener* as a variety of *B. coactus*, Emery (1906) indicated that this variety differs from typical *B. coactus* mainly in body and eye size, which are traits with a lot of intraspecific variation as we already indicated in the remarks of *B. coactus*. We did not find consistent differences in body size, nor in the number of ommatidia along the maximal diameter of the eye between both taxa. Emery (1906) further emphasized that the medial antenomeres are somewhat longer than wide in *B. degener*, and vice versa in *B. coactus*. However, we cannot confirm this putative difference from the type material of both species. Although some putatively diagnostic differences between *B. coactus* and *B. degener* are indicated in the diagnosis, the taxonomic importance of these differences remains to be examined. Our morphometric measurements confirm the difficulty to establish consistent differences between both taxa, and

furthermore our phylogenetic analyses (see below) recovered *B. degener* nested within *B. coactus*. However, a deep phylogenetic branch separates *B. degener* from *B. coactus* as is also recognized by in the ABGD analysis (see below), and given the taxonomic complexity surrounding *B. coactus* it is possible that the one specimen identified as *B. coactus* that renders the species paraphyletic in fact belongs to a distinct taxon. With the sampling that is currently available, this issue cannot be resolved and therefore we do not further synonymize *B. coactus* and *B. degener* here.

***Brachymyrmex delabiei* Ortiz & Fernández**

(Fig. 26, supplementary material Fig. S15)

Brachymyrmex delabiei Ortiz and Fernández, 2014: 24, Figs. 22, 23, 24 (w). **Holotype worker** (MZSP: USNMENT00757718) and **paratype workers** (CPDC: USNMENT00757719, ICN: USNMENT00757720, USNM: USNMENT00757721): 4 workers. **BRAZIL: São Paulo:** Tapiraí, -24.03208 -47.65556, 08-14 Jan. 2001, R.R. Silva & Eberhardt.

Additional material examined. **BRAZIL: Bahia:** Boa Nova, João Mata, 13 Aug. 2003, J.R.M. Santos & J.C.S. Carmo, 1 worker (CPDC: USNMENT00757610); A61 Camacan, 27 Aug. 1999, -15.60111 -39.52111, col. J.R.M. dos Santos, 1 worker (CPDC: USNMENT00757837); **Santa Catharina:** Palhoça, PE Serra do Tabuleiro, 02–10 Nov. 2003, -27.74111 -48.69722, R.R. Silva, B.H. Dietz and A. Tavares, 1 worker (MZSP: USNMENT00757725); **São Paulo:** São Bernardo do Campo, 01 June 1971, W.L. & D.E. Brown, 1 worker (MCZC: USNMENT00757835).

Diagnosis. *Brachymyrmex delabiei* is most similar in morphology to *B. brasiliensis* and *B. feitosai*, because they all have tumuliform metathoracic spiracles, however, it differs from *B. brasiliensis* by its entirely smooth and shiny body, and from *B. feitosai* by the presence of two erect hairs on the pronotum and two on the mesonotum, the lack of dense pubescence on the first segment of the gaster and the yellowish body.

Description. See Ortiz and Fernández (2014).

Brachymyrmex depilis Emery

(Fig. 27, supplementary material Fig. S16)

Brachymyrmex heeri subsp. *depilis* Emery, 1893: 635 (w.q.). **Lectotype worker** (MCSN: USNMENT00757228) and **paralectotype workers, queen, male** (MCSN: USNMENT00757225 - 00757232; **here designated**): 37 workers, 1 queen, 10 males [examined]. **USA: District of Columbia:** Georgetown College, 10 Aug. 1885, leg. Pergrande. Wheeler and Wheeler (1953: 139) (l.). Raised to species: Santschi (1923a: 663).
 = *Brachymyrmex nanellus* Wheeler, 1903: 102, Fig. 7b (w.m.). (MCZC: MCZ Cotype 22939): 5 workers [examined]. **USA: Texas:** Austin, 25 May 1901. Synonymy by Creighton (1950: 359).
 = *Brachymyrmex depilis* subsp. *flavescens* Grundmann, 1952: 117 (w.). (USNM: USNMENT00529204): 3 workers [examined]. **USA: Utah:** near Salt Lake City. Lower portion of Big Cottonwood Canyon, 24 June 1947. Synonymy by Cole (1953: 266).

2190 **Additional material examined. CANADA: Nova Scotia:** Halifax, 15 m, 44.63333 -63.61667,
2191 25 Oct. 1996, P.S. Ward #13234, 2 workers, 1 queen (PSWC: USNMENT00757818). **MEXICO:**
2192 **Tamaulipas:** Gomez Parias, 25 Sep. 1987, W. MacKay #10073, 2 workers (WEMC:
2193 USNMENT00757816); **Veracruz:** Las Hamacas, 17 km. N Santiago Tuxtla, 26-28 Aug. 1953,
2194 E.O. Wilson, 5 workers, 1 queen (MCZC: CMOS000114 - 000115); Los Tuxtlas, 10 km NNW
2195 Sontecomapan, 18.58333 -95.08333, 200 m, 20 Mar. 1985, P.S. Ward #7333-55, 3 workers
2196 (PSWC: USNMENT00757815). **UNITED STATES: Alabama:** Marshall Co. JCT 420 7 km S
2197 Morgna city, 34.41111 -86.52361, 09 June 1998, MacKay fam. #188203, 2 workers (WEMC:
2198 USNMENT00757813); **Arkansas:** Cross Co. Village Cr. St. Pk. 14 Aug. 1988, R. Anderson, 3
2199 workers (WEMC: USNMENT00757805 - 00757807); **California:** 8 km S, Brans. Wiask, 10 Feb.
2200 1943, W.S. Ross, ANTC10266, 4 workers (CASENT: CASENT0196008); Santa Barbara Co,
2201 Figueroa Crk., Sedgwick Ranch, 34.71667 -120.03333, 350 m, 02 Mar. 1996, P.S. Ward #12963,
2202 3 workers (PSWC: USNMENT00757590); **District of Columbia:** Washington D.C. 25 May
2203 1948, F. Bonet #1718, 3 workers (MZUSP: USNMENT00757798). **Florida:** Highlands Co.
2204 Archbold Biol. Station, 22 Aug. 1995, A. Wild, 5 workers (ALWC: USNMENT00757817);
2205 **Kentucky:** Floyd Co. Jennie Wiley St. Pk., 07 July 1968, S. Peck Ber #134, 1 worker (MCZC:
2206 CMOS000028); **Louisiana:** Tammany Par. Abita, Springs, Money Hills Golf Course, 30.55156 -
2207 89.95488, 08 Sep. 2000, A.M. Pranschke, 2 workers (CEPLAC: USNMENT00757801); **New**
2208 **Mexico:** Sandoval Co, Bandelier, Nat. Mon, 21 Aug. 1986, W. & E. MacKay #8784, 2 workers
2209 (WEMC: USNMENT00757814); **New York:** Newark, Morris Farm, U. Delaware,
2210 Liriadendrofagus, 18 Apr. 1976, S. Handel, 2 workers (MCZC: CMOS000116, 000117); Ontario
2211 Co. Gannet Hill, 42.7 -77.4, 640 m, 27-29 Aug 2003, A.L. Wild #AW1970, 2 workers, 1 queen
2212 (ALWC: USNMENT00757799); Ontario Co. Gannet Hill, 42.7 -77.4, 640 m, 10 Sep. 1995, A.L.
2213 Wild #AW0719, 3 workers (ALWC: USNMENT00757799); **Texas:** 16 km S San Antonio, 18

2214 Feb. 1942, E.S. Ross, ANTC10267, 3 workers (CASENT: CASENT0196009); Houston Co. Big
2215 Stough Wild Area, 09 May 1988, R. Anderson #12760, 4 workers (WEMC:
2216 USNMENT00757811 - 00757812, 00758040); Sabino Co. 14.5 K E Nerwphill, 11 May 1988, R.
2217 Anderson #12763, #12763, 6 workers (WEMC: USNMENT00757808 - 00757810); **Vermont:**
2218 Nr. Burlington, Temperate Forest, Nov 2001, R. Blatrix, 9 workers (CEPLAC:
2219 USNMENT00757802 - 00757804).

2220
2221 **Diagnosis.** *Brachymyrmex depilis* resembles *B. heeri* and *B. giardi* as all three taxa have the
2222 mesonotum bulging dorsally above the pronotum in lateral view, and a gaster with dense
2223 pubescence. However, *B. depilis* differs from *B. heeri* by its shorter scapes and the lack of erect
2224 hairs on the mesosoma, and from *B. giardi* by its smaller eyes, its appressed hairs on the dorsum
2225 of the mesosoma, its yellowish color and its Nearctic distribution, i.e from the South of Canada to
2226 the North of Mexico.

2227
2228 *Lectotype and paralectotypes measurements* (mm) (n=10). HL₁ 0.47-0.49; HL₂ 0.33-0.37; HL₃
2229 0.10-0.18; HW 0.39-0.45; SL 0.35-0.41; EL 0.08-0.12; WL 0.39-0.51; PnL 0.12-0.20; PnW 0.27-
2230 0.33; ML 0.10-0.14; MW 0.20-0.21; *Indices* CI 80.00-92.00; SI₁ 85.71-100.00; SI₂ 100.00-
2231 117.65; OI₁ 18.18-30.00; OI₁ 20.00-36.00.

2232
2233 *Additional material examined measurements* (mm) (n=10). HL₁ 0.31-0.50; HL₂ 0.19-0.35; HL₃
2234 0.05-0.14; HW 0.29-0.46; SL 0.27-0.42; EL 0.08-0.10; WL 0.31-0.46; PnL 0.08-0.18; PnW 0.22-
2235 0.31; ML 0.07-0.13; MW 0.17-0.22; *Indices* CI 88.89-94.74; SI₁ 85.71-95.74; SI₂ 110.71-142.86;
2236 OI₁ 19.57-30.30; OI₂ 17.14-30.00.

2237

Description. *Head.* Slightly longer than wide in full face view; posterior cephalic margin slightly concave. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes are short, usually barely reaching the posterior margin of the head, and never surpassing it by a length that equals the maximal diameter of the eye. Ocelli are absent. Eyes are small and positioned on the cephalic midline; they have 6-8 ommatidia along their maximal diameter.

Mesosoma. Not bearing any erect hairs. The mesonotum is inflated and bulges dorsally above the pronotum in lateral view. Metanotal groove absent or narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles are small, in dorsolateral position, not protruding, but touching the propodeal suture. Dorsum of the propodeum is weakly convex and much shorter than the propodeal slope. Propodeal spiracles are circular, positioned on the posterior propodeal margin at the middle of the propodeal slope. Legs with appressed hairs. Petiole short and inclined forward.

Gaster. With dense pubescence and scattered long erect hairs at the edges of the segments.

Color and sculpture. Body opaque with inconspicuous sculpture. Body yellowish, sometimes with the gaster a bit darker than the mesosoma.

Distribution (supplementary material Fig. S16). *Brachymyrmex depilis* is known from Canada, México, and the United States.

Biology. Grundmann (1952) collected a nest of *B. depilis* subsp. *flavescens* from among the roots of the scrub oak *Quercus gambelii* and suggested that this species is subterranean and tends

aphids and coccids on the roots of plants. This association was also highlighted by Yensen et al. (1980) and Wheeler and Wheeler (1986). Small colonies of *B. depilis* were found in the soil under stones or in rotting wood in a wide variety of habitats: open forest, dense moist forest, grass lands, and dry fields (Wheeler and Wheeler 1986). Surprisingly, Yensen et al. (1980) reported *B. depilis* from an intertidal halophyte-covered mud flat in the Gulf of California in Mexico, where colonies are regularly inundated by sea water. The authors suggest that the mechanisms that allow the species to survive heavy rains elsewhere may have preadapted their survival in this unusual habitat. Page (1982) reported on copulatory behavior and observed a queen of *B. depilis* with attached to her abdomen three motionless males, that she dragged around. As such he suggested that *B. depilis* seems to have multiple copulations but whether insemination occurs by several partners is unknown.

Remarks. The lectotype is designated here as the worker on pin USNMENT00757229 and the other specimens are paralectotypes.

Brachymyrmex depilis was originally described as a subspecies of *B. heeri* by Emery (1893), and he distinguished it from typical *B. heeri* because *B. depilis* lacks erect hairs on the mesosoma. Santschi (1923a) raised the subspecies to species but did not provide criteria to support his decision. Nevertheless, we consider this decision justified given the differences we mention here in the diagnosis.

In the original description of *B. nanellus* Wheeler (1903) reported a comparison of his material to alleged specimens of *B. depilis*, and he described a series of differences to support the status of *B. nanellus* as a separate species. Santschi (1923a) accepted this taxonomic decision, but as Creighton (1950) pointed out the comparative material unlikely belonged to *B. depilis*, and after a

further comparison of both taxa he synonymized *B. nanellus* with *B. depilis*, which we support here after re-examining the material.

Brachymyrmex depilis subsp. *flavescens* was originally distinguished from *B. depilis* by having a lighter body color, smaller eyes, an opaquer body due to its shriveled integument, scarcer pubescence and hairs (Grundmann 1952). However, after examining this material we agree with the conclusion of Cole (1953) that these specimens appear to be part of an incipient colony, which adequately explains all these morphological differences outlined by Grundmann (1952). Fisher and Cover (2007) suggested that *B. depilis* may constitute a complex of several species. The material studied here is perhaps too limited to accurately comment on this issue, however, we did not find consistent morphological differences between samples, except perhaps in body size.

Brachymyrmex donisthorpei Santschi

(Fig. 28, supplementary material Fig. S17)

Brachymyrmex donisthorpei Santschi, 1939: 320, Figs. 4, 5 (w.). **Lectotype worker** (NHMB: USNMENT00757183) and **paralectotype workers** (NHMB: USNMENT00757184-00757185; **here designated**): 3 workers [examined]. **COLOMBIA**, Mar. 1937, Paul Robá, leg.

Additional material examined. BRAZIL: Bahia: Vargito, -15.40 -39.55, 22 Mar. 1999, J.R.M. dos Santos, 1 worker (CEPLAC: USNMENT00757839); **São Paulo:** Iguape, E.E. Jureia-Itatins, Nucleo Rio verde, -24.54417 -47.23556, 5-14 Mar. 2001, A.A. Tavares, 1 worker (ICN: MZSP158). **COLOMBIA: Magdalena:** El Campano, 11.12 -74.10, 1300 m, 13 Aug. 1985. P.S. Ward #7891-23, 2 workers, 1 queen (PSWC: USNMENT00757840); **Nariño:** territorio Kofan,

2308 0.47481 -77.17913, 1000 m, 28 Sep. 1998, 1 worker (IAvH). **ECUADOR: Zamora-Chinchipe:**
 2309 Copalinga, -4.09122 -78.96069, 17-19 Oct. 2009, Jacquemin, 1 worker (RBIN: Coll.RIScNB SID
 2310 SPM_ID3753921). **PARAGUAY: Boquerón:** Enciso N.P. (Southern side), -21.20298 -
 2311 61.65909, 04-06 Nov. 2001, M. Leponce.

2312

2313 **Diagnosis.** *Brachymyrmex donisthorpei* morphologically resembles *B. modestus* and *B. myops*
 2314 because they all have dense, short pubescence over the entire body, scapes with short suberect
 2315 hairs, eyes that are positioned below the cephalic midline, a metanotal groove that is either
 2316 absent or narrower than the diameter of the metathoracic spiracles, and yellowish body color.
 2317 *Brachymyrmex donisthorpei* differs from *B. modestus* and *B. myops* by its short scapes that
 2318 approximately reach the posterior margin of the head or surpass it by less than the maximal
 2319 diameter of the eye.

2320

2321 *Lectotype and paralectotype measurements* (mm) (n=2). HL₁ 0.39-0.41; HL₂ 0.25-0.27; HL₃
 2322 0.08; HW 0.33-0.35; SL 0.27-0.29; EL 0.05; WL 0.39; PnL 0.10; PnW 0.27-0.29; ML 0.10; MW
 2323 0.20; *Indices* CI 85.00-85.71; SI₁ 82.35-83.33; SI₂ 107.14-107.69; OI₁ 13.89-14.71; OI₂ 19.05-
 2324 20.00.

2325

2326 *Additional material examined measurements* (mm) (n=4). HL₁ 0.32-0.38; HL₂ 0.22-0.29; HL₃
 2327 0.07-0.09; HW 0.26-0.33; SL 0.24-0.29; EL 0.04; WL 0.27-0.38; PnL 0.11-0.12; PnW 0.20-0.23;
 2328 ML 0.06-0.09; MW 0.13-0.16; *Indices* CI 80.55-86.05; SI₁ 86.49-96.55; SI₂ 96.97-112.00; OI₁
 2329 13.51-16.67; OI₂ 22.22-23.26.

2330

Description. Head. Substantially longer than wide in full face view; posterior cephalic margin slightly concave. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. Dorsum of the head has conspicuous appressed pubescence and several suberect hairs. The scapes approximately reach the posterior margin of the head or surpass it by a length smaller than the maximal diameter of the eye, and they have appressed and decumbent hairs. Ocelli absent. The eyes are positioned below the cephalic midline and have only 3-4 ommatidia along their maximal diameter.

Mesosoma. With several short appressed and sub-erect hairs. The mesonotum is not inflated and does not bulge dorsally above the pronotum in lateral view. Metanotal groove absent or narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles dorsolateral in position, not protruding, and touching the propodeal suture. Dorsum of the propodeum flat and much shorter than propodeal declivity. Propodeal spiracles circular, small and inconspicuous, positioned on the posterior propodeal margin, slightly posterior of the middle of the propodeal slope. Legs with appressed and sub-erect hairs. Petiole short and inclined forward.

Gaster. With appressed dense pubescence and some sub-erect hairs near the edges of the segments.

Color and sculpture. Body yellowish, with imbricate sculpture on the dorsum of the mesosoma.

Distribution (supplementary material Fig. S17). *Brachymyrmex donisthorpei* is known from Brazil, Colombia, Ecuador and Paraguay.

Biology. Unknown.

Remarks. No specific geographic information is available on the type material beyond Colombia.

Brachymyrmex feitosai Ortiz & Fernández

(Figs. 29, supplementary material Fig. S18)

Brachymyrmex feitosai Ortiz and Fernández, 2014: 27, Figs. 25, 26, 27 (w). **Holotype worker** and **paratype workers** (MZSP: USNMENT00757694): 3 workers. **BRAZIL: Rio de Janeiro:** Floresta de Tijuca, D. Federal. 16 Dec. 1959, C.A: Campos Seabra.

Additional material examined. BRAZIL: Minas Gerais: Lavras, Ijaci e Perdões, -21.24528 - 44.99972, Fragmento, 06 Dec. 2002, M.S. Santos & N.S. Dias, 4 workers (CPDC: USNMENT00757836, 00759008); **São Paulo:** Piedade, Floresta Atlantica "Theomar", -23.73846 -47.38957, 16 Nov. 2008, G. Bieber, 3 workers (ICN: USNMENT00759038); Sete Barras, PE Carlos Botelho, 600 m, -24.20833 -47.97056, 11–15 May 2009, armadilha subterrânea #18, F. Esteves et al., 1 worker (MZSP: ANTWEB CASENT0217326).

Diagnosis. *Brachymyrmex feitosai* resembles *B. brasiliensis* and *B. delabiei* because they all have tumuliform metathoracic spiracles. However, *B. feitosai* differs from *B. brasiliensis* by its entirely smooth and shiny body, that is more brownish, and by the dense yellowish pubescence

on the first gastral segment. It differs from *B. delabiei* by the presence of many suberect hairs on the pronotum and mesonotum and its dense yellowish pubescence on the first gastral segment.

Description. See Ortiz and Fernández (2014).

Brachymyrmex fiebrigi Forel

(Figs. 30, 31, supplementary material Fig. S19)

Brachymyrmex fiebrigi Forel, 1908: 400 (w.). **Lectotype worker** (MHNG: USNMENT00757164) and **paralectotype workers** (MHNG: USNMENT00757164-00757165; **here designated**): 4 workers [examined]. **PARAGUAY:** San Bernandino, Fiebrig leg. Santschi (1922: 260) (q.m.). See also: Santschi (1923a: 661).

= *Brachymyrmex fiebrigi* var. *funicularis* Santschi, 1922: 260 (w.). (NHMB: USNMENT00757180-007581, 00758094): 22 workers [examined]. **ARGENTINA: Córdoba:** Alta Gracia. **n. syn.**

= *Brachymyrmex fiebrigi* var. *fumida* Santschi, 1923a: 661 (w.). (MHNB: USNMENT00757704, 00758157): 4 workers [examined]. **ARGENTINA: Buenos Aires:** Cerro “Ruinas”; (MHNB: USNMENT00758093, NHMG: USNMENT00758153): 3 workers [examined]. **ARGENTINA: Cordoba:** La Cabana. **n. syn.**

Additional material examined. ARGENTINA: Cordoba: Alta Gracia, Bruchi, 2 workers (MZUSP: USNMENT00757548). **BRAZIL: Bahia:** Canavieiras, -15.56361 -39.01722, 24 Aug. 1998, J.C.S. Carmo & J.R.M. Santos, 1 worker (CEPLAC: USNMENT00757962; Esplanada

2400 Baixio, -12.11444 -37.69694, June-Oct. 2010, M.L.O. Travassos, #5644, 1 worker (CEPLAC:
2401 USNMENT00757545). **Minas Gerais:** Lavras, 06-12 2002, M.S. Santos, N.S. Dias, 2 workers
2402 (CEPLAC: USNMENT00759008). **São Paulo:** Iguape, EE Jureia-Itatins, Nucleo Rio verde, -
2403 24.54417 -47.23556, 05-14 Mar. 2001, A.A. Tavares, 1 worker (ICN: MZSP158). **COSTA**
2404 **RICA: Heredia:** Cantarrana, 11 km ESE La Virgen, 10.33516 -84.04856, 300 m, 26 Feb. 2007,
2405 Marcos-Deimer-Joel, 1 worker (JTLC: INBIO0003646597); **Limón:** Casa Verde, Tortuguero,
2406 10.58333 -83.51667, 5 m, 24 June 1988, J. Longino #2154, 3 workers (JTLC:
2407 INBIOCRI001280321, 001280326, 001280331); **Puntarenas:** 8 km WNW Potrero grande, 9.03 -
2408 85.25, 200 m, 01 Aug. 1985, P.S. Ward #7792, 3 workers (PSWC: USNMENT00757549); La
2409 Pita, rd. To Monteverde 10.16667 -84.91667, 120 m, 13 July 1984, J. Longino, 1 worker (JTLC:
2410 JTLC000005902). **CUBA: Viñales:** Pinar del Rio, 14 June 1953, E.O. Wilson #10, 2 workers, 1
2411 male (MCZC: USNMENT00757546). **MEXICO: Quintana Roo:** Municipio Leona Vicario,
2412 Reserva Ecológica "El Edén", 21.21667 -87.18333, 03 July 1997, G.M. Daniel, 1 worker (ICN:
2413 USNMENT00757626); **PARAGUAY: Boquerón:** Garrapatal, -21.44306 -61.87500, 04-06 Nov.
2414 2001, M. Leponce, 1 worker (RBIN: Coll.RIScNB SID SPM_ID14544); Garrapatal, -21.43965 -
2415 61.48899, 05-06 Nov. 2001, M. Leponce, 1 worker (RBIN: Coll.RIScNB SID SPM_ID25159);
2416 Enciso, -21.20 -61.67, 03-06 Nov. 2001, M. Leponce & T. Delsinne #4123-9/3, 3 workers
2417 (ALWC: ANTWEB CASENT0173481); Enciso N.P. (Southern side), -21.19978 -61.66084, 17-
2418 18 Sep. 2003, T. Delsinne, 1 worker (RBIN: Coll.RIScNB SID SPM_ID31851); Enciso N.P.
2419 (Southern side), -21.19978 -61.66084, 04-06 Nov. 2003, M. Leponce, 1 worker (RBIN:
2420 Coll.RIScNB SID SPM_ID32154); Fortín Mayor Infante Rivarola, -21.67146 -62.41312, 02-06
2421 Nov. 2001, M. Leponce, 1 worker (RBIN: Coll.RIScNB SID SPM_ID30618); Mister Long, -
2422 20.60386 -62.05053, 05-06 Nov. 2001, M. Leponce, 1 worker (RBIN: Coll.RIScNB SID
2423 SPM_ID25477); Mister Long, -20.60386 -62.05053, 17-18 Sep. 2003, T. Delsinne, 2 workers

(RBIN: Coll.RIScNB SID SPM_ID 26023, Coll.RIScNB SID SPM_ID27108); Mister Long, -
 20.60386 -62.05053, 01-04 Oct 2004, T. Delsinne, 1 worker (RBIN: Coll.RIScNB SID
 SPM_ID30953); Nueva Asunción, -20.68896 -61.92886, 17-18 Sep. 2003, Delsinne (RBIN:
 Coll.RIScNB SID SPM_ID27184); **Central:** Capiata, -25.35 -57.42, 22 Feb. 1994, B. Garcete
 #ibn 197, 1 worker (ALWC: USNMENT00757544); **Itapúa:** Isla Yacyretá E Melgarejo, -22.42 -
 56.50, 11 Nov. 1997, B. Barrios #ibn 217, 2 workers (ALWC: USNMENT00757891).
SURINAME: Paramaribo, Apr. 1959, I.v.d. Drif, 3 workers (MZUSP: USNMENT00757547).

Diagnosis. *Brachymyrmex fiebrigi* morphologically resembles *B. depilis*, because they both have
 short scapes that do not or just reach the posterior margin of the head, a gaster with dense
 pubescence, a yellowish body and eyes that are positioned on the cephalic midline.
Brachymyrmex fiebrigi differs from *B. depilis* by its mesosoma, which usually bears several erect
 hairs, two on the pronotum and two on the mesonotum and by its geographic distribution, which
 ranges from the South of Mexico until Paraguay, including Cuba.

Lectotype and paralectotypes measurements (mm) (n=3). HL₁ 0.35-0.37; HL₂ 0.23; HL₃ 0.08-
 0.10; HW 0.31; SL 0.25-0.29; EL 0.08-0.10; WL 0.27-0.31; PnL 0.12; PnW 0.20-0.25; ML 0.06;
 MW 0.16-0.20; *Indices* CI 87.21-88.89; SI₁ 81.25-93.75; SI₂ 108.33-125.00; OI₁ 25.00-31.25;
 OI₂ 21.05-27.78.

Additional material examined measurements (mm) (n=12). HL₁ 0.32-0.46; HL₂ 0.22-0.34; HL₃
 0.07-0.13; HW 0.27-0.41; SL 0.22-0.36; EL 0.08-0.10; WL 0.26-0.40; PnL 0.09-0.14; PnW 0.20-
 0.28; ML 0.06-0.11; MW 0.15-0.20; *Indices* CI 75.71-88.46; SI₁ 80.00-93.75; SI₂ 96.77-115.38;
 OI₁ 21.74-33.33; OI₂ 20.00-28.85.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin flat. Dorsum of the head with appressed hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes are short, usually approximately reaching the posterior margin of the head, and they bear appressed and decumbent hairs. Ocelli apparently absent. Eyes are positioned on the cephalic midline and have 6-9 ommatidia along their maximal diameter.

Mesosoma. Typically with two erect hairs on the pronotum and two on the mesonotum. The mesonotum is not inflated and does not bulge dorsally above the pronotum in lateral view. Metanotal groove absent or narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles dorsolateral in position, not protruding, and touching the propodeal suture. Dorsum of the propodeum flat and much shorter than the posterior slope. Propodeal spiracles circular, small and inconspicuous, positioned on the posterior propodeal margin slightly posterior of the middle of the propodeal slope. Legs with appressed hairs. Petiole short and inclined forward.

Gaster. With dense pubescence and scattered suberect hairs at the edges of the segments.

Color and sculpture. Body usually smooth, shiny and yellowish.

Distribution (supplementary material Fig. S19). *Brachymyrmex fiebrigi* is known from Argentina, Brazil, Costa Rica, Cuba, Mexico, Paraguay and Suriname.

Biology. Some specimens have been collected from below stones (PSWC: USNMENT00757549); Forel (1908) suggested that this species nests in dry branches of bushes.

Remarks. The lectotype is the second ant from the top on pin USNMENT00757164, whereas the other specimens on that pin are paralectotypes. Santschi (1922) considered *B. fiebrigi* var. *funicularis* as a variety of *B. fiebrigi* mainly based on its darker-colored funiculus and posterior segments of the gaster, but otherwise the type specimens of this variety are very similar in measurements, head shape, and gastric pubescence compared to the type material of *B. fiebrigi*. Overall, we consider these differences to represent intraspecific variation. Santschi (1923a) considered *B. fiebrigi* var. *fumida* as a variety that only differs from the typical *B. fiebrigi* by its somewhat darker body color, and the overall light yellowish scapes and tibia. As for *B. fiebrigi* var. *funicularis* we consider these differences to represent intraspecific variation and both varieties are synonymized here.

***Brachymyrmex flavidulus* (Roger)**

(Supplementary material Fig. S20)

Plagiolepis flavidula Roger, 1863: 162 (w.). **Lectotype worker** (MfNB: 19185: GBIF-D/FoCol2900; GBIF-D/FoCol2910; **here designated**): 1 worker [examined]. **CUBA.** Attributed to *Brachymyrmex* by Smith (1955: 99).

Additional material examined. COLOMBIA: Valle del Cauca: Bosque Yotoco, 1575 m, 25 June 1989, W.P. MacKay #11562, 2 workers (WEMC: USNMENT00757634). **COSTA RICA: Puntarenas:** Monteverde, 10.29564 -84.79009, 1540 m, 10 Dec. 1987, J. Longino #1975-s, 1

worker, 1 queen (JTL: JTL0000005251). **JAMAICA: Trelawny:** 5 km N Quick Step,
18.26667 -77.71667, 360 m, A.L. Wild #AW1382, 1 worker (ALWC: USNMENT00757658).

Diagnosis. *Brachymyrmex flavidulus* resembles *B. fiebrigi*, *B. giardi* and *B. depilis* in that they all have short scapes that approximately reach the posterior margin of the head or surpass it by less than one maximal diameter of the eye, their gaster bears dense pubescence, their eyes are located on the cephalic midline and their bodies are yellowish. *Brachymyrmex flavidulus* differs from *B. depilis* and *B. giardi* by its mesonotum that does not bulge dorsally above the pronotum in lateral view, and from *B. fiebrigi* by the absence of erect hairs on the pronotum and mesonotum.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin slightly convex. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes are short and barely reach the posterior margin of the head. Ocelli apparently absent. Eyes are positioned on the cephalic midline and have 7-9 ommatidia along their maximal diameter.

Mesosoma. Without erect hairs. The mesonotum does not bulge dorsally above the pronotum in lateral view. Metanotal groove absent. Metathoracic spiracles dorsolateral in position, not protruding, and touching the propodeal suture. Dorsum of the propodeum shorter than posterior slope. Propodeal spiracles circular, positioned on the posterior propodeal margin, slightly posterior of the middle of the propodeal slope. Legs with appressed hairs. Petiole short and inclined forward.

Gaster. With dense pubescence.

Color and sculpture. Body usually smooth, shiny and yellowish.

Distribution (Supplementary material Fig. S20). This species is known from Colombia, Costa Rica, Cuba and Jamaica.

Biology. Unknown.

Remarks. *Brachymyrmex flavidulus* is a problematic species for several reasons. It was described by Roger (1863) as a species of *Plagiolepis*. Smith (1955) transferred it to *Brachymyrmex*, seemingly based in geographic reasons, i.e. that *Plagiolepis* is not native to the neotropics. We agree with the attribution to *Brachymyrmex* because the type of *Brachymyrmex flavidulus* has 9 antennal segments, which is a diagnostic trait of *Brachymyrmex*, whereas *Plagiolepis* has 11 antennal segments (Bolton 2003). The type series consist of a single individual of which the mesosoma and gaster are mounted on a pin, and the head is prepared on a microscope slide. This preservation hampers us to document the arrangement of hairs on scapes, head, and clypeus as well as the number of ommatidia in the maximal diameter of the eye.

The worker on pin JTLC0000005251 is unusual in comparison to the other specimens of *B. flavidulus* in having sparser gastral pubescence and somewhat longer scapes. Additional material from Costa Rica would be required to adequately characterise the morphological variation in these populations, and to verify its species attribution.

This species is morphologically very similar to *B. fiebrigi*. *Brachymyrmex flavidulus* lacks the erect hairs on the mesosoma that are present in *B. fiebrigi*, but as the number of specimens available of *B. flavidulus* is very limited we cannot currently comment on the consistency of this

difference. An in-depth comparison with *B. fiebrigi* is required when more specimens of *B. flavidulus* become available, especially from Cuba, where both species occur.

Brachymyrmex gagates Wheeler

(Fig. 32, supplementary material Fig. S21)

Brachymyrmex gagates Wheeler, 1934: 206 (w.). **Lectotype worker** (USNM: USNMENT00529454) and **paralectotype workers** (USNM: USNMENT00529454; MCZC: M.C.Z. Cotype 1-3 21436, M.C.Z. Cotype 4-6 21436; **here designated**): 9 workers [examined].
MEXICO: Veracruz: Mirador, 20 Apr. 1929.

Additional material examined. PANAMA: Colon: San Lorenzo Forest, 9.28333 -79.97194, J. Schmidt & J. Bail, fogging, 2 workers (ICN: USNMENT00759031).

Diagnosis. *Brachymyrmex gagates* resembles *B. degener* and *B. gaucho* in morphology, because they all have smooth, shiny, and dark brown or black bodies, scapes that surpass the posterior margin of the head, and a gaster with scarce pubescence. *Brachymyrmex gagates* differs from *B. degener* by its darker body and by having a mesonotum that is almost circular in dorsal view and that does not bulge above the pronotum in lateral view. It differs from *B. gaucho* by having a slightly concave posterior cephalic margin, scapes with decumbent hairs, a second segment of the antennal funiculus that is conspicuously shorter than the first antennal segment, and its almost circular mesonotum in dorsal view that does not bulge above the pronotum in lateral view.

Lectotype measurements (mm). HL₁ 0.59; HL₂ 0.39; HL₃ 0.18; HW 0.55; SL 0.51; EL 0.16; WL 0.59; PnL 0.18; PnW 0.39; ML 0.16; MW 0.20; *Indices* CI 93.33; SI₁ 92.86; SI₂ 130.00; OI₁ 28.57; OI₂ 30.00.

Description. Head. Slightly longer than wide in full face view; posterior cephalic border slightly concave. Dorsum of the head with scattered appressed hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes bear decumbent hairs and surpass the posterior margin of the head by a length smaller than the maximal diameter of the eye. Three ocelli present. Eyes are positioned slightly posteriorly to the cephalic midline and have 10-12 ommatidia along their maximal diameter.

Mesosoma. Typically bearing two erect hairs on the pronotum and two on the mesonotum, sometimes with some additional appressed hairs on the dorsum of the mesonotum. The mesonotum is inflated but does not bulge dorsally above the pronotum in lateral view; it is almost circular in dorsal view. Metanotal groove wider than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, protruding slightly, and either just or just not touching the propodeal suture. Dorsum of the propodeum convex and somewhat shorter than the posterior declivity. Propodeal spiracles circular, positioned on the posterior propodeal margin, anterior of the middle of the propodeal slope. Legs have appressed hairs. Petiole short and inclined forward.

Gaster. With scattered pubescence and several scattered long erect hairs.

Color and sculpture. Head and gaster are smooth and shiny, whereas the dorsum of the mesosoma is slightly imbricate. Body uniformly dark brown, apart from the terminal segments of the tarsus and the hairs, which are lighter.

Distribution (Supplementary material Fig. S21). *Brachymyrmex gagates* is known from Mexico and Panama.

Biology. The type specimens were collected from an epiphytic bromelia (*Tillandsia streptophylla*) (Wheeler 1934).

Remarks. The lectotype is the ant at the top of pin USNM: USNMENT00529454, whereas the others on that pin are paralectotypes. Wheeler (1934) pointed out that *B. gagates* is similar to but nevertheless different from *B. incisus* (which is here synonymized to *B. degener*) of which he had specimens from Panama in his collection. He reported that *B. gagates* has a wider head, a much more prominent mesonotum, a more distinct and impressed promesonotal suture, longer funicular joints and darker body color. We are uncertain as to what he exactly implied about the promesonotal suture, because it is very distinctive in all *Brachymyrmex* species, and the mesonotum bulges dorsally above the pronotum in lateral view in *B. degener* whereas it does not in *B. gagates* (see diagnosis). We agree that generally *B. incisus* (and thus *B. degener*) generally have much lighter body color than *B. gagates*, but as mentioned in the remarks of *B. degener* and *B. coactus* the variation in body color in these species requires more detailed documentation.

Brachymyrmex gaucho Santschi

(Fig. 33, supplementary material Fig. S22)

Brachymyrmex gaucho Santschi, 1917: 283 (w.). (NHMB) [examined, but the type is severely damaged]. **ARGENTINA: Córdoba:** Unquillo, M. Birabén. Combination in *Brachymyrmex* (*Brysha*) by Santschi (1923a: 674). See also: Quirán (2005: 767).

Diagnosis. *Brachymyrmex gaucho* is morphologically similar to *B. antennatus* because both have legs and antennae with erect hairs and a second segment of the antennal funiculus that is as long as or longer than the first. However, *B. gaucho* differs from *B. antennatus* by having a flat posterior cephalic margin, a dark brown body, erect hairs on the scape and the dorsum of the head, a mesonotum that bulges dorsally above the pronotum, and a gaster with scarce pubescence.

Description. Head. Almost equally wide as long in full face view; the posterior cephalic margin is flat and the posterior side of the head is wider than the anterior side. Dorsum of the head bears scattered erect hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are clearly shorter and decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior cephalic margin by a length smaller than 1.5× the maximal diameter of the eye and have erect hairs. The second segment of the antennal funiculus is as long as or longer than the first. Three ocelli are present. Eyes are positioned on the cephalic midline and have 13-14 ommatidia along their maximal diameter.

Mesosoma. With several thin, erect hairs. The mesonotum is inflated, anteroposteriorly inclined and bulges dorsally above the pronotum in lateral view. Metanotal groove usually absent, but when present narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, slightly protruding, and near the propodeal suture. Dorsum of the propodeum flat and equal in length to the propodeal slope. Propodeal spiracles circular, positioned just dorsally of the posterior propodeal margin and slightly posterior of the middle of the propodeal slope. Legs have suberect and erect hairs. Petiole short and inclined forward.

Gaster. With scattered pubescence and several scattered long erect hairs.

Color and sculpture. Head and gaster are smooth and shiny, whereas the dorsum of the mesosoma is imbricate. Body uniformly dark brown.

Distribution (Supplementary material Fig. S22). *Brachymyrmex gauchoi* is currently only known from Argentina.

Biology. Unknown.

Remarks. The type specimen in the NHMB is damaged but Quirán deposited 3 workers belonging to this species from Argentina, Córdoba II-2001, E. Quirán, leg. at the NHMB, which we also examined. These specimens come from the same state as the type material, but they are no types. We studied these specimens, one of which is illustrated in Fig. 33. More type material would exist at the MACN (5 workers) and the MLP (1 worker) (Quirán 2005), but it is not studied here.

Brachymyrmex giardi Emery

(Fig. 34, supplementary material Fig. S23)

Brachymyrmex giardi Emery, 1895: 215 (w.q.). **Lectotype worker** (MSNG: USNMENT00757220) and **paralectotype workers, putative worker-queen intercaste, queen, male** (MSNG: USNMENT00757218 - 00757220, MHNG: USNMENT00758105-00758109; **here designated**): 6 workers, 9 putative worker-queen intercastes, 1 queen, 1 male [examined]. **CHILE:** Santiago de Chile. Emery (1906: 178) (m.). = *Brachymyrmex melensis* De Zolessi et al., 1978: 26 (w.q.l.). **URUGUAY: Cerro Largo:** Melo. [not examined]. **n. syn.**

Additional material examined. CHILE: Valparaíso, 2 workers (MCZC: M.C.Z. Cotype22940).

Diagnosis. *Brachymyrmex giardi* resembles *B. depilis* and *B. heeri* as these species have a mesonotum that bulges dorsally above the pronotum in lateral view, and a gaster with dense pubescence. Additionally, *B. giardi* and *B. depilis* have bodies without erect hairs; they can be distinguished because *B. giardi* has dense decumbent pubescence on the head and mesosoma, usually a dark brownish body, and it is geographically restricted to Chile and Uruguay. Furthermore, *B. giardi* differs from *B. heeri* by having short scapes, and no erect hairs on the pronotum or mesonotum.

Lectotype and paralectotype measurements (mm) (n=8). HL₁ 0.45-0.68; HL₂ 0.29-0.42; HL₃ 0.10-0.32; HW 0.35-0.68; SL 0.33-0.59; EL 0.10-0.18; WL 0.39-0.89; PnL 0.10-0.21; PnW 0.25-0.57; ML 0.08-0.35; MW 0.16-0.52; **Indices** CI 78.26-105.00; SL₁ 84.85-100.00; SL₂ 113.33-142.86; OI₁ 23.53-33.33; OI₂ 21.74-50.00.

Worker description. Head. Slightly longer than wide in full face view; posterior cephalic margin is flat. Dorsum of the head has dense appressed hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are clearly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal oblique view. The scapes surpass the posterior cephalic margin by a length smaller than the maximal diameter of the eye and have decumbent hairs. Three ocelli appear to be present. Eyes are positioned on the cephalic midline and have 7-9 ommatidia along their maximal diameter.

Mesosoma. Without erect hairs. The mesonotum is inflated and bulges dorsally above the pronotum in lateral view. Metanotal groove usually absent, or narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, not protruding, and touching the propodeal suture. Dorsum of the propodeum slightly convex and shorter than the posterior propodeal margin. Propodeal spiracles circular, positioned on the posterior propodeal margin slightly posterior of the middle of the propodeal slope. Legs with appressed hairs. Petiole short and inclined forward.

Gaster. With dense pubescence and scattered long erect hairs along the edges of the segments. Some specimens have the same morphology as a regular worker as to the head and mesosoma, but have a gaster that is somewhat expanded, i.e. they are somewhat physogastric.

Color and sculpture. Body smooth and shiny, usually dark brownish with yellowish legs and pubescence.

Intercaste description. The morphology of the putative worker-queen intercaste differs from that of the worker by its larger size, the eyes that have around 9 ommatidia along their maximal diameter, the pronotum that bears several semi-erect hairs, the enlarged mesonotum that does not bulge dorsally above the pronotum in lateral view, and that does not bear erect but several subdecumbent hairs, the sharper posterior ending of the mesonotum in dorsal view, the deep metanotal groove that is wider than the metathoracic spiracles, the almost laterally positioned metathoracic spiracles, that do not protrude and do not touch any suture, and the uniform yellowish body color (albeit with lighter-colored legs).

Distribution (Supplementary material Fig. S23). *Brachymyrmex giardi* is known to occur in Chile and Uruguay.

Biology. The biology of *B. giardi* has not recently been studied, however Emery (1895) indicated that Prof. Giard observed an association between *B. giardi* and the coccid *Margadores vitium*. As to the biology of *B. melensis*, which we synonymize here with *B. giardi*, De Zollessi et al. (1978: 39) provided detailed habitat information including specifications on the landscape, soil and vegetation. Their nest was subterranean, with several chambers between 15 and 50 cm deep, each chamber being about 3 cm high and 3 to 5 cm long and wide. Some repletes were found hanging from the roof together with normal workers as is observed in *Mymecocystus hortideorum*.

Remarks. The second ant from the top in pin MSNG: USNMENT00757220 is designated here as lectotype, whereas the other specimens are paralectotypes. In the original description of *B. giardi* Emery (1895: 215) described a worker, a replete and a queen, and the replete is what we consider here as a putative worker-queen intercaste, because a regular queen was also reported by Emery

(1895). Note that this queen was indicated to be wingless, however, after studying the material we confirm that it represents a real queen rather than an ergatoid, and the replete has, as mentioned above, a hybrid morphology between queen and worker. Upon dissection of the abdomen of the replete Emery (1895: 215) reported that the crop is full of honey-like liquid, but also that the ovaries are more developed than in normal workers, and that these repletes likely have a reproductive function. Nevertheless, he considered nourishment their primary function, as is confirmed by De Zolessi et al. (1978). In summary, the exact affinity of these repletes is uncertain: if it were ergatoid queens we would not expect a regular queen to be present (Peeters 1991), which points to an intercaste, because intercastes co-exist with a regular queen. However, intercastes do not usually participate in reproduction (Peeters 1991). Given all the available data, we consider these specimens for now to be a putative worker-queen intercaste, as mentioned before, but the intriguing issue of the repletes in *B. giardi* requires further study.

We have not been able to locate the type material of *B. melensis* and have therefore studied it from the detailed work of De Zolessi et al. (1978). These authors subdivided the putative worker-queen intercaste into two categories: the first for specimens that resemble normal workers but have the gaster somewhat expanded, and the second for the putative intercaste, which displays a strongly enlarged gaster with the ability to store liquids. De Zolessi et al. (1978) indicate that *B. melensis* resembles *B. physogaster* Kusnezov (1960) most, a species here synonymized to *B. heeri*, but that both differ in size and in the number of ocelli (see additional differences in the diagnosis above). These authors did not compare *B. melensis* and *B. giardi*, but upon doing so we did not find any trait that allows distinguishing these taxa and hence we synonymize *B. melensis* here. *Brachymyrmex giardi* and *B. heeri* are indeed quite similar, not in the least by the presence of a putative worker-queen intercaste, and further in-depth study of both species is required.

Brachymyrmex giardi var. *nitida* was previously suggested to be a junior synonym of *B. giardi* (Snelling and Hunt 1975), but in our opinion, it is a junior synonym of *B. bruchi* (see above). *Brachymyrmex giardi* var. *cordobensis* on the other hand appears to be a junior synonym of *B. heeri* (see below).

***Brachymyrmex heeri* Forel**

(Figs. 35, 36, supplementary material Fig. S24)

Brachymyrmex heeri Forel, 1874: 91, Figs. 16, 20 (w.). **Lectotype worker** (MHNG: USNMENT00757169) and **paralectotype workers, males, queen** (MHNG: USNMENT00757167-00757171, USNMENT00758116-00758120); **here designated**): 15 workers, 3 males, 1 queen [examined]. **SWITZERLAND: Zurich:** Serra des orchidiées. Forel (1876: 52) (q.m.). See also: Santschi (1923a: 664).
 = *Brachymyrmex goeldii* Forel, 1912a: 65 (w.). (MHNG: USNMENT00757166): 1 worker [examined]. **BRAZIL: São Paulo:** Botucatu. **n. syn.**
 = *Brachymyrmex giardi* var. *cordobensis* Santschi, 1929: 309 (w.). (NHMB: USNMENT00757698, 00757699, CASENT0911600): 23 workers [examined]. **ARGENTINA: Cordoba:** Alta Gracia. **n. syn.**
 = *Brachymyrmex physogaster* Kusnezov, 1960: 382, Figs.1-4 (w.). (INSUE): 7 workers [examined]. **ARGENTINA: Salta:** National park Estancia El Rey. **n. syn.**

Additional material examined. ARGENTINA: Misiones: Loreto, C. Bruch, 1 worker (NHMB: USNMENT00758095). **BOLIVIA: Santa Cruz:** 10 km NW Terevinto, -17.67 -63.45, 380 m, 09 Dec. 1993, P.S. Ward #12314-61, 2 workers (MCZC: USNMENT00757940); Buena Vista, -

2776 17.45 -63.67, 350 m, 18 Dec. 1993, P.S. Ward #12438-79, 3 workers (PSWC:
2777 USNMENT00757745); Las Gamas, Parque Nacional Noel Kempff Mercado, -14.80 -60.38, 700
2778 m, 04 Dec. 1993, 6 workers (PSWC: USNMENT00757941, 00758024). **BRAZIL: Goiás:**
2779 Campo Limpo, faz conceição, -16.33083 -49.16367, 01-07 July 2005, R.R. Silva & R.M. Feitosa,
2780 8 workers (ICN: MZSP120, 121); **Minas Gerais:** Serra Caraça, 1380 m, Oct. 1961, Martins &
2781 Silva, 2 workers, 3 putative worker-queen intercastes (MZSP: USNMENT00757603); Serra
2782 Caraca, Kloss, Lenko, Nov. 1961, Martins & Silva, 3 workers, 1 putative worker-queen intercaste
2783 (MCZC: USNMENT00757598); **Pará:** Melgaço, Caixiuanã, ECFPn, -1.77803 -51.42694, 27
2784 Nov.- 03 Dec. 2001, 2 workers (MPEG: USNMENT00757592, 00757550); Melgaço, Caixiuanã,
2785 ECFPn, -1.70661 -51.45909, 25-27 Oct. 2005, Equipe A.Y. Harada, 11 workers (MPEG:
2786 AYH057); Melgaço, Caixiuanã, ECFPn, -1.75444 -51.52241, 24-26 Jan. 2006, Equipe A.Y.
2787 Harada, 5 workers (MPEG: AYH023); Melgaço, Caixiuanã, ECFPn, -1.75444 -51.52241, 28 Oct.
2788 2003, A.Y. Harada, E.P. Fagundes, C.J.M. Ribeiro, C.E.D. Sanhudo, C.A.R. Moura, J.L.P.
2789 Souza, C. Renato, 8 workers (MPEG: AYH083); **Santa Catarina:** São Bento do Sul, APA Rio
2790 Vermelho, -26.36417 -49.27111, 30 Mar.-04 Apr. 2001, R.R. Silva & Everhardt, 2 workers (ICN:
2791 MZSP043); **São Paulo:** Barueri, K. Lenko, 4 workers, 1 queen (MZSP: USNMENT00757602);
2792 Caraguatatuba, Reserva Florestal, 13 July 1965, Exp. Dep. Zool. 3487, 4 workers, 1 queen
2793 (MZSP: USNMENT00757597); Cunha, PE Serra do Mar, Nucleo Cunha-Indara, -23.25083 -
2794 45.00722, 21-22 Apr. 2001, A.A. Tavares & R.R. Silva, 15 workers (ICN: MZSP151).
2795 **COLOMBIA: Caldas:** Aranzazu, Vereda Cuatro Esquinas, Finca Tres Esquinas, 5.31870 -
2796 75.48947, 1837 m, 06-08 Aug. 2003, L.E. Franco & J. Cruz, 2 workers (IAvH: IAvH27322);
2797 Aranzazu, Vereda La Guaira, Finca Alto Bonito, 5.27883 -75.48461, 2056 m, 25-26 July 2003,
2798 L.E. Franco & J. Cruz, 1 worker (IAvH: IAvH27303); Aranzazu, Vereda Sabana Larga, Finca
2799 Las Colinas de Zega, 5.31713 -75.47556, 2000 m, 25-27 July 2003, L.E. Franco & J. Cruz, 5

workers, 1 queen (IAvH: IAvH25458, 25459); Salamina, Vereda El Cedrito, Finca El Cedrito,
5.33117 -75.46744, 1960 m, 27-29 Aug. 2002, L.E. Franco & J. Cruz, 1 worker (IAvH:
IAvH25465); **Huila**: 8 km S. Neiva, 20 Mar. 1976, W. & E. MacKay, 4 workers (WEMC:
USNMENT00757948, 00757949); Neiva: 23 Mar. 1976, W. & E. MacKay, 4 workers, 1 queen, 1
male (WEMC: USNMENT00757733, 00757946, 00757947); **Nariño**: Altaquer, Barro Nambi, C.
Sanda #22, 2 workers (ICN: USNMENT00757633); **Quindio**: Calarcá, Vereda Pradera Baja,
Finca La Holanda, 4.55694 -75.63917, 1575 m, 29 Nov. 1999, E. Gonzalez & J. Sossa, 1 worker
(IAvH: IAvH-E74153); Calarcá, Vereda Santo Domingo, Finca Santa Librada, 4.55694 -
75.63917, 1575 m, 16 Mar. 2000, J. Sossa, 1 worker (IAvH: IAvH-E74154); Filandia, Vereda
Cruces, Finca Pavas, 4.70422 -76.63250, 1900 m, 04-06 June 2002, E. Jimenez & M.F. Reina, 2
workers (IAvH: IAvH27228); Génova, Vereda El Cedral, Finca Buenos Aires, 4.235 -75.77556,
1600 m, 26 Oct. 1999, E. Gonzalez & J. Sossa, 2 workers (IAvH: IAvH-E74166, 74167);
Risaralda: Apia, La María, Cafetal de sol (S-III), 3.13 -75.95, 1405 m, 28 Jan. 2002, L. Rivera, 1
worker (IAvH: IAvH-E74175); Pereira Vereda La Suiza, SFF Otún Quimbaya, 4.72800 -
75.57744, 1900 m, 24-26 Nov. 2002, M. Reina & L.E. Franco, 2 workers, 1 putative worker-queen
intercaste (IAvH: IAvH27279); Pereira, Vereda La Suiza, Finca Pez Fresco, 1890 m, 22-24 Nov.
2002, E. Jimenez & M.F. Reina, 1 worker (IAvH: IAvH27285); **Valle del Cauca**: Cairo, Vereda
Llano Grande, Finca Encanto, 4.73603 -76.21698, 1650 m, 03 Apr. 2003, J. Henao, 1 worker
(IAvH: IAvH25147); Medio Calima Campamento DR., C.H.M. Aldana, 1 worker (ICN:
USNMENT00757551). **COSTA RICA: Guanacaste**: Cerro Cacao, 10.92682 -85.46823, 1100
m, 09 Feb. 1989, J. Longino #2342, 1 worker (INBIOCRI001280503); **Heredia**: 16 km N Vol.
Barba, 10.283 -84.083, 950 m, 12 July 1986, J. Longino #1367, 1 worker, 1 queen (JTLC:
JTLC000005274); 16 km SSE La Virgen, 10.26871 -84.08572, 1100 m, 09 Mar. 2001, 1 worker
(JTLC: INBIO0003205132); coffee farms vic. Heredia, 1100 m, 01 July 1991, I. Perfecto, 1

worker (JTLC: LACM ENT 139924); **Puntarenas:** Monteverde, 10.3 -84.8, 1500 m, 17 May
 2001, S. Yanoviak & J. Gering, 1 worker, 1 queen (JTLC: JTLC000002089, JTLC000002253);
 Monteverde, 10.301 -84.806, 1500 m, 14 July 1984, J. Longino 1556, 1 worker, 1 queen (JTLC:
 JTLC000005268); 3 km SE Monteverde, 10.283 -84.783, 1200 m, 02 Mar. 1994, J. Longino
 #3578-s, 1 worker (JTLC: INBIO CRI001282749); 4 km S San Vito, 8.783 -82.967, 1200 m, 30
 June 1995, J. longino #3702-s, 1 worker (JTLC: INBIOCRI001280752); Sirena, Parque Nacional
 Corcovado, 8.467 -83.583, 0-100 m, 23 Sep. 1982, J. Longino, 1 worker (JTLC:
 JTLC000005266); **ECUADOR:** 3.2-13 km N of Puyo, Napo, Pastaza, 953 m, 09 Feb. 1955, R.I.
 Schlinger & E.S. Ross, ANTC10200, 1 worker (CASENT: CASENT0196022); **Pichincha:**
 Maquipucuna, 5km ESE Nanegal, 0.116 -78.633, 1500 m, 17 Aug. 1991, P.S. Ward #11503-19, 2
 workers, 1 queen (PSWC: USNMENT00757596); **Zamora-Chinchipe:** Copalinga, -4.09122 -
 78.96069, 1000 m, 01-03 Oct. 2009, Delsinne & Arias. **FRENCH GUIANA:** Basse Vie (Petit
 Saut), Aug. 1999, S. Dorou, 3 workers, 2 males (CPDC: USNMENT00757952).
GUATEMALA: El Progreso, 20 km N Estancia de la Virgen, 1800-1900 m, 08 June 1991, R.S.
 Anderson, 1 worker (JTLC: CASENT0601427); Sololá, 1 km N San Andrés, Semetabaj, 14.75 -
 91.13, 1840 m, 16 Nov. 2003, A.L. Wild #AW2059, A.L. Wild #AW 2059, 3 workers (ALWC:
 USNMENT00757942). **MEXICO: Chiapas :** 15.1 km N.W. Bochil, 17.09120 -92.99138, 1930
 m, 24 Sep. 1992, R.S. Anderson, 1 worker (JTLC: CASENT0603200); 29 km E La Trinitaria,
 16.106 -91.772, 1520 m, 21 July 2007, J. Longino #6100, 1 worker (JTLC: JTLC000010323); 3.8
 km ESE Custepec, 15.71205 -92.93387, 1900 m, 18 July 2007, J. Longino #6072-2, 2 workers, 1
 queen, 1 male (JTLC: JTLC000010342, 000010343); **Jalisco:** 6.76 km SW Mazamitla, 19.89222
 -103.07722, 1997 m, 22 June 2000, W. & E. MacKay, 1 worker, 1 male (WEMC:
 USNMENT00757739); **Nuevo León:** nr Monterrey, Mesa de Chipinque, 1365 m, 16-18 July
 1965, 2 workers, 1 queen (MCZC: USNMENT00757666); **Veracruz:** 2.7 km N Teocelo, 1128

2848 m, 22-24 July 1973, A. Newton, 2 workers (WEMC: USNMENT00757945, 00757607); Km 38
 2849 on Fortin-Huatusco road, Cornell Iniversity, 1965, 2 workers, 1 queen (MCZC:
 2850 USNMENT00757954); Las Hamacas, 17 km N Santiago Tuxtla, 26-28 Aug. 1853, E.O. Wilson
 2851 #357, 2 workers (MCZC: USNMENT00757951); Los Tuxtlas, 10 km NNW Sontecomapan,
 2852 18.58333 -95.08333, 500 m, 21 Mar. 1985, P.S. Ward #7364; 5.5 km NE Coscomatepec, 05 June
 2853 1988, W. MacKay #10844, 2 workers, 1 male (PSWC: USNMENT00757950); 5.5 km NE
 2854 Coscomatepec, 05 June 1988, W. MacKay #10844, 2 workers, 1 male (WEMC:
 2855 USNMENT00757944). **NICARAGUA: Granada:** Mombacho Volcano, 11.93394 -85.97858,
 2856 1150 m, 18 July 2003, W. & E. Mackay, 2 workers, 1 queen (WEMC: USNMENT00758042).
 2857 **PANAMA: Canal zone:** 3 km NW Gamboa, 9.13333 -79.71667, 40 m, 10 Dec. 1983, P.S. Ward
 2858 #6391-14, 3 workers (PSWC: USNMENT00757542); **Chiriqui:** Parque Nacional Volcan Baru
 2859 Boquete, 1850 m, 18 June 1995, R. Anderson #17810, 1 worker (WEMC:
 2860 USNMENT00757943). **PARAGUAY: Canindeyú,** Reserva Natural Bosque Mbaracayú,
 2861 Jejuimini, -24.1 -55.5, 24 July 1996, A. Wild #AW0235, 2 workers, 1 queen (ALWC:
 2862 USNMENT00758025); Reserva Natural Bosque Mbaracayú, Jejuimini, -24.1 -55.5, 11 Mar.
 2863 1997, A. Wild #AW0477, #AW0478, 3 workers, 1 queen (ALWC: USNMENT00757543,
 2864 00757955). **VENEZUELA: Aragua:** Parque Nacional Henri Pittier, La Toma, 10.59233 -
 2865 68.14031, 1169 m, 09-19 Aug. 2008, 1 worker (ICN: USNMENT00757740); **Lara:** 9 km SE
 2866 Barbacoas, 9.77 -70.06, 2000 m, 22 Aug. 1987, P.S. Ward #8922, 2 workers, 1 queen (PSWC:
 2867 USNMENT00757953).
 2868
 2869 **Diagnosis.** *Brachymyrmex heeri* resembles *B. depilis* and *B. giardi* closely, because all three
 2870 species have a mesonotum that bulges above the pronotum in lateral view, and a gaster with

dense pubescence. However, *B. heeri* differs from *B. depilis* and *B. giardi* by having scapes that surpass the posterior margin of the head.

Lectotype and paralectotypes measurements (mm) (n=5). HL₁ 0.39-0.43; HL₂ 0.27-0.30; HL₃ 0.10; HW 0.35-0.41; SL 0.37-0.39; EL 0.10-0.11; WL 0.39-0.45; PnL 0.10; PnW 0.25-0.31; ML 0.08-0.12; MW 0.16-0.20; *Indices* CI 90.00-100.00; SI₁ 90.48-111.11; SI₂ 126.67-142.86; OI₁ 23.81-27.78; OI₂ 22.72-25.00.

Additional material examined measurements (mm) (n=5). HL₁ 0.41-0.60; HL₂ 0.27-0.39; HL₃ 0.10-0.13; HW 0.40-0.66; SL 0.36-0.52; EL 0.09-0.19; WL 0.35-0.68; PnL 0.11-0.16; PnW 0.27-0.45; ML 0.09-0.21; MW 0.18-0.35; *Indices* CI 93.75-110.81; SI₁ 78.05-93.62; SI₂ 114.29-135.71; OI₁ 21.74-29.27; OI₂ 16.22-28.00.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin slightly concave. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior margin of the head by a length smaller than the maximal diameter of the eye; they bear decumbent hairs. Ocelli absent. Eyes are positioned on the cephalic midline and have 6-7 ommatidia along their maximal diameter.

Mesosoma. With several decumbent hairs and usually two erect hairs on the pronotum and two on the mesonotum, but sometimes those on the mesonotum or on both are absent. The mesonotum is inflated and bulges dorsally above the pronotum in lateral view. Metanotal groove

absent or narrower than the diameter of the metanotal spiracles. Metathoracic spiracles in dorsolateral position, not protruding, and touching the propodeal suture. Dorsum of the propodeum convex and shorter than the propodeal slope. Propodeal spiracles circular, positioned on the posterior propodeal margin, slightly posterior of the middle of the propodeal slope. Legs with appressed hairs. Petiole short and inclined forward.

Gaster. With dense pubescence and scattered long erect hairs at the edges of the segments. Some specimens of *B. heeri* resemble the regular worker in head and mesosoma, but they have a strongly expanded gaster (physogastry).

Color and sculpture. Head and gaster smooth, dorsum of the mesosoma with imbricate sculpture, body opaque and yellowish, sometimes with a somewhat darker gaster.

Distribution (Supplementary material Fig. S24). We have studied *B. heeri* from localities in Argentina, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, French Guiana, Guatemala, Mexico, Nicaragua, Panama, Paraguay, Uruguay, Venezuela and from populations that were introduced in Switzerland. Santschi (1923a) also reported this species from Puerto Rico, Jamaica, Haiti and Guyana, but we have not studied this material.

Biology. *Brachymyrmex heeri* was originally described from specimens collected in a tropical orchid greenhouse in Switzerland (Forel 1874). The species was found climbing on various plants, and was associated with aphids, but the nest was not located. Santschi (1929) reported that the nest of the type specimens of *B. giardi* var. *cordobensis* was found at the base of a tree, and *B. physogaster* was collected in the heavily humic, finely loamy soil in the shadow of trees, where both excessive moisture and eventual drought are unlikely (Kusnezov 1960).

Remarks. The lectotype is designated here as the ant in the middle of their holder MHNG: USNMENT00757169, whereas the other specimens are paralectotypes. Forel (1874) described the worker of *B. heeri*, but did not indicate physogastry in his description, and Santschi (1923a) did not comment on this issue neither. In the description of *B. giardi* var. *cordobensis* (which is here synonymized under *B. heeri*) Santschi (1929) referred to physogastric specimens, and also to ‘worker-queens’ with a strongly expanded gaster. He does not provide any additional description of these worker-queen specimens, but upon examination of this material and other samples of *B. heeri* we exclusively found worker-like specimens with a normal or robust mesosoma and an expanded gaster. These specimens do not have morphological features reminiscent of a queen, but rather differ from regular workers by having a larger body size, a subquadrate head, with the posterior cephalic margin slightly concave to almost flat, scapes that barely reach the posterior margin of the head, three ocelli, eyes that have approximately 11 ommatidia along their maximal diameter, a deep metanotal groove that is wider than the diameter of the metathoracic spiracles, and as already mentioned, a strongly expanded gaster. To exclude the possibility that the museum samples we studied reflect a mixture of two species, we sequenced specimens of both morphs, and found them to be genetically very similar. In summary, *B. heeri* either has dimorphic workers, or a putative worker-queen intercaste, and whereas we consider the first scenario more likely (because we did not find specimens with a hybrid worker-queen morphology), the issue requires more study. These observations also apply to *B. physogaster*, and this species and *B. giardi* var. *cordobensis* are synonymized here with *B. heeri* because they contain all its morphological features. Forel (1912a) distinguished *B. goeldii* from other *Brachymyrmex* species principally based on the form of the head, and he mainly compared it with *B. bruchi*, however, this material appears to belong to a ‘robust worker’ of *B. heeri*. Interestingly, as for *B. heeri* before, Forel (1912a) does not mention physogastry.

Two varieties have been assigned to *B. heeri*, namely *B. heeri* var. *fallax*, and *B. heeri* var. *basalis*. As indicated before, *B. heeri* var. *fallax* is attributed here to *B. aphidicola*, and *B. heeri* var. *basalis* is synonymized under *B. pictus* (see below) here.

It is noteworthy that *B. heeri* has a wide geographic distribution and a study of the morphological variation within the species in a molecular and geographic context would be required. Likewise, it would be interesting to study the biology of the various morphs within a colony, including the underlying developmental processes and their distribution and behavior within the colony.

Indeed, some colleagues (Kusnezov 1960) have labeled physogastric specimens here assigned to *B. heeri* as honey pot workers and have observed them hanging from the ceiling of the chambers of the nest, as in *Myrmecocystus*, and *B. melensis* (see *B. giardi* above). However, why physogastry is present in some *Brachymyrmex* species, but not in others remains unclear.

Kusnezov (1960) suggested that it may relate to a trophobiotic lifestyle, whereas others suggested it is an adaptation to periodically arid conditions or food scarcity (Forel 1902; Wheeler 1910). However, Creighton (1950), argued exactly the opposite by suggesting that physogastry may develop when a xerophyte species encounters and adapts to less arid and more resource-rich habitats. Clearly, more work on this issue is required, but as mentioned above, the habitat from which *B. physogaster* was reported by Kusnezov (1960) does not appear to confirm the ‘scarcity hypothesis’. This future work should perhaps also consider potential intrinsic causes of physogastry beyond the putative environmental drivers discussed above.

***Brachymyrmex iridescens* NEW SPECIES**

(Fig. 37, supplementary material Fig. S25)

Holotype worker (MZSP: USNMENT00757758) and **paratype workers** (MZSP: USNMENT00757757): 5 workers. **BRAZIL: Santa Catharina**, Chapecó, July 1960, F. Plaumann 9878.

Additional material examined. ARGENTINA: Misiones: Parque Nacional Iguazú, -25.71847 - 54.43319, 23 Sep. 1999, Leponce, Roisin & Theunis, 1 worker (MACN: MACN_En 18283, MACN_En 18201, MACN_En 18242); Parque Nacional Iguazú, 1 worker (RBINS: Coll. RISCNB SID SPM_ID01612). **BRAZIL: Parana:** Londrina, Nov. 2004, D.T. Lopes, 1 worker (CPDC: USNMENT00757755); **Santa Catharina:** Teutônia, June 1961, F. Plaumann, 8219, 3 workers (MZSP: USNMENT00757756).

Etymology: The epithet *iridescens* refers to the conspicuous iridescent appearance of this species under stereoscope illumination.

Diagnosis. *Brachymyrmex iridescens* morphologically resembles *B. santschii*, because both have conspicuous, strongly alveolate sculpture on the head and mesosoma. However, they differ from one another because *B. iridescens* has a metanotal groove that is narrower than the diameter of the metathoracic spiracles, scapes that approximately reach the posterior margin of the head, and a gaster with dense pubescence.

Holotype and paratype measurements (mm) (n=2). HL₁ 0.40-0.43; HL₂ 0.29 - 0.30; HL₃ 0.09; HW 0.35 - 0.37; SL 0.30-0.34; EL 0.09-0.10; WL 0.39-0.40; PnL 0.13; PnW 0.22-0.25; ML 0.09 - 0.11; MW 0.13-0.16; **Indices** CI 85.42-86.67; SI₁ 80.95-82.5; SI₂ 100.00; OI₁ 23.81-25.00; OI₂ 23.81-25.00.

2990
2991 *Additional material examined measurements* (mm) (n=2). HL₁ 0.37-0.42; HL₂ 0.26-0.30; HL₃
2992 0.07-0.11; HW 0.29-0.38; SL 0.28-0.30; EL 0.09; WL 0.39-0.42; PnL 0.12 - 0.13; PnW 0.22-
2993 0.22; ML 0.09-0.11; MW 0.13-0.18; *Indices* CI 78.57-89.36; SI₁ 80.95-93.94; SI₂ 100.00-106.90;
2994 OI₁ 23.81-30.30; OI₂ 19.05-25.53.

2995
2996 **Description. Head.** Slightly longer than wide in full face view; posterior cephalic margin slightly
2997 concave or flat. Dorsum of the head with decumbent hairs. Clypeus with a rounded anterior
2998 margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior
2999 margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the
3000 clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal
3001 margin in oblique anterodorsal view. The scapes are short and approximately reach the posterior
3002 margin of the head; they have decumbent and suberect hairs. Three ocelli are present. Eyes are
3003 positioned on the cephalic midline and have 8-9 ommatidia along their maximal diameter.
3004 **Mesosoma.** With several decumbent hairs, and on the pronotum some suberect hairs. The
3005 mesonotum is inflated and bulges dorsally above the pronotum. The metanotal groove is
3006 narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles dorsal, slightly
3007 protruding, and not touching the mesonotal nor propodeal suture. Dorsum of the propodeum
3008 slightly convex and shorter than the propodeal slope. Propodeal spiracles circular, positioned on
3009 the posterior propodeal margin at the middle of the propodeal slope. Legs with appressed hairs.
3010 Petiole short and inclined forward.
3011 **Gaster.** With decumbent, dense pubescence and several scattered long erect hairs.
3012 **Color and sculpture.** Head and thorax finely alveolate, gaster smooth and shiny. The body is
3013 uniformly brownish.

Distribution (supplementary material Fig. S25). *Brachymyrmex iridescens* is known from Argentina and Brazil.

Biology. Unknown.

Remarks. *Brachymyrmex iridescens* resembles *B. santschii*, but their distributions are strongly disjunct: *B. iridescens* is only known from Brazil and Argentina, whereas *B. santschii* from Costa Rica and Panama.

Brachymyrmex micromegas Emery

(Fig. 38, supplementary material Fig. S26)

Brachymyrmex (Brysha) micromegas Emery in Santschi, 1923a: 675, Figs. 30, 32 (w.).

Lectotype minor worker (MCSN: USNMENT00757222) and **paralectotype minor workers, major workers** (MCSN: USNMENT00757222-00757223; MZSP: USNMENT00758145-00758146, 00757825-00757827, 00757830; NHMG: USNMENT00758145-00758146): 4 major workers, 5 minor workers [examined]. **BRAZIL: São Paulo:** São Paulo city, Ipiranga. See also: Ortiz and Fernández (2014: 16, Figs. 1-6).

Additional material examined. **BRAZIL: São Paulo:** Agudos, 05 Nov. 1967, W. Kempf, 1 minor worker (MZSP: USNMENT00757830); Anhembi, Faz B. Rico, 14 Feb. 1969, W. Kempf, J.C. Magalhães, L.T.F.M. Kulman, 1 minor worker (MZSP: USNMENT00757834).

Diagnosis. *Brachymyrmex micromegas* morphologically resembles *B. pilipes* because both species have a dimorphic worker caste, a clypeus with a row of long thick hairs near the anterior margin, toruli that touch the posterior clypeal margin, but never surpass it in oblique anterodorsal view, and tumuliform metathoracic spiracles. However, *B. micromegas* differs from *B. pilipes* by having a smooth and shiny body, with very fine longitudinal striations restricted to the metapleura.

Description. See Ortiz and Fernández (2014).

Brachymyrmex minutus Forel

(Fig. 39, supplementary material Fig. S27)

Brachymyrmex minutus Forel, 1893: 346 (w.q.). **Lectotype worker** (MHNG: USNMENT00757150) and **paralectotype workers, queen** (MHNG: USNMENT00757149-00757151; USNMENT00758110-00758112; **here designated**): 15 workers, 1 queen [examined].
ANTILLES: Saint Vincent. See also: Santschi (1923a: 667).

Additional material examined. BOLIVIA: Santa Cruz: Aserradero Moira, -14.57 -61.20, 180 m, 27 Nov. 1993, P.S. Ward #12174-49, 3 workers (PSWC: USNMENT00757587), 3 workers (MCZC: USNMENT00757305); 10 km NW Terevinto, -17.67 -63.45, 380 m, 09 Dec. 1993, P.S. Ward #12314-62, #12314-63, 2 workers (PSWC: USNMENT00757870), 5 workers (MCZC: USNMENT00757303-00757304); 35 km SSE Flor de Oro, -13.833 -60.867, 450 m, 29 Nov. 1993, P.S. Ward #12199-73, 7 workers (MCZC: USNMENT00757301 - 00757302); Las Gamas, Parque Natural Noel Kempff Mercado, -14.80 -60.38, 700 m, 03 Dec. 1993, P.S. Ward #12266-43, 4 workers (MCZC: USNMENT00757299-00757300); Las Gamas, Parque Natural Noel

3062 Kempff Mercado P, -14.80 -60.38, 700 m, 04 Dec. 1993, P.S. Ward #12266-45, 6 workers
3063 (MCZC: USNMENT00757297-00757298). **BRAZIL: Ceará:** Guaramiranga (Pq. Tr.), -4.267 -
3064 38.933, 900 m, 22 Feb. 2002, Y. Quinet, 1 worker (CPDC: USNMENT00757874); **Goiás:**
3065 Campo Limpo, faz conceição, -16.33083 -49.16367, 20-24 Jan. 2005, R.R. Silva, 9 workers
3066 (ICN: MZSP071); Campo Limpo, faz conceição, -16.33083 -49.16367, 01-07 July 2005, R.R.
3067 Silva & R.M. Feitosa, 15 workers (ICN: MZSP120 - MZSP121); **Pará:** Belem, 07 Aug. 1962,
3068 P.F. Doulington. B.F. 14, 1 worker (MCZC: USNMENT00757256); Melgaço, Caxiuanã ECFPn,
3069 -1.70661 -51.45909, 10-12 Oct. 2006, Equipe A.Y. Harada, 1 worker (MPEG: AYH018); 10-11
3070 Oct. 2006, 1 worker (MPEG: AYH019); 10-12 Oct. 2005, 7 workers (MPEG: AYH041); 24-26
3071 Jan. 2007, 6 workers (MPEG: AYH003, 069, 115, 122, 124); 28-30 Jan. 2006, 5 workers
3072 (MPEG: AYH001, 007); 23-25 Apr. 2007, 1 worker (MPEG: AYH005); A.Y. Harada, E.P.
3073 Fagundes, C.J.M. Ribeiro, C.E.D. Sanhudo, C.A.R. Moura, J.L.P. Souza, C. Renato, 3 workers
3074 (MPEG: AYH076); -1.72484 -51.42979, 26 Oct. 2006, A.Y. Harada, E.P. Fagundes, C.J.M.
3075 Ribeiro, C.E.D. Sanhudo, C.A.R. Moura, J.L.P. Souza, C. Renato, 45 workers 1 Queen (MPEG:
3076 AYH005, 016, 032, 052, 053, 068, 070, 078, 087, 093, 097, 100, 102, 106, 113, 136); 12-14 Oct.
3077 2006, Equipe A.Y. Harada, 1 worker (MPEG: AYH045); 20-22 July 2006, 2 workers (MPEG:
3078 AYH095); 20-22 Oct. 2005, 2 workers (MPEG: AYH082, 105); 21-23 Oct. 2005, 1 workers
3079 (MPEG: AYH006); 22-24 Apr. 2005, 2 workers (MPEG: AYH082, 105); 23-25 Feb. 2006, 1
3080 worker (MPEG: AYH033); 24-26 July 2003, 10 workers (MPEG: AYH066, 084, 108, 119, 133,
3081 135); 26-28 Nov. 2003, A.Y. Harada, E.P. Fagundes, C. Renato, 1 worker (MPEG: AYH117);
3082 07-09 Feb. 2003, 1 worker (MPEG: AYH060); Melgaço, Caxiuanã ECFPn, -1.73360 -51.51054,
3083 27 Oct. 2003, Equipe A.Y. Harada, 3 workers (MPEG: AYH014, 061); Melgaço, Caxiuanã
3084 ECFPn, -1.73360 -51.51053, 27 Oct. 2003, A.Y. Harada, E.P. Fagundes, C.J.M. Ribeiro, C.E.D.
3085 Sanhudo, C.A.R. Moura, J.L.P. Souza, C. Renato, 3 workers (MPEG: AYH101, 035, 050); 14-16

3086 Oct. 2006, Equipe A.Y. Harada, 15 workers, 2 queens (MPEG: AYH107, 081, 116); 23-25 July
3087 2006, 1 worker (MPEG: AYH104); 12-14 Oct. 2006, Equipe A.Y. Harada, 3 workers (MPEG:
3088 AYH051); Melgaço, Caxiuanã ECFPn, -1.73584 -51.48762, 30 Oct. 2003, A.Y. Harada, E.P.
3089 Fagundes, C.J.M. Ribeiro, C.E.D. Sanhudo, C.A.R. Moura, J.L.P. Souza, C. Renato, 1 worker
3090 (MPEG: AYH091); 13-15 Oct. 2005, Equipe A.Y. Harada, 5 workers (MPEG: AYH031, 056);
3091 15-17 Jan. 2006, 1 worker (MPEG: AYH132); 21 Apr. 2006, 1 worker (MPEG: AYH080); 22-24
3092 July 2006, 1 worker (MPEG: AYH121); 23-25 Oct. 2005, 3 workers (MPEG: AYH017, 027,
3093 030); 23-28 Oct. 2005, 1 worker (MPEG: AYH022); 25-27 Jan. 2006, 1 worker (MPEG:
3094 AYH128); 26-28 Jan. 2007, 2 workers (MPEG: AYH075); -1.75444 -51.52241, 28 Jan. 2003,
3095 AY Harada, E.P. Fagundes, C.J.M. Ribeiro, C.E.D. Sanhudo, C.A.R. Moura, J.L.P. Souza, C.
3096 Renato, 1 worker (MPEG: AYH011); 28 Oct. 2003, 10 workers (MPEG: AYH028, 079, 089,
3097 092, 118); 01-03 Nov. 2004, Equipe A.Y. Harada, 1 worker (MPEG: AYH020); 01-05 Nov.
3098 2004, 1 worker (MPEG: AYH004); 19-21 Oct. 2007, 1 worker (MPEG: AYH026); 20-22 July
3099 2007, 3 workers (MPEG: AYH025, 065); 22-24 Oct. 2003, 1 worker (MPEG: AYH085); 22-24
3100 Oct. 2005, 2 workers (MPEG: AYH110, 123); 24-26 Oct. 2006, 1 worker (MPEG: AYH040);
3101 Melgaço, Caxiuanã ECFPn, -1.78155 -51.59197, 24-26 Oct. 2007, 1 worker (MPEG: AYH009);
3102 30 July-01 Aug. 2003, 2 workers (MPEG: AYH010); 02 Oct. 2006, A.Y. Harada, E.P. Fagundes,
3103 C.J.M. Ribeiro, C.E.D. Sanhudo, C.A.R. Moura, J.L.P. Souza, C. Renato, 2 workers (MPEG:
3104 AYH077); 30 Oct. 2003, 2 workers (MPEG: AYH125, 130); 02 Nov. 2003, 1 worker (MPEG:
3105 AYH120); 12-14 Oct. 2006, Equipe A.Y. Harada, 1 worker (MPEG: AYH054); 14-16 Oct. 2006,
3106 1 worker (MPEG: AYH043); 15-17 Oct. 2006, 1 worker (MPEG: AYH055); 15-17 Oct. 2010, 16
3107 workers (MPEG: AYH013, 024); 23-25 Apr. 2003, 1 worker (MPEG: AYH096); 23-25 July
3108 2007, 6 workers (MPEG: AYH002, 042, 072); 23-25 May 2003, 1 worker (MPEG: AYH114);
3109 24-26 July 2006, 2 workers (MPEG: AYH015); 25-27 Jan. 2007, 2 workers (MPEG: AYH064,

090); 25-27 June 2007, 1 worker (MPEG: AYH012); 30 July-01 Aug. 2003, 3 workers (MPEG:
AYH103, 131); 30 July-01 Aug. 2003, A.Y. Harada, E.P. Fagundes, C. Renato, 2 workers
(MPEG: AYH098, 109); **Rondônia:** Ouro Preto do Oeste, 04 Apr. 1985, F.F. Ramos, Res. INPA
N°0388, 2 workers (MPEG: USNMENT00757865, 00757866); São Paulo, Jundiai, Serra Do
Japi, Jan. 2009, S. Diniz, 3 workers (ICN: USNMENT00759044); **São Paulo:** Tapirai, -24.03208
-47.46556, 08-14 Jan. 2001, R.R. Silva & Everhardt, 1 worker, 2 males (ICN: MZSP172).
COLOMBIA: Amazonas: Leticia, 1 worker (ICN); Parque Nacional Natural Amacayacu,
Matamata, -3.68 -70.25, 150 m, 23 Oct. 2000, 1 worker (ICN); **Cundinamarca:** La Vega,
Reserva Natural Natautá, 5.00 -74.33, 1040 m, 10 Nov. 2010, F. Fernández, 1 worker (ICN:
USNMENT00757873); **Magdalena:** 4 km N San Pedro, 10.95 -74.05, 550 m, 14 Aug. 1985, P.S.
Ward #7912-35, 3 workers (PSWC: USNMENT00757863); **Norte de Santander:** 2 km N
Barrancabermeja, Dec. 1962, leafmodd Berles. J. Archer; **Quindío:** Buenavista, Vereda El
infierno, Finca Guadalajara, 4.37667 -75.76944, 1160 m, 16 Nov. 1999, E. Gonzalez, 3 workers
(IAvH: IAvH-E74164); Calarca, Vereda Santo Domingo, Finca Santa Librada, 4.55694 -
75.63917, 1575 m, 16 Jan. 2000, J. Sosa, 5 workers, 1 queen (IAvH: IAvH-E74163, 74157);
Circasia, Vereda Buenavista, Finca Calamar, 4.59806 -75.69861, 1450 m, 12 Oct. 1999, E.
Gonzalez, 2 workers (IAvH: IAvH-E74168); **Risaralda:** La Celia, 5.00361 -76.00444, 1900 m,
27 Jan. 2011, Gustavo Zabala, 2 workers (ICN); **Valle del Cauca:** Cairo, Vereda Vallecitos,
Finca El Maladero, 4.75803 -76.22732, 1850 m, 29 Mar. 2003, J. Henao, 1 worker (IAvH:
IAvH25152); **Vichada:** Cumaribo, Corregimiento Santa Rita, PNN El Tuparro, 5.3075 -67.9500,
135 m, 14-16 Feb. 2004, I. Quintero & E. Gonzalez, 1 worker (IAvH: USNMENT00759055).
COSTA RICA: Heredia: Estación Biológica La Selva, 10.43691 -84.01374, 50 m, 19 Mar. 93,
J. Longino, 1 worker (JTLCL: JTLCL000007845); La Selva, 12 June 1991, L.E. Tennant, 2 workers
(MCZC: USNMENT00757284, 00757285); **Puntarenas:** Estación Biológica Los Llanos,

3134 10.30487 -84.83735, 1150 m, 28 Feb. 2004, J. Longino #5249-s, 1 worker (JTLC:
 3135 JTLC000004545); Peninsula Osa, Parque Natural Corcovado, Sirena, 8.467 -83.583, 11 Aug.
 3136 1980, J. Longino, 1 worker (MCZC: USNMENT00757289); Parque Natural Corcovado, Sirena,
 3137 8.48333 -83.60000, 10 m, 27 June 1982, J. Longino, 1 worker (JTLC: JTLC000005929); **San**
 3138 **José:** San Jose, 9.933 -84.083, 1100 m, 14 June 1999, J. Longino #4040-s, 1 worker (JTLC:
 3139 LACM ENT 143521). **CUBA: Holguín:** 2 km N La Melba, 20.467 -74.817, 400 m, 22 Aug.
 3140 2001, P.S. Ward #14424-16, 3 workers (PSWC: USNMENT00757862); **Manicaragua:** Trinidad
 3141 Mts, 01 Aug. 1953, E. O. Wilson #65, 3 workers, 1 queen (MCZC: USNMENT00757295).
 3142 **DOMINICAN REPUBLIC:** 16 km ENE Pedernales, 18.1167 -71.6167, 800 m, 10 Sep. 1992,
 3143 P.S. Ward #11751-16, 3 workers (PSWC: USNMENT00757872). **ECUADOR: Pichincha:**
 3144 Reserva Forestal ENDESA, 0.083 -79.033, 25 Jan. 1994, L.E. Tennant, 3 workers MCZC:
 3145 USNMENT00757293, 00757869); Reserva Forestal ENDESA, 0.13 -79.05, 600 m, 05 Dec.
 3146 2003, A. L. Wild #AW2195, 1 worker (ALWC: USNMENT00757861); **Zamora-Chinchipe:**
 3147 Copalinga, -4.09122 -78.96069, 1000 m, 28-30 Sep. 2009, Delsinne/Arias, col id 35155, 35161,
 3148 15 workers (RBINS: Coll.RIScNB SID SPM_ID3515505, 3516111); 30 Sep.– 02 Oct. 2009,
 3149 Delsinne/Arias, col id 34651, 39654, 3 workers (RBINS: Coll.RIScNB SID SPM_ID3465109,
 3150 3465404); 01-03 Oct. 2009, Delsinne/Arias, col id34663, 34671, 34673, 14 workers (RBINS:
 3151 Coll.RIScNB SID SPM_ID3466304, 3467107, 3467305); 07 Oct. 2009, Delsinne/Arias, col Id
 3152 34715, 34733, 29 workers (RBINS: Coll.RIScNB SID SPM_ID3471501, 3473311); 04-06 Oct.
 3153 2009, Delsinne/Arias, col id34695, 34703-34705, 34709), 19 workers (RBINS: Coll.RIScNB SID
 3154 SPM_ID3469506, 3470305, 3470405, 3470504, 3470909); 05-07 Oct. 2009, Delsinne/Arias, col
 3155 id34746, 34751, 34753, 5 workers (RBINS: Coll.RIScNB SID SPM_ID3474605, 3475106,
 3156 3475305). **FRENCH GUIANA:** Araguez, Inselbery forest, Sara Groc, 3 workers (ICN:
 3157 USNMENT00757864); Kaw Mountains, Oct. 2008, Sara Groc, 2 workers (ICN:

USNMENT00757867); Oct. 2009, Sara Groc, 6 workers (ICN: USNMENT00759035).

GUATEMALA: Zacapa: 8.5 km NE Tuculután, 15.058717 -89.67638, 1100 m, 06 July 2001, J. Longino #6016-s, 1 worker (JTLC: JTLC000009864). **MEXICO: Oaxaca:** 7.2 km S Valle Nacional, 490 m, 11-18 Aug. 1973, A. Newton, 2 workers (MCZC: USNMENT00757286, 00757287); **Veracruz:** Los Tuxtlas, 10 km NNW Sontecomapan, 18.583 -95.083, 500 m, 21 Mar. 1995, P.S. Ward #1369-39, 2 workers (PSWC: USNMENT00757871); Sa. Teoviscocla, nr. Cuichapa to 1600 m trop. For w. coffe, 04 Aug. 1965, Cornell Univ. Mexico Field Party, 6 workers, 1 queen (MCZC: USNMENT00757290, 00757291, 00757296). **PANAMA:** Barro Colorado I., Canal Zone, Jan. 1960, m-16 Strays, W.L. Brown, E.S. McCluskey, 1 worker (MCZC: USNMENT00757288); **PARAGUAY: Canindeyú:** Reserva Natural del Bosque, Mbaracayú, Jejuimi, -24.1 -55.5, 02 May 1996, A. Wild #0132, 3 workers, 1 queen (ALWC: USNMENT00757601); 11 Feb. 1997, A. Wild #AW 0409, 1 worker (ALWC: USNMENT00757860). **PERU: Madre de Dios:** Reserva Nacional Tambopata, Centro Sachavacayoc, -12.85583 -69.36194, 19-31 July 2012, curso de hormigas, 7 workers (ICN: JSC120726-LS01). **SURINAME:** Tambahredjo, June 1959, I. V. d. Drift, 1 worker (MPEG: USNMENT00757876). **VENEZUELA: Aragua:** Parque Nac. Henri Pittier, La Toma, 10.34924 -67.68251, 1169 m, 09-19 Aug. 2008, Ant Course, 3 workers, 1 queen (ICN: USNMENT00757600, 00758023); Rancho Grande, 1100 m, 23-27 June 1967, W.L. Brown, 1 worker (MCZC: USNMENT00757294); 12 Aug. 1967, R.W. Poole, 3 workers (MCZC: USNMENT00757875).

Diagnosis. *Brachymyrmex minutus* morphologically resembles *B. australis*, *B. aphidicola* and *B. termitophilus*, because all these species have eyes located on the cephalic midline, a mesonotum that does not bulge dorsally above the pronotum in lateral view, and yellowish body color.

Brachymyrmex minutus differs from the three other species, or any other *Brachymyrmex* species for that matter, by having a very inconspicuous mesometanotal suture, giving the impression that the mesonotum and metanotum are fused. Additionally, *B. minutus* differs from *B. termitophilus* by having scattered pubescence on the gaster, from *B. aphidicola* by the presence of only two erect hairs on the pronotum and from *B. australis* by having scapes that surpass the posterior margin of the head by a length that is smaller than the maximal diameter of the eye.

Lectotype and paralectotypes worker measurements (mm) (n=4). HL₁ 0.37-0.40; HL₂ 0.25-0.31; HL₃ 0.07-0.10; HW 0.32-0.36; SL 0.32-0.36; EL 0.08-0.11; WL n.a.; PnL n.a.; PnW 0.20-0.24; ML 0.06-0.07; MW 0.14-0.15; *Indices* CI 85.88-89.29; SI₁ 92.59-108.00; SI₂ 107.14-126.67; OI₁ 26.03-29.63; OI₂ 20.00-25.27.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin weakly convex. Dorsum of the head with sparse hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal oblique view. The scapes surpass the posterior margin of the head by a length that is smaller than the maximal diameter of the eye; they have appressed pubescence. Ocelli absent. Eyes are positioned on the cephalic midline and have 8-9 ommatidia along their maximal diameter.

Mesosoma. Typically with two erect hairs on the pronotum and without erect hairs on the mesonotum. The mesonotum is not inflated and does not bulge dorsally above the pronotum in lateral view. Mesometanotal suture inconspicuous, giving the impression that the mesonotum and

metanotum are fused. Metanotal groove absent or narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, not protruding, and touching the propodeal suture. Dorsum of the propodeum slightly convex and shorter than the propodeal slope. Propodeal spiracles circular, positioned on the posterior propodeal margin, just dorsally at the middle of the propodeal slope. Legs with appressed and scattered hairs. Petiole short and inclined forward.

Gaster. With scarce pubescence and several scattered long suberect hairs.

Color and sculpture. Body smooth, or finely granulated and shiny, sometimes with some imbricate sculpture on the dorsum of the mesosoma. Body usually yellowish, but sometimes reddish.

Distribution (Supplementary material Fig. S27). *Brachymyrmex minutus* is known to occur in Bolivia, Brazil, Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, French Guiana, Guatemala, Mexico, Panama, Paraguay, Peru, Suriname and Venezuela.

Biology. Forel (1893) found several colonies subterraneous at the roots of sod, usually where it overgrows rocks, typically within the forest and/or nearby streams. The nest of *B. minutus* consists of large tunnels with small chambers at intervals. Colonies contain ~50 to 100 individuals, with a single queen.

Remarks. The lectotype is designated here as the second ant counting from the top of pin MHNG: USNMENT00757150, whereas the other specimens on that pin are paralectotypes.

Forel (1893) admitted having confused this species for *B. heeri* before but provided several morphological differences. However, *B. minutus* is morphologically more similar to the species indicated here in the diagnosis.

***Brachymyrmex modestus* Santschi**

(Fig. 40, supplementary material Fig. S28)

Brachymyrmex modestus Santschi, 1923b: 271 (w.). **Lectotype worker** (NHMB: USNMENT00758099) and **paralectotype workers** (NHMB: USNMENT00758099, 00758100; **here designated**): 3 workers [examined]. **BRAZIL: Santa Catarina:** Blumerau, A. Reinchensperguer leg.

Additional material examined. BRAZIL: Santa Catarina: Palhoça, PE Serra do Tabuleiro, -27.74111 -48.69722, 02-10 June 2003, R.R. Silva, B.H. Dietz & A. Tavares, 1 worker (ICN: MZSP033); São Bento do Sul, APA Rio Vermelho, -26.36417 -49.27111, 30 Mar.-04 Apr. 2004, R. Silva & Eberhardt, 8 workers (ICN: MZSP138); **São Paulo:** Cunha, PE Serra do Mar, Nucleo Cunha-Indara, -23.25083 -45.00722, 21-22 Apr. 2001, A.A. Tavares & R.R. Silva, 12 workers (ICN: MZSP149); Praia grande, PE Serra do Mar, nucleo pilhões-Cubatão, -23.9753 -46.5400, 26-27 May 2001, A.A. Tavares & R.R. Silva, 5 workers (ICN: MZSP165). **COLOMBIA:** **Amazonas:** Leticia, Reserva Forestal del Rio Calderón, Estación Biológica El Zafre, -4.00583, -69.89861, 150 m, 02-04 Dec. 2007, L.E. Franco & S. Florez, 2 workers (IAvH); **Caldas:** Aranzazu, Vereda Chambery, Finca Los Planes, 5.29231 -75.47283, 1910 m, 01-03 Aug. 2003, L.E. Franco & Cruz, 1 worker (IAvH: IAvH27307); Finca maranduba, 5.30731 -75.47250, 2050 m, 30 July–01 Aug. 2003), L.E. Franco & Cruz, 2 workers (IAvH: IAvH27288); Vereda La Guaiara, Finca Villa Ofelia, 5.286 -75.465, 1965 m, 01-03 Aug. 2003, L.E. Franco & Cruz, 1

worker, 1 queen (IAvH: IAvH27320); Vereda Sabana Larga, Finca Cañada Brujas, 5.30883 -
 75.47281, 1920 m, 31 July-02 Aug. 2003, L.E. Franco & Cruz, 3 workers (IAvH: IAvH55442);
Quindio: Circasia, Finca Calamar, 4.60 -75.70, 1450 m, 12 Oct. 1999, E. Gonzalez, 1 worker
 (IAvH: IAvH 74169); Filandia, Vereda Cruces, Finca Aranjuez, 4.70826 -75.64679, 1750 m, 13-
 15 July 2002, E. Jiménez & L.E. Franco, 2 workers (IAvH: IAvH27261); Finca La Cha, 4.70468
 -75.60982, 1920 m, 28-30 Aug. 2002, E. Jiménez & L.E. Franco, 1 worker, 1 queen (IAvH:
 IAvH27233); 4.69617 -75.61056, 1920 m, 28-30 Aug. 2002, E. Jiménez & L.E. Franco, 2
 workers (IAvH: IAvH27239); **Risaralda:** Pereira, Vereda El Manzano, Finca Santa Isabel,
 4.70515 -75.62377, 1860 m, 15-17 July 2002, E. Jiménez & L.E. Franco, 3 workers (IAvH:
 IAvH27234); Vereda La Suiza, Finca El Amparo de Niños, 4.74624 -75.59830, 1810 m, 28-30
 Nov. 2002, L.E. Franco, 3 workers (IAvH: IAvH27273); 4.75013 -75.60278, 1780 m, 26-28 Nov.
 2002, L.E. Franco & E. Londoño, 2 workers (IAvH: IAvH27281); Finca Pez Fresco, 4.73838 -
 75.58016, 1910 m, 22-24 Nov. 2002, E. Jiménez & M.F. Reina, 1 worker, 1 queen (IAvH:
 IAvH27275); Finca Tesorito, 4.72141 -75.56186, 1940 m, 27-29 Nov. 2002, E. Jiménez, L.E.
 Franco & E. Londoño, 2 workers, 1 queen (IAvH: IAvH27280); Santuario, 26 Feb. 2003, 1
 worker (IAvH: IAvH27286). **ECUADOR: Pichincha:** Maquipucuna, 5 km, ESE Nanegal,
 0.11667 -78.63333, 1500 m, 17 Aug. 1991, P.S. Ward #11503-19, 5 workers (MCZC:
 USNMENT00757255, 00757283).

Diagnosis. *Brachymyrmex modestus* morphologically resembles *B. donisthorpei* and *B. myops*
 because these species have short dense hairs on the head and the mesosoma, short suberect hairs
 on the scapes, eyes below the cephalic midline of the head, the metanotal groove is either absent
 or narrower than the diameter of the metathoracic spiracles, their gaster bears dense pubescence,
 and their bodies are yellowish. *Brachymyrmex modestus* differs from *B. donisthorpei* by having

scapes that surpass the posterior margin of the head, and from *B. myops* by having a mesonotum that bulges dorsally above the pronotum in lateral view.

Lectotype and paralectotypes measurements (mm) (n=3) HL₁ 0.49-0.51; HL₂ n.a.; HL₃ 0.14-0.16; HW 0.45; SL 0.43; EL 0.08-0.09; WL 0.49-0.55; PnL 0.10-0.14; PnW 0.29-0.39; ML 0.08-0.16; MW 0.20-0.25; *Indices* CI 88.46 - 92.00; SI₁ 95.65; SI₂ n.a.; OI₁ 17.39-19.57; OI₂ 20.00-25.27.

Additional material examined measurements (mm) (n=3). HL₁ 0.41-0.46; HL₂ 0.29-0.32; HL₃ 0.11-0.12; HW 0.38-0.45; SL 0.38-0.40; EL 0.06-0.07; WL 0.45-0.49; PnL 0.12-0.13; PnW 0.22-0.28; ML 0.10-0.12; MW 0.18-0.22; *Indices* CI 91.49-100.00; SI₁ 90.00-97.78; SI₂ 120.00-133.33; OI₁ 15.56-18.61; OI₂ 23.53-27.66.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin flat. Dorsum of the head with appressed and several suberect hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior margin of the head by a length approximately equal to the maximal diameter of the eye and bear decumbent hairs. Ocelli appear to be absent. Eyes are positioned below the cephalic midline and have 3-4 ommatidia along their maximal diameter.

Mesosoma. Usually with two erect hairs on the pronotum and two on the mesonotum; sometimes additional decumbent hairs are present, mainly on the pronotum. The mesonotum is inflated, somewhat anteriorly inclined, and bulges dorsally above the pronotum in lateral view. Metanotal

groove usually absent or narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles small and in dorsolateral position, not protruding, and touching the propodeal suture. Dorsum of the propodeum convex and shorter than the propodeal slope. Propodeal spiracles circular and positioned on the posterior propodeal margin, ventrally and slightly posterior of the middle of the propodeal slope. Legs with appressed hairs. Petiole short and inclined forward.

Gaster. With dense pubescence and some long erect hairs at the edges of the segments.

Color and sculpture. Head and gaster smooth and shiny, dorsum of the mesosoma slightly imbricate. Body yellowish, with the gaster sometimes being darker in color.

Distribution (Supplementary material Fig. S28). *Brachymyrmex modestus* is known from Brazil, Colombia and Ecuador.

Biology. The type material of *B. modestus* was collected in association with termites (Santschi 1923b).

Remarks. The here designated lectotype is the specimen without expanded gaster on pin NHMB: USNMENT00758099, whereas the other specimen is one of the paralectotypes. Santschi (1923b) mentioned the presence of physogastric workers in *B. modestus*, and we also observed some physogastric individuals in other samples (ICN: MZSP138, 149). These specimens are characterized by having a larger body in comparison to regular workers, and they have shorter scapes that barely reach the posterior margin of the head.

Brachymyrmex musculus Forel

(Fig. 41, supplementary material Fig. S29)

Brachymyrmex tristis r. *musculus* Forel, 1899: 124 (w.). **Lectotype worker** (MHNG: USNMENT00757155) and **paralectotype workers** (MHNG: USNMENT00757153-00757155; USNMENT00758113-00758115; MCSN: USNMENT00757152; **here designated**): 16 workers [examined]: **COSTA RICA**: Pittier; Forel (1901a: 135) (q.). Raised to species: Forel (1901a: 135). See also: Santschi (1923a: 673).

Additional material examined. ARGENTINA: Mendoza: 22.81 km W Villa Seca, -33.58515 - 69.41708, 1835 m, 06 Jan. 2008, W. MacKay, 1 worker (WEMC: USNMENT00757974); **Santa Cruz:** 12 km S Bajo Caracoles, 640 m, E.I. Schlinger & M.E. Trwin, ANTC10276, 1 worker (CASC: CASENT0196018). **COLOMBIA: Quindio:** Filandia, Vereda Cruces, Finca Los Micos, 4.70239 -75.64665, 1800 m, 12-14 July 2002, E. Jimenez & L.E. Franco, 1 worker (IAvH: IAvH27235). **COSTA RICA: Puntarenas:** Monteverde, 10.301 -84.806, 1500 m, 27 June 1984, J. Longino, 2 workers, 1 queen (JTLC: JTLC000005951, JTLC000005953). **MEXICO:** Mexico, 6.5 km E Chalma, 26 May 1988, W.P. MacKay #10386, 1 worker, 2 males, 1 queen (WEMC: USNMENT00759016). **PARAGUAY: Amambay:** Pedro Juan Caballero, - 22.567 -55.617, 20 Aug. 1998, A. Wild #AW0642, 1 worker (ALWC: USNMENT00757965). **VENEZUELA: Lara:** 9 km SE Barbacoas, 9.77 -71.06, 2000 m, 22 Aug. 1987, P.S. Ward #8923, 3 workers (PSWC: USNMENT00757589).

Diagnosis. *Brachymyrmex musculus* morphologically resembles *B. bruchi*, *B. patagonicus* and *B. oculatus*, because all four species have scapes that surpass the posterior margin of the head, a mesonotum that does not bulge dorsally above the pronotum in lateral view, a gaster with scattered pubescence and a brownish body. However, *B. musculus* differs from the three other

species by having a metanotal groove that is wider than the diameter of the metathoracic spiracles.

Lectotype and paralectotype measurements (mm) (n=5). HL₁ 0.43-0.48; HL₂ 0.30-0.33; HL₃ 0.10-0.11; HW 0.39-0.42; SL 0.39-0.42; EL 0.10-0.12; WL 0.42-0.46; PnL 0.11; PnW 0.25-0.29; ML 0.08-0.10; MW 0.18-0.20; *Indices* CI 87.16-91.26; SI₁ 98.92-100.00; SI₂ 117.65-136.76; OI₁ 23.16-30.00; OI₂ 21.10-23.81.

Additional material examined measurements (mm) (n=3) HL₁ 0.48-0.51; HL₂ 0.33-0.37; HL₃ 0.10-0.12; HW 0.44-0.47; SL 0.43-0.47; EL 0.12-0.14; WL 0.35-0.51; PnL 0.10-0.14; PnW 0.30-0.32; ML 0.10-0.12; MW 0.19-0.20; *Indices* CI 89.09-92.59; SI₁ 97.87-102.04; SI₂ 125.00-131.58; OI₁ 26.00-30.61; OI₂ 21.15-24.07.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin slightly concave. Dorsum of the head has sparse appressed hairs. Clypeus with the medial anterior margin somewhat forming a lip and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more are near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior cephalic margin with a length up to the maximal diameter of the eye; with appressed hairs. Three ocelli are present but inconspicuous. Eyes are positioned on the cephalic midline with 9-11 ommatidia along their maximal diameter.

Mesosoma. Typically with two erect hairs on the pronotum and two on the mesonotum; sometimes with additional suberect hairs mainly on the pronotum. The mesonotum is not inflated

and does not bulge dorsally above the pronotum in lateral view. Metanotal groove wider than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, not protruding, and close to the propodeal suture. Dorsum of the propodeum convex and shorter than the posterior propodeal slope. Propodeal spiracles circular, positioned on the posterior propodeal margin at the middle of the propodeal slope. Legs with appressed hairs. Petiole short and inclined forward.

Gaster. With scattered pubescence and several scattered long erect hairs.

Color and sculpture. Body overall smooth and shiny, except for the sometimes slightly imbricate sculpture on the dorsum of the mesosoma. Body typically brownish, however, the bulbi of the antennae are whitish, and the antenna and legs, especially the tarsi, are somewhat lighter in color than the body.

Distribution (Supplementary material Fig. S29). *Brachymyrmex musculus* is known from Argentina, Colombia, Costa Rica, Mexico, Paraguay and Venezuela.

Biology. Unknown.

Remarks. The lectotype is here designated as the ant at the top of pin MHNG:

USNMENT00757155, whereas the other specimens in the pin are paralectotypes.

Forel (1899) originally described *B. musculus* as a race of *B. tristis*, but later indicated that the difference in size urged him to elevate it to a separate species (Forel 1901a). We agree with this decision, because *B. tristis* differs from *B. musculus* by having dense decumbent hairs on the head and the dorsum of the mesosoma, a mesonotum that bulges dorsally above the pronotum, and metathoracic spiracles that protrude slightly.

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3398 *Brachymyrmex myops* Emery

3399 (Fig. 42, supplementary material Fig. S30)

3400 *Brachymyrmex myops* Emery, 1906: 182, footnote, Fig. 42 (w.m.). **Lectotype worker** (NHMB:

3401 USNMENT00757221) and **paralectotype male** (NHMB: USNMENT00757221; **here**

3402 **designated**): 1 worker, 1 male [examined]. **BRAZIL: Santa Catarina:** Joinville, J. P. Schmalz,

3403 leg. See also: Santschi (1923a: 663).

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3405 **Additional material examined. BOLIVIA: Santa Cruz:** 35 km SSE Flor de Oro, -13.833 -

3406 60.867, 450 m, 29 Nov. 1993, P.S. Ward #12199-74, 5 workers (MCZ: USNMENT00757254,

3407 00757892), 3 workers (PSWC: USNMENT00758027); **BRAZIL: Amazonia:** Rondonia, Jerau,

3408 R.M. Feitosa, 5 workers (ICN: MZSP178); **Pará:** Belém, 07 Aug. 1962, P.F. Doulington. B.F.

3409 14, 1 worker (MCZC: USNMENT00757257); 14 Aug. 1962, P.F. Doulington. B.F. 19, 2 workers

3410 (MCZC: USNMENT00757258); 14 Aug. 1962, P.F. Doulington. B.F. 19, 1 worker (MCZC:

3411 USNMENT00757259); Melgaço, Caxiuanã ECFPn, -1.70661 -51.45909, 01 Nov. 2003, A.Y.

3412 Harada, E.P. Fagundes, C.J.M. Ribeiro, C.E.D. Sanhudo, C.A.R. Moura, J.L.P. Souza, C. Renato,

3413 1 worker (MPEG: AYH094); 10-12 Oct. 2006, Equipe A.Y. Harada, 1 worker (MPEG:

3414 AYH046); 10-12 Oct. 2007, Equipe A.Y. Harada, 2 workers (MPEG: AYH038); 20-22 Oct.

3415 2006, Equipe A.Y. Harada, 8 workers (MPEG: AYH058); 20-22 Oct. 2007, Equipe A.Y. Harada,

3416 4 workers (MPEG: AYH021, 047, 059); 25-27 Oct. 2007, Equipe A.Y. Harada, 3 workers

3417 (MPEG: AYH039, 048, 099); -1.73584 -51.48762, 13-15 Oct. 2005, Equipe A.Y. Harada, 5

3418 workers (MPEG: AYH037); 25-27 Jan. 2007, Equipe A.Y. Harada, 1 worker (MPEG: AYH111);

3419 -1.78155 -51.59753, 15-17 Oct. 2007, Equipe A.Y. Harada, 3 workers (MPEG: AYH013, 044);

24-26 Oct. 2007, Equipe A.Y. Harada, 1 worker (MPEG: AYH029); 25-27 Jan. 2007, Equipe
 A.Y. Harada, 1 worker (MPEG: AYH062); 27-29 Jan. 2006, Equipe A.Y. Harada, 5 workers
 (MPEG: AYH034); 30 July-01 Aug. 2003, Equipe A.Y. Harada, 13 workers (MPEG: AYH134);
 A.Y. Harada, E.P. Fagundes, C. Renato, 3 workers (MPEG: AYH129). **COLOMBIA: Cauca:**
 PNN Gorgona, Mancora, 2.967 -78.183, 60 m, 02 Feb. 2000, D. Campos, 16 workers (IAvH).

Diagnosis. *Brachymyrmex myops* morphologically resembles *B. donisthorpei* and *B. modestus*
 because all three species have dense short hairs on the head and mesosoma, scapes with short
 suberect hairs, eyes that are positioned below the cephalic midline of the head, a metanotal
 groove that is absent or narrower than the diameter of the metathoracic spiracles, a gaster with
 dense pubescence, and yellowish body color. However, *B. myops* differs from *B. donisthorpei* by
 having scapes that surpass the posterior margin of the head and from *B. modestus* by having a
 mesonotum that does not bulge dorsally above the pronotum.

Lectotype measurements (mm) HL₁ 0.41; HL₂ 0.29; HL₃ 0.12; HW 0.37; SL 0.35; EL 0.06; WL
 0.41; PnL 0.14; PnW 0.25; ML 0.12; MW 0.20; *Indices* CI 90.48; SI₁ 94.74; SI₂ 120.00; OI₁
 15.79; OI₂ 28.57.

Additional material examined measurements (mm) (n=3). HL₁ 0.37-0.38; HL₂ 0.27-0.30; HL₃
 n.a.; HW 0.33-0.34; SL 0.34-0.36; EL 0.05-0.06; WL 0.36; PnL 0.09-0.10; PnW 0.22-0.23; ML
 0.06-0.07; MW 0.15-0.18; *Indices* CI 88.10-88.37; SI₁ 102.70-105.40; SI₂ 111.76-130.00; OI₁
 15.79-18.92; OI₂ n.a.

Description. *Head.* Slightly longer than wide in full face view; posterior cephalic margin slightly concave. Dorsum of the head with appressed and several suberect hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more are near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior margin of the head by a length approximately equal to the maximal diameter of the eye and have decumbent and suberect hairs. Ocelli absent. Eyes are positioned below the cephalic midline and have 3-4 ommatidia along their maximal diameter.

Mesosoma. Usually two erect hairs on the pronotum and two on the mesonotum; sometimes decumbent hairs are present, mainly on the pronotum. The mesonotum is somewhat inflated, but it does not bulge dorsally above the pronotum in lateral view. Metanotal groove absent or narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles inconspicuous, in dorsolateral position, not protruding, and not touching any suture. Dorsum of the propodeum weakly convex and much shorter than the propodeal slope. Propodeal spiracles circular but inconspicuous, positioned on the posterior propodeal margin, slightly posterior of the middle of the propodeal slope. Legs with appressed hairs. Petiole short and inclined forward.

Gaster. With dense pubescence and several long erect hairs, mainly along the edges of the segments.

Color and sculpture. Head and gaster smooth and shiny, dorsum of the mesosoma slightly imbricate. Body usually uniformly yellowish, but sometimes with a darker gaster

Distribution (Supplementary material Fig. S30). *Brachymyrmex myops* is known from Bolivia, Brazil and Colombia.

Biology. Emery (1906) described *B. myops* from specimens that were collected in the nest of the termite *Anoplotermes ater*.

Remarks. The worker on pin NHMB: USNMENT00757221 is designated here as the lectotype. *Brachymyrmex myops* has been described from one worker and a male, which makes it currently impossible to determine the intraspecific variation. *Brachymyrmex modestus* has also been collected from termite nests, has a very similar geographic distribution as *B. myops*, and both species resemble one another morphologically (see diagnosis). They differ in whether the mesonotum bulges dorsally above the pronotum in lateral view, which is a trait of diagnostic value to delimit several *Brachymyrmex* species, however, the conditions in *B. myops* and *B. modestus* are not strongly different, and both species may be conspecific.

***Brachymyrmex nebulosus* LaPolla & Longino**

(Fig. 43, supplementary material Fig. S31)

Brachymyrmex nebulosus LaPolla and Longino, 2006: 299, Fig. 1 (w.). **COSTA RICA:**

Puntarenas: 6 km south of Monteverde, 10.25 -84.82, 800 m, 22 June 1999, J. Longino #4050, LACM ENT 143550 (INBC).

Paratype examined. COSTA RICA: Puntarenas: Ojo de agua, rd to Monteverde, 800 m, 05 July 1991, J. Longino, leg. (JTLC #2965), 2 workers (INBIO).

Additional material examined. MEXICO: Chiapas: Sierra Morena, 16.15427 -93.58961, 1150 m, 11 May 2008, J. Longino #6218-s, 2 workers (JTLC: JTLC0000007379; CASENT0609689).

Diagnosis. *Brachymyrmex nebulosus* differs from other *Brachymyrmex* species in having a clypeus with its medial portion forming a conspicuous “lip”, its hour-glass shaped mesosoma and it has portions of the head and mesosoma that bear alveolate sculpture. *Brachymyrmex musculus* is the only other *Brachymyrmex* species known to date that has a clypeus with a somewhat developed medial lip, but it is less conspicuous than in *B. nebulosus*.

Paratype measurements (mm). HL₁ 0.67; HL₂ 0.40; HL₃ 0.24; HW 0.63; SL 0.62; EL 0.18; WL 0.80; PnL 0.29; PnW 0.45; ML 0.26; MW 0.23; *Indices* CI 94.67; SI₁ 97.18; SI₂ 153.33; OI₁ 28.17; OI₂ 36.00.

Additional material examined measurements (mm) (n=1). HL₁ 0.80; HL₂ 0.49; HL₃ 0.23; HW 0.73; SL 0.72; EL 0.20; WL 0.92; PnL 0.31; PnW 0.50; ML 0.12; MW 0.27; *Indices* CI 91.11; SI₁ 98.78; SI₂ 111.76; OI₁ 15.79; OI₂ n.a.

Description. See LaPolla and Longino (2006).

Distribution (supplementary material Fig. S31). This species is known from Costa Rica and Mexico.

Biology. *Brachymyrmex nebulosus* was collected from sites at about 800 m elevation in moist forest at the transition between lowland dry forest and cloud forest. All collected workers were

obtained from open scrubby vegetation. In the field, these ants look and behave remarkably like *Crematogaster* (LaPolla and Longino 2006).

Remarks. *Brachymyrmex nebulosus* has been originally described from Costa Rica, but during our studies we came across two specimens from Mexico that very strongly resemble this species. The only differences are that the Mexican specimens have a more squared head, and stronger alveolate sculpture on the head and the dorsum of the mesosoma. Considering these differences and the geographical distribution, these Mexican specimens may be a variety of *B. nebulosus*, or potentially a different species, although more material and further study would be required to resolve this issue.

Brachymyrmex obscurior Forel

(Fig. 44, supplementary material Fig. S32)

Brachymyrmex heeri var. *obscurior* Forel, 1893: 345 (w.q.m.). **Lectotype worker** (MHNG: USNMENT00757132) and **paralectotype workers, queens, males** (MHNG: USNMENT00757132-00757135; USNMENT00758124-00758128; **here designated**): 16 workers, 3 queens, 3 males [examined]. **ANTILLES:** Saint Vincent. Subspecies of *Brachymyrmex heeri*: Forel (1897: 298); Forel (1912a: 62). Raised to species: Wilson and Taylor (1967: 92). See also Santschi (1923a: 666).

Additional material examined. ARGENTINA: Chubut: 3 km N. Puerto Lobos, 20 m, 14 Dec. 1966, E.I. Schlinger & M. Irwin, ANTC 10275, 1 worker (CASC: CASENT0196017). **BRAZIL: Bahia:** CEPEC, 11 Nov. 1997, L.S. Ramos, 1 worker (CPDC: USNMENT00757668); **São Paulo:** Caraguatatuba, Reserva Florestal, 40-80 m, 12-22 May 1971, W.L. & D.E. Brown, 2

workers, 1 queen (MCZC: USNMENT00757659); Itirapina, cerrado, Dec. 2008, D.P. Silva, 3
workers (ICN: USNMENT00759042); Ubatuba, Picinguaba, July 2011, 2 workers (ICN:
USNMENT00759051). **CHILE:** Santiago, Nov. 1996, C. Errard, 3 workers (CPDC:
USNMENT00757683). **COLOMBIA: Córdoba:** Monteria, Finca Betania, 29 June 2009, Juan
C. Abadia, 4 workers (IAvH); Valencia, Villa Mary, 02 June 2009, Juan C. Abadia, 4 workers
(IAvH); **Huila:** 17 km NW La Plata, 03 Jan. 1984, W.P. MacKay #7133, 1 worker (WEMC:
USNMENT00759021); 17km N La Plata, 03 Jan. 1984, W.P. MacKay #7139, 1 worker 1 queen
(WEMC: USNMENT00758996); **Magdalena:** Parque Nacional Natural Tayrona, Cañaveral,
11.33 -74.03, 30 m, 18-20 Aug. 2002, M. Sharkey, P. Arias & E. Torres, 7 workers (IAvH);
Valle del Cauca: Cairo, vereda Llano Grande, Finca Encanto, 4.73620 -76.21698, 1550 m, 31
Mar. 2003, R. Garcia, 1 worker (IAvH: IAvH25144). **DOMINICAN REPUBLIC: La Vega:** 12
km NW Bonao, 19.03333 -70.48333, 890 m, 31 Aug. 2001, A.L. Wild #AW1324, 2 workers
(ALWC: USNMENT00757987); 5 km N El Río, 19.02 -70.60, 1230 m, 01 Sep. 2001, A.L. Wild
#AW1339, 1 worker (ALWC: USNMENT00757657); Casabito For. El Rio - Bona Km 8, 07 Feb.
1975, W.L.& D.E. Brown, 2 workers (MCZC: USNMENT00757664). **FRENCH GUIANA:** 20
km Sinnamary, 12 Feb 1994, A. Dejean #17025, 2 workers (ICN: USNMENT00757660).
GUATEMALA: El Progreso: 5 km El Rancho, 14.9167 -90.0667, 400 m, 17 Nov. 2003, P.S.
Ward #15076-3, 3 workers (PSWC: USNMENT00757667); **Escuintla:** Escuintla, 30 Dec. 1911,
W.M. Wheeler, 3 workers (MCZC: USNMENT00759001). **JAMAICA:** Manchester, Gourie
Forest Res., 18.20 -77.52, 860 m, 10 Sep. 2001, A.L. Wild #AW1375, 1 worker (ALWC:
USNMENT00757669). **MEXICO: Chiapas:** Custepec, 15.72196 -92.95037, 1530 m, 19 May
2008, J. Longino #6280, 1 worker, 1 queen (JTLC: JTLC000007437, JTLC 000007438); **Jalisco:**
7 km SW Tamazula, 19.68056 -103.32194, 992 m, 22 June 2000, W. & E. Mackay, 2 workers
(WEMC: USNMENT00757729). **NEW CALEDONIA:** Road to My. Koghi, Dec. 1985, N.L.H.

Krauss, ANTC10279, 1 worker (CASC: CASENT0196021). **UNITED STATES: Florida:**
 Sarasota Co. Longino Ranch. T38S, R22E Sect, 27.15 -82.12, 20 m, 07 June 1981, J. Longino, 2
 workers (JTLC: JTLC0000005943); **Texas:** Del Mar, 26.01167 -97.31861, 26 Sep. 1972, W.S.
 Ross, ANTC 10263 10264, 2 workers (CASC: CASENT0196005, 0196006).

Diagnosis. *Brachymyrmex obscurior* morphologically resembles *B. cordemoyi* and *B.*
patagonicus because all three species have a metanotal groove that is absent or narrower than the
 diameter of metathoracic spiracles, their mesonotum does not bulge dorsally above the pronotum,
 their scapes usually surpass the posterior margin of the head, and their bodies are brownish.
Brachymyrmex obscurior and *B. cordemoyi* differ from *B. patagonicus*, however, because they
 have dense pubescence on the gaster. *Brachymyrmex obscurior* differs from *B. cordemoyi* by
 having less conspicuous dense pubescence on the dorsum of the head and the mesosoma, dense
 decumbent pubescence on the gaster, and eyes with fewer ommatidia along their maximal
 diameter (on average 9 instead of 10-12).

Lectotype and paralectotypes workers measurements (mm) (n=8). HL₁ 0.39-0.47; HL₂ 0.27-0.35;
 HL₃ 0.10-0.12; HW 0.35-0.48; SL 0.35-0.45; EL 0.10-0.15; WL 0.31-0.53; PnL 0.09-0.15; PnW
 0.23-0.30; ML 0.06-0.14; MW 0.15-0.23; *Indices* CI 79.17-106.67; SI₁ 96.59-115.79; SI₂ 125.71-
 1146.67; OI₁ 25.00-31.25.

Additional material examined measurements (mm) (n=2). HL₁ 0.44-0.47; HL₂ 0.30-0.32; HL₃
 0.11-0.12; HW 0.37-0.42; SL 0.38-0.41; EL 0.11-0.12; WL 0.42-0.47; PnL 0.11-0.13; PnW 0.26-
 0.30; ML 0.11; MW 0.18-0.19; *Indices* CI 84.34-88.89; SI₁ 96.25-102.86; SI₂ 126.32-128.33; OI₁
 28.57-28.75; OI₂ 24.10-24.44.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin slightly concave. Dorsum of the head with sparse appressed hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are clearly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior cephalic margin by a length up to the maximal diameter of the eye, and they have appressed hairs. Ocelli absent. Eyes are positioned on the cephalic midline and have 8-10 ommatidia along their maximal diameter.

Mesosoma. Typically with two erect hairs on the pronotum and two on the mesonotum. The mesonotum is not inflated and does not bulge dorsally above the pronotum in lateral view. Metanotal groove absent or narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, not protruding, and typically touching the mesometanotal and propodeal sutures. Dorsum of the propodeum convex and shorter than the propodeal slope. Propodeal spiracles circular and positioned on the posterior propodeal margin, slightly anterior of the middle of the propodeal slope. Legs with appressed hairs. Petiole short and inclined forward.

Gaster. With decumbent dense pubescence and several scattered long erect hairs.

Color and sculpture. Body smooth and shiny, except for the dorsum of the mesosoma which is sometimes slightly imbricate. Body uniformly brownish, but with slightly lighter antenna and legs.

Distribution (supplementary material Fig. S32). *Brachymyrmex obscurior* is widespread and known from the Antilles, Argentina, Brazil, Chile, Colombia, the Dominican Republic, French

Guiana, Guatemala, Hawaii, Jamaica and Mexico. It has also been introduced in New Caledonia, the United States and other colleagues have reported it from Samoa and Hawaii (Wilson and Taylor, 1967), but we did not examine this material.

Biology. In the original description, Forel (1893) mentioned that this species forms colonies of a few hundred individuals. Nests are usually constructed on open ground, typically under a stone, or at the roots of grass and weeds. The nest consists of only one or two simple chambers that are connected with a short passage. Forel (1893) indicated that *B. obscurior* occurs from sea level up to 800 m of altitude, but here we report new records from localities above 800 m.

Remarks. The specimen at the top of pin MHNG: USNMENT00757132 is designated here as the lectotype, whereas the other ants are paralectotypes. Forel (1893) described *B. obscurior* as a variety of *B. heeri* and indicated that it differs from typical *B. heeri* by having a brownish instead of yellowish body and slightly denser pubescence on the gaster. We observed that both species can readily be distinguished as to whether or not the mesonotum bulges dorsally above the pronotum in lateral view. Forel (1893) also reported that *B. obscurior* resembles *B. patagonicus* but that both taxa differ as to the presence or absence of ocelli, in body size, as to pubescence and the length of the scapes. He further considered *B. obscurior* to be a difficult “form” that represents a morphological transition between *B. patagonicus* and *B. heeri* (Forel 1912a). We agree that *B. obscurior* and *B. patagonicus* are morphologically very similar (see diagnosis), and molecular studies of both taxa will be required to examine whether they are distinct species. Wilson and Taylor (1967) recognized *B. heeri* var. *obscurior* as a distinct species as a provisional measure in anticipation of a full-scale revision of the genus. We agree with this decision, based on the morphological differences indicated above, but we cannot for now comment on their

proposed synonymization of *B. heeri* var. *aphidicola* Wheeler, 1934 to *B. obscurior*, as this material from Hawaii was not available to us.

***Brachymyrmex oculatus* Santschi**

(Fig. 42, supplementary material Fig. S33)

Brachymyrmex oculatus Santschi, 1919: 55 (w.). **Lectotype worker** (NHMB: USNMENT00758101) and **paralectotype workers** (NHMB: USNMENT00758101; **here designated**): 6 workers [examined]. **ARGENTINA: Buenos Aires:** Sierra de las Ventanas, Bruch leg. Quirán et al. (2004: 282) (m).

Additional material examined. ARGENTINA: Entre Ríos: Vilcaguay, Bruchi, 3 workers (MZSP: USNMENT00757776); **Santa Fé:** Fives Lilles, Wiser, 6 workers (MCZC: USNMENT00757250).

Diagnosis. *Brachymyrmex oculatus* morphologically resembles *B. bruchi* and *B. patagonicus*, because all three species have scapes that surpass the posterior margin of the head, they usually have two erect hairs on the mesonotum, their mesonotum does not bulge dorsally above the pronotum in lateral view, a metanotal groove is absent or narrower than the diameter of the metathoracic spiracles, their gaster has scarce pubescence and several scattered long erect hairs and their body is brownish. *Brachymyrmex oculatus* differs from *B. bruchi* and *B. patagonicus*, however, by having larger eyes, with a maximal diameter that approximates a third of the length of the head (HL₁). They usually have more than 14 ommatidia along their maximal diameter.

Lectotype and paralectotypes worker measurements (mm) (n=4). HL₁ 0.45-0.50; HL₂ 0.35-0.41; HL₃ 0.11-0.14; HW 0.48-0.58; SL 0.45-0.50; EL 0.15-0.18; WL 0.53-0.61; PnL 0.15-0.17; PnW 0.30-0.39; ML 0.14-0.20; MW 0.23-0.27; *Indices* CI 106.67-115.15; SI₁ 86.84-93.75; SI₂ 122.22-133.33; OI₁ 31.25-34.29; OI₂ 21.88-27.27.

Description. Head. Slightly longer than wide in full face view; posterior cephalic border flat. Dorsum of the head with sparse appressed hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior cephalic margin by a length that is shorter than the maximal diameter of the eye; they have appressed hairs. Ocelli absent. Eyes are positioned on the cephalic midline and usually have more than 14 ommatidia along their maximal diameter.

Mesosoma. Dorsum of the mesosoma with sparse appressed hairs, and typically with two erect hairs on the pronotum and two on the mesonotum; sometimes with additional suberect hairs, mainly on pronotum. The mesonotum is not inflated and does not bulge dorsally above the pronotum in lateral view. Metanotal groove absent or narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, not protruding, and touching the propodeal suture. Dorsum of the propodeum slightly convex and shorter than the propodeal slope. Propodeal spiracles circular, positioned on the posterior propodeal margin, at the middle of the propodeal slope. Legs with scattered appressed hairs. Petiole short and inclined forward.

Gaster. With scattered pubescence and several scattered long erect hairs, mainly at the edges of the segments.

Color and sculpture. Body overall smooth and shiny, with the dorsum of the mesosoma slightly imbricate. Body uniformly brownish.

Distribution (Supplementary material Fig. S33). *Brachymyrmex oculatus* is exclusively known from Argentina. Quirán et al. (2004) examined material from additional localities throughout the country.

Biology. Unknown.

Remarks. The specimen at the top of pin NHMB: USNMENT00757132 is here designated as lectotype, whereas the other ants in that pin are paralectotypes. Santschi (1919) suggested that *B. oculatus* can be confused with *B. bruchi* based on overall similarity. *Brachymyrmex patagonicus* is also very similar, and as mentioned in the diagnosis *B. oculatus* differs mainly from these species by its larger eyes. Whereas *B. patagonicus* has two erect hairs on the pronotum and *B. bruchi* usually more than two, the number of erect hairs on the pronotum is variable in *B. oculatus*.

Quirán et al. (2004) designated a male to be the lectotype of *B. oculatus*, because it was labelled as “typus”, and the associated workers were designated to be paralectotypes. However, the original description by Santschi (1919) exclusively described the worker morphology, and therefore logic dictates that the lectotype should be a worker. As such, we redesignated a worker of Santschi (1919) type series as lectotype here.

3704

3705 *Brachymyrmex patagonicus* Mayr

3706 (Figs. 46, 47, supplementary material Fig. S34)

3707 *Brachymyrmex patagonicus* Mayr, 1868: 164 (w.m.). (NHMW), Emery (1906: 178) (q.).

3708 **ARGENTINA: Buenos Aires:** Rio Negro. See also: Santschi (1923a: 657).

3709 = *Brachymyrmex patagonicus* var. *atrátula* Santschi, 1923a: 657, Fig. 3 (w.). (NHMB:

3710 USNMENT00757695): 2 workers [examined] **ARGENTINA: Jujuy:** Alfarito; synonym

3711 proposed by Quirán et al. (2004: 275). See also: Santschi (1923a: 657).

3712 = *Brachymyrmex laevis* Emery, 1895: 216 (w.). (MSNG: USNMENT00757205, 00757206;

3713 MHNG: USNMENT00758130): 4 workers [examined] **CHILE:** Valdivia. See also: Forel (1908:

3714 400); Forel (1912a: 62); Santschi (1923a: 659). **n. syn.**

3715

3716

3717 **Additional material examined. ARGENTINA: Entre Rios:** 8.63 km W Concordia, -31.42303 -

3718 58.11672, 16 m, 26 Dec. 2007, W. MacKay #22667, 1 worker (WEMC: USNMENT00758002);

3719 **Las Heras:** Agua de las zorras, Paramillo de Uspallata, 13 km NW of Villavicencio, -32.48011 -

3720 69.16467, 2750 m, 3 workers 1 queen (MCZC: USNMENT00759011); **Mendoza:** 22.81 km W

3721 Villa Seca, -33.58515 -69.41708, 1835 m, 06 Jan. 2008, W. MacKay, 4 workers, 1 queen

3722 (WEMC: USNMENT 00757968, 00757973, 00759018, 00759020); **Santiago del Estero:** 2

3723 workers (ICN: USNMENT00759047). **BRAZIL: Pará:** Melgaço, Caxiuanã ECFPn, -1.73584 -

3724 51.48762, 23-25 Oct. 2005, Equipe A.Y. Harada, 5 workers (MPEG: AYH036); -1.72484 -

3725 51.42979, 26 Oct. 2003, A.Y. Harada, E.P. Fagundes, C.J.M. Ribeiro, C.E.D. Sanhudo, C.A.R.

3726 Moura, J.L.P. Souza, C. Renato, 2 workers (MPEG: AYH053); Santarem, Taperinha, -2.90 -

3727 54.33, July 1975, R. L. Jeanne, 3 workers (MCZC: USNMENT00757990); **São Paulo:**

3728 Cananéia, P.E. Ilha Do Cardoso, -22.30 -47.88, 02 Nov. 2007, C. Bottcher & E.R. Pereira, 1
 3729 worker (ICN: USNMENT00757730); Itirapina: 11 Feb. 2009, S. Sendoya, 23 workers (ICN:
 3730 USNMENT00759052). **COLOMBIA: Caldas:** Aranzazu, Vereda Alegrías, Finca Betania, La
 3731 Esperanza, 5.29831 -75.49053, 1990 m, 08-09 Aug. 2003, L.E. Franco & J. Cruz, 3 workers
 3732 (IAvH: 55576); Finca Villa Rosita, 5.30603 -75.48489, 1825 m, 06-08 Aug. 2003, L.E. Franco &
 3733 J. Cruz, 2 workers (IAvH: IAvH25467, 25468); Vereda Buenavista, Naranjal Finca Bizerta,
 3734 5.28431 -75.48942, 2065 m, 25-27 July 2003, L.E. Franco & J. Cruz, 1 worker (IAvH:
 3735 IAvH25471); 4.285 -75.489, 2065 m, 25-27 July 2003, L.E. Franco & J. Cruz, 2 workers, 1
 3736 queen (IAvH: IAvH27267); Finca La Herradura, 5.27936 -75.49744, 2020 m, 5-7 Aug. 2003,
 3737 L.E. Franco & J. Cruz, 1 worker (IAvH: IAvH27291); Vereda Chambery, Finca Las Garzas,
 3738 5.29481 -75.47292, 1980 m, 5-6 July 2003, L.E. Franco & J. Cruz, 3 workers (IAvH:
 3739 IAvH55563); Vereda Chupaleros, Finca Alegrias, 5.30633 -75.50028, 1960 m, 27-29 July 2003,
 3740 L.E. Franco & J. Cruz, 3 workers (IAvH: IAvH25466); Veredada El Eden, Finca Los
 3741 Guayacanes, 5.29606 -75.49428, 1984 m, 26 July 2003, L.E. Franco & J. Cruz, 1 worker, 1 male
 3742 (IAvH: IAvH27294); Vereda San José, Finca Casa Roja 5.33348 -75.48892, 1777 m, 07-09 Aug.
 3743 2003, L.E. Franco & J. Cruz, 2 workers (IAvH: IAvH25462, 25463); Salamina, Vereda El
 3744 Cedrito, Finca El Cedrito, 5.33197 -75.46785, 1960 m, 27-28 July 2003, L.E. Franco & J. Cruz, 3
 3745 workers (IAvH: IAvH25470, 25472); **Córdoba:** Monteria, 29 June 2009, Juan C. Abadia, 3
 3746 workers (ICN); **Cundinamarca:** Villeta, Conjunto Residencial Las Acacias, 5.01361 -74.47306,
 3747 11 Jan. 2010, C.M. Ortiz, 8 workers (ICN); **Quindío:** Filandia, Vereda Cruces, Finca Los Micos,
 3748 4.70452 -75.64665, 1800 m, 12-14 July 2002, E. Jimenez & L.E. Franco, 2 workers (IAvH:
 3749 IAvH27227, 27240); **Valle del Cauca:** bosque Yotoco, 1575 m, 23 June 1989, W.P. MacKay
 3750 #11720, 1 worker (WEMC: USNMENT00757995); Medio Calima, 24 June 1989, E. MacKay
 3751 #11744, 3 workers, 1 queen (WEMC: USNMENT00759012, 00759013). **COSTA RICA:**

3752 **Alajuela:** Juan Santa Maria airport, 9.98 -84.20, 900 m, 09 Jan. 1999, J. Longino #3958-s, 1
 3753 worker (JTLC: LACM ENT 142311); **Heredia:** Estación Biológica la Selva, 10.433 -84.017,
 3754 May 1994, J. Longino #3625, 1 worker (JTLC: INBIOCRI001260979); 10.423 -84.001, 50 m, 04
 3755 Aug. 2004, W. & E. Mackay #20890, 1 worker (WEMC: USNMENT00758039); 06 Aug. 2004,
 3756 W. & E. Mackay #20917, 1 worker (WEMC: USNMENT00757982); **Limon:** 3 km SSE Cahuita,
 3757 9.71667 -82.83333, 70 m, 24 Dec. 1983, P.S. Ward #6530-40, 3 workers (PSWC:
 3758 USNMENT00758007); **Puntarenas:** Estación Biológica Los Llanos, 10.30487 -84.83735, 1150
 3759 m, 28 Feb. 2004, J. Longino, 1 worker (JTLC: JTLC000005287); 6 km S Monteverde, 10.25 -
 3760 84.82, 800 m, 22 June 1999, J. Longino, 1 worker, 1 queen (JTLC: LACM ENT 143543).
 3761 **ECUADOR: Chimborazo:** Huigra, -2.29417 -78.98861, 1200 m, 18 Feb. 2004, Roger Vila I-
 3762 457, 2 workers (ICN: USNMENT00758037). **GUATEMALA: El Progreso:** 3.8 km E. San
 3763 Cristobal, 14.91850 -90.04075, 302 m, 19 July 2004, W. & E. MacKay #20586, 3 workers
 3764 (WEMC: USNMENT00759006); **Santa Rosa:** 5 km SW Cuilapa, 14.23333 -90.33333, 575 m,
 3765 14 Nov. 2003, A.L. Wild #AW2030, 1 worker (ALWC: USNMENT00758009); **Suchitepéquez:**
 3766 Finca Tarrales, 12.3 km N Patulul, 14.52256 -91.13642, 740 m, 30 July 2004, W. & E. Mackay
 3767 #20782, 2 workers (WEMC: USNMENT00757688, 00757983). **HONDURAS:** La Lima, 23 Jan.
 3768 1960, C. Evers, UFC-217-35 (6871), 5 workers, 1 male (MZSP: USNMENT00757621,
 3769 00757622). **JAPAN:** Hyogo, Kob, Port Island, 34.67 135.20, 18 Sep. 2007, M. Yoshimura, 1
 3770 worker (ICN: MY1862-12). **MEXICO: Federal:** Mexico City, 6.5 km E Chalma, 26 May 1998,
 3771 W. MacKay #10386, 1 worker, 2 males (WEMC: USNMENT00757993); **Guanajuato:** Highway
 3772 57, km 306, Rancho Jardin, 21.14224 -100.95341, 10 Aug. 1965, Cornell University, 1 worker
 3773 (MCZC: USNMENT00759002); **Jalisco:** 6 km N El Tuito, 20.3667 -105.3167, 730 m, 31 Dec.
 3774 1987, P.S. Ward #9327-11, 2 workers (PSWC: USNMENT00757679); **Nuevo Leon:** 8 km W.
 3775 Iturbide, 09 Nov. 1946, W.S. Ross, ANTC10261, 2 workers (CPDC: CASENT0196003);

3776 **Nayarit:** 19.3 km S Rosamorada, 21.94389 -105.20639, 51 m, 19 June 2000, W. & E. MacKay
 3777 #19126, 2 workers (WEMC: USNMENT00757983); **Oaxaca:** 148 km NE Oaxaca Rt175,
 3778 17.02647 -96.71947, 1210 m, 04 June 1988, W. MacKay #10825, 3 workers (WEMC:
 3779 USNMENT00757732); 1.6 km E Reforma, near Tuxtepec, 18.08078 -96.13677, 12-15 Aug.
 3780 1973, A. Newton, 1 worker (MCZC: USNMENT00757680); **Puebla:** 6.5 km W Izucar
 3781 Matamoros, 1220 m, 26 May 1988, W. MacKay, 1 worker, 1 male (WEMC:
 3782 USNMENT00757991); **San Luis de Potosi:** 10 km S San Luis Potosi, 21 May 1988, W.P.
 3783 MacKay #10307 #10308, 6 workers, 2 males, 1 queen (WEMC: USNMENT00757685,
 3784 00759015, 00759017); 16 km S San Luis Potosi, 21 May 1988, W.P. MacKay #10307, 2
 3785 workers, 1 male (WEMC: USNMENT00758006); 11 km N Cardenas, 1720 m, 09 June 1988, W.
 3786 MacKay #1095, 1 worker, 2 males (WEMC: USNMENT00759027); **Tamaulipas:** 32.3 km SE
 3787 Ciudad Victoria, 23.49161 -96.97775, 289 m, 24 Mar. 2008, W. & E. MacKay #22930, 2 workers
 3788 (WEMC: USNMENT00757681, 00757687); Gomez Farias, 25 Sep. 1987, A. Rebeles #10096, 1
 3789 worker (WEMC: USNMENT00757994); **Veracruz:** Los Tuxlas, July 2001, A. Pezon, 1 worker
 3790 (CPDC: USNMENT00757989); Xalapa, V. Rico Gray #17209, 4 workers (MCZC:
 3791 USNMENT00759026, 00758044). **PARAGUAY: Canindeyú:** Reserva Natural Bosque
 3792 Mbaracayú, Aguara Ñu, -24.18333 -55.28333, 240 m, 16 Nov. 2002, A. L. Wild, 1 worker
 3793 (ALWC: USNMENT00757971); **Itapúa:** Isla Yacyretá, -27.41667 -56.75417, 25 Sep. 1997, B.
 3794 Barrios #ibn 216, 1 worker (ALWC: USNMENT00757683); **Presidente Hayes:** 5 km SSE Pozo
 3795 Colorado, -23.55 -58.77, 140 m, 05 Dec. 2002, A.L. Wild #AW1764, 1 worker (ALWC:
 3796 USNMENT00758010). **URUGUAY: Salta:** Salta, Parque Municipal Benito Solari, 25 Dec.
 3797 2007, W. & E. MacKay #22634, 1 worker (WEMC: USNMENT00757731).
 3798

Diagnosis. *Brachymyrmex patagonicus* morphologically resembles *B. bruchi* and *B. oculatus*, because all three species have scapes that surpass the posterior margin of the head by a length approximately equal to the maximum diameter of the eye or less, they usually have two erect hairs on the mesonotum, which does not bulge dorsally above the pronotum in lateral view, the metanotal groove is absent or narrower than the diameter of the metathoracic spiracles, their gaster has scarce pubescence and several scattered long erect hairs, the body is uniformly brownish. *Brachymyrmex patagonicus* differs from *B. bruchi*, however, by usually having two erect hairs on the pronotum and two on the mesonotum and from *B. oculatus* by having smaller eyes, with a maximal diameter of approximately $1/4^{\text{th}}$ of the length of the head (HL_1) and usually with less than 14 ommatidia along their maximal diameter.

Types measurements (mm) (n=2). HL_1 0.45-0.53; HL_2 0.33-0.37; HL_3 0.10-0.13; HW 0.38-0.49; SL 0.40-0.48; EL 0.14-0.17; WL 0.38-0.51; PnL 0.11-0.15; PnW 0.26-0.33; ML 0.07-0.11; MW 0.17-0.24; *Indices* CI 85.29-92.50; SI_1 97.30-103.45; SI_2 120.00-128.57; OI_1 33.78-36.21; OI_2 22.06-25.00.

Additional material examined measurements (mm) (n=13). HL_1 0.40-0.59; HL_2 0.28-0.39; HL_3 0.07-0.16; HW 0.33-0.51; SL 0.35-0.49; EL 0.09-0.14; WL 0.35-0.55; PnL 0.09-0.20; PnW 0.23-0.35; ML 0.07-0.14; MW 0.15-0.23; *Indices* CI 81.40-93.33; SI_1 92.00-128.95; SI_2 116.22-163.33; OI_1 22.22-32.5; OI_2 18.18-28.57.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin slightly concave. Dorsum of head with sparse appressed hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin,

two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior cephalic margin by a length that is shorter than the maximal diameter of the eye; they have appressed hairs. At least one central ocellus is present. Eyes are positioned on the cephalic midline and have 8-12 ommatidia along their maximal diameter.

Mesosoma. Dorsum of the mesosoma with sparse appressed hairs, typically with two erect hairs on the pronotum and two on the mesonotum. The mesonotum is not inflated and does not bulge dorsally above the pronotum. Metanotal groove absent or narrower than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, not protruding, and touching the propodeal suture. Dorsum of the propodeum slightly convex and shorter than the propodeal slope. Propodeal spiracles circular, situated on the posterior propodeal margin, at the middle of the propodeal slope. Legs with appressed and scattered hairs. Petiole short and inclined forward.

Gaster. With scattered pubescence and several scattered long erect hairs, mainly at the edges of the segments.

Color and sculpture. Body overall smooth and shiny, except for the sometimes slightly imbricate sculpture on the dorsum of the mesosoma, and typically uniformly brownish.

Distribution (supplementary material Fig. S34). *Brachymyrmex patagonicus* is widespread and known from Argentina, Brazil, Colombia, Chile, Costa Rica, Ecuador, Guatemala, Honduras, Mexico, Paraguay, Uruguay and it has been introduced in Japan (Ortiz-Sepulveda pers. obs.) and the United States (MacGown et al. 2007).

Biology. MacGown et al. (2007) indicated that *B. patagonicus* nests in a variety of habitats, both natural and disturbed, ranging from pine forests over mixed forest and prairie to urban environments. Colonies may contain many hundreds of workers packed into a small sheltered area. Where this species is found, colonies are often abundant and within a few centimeters from one another. Nests can be found in loose tree bark, at the base of plants, in soil, dead wood and organic litter, or below natural and man-made objects. The species is considered a nuisance pest, as both alates and foraging workers may enter man-made structures to forage and/or nest (MacGown et al. 2007).

Remarks. As Quirán et al. (2004) already indicated Mayr (1868) described *B. patagonicus* based on specimens from Argentina. However, the specimens in the NHMW: USNMENT00757201-00757204 that were examined and identified as types by Mayr are from Chile. Either the locality indicated in the original description may be wrong, or specimens from Argentina may be lacking from the collection, and as such we do not designate a lectotype here.

Emery (1895), upon describing *B. laevis* (which is sometimes misspelled as *B. levis*, e.g. Emery (1906: 178); Santschi (1923a: 659)), indicated that it is closely related to *B. patagonicus* and to the dark forms of *B. heeri*, but he considered *B. laevis* distinct by having a smooth and shiny tegument of the head. However a description of the species is not provided, and after examining the type material of *B. laevis* we have not identified any consistent morphological differences compared to *B. patagonicus* so that we synonymize the species here.

Brachymyrmex patagonicus displays variation in color from light to dark brown; *B. patagonicus* var. *atrátula* was described by Santschi (1923a) as a variety with darker, almost black tegument, and a smooth and shiny body. Evaluating these morphological differences Quirán et al. (2004)

suggested that *B. patagonicus* var. *atratura* is a junior synonym of *B. patagonicus*, and we agree with this decision.

Guénard (2018) reports the first record of *B. patagonicus* from continental Asia (Hong Kong), however, the specimen illustrated in the paper does not display the diagnostic features of this species, but rather those of *B. cordemoyi*. It is noteworthy that *B. patagonicus* is very abundant and geographically widespread, but its morphological variation and genetic diversity as well as other biological features remain poorly studied. An in-depth study of these features in a geographic context would be required to determine if *B. patagonicus* is a distinct species, a species complex, or conspecific with some other taxa, e.g. *B. bruchi* and *B. obscurior*.

***Brachymyrmex pictus* Mayr**

(Figs. 48, supplementary material Fig. S35)

Brachymyrmex pictus Mayr, 1887: 522 (w.q.). **Lectotype worker** (NHMW: ANTWEB CASENT0915735) and **para lectotype worker** (NHMW; MHNG: USNMENT00758144; **here designated**): 3 workers [examined]. **BRAZIL: Santa Catharina.**

= *B. heeri* var. *basalis* Wheeler, 1921: 166 (w.). [not examined]. **GUYANA:** Kartabo, Puruni trail. **n. syn.**

= *B. pictus* subsp. *balboae* Wheeler, 1942: 253 (w.q.m.). (MCZC: M.C.Z. Cotype 1-3, 4-6, 7-9, 21438): 2 workers, 8 queens, 2 males [examined]. **PANAMA:** Balboa. **n. syn.**

Additional material examined. BOLIVIA: Santa Cruz: 35 km SSE Flor de Oro, -13.83333 - 60.87763, 450 m, 01 Dec. 1993, P.S. Ward #12232, 3 workers, 1 male (MCZC: CMOS000012, CMOS000013). **BRAZIL: Amazonas:** 11 Sep. 1962, W.L. Brown, 3 workers (MCZC:

CMOS000002); Aleixo nr. Manaus, 11 Sep. 1962, W. L. Brown, 8 workers, 2 males, 6 queens
(MCZC: CMOS000004, CMOS000006, CMOS000009-0000011); Peredão Rd. S. of Manaus, 02
Sep. 1962; W. L. Brown, 12 workers (MCZC: CMOS000003, CMOS000005, CMOS000007,
CMOS000008); **Bahia:** Ilheus, 27 Mar. 1997, C.S.F. Mariano, 4 workers (CPDC:
USNMENT00757794); **Espirito Santo:** Nov. 1977, M. Alvarenga, 4 workers (MZSP:
USNMENT00757785); **São Paulo:** Caraguatatuba, Reserva Florestal, 40 m, 22 May-01 June
1962, Exp. Dep. Zool. 2056, 8 workers (MZSP: USNMENT00757676, 00757783); Ilha dos
Pescadores (Ilha da Vitoria), 24 Mar. 1964, 2 workers, 2 queens (MZSP: USNMENT00757604);
Ubatuba, Picinguaba, July 2011, 9 workers (ICN: USNMENT00759053). **COLOMBIA: Cauca:**
Isla Gorgona, 11 Sep. 1989, M. Baena #GQA-05, 3 workers (WEMC: USNMENT00757796,
00757797); **Magdalena:** 2 km ESE Minca, 11.13 -74.10, 780 m, 13 Aug. 1985, P.S. ward #7895,
2 workers, 1 queen (PSWC: USNMENT00757792); **Putumayo:** Parque Nacional Natural La
Paya, Cabaña La Paya, -0.03, -75.20, 330 m, 15-30 Sep. 2002, A. Morales, 1 worker (IAvH).
COSTA RICA: Puntarenas: Parque Natural Corcovado, Sirena, 8.483 -83.583; 23 Apr. 1981, J.
Longino, 1 worker, 1 queen (JTLC000005913, 000005914); 14 June 1982, J. Longino, 2 workers
(MCZC: USNMENT00757793); Reserva Biologica Carara, 9.78 -84.60, 30 m, 24 July 1985, P.S.
Ward #7615, 2 workers, 1 queen (PSWC: USNMENT00757784); Reserva Biologica Carara,
Estación Quebrada Bonita, 9.78 -84.60, 30 m, 24 July 1985, J. Longino #0562, 1 worker, 1 queen
(JTLC: JTLC000006051). **ECUADOR: Esmeraldas:** 6.1 km E Rio Verde, 1.07694, -79.41389,
13 July 2005, W. & E. MacKay #21098, 1 worker (WEMC: USNMENT00757791); **Manabí:** 20
km NE Chone, 300 m, 1976, S. & J. Peck, 2 workers (MCZC: CMOS000014); **Pichincha:**
Cotopaxi, 19 km ENE La Maná, -0.88 -79.05, 1100 m, 10 Aug. 1991, P.S. Ward #11418-23, 1
worker (MCZC: USNMENT00758017). **FRENCH GUIANA:** Saint Elie-K, 4.82261, -53.27649,
Apr. 2002, J. Orivel & J. Le Breton, 6 workers, 1 queen (CPDC: USNMENT00757786,

00757787). **GUATEMALA: Petén:** Finca Ixobel, 83 km SE Flores, 16.30367, -89.42353, 365
 m, 25 July 2004, W. & E. MacKay #20694, 1 worker, 1 male, 1 queen (WEMC:
 USNMENT00758998); **GUYANA:** Rupununi, Apoteri, 4.08333 -58.58333, 100 m, 12 Jan. 1981,
 J. Longino, 1 worker (JTLC: JTLC000005918). **JAMAICA: Saint Andrew:** Cinchona, 18.067 -
 76.650, 1450 m, 19 Mar. 1984, 1 worker (JTLC: JTLC000005924). **PANAMA:** Gamboa,
 Parque, 9.11722 -79.69972, 24 Apr. 1988, D. Quintero #1, 2 workers (WEMC:
 USNMENT00757795). **PERU: Madre de Dios:** Tambopata, 15 km NE Puerto Maldonado, June
 1989, S.P. Cover & J.E. Tobin, JT 219 CA-740, 2 workers (MCZC: CMOS000032).
VENEZUELA: Bolívar: Canaima, Orchid Is., 14 Oct. 1988, W. MacKay #11165, 8 workers, 3
 males, 1 queen (WEMC: USNMENT0075778800757790, 00757960, 00758997).

Diagnosis. The unique feature for *B. pictus* is a conspicuous color difference between the head
 and thorax, which are yellow and the gaster, which is black, or yellow with (a) black spot(s).

Additional material examined measurements (mm) (n=1). HL₁ 0.43; HL₂ n.a.; HL₃ 0.08; HW
 0.38; SL 0.38; EL 0.11; WL 0.44; PnL n.a.; PnW n.a.; ML 0.09; MW 0.18; *Indices* CI 89.58; SI₁
 100.00; SI₂ n.a.; OI₁ 26.83; OI₂ 28.57.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin flat.
 Dorsum of the head has sparse appressed hairs. Clypeus with a rounded anterior margin and five
 long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs
 are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly
 shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique
 anterodorsal view. The scapes surpass the posterior cephalic margin by a length that is smaller

than the maximal diameter of the eye; they have appressed hairs. Three ocelli present. Eyes are positioned on the cephalic midline and have 7-10 ommatidia along their maximal diameter.

Mesosoma. Typically with two erect hairs on the pronotum and two on the mesonotum. The mesonotum is not inflated and does not bulge dorsally above the pronotum in lateral view. The mesometanotal suture is directly visible, however, there is no marked constriction between the mesonotum and metanotum, and as a result the metanotal groove is absent. Metathoracic spiracles widely separated in dorsolateral position, not protruding, and touching the propodeal suture. Dorsum of the propodeum flat and shorter than the propodeal slope. Propodeal spiracles circular, situated slightly ventral to the posterior propodeal margin, and slightly posterior of the middle of the propodeal slope. Legs with appressed and scattered hairs. Petiole short and inclined forward.

Gaster. With scattered pubescence and several scattered long erect hairs.

Color and sculpture. Body smooth and shiny. The head and thorax are yellowish whereas the gaster is either totally black or yellowish with one or more black spots.

Distribution (Supplementary material Fig. S35). *Brachymyrmex pictus* is known to occur in Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guatemala, Guyana, Jamaica, Panama, Peru and Venezuela.

Biology. The colony of *B. heeri* var. *basalis* reported by Wheeler (1921) and Wheeler (1942) was small but nevertheless contained brood. It was found in hollow petioles of a small *Tachigalia paniculata* tree on the Puruni trail at Kartabi, Guyana. Several colonies of *B. pictus* subsp. *balboae* were found to be nesting in hollow twigs of *Tripalis americana* at Balboa, Panama

(Wheeler 1942). No biological information exists on typical *B. pictus*, but it seems this species is arboreal.

Remarks. One of the specimens determined as a syntype of *B. pictus* (NHMW: CASENT0915734) displays the diagnostic features of *B. admotus*. Given that both species were described by Mayr (1887) in the same publication from the same type locality, we consider the identification of this specimen to be a labeling mistake. Upon describing *B. pictus*, Mayr (1887) did not provide any information on the diagnostic features he considered relevant to distinguish *B. pictus* from other *Brachymyrmex* species. Wheeler (1921) described *B. heeri* var. *basalis*, but he did not provide any morphological description for his typical *B. heeri* specimens nor for the variety. The only feature described for *B. heeri* var. *basalis* is its yellow body with a black first segment of the gaster (which to our knowledge only fits with the characters of *B. pictus*). Other complications are that the material has not been illustrated, that both the typical form and the variety were found on the same tree species and the same locality, and that we have not been able to locate the material. Later, Wheeler (1942) continued to consider his specimens of *B. heeri* and *B. heeri* var. *basalis* to be distinct of *B. pictus*. Given the information available we consider it likely that *B. heeri* var. *basalis* belongs to *B. pictus*, but we cannot comment on the taxonomic status of his typical *B. heeri* specimens for now. Fortunately, Wheeler (1942) provided a description of *B. pictus* subsp. *balboae*, which indicates that it differs from the typical *B. pictus* only by being smaller. It is indeed somewhat smaller (1.0-1.2 mm) than the typical form described by Mayr (1887; 1.3-1.6 mm), however, after studying the material we consider this difference to likely represent geographic variation, and we synonymize this subspecies here, although a better characterization of the variation in *B. pictus* is required.

Brachymyrmex pilipes Mayr

(Fig. 49, supplementary material Fig. S36)

Brachymyrmex pilipes Mayr, 1887: 524 (q.m.). **Lectotype queen** (NHMW) and **paralectotype queen, male** (NHMW): 2 queens, 1 male [examined]. **BRAZIL: Santa Catharina.** Santschi (1929: 310) (w.). (NHMB): 2 major workers, 2 minor workers, 1 queen [examined]. **BRAZIL: Parana:** Río Negro. Combination in *Brachymyrmex* (*Brysha*): Santschi (1923a: 674). See also: Ortiz and Fernández (2014: 19, Figs. 7-12).

Diagnosis. *Brachymyrmex pilipes* morphologically resembles *B. micromegas* because both species have a dimorphic worker caste, tumuliform metathoracic spiracles, toruli that touch the posterior clypeal margin, but never surpass it (best observed in oblique anterodorsal view) and a clypeus with a row of long thick hairs near the anterior margin. However, *B. pilipes* differs from *B. micromegas* by the fine, longitudinal striations on most of the mesosoma, and by usually having a gaster of darker color than the rest of the body.

Description. See Ortiz and Fernández (2014).

Brachymyrmex santschii Menozzi

(Fig. 50, supplementary material Fig. S37)

Brachymyrmex santschii Menozzi, 1927: 338, Fig. 5 (w.). [not examined]. **COSTA RICA: San José.**

Additional material examined. COSTA RICA: Cartago: 2 km N Cervantes, 1600 m, Jan. 1973, W.L. Brown, 4 workers, 2 putative worker-queen intercastes (MCZC: CMOS000098, USNMENT00757750-00757751); **Guanacaste:** Rincon de la Vieja, Las Pailas 7676, 10.77556 - 85.34528, 1400 m, 18 Feb. 1996, R. Anderson, 2 workers (WEMC: USNMENT00757753, 00757754); **Puntarenas:** Monteverde, 10.30 -84.83, 1400 m, Apr.-May 1987, S. Little, 1 worker (JTLC: JTLC000005243); Monteverde, 10.2964 -84.7831, 1550 m, 18 Jan. 2003, L.A. Schonberg, 1 worker (JTLC: JTLC000005055); **San José:** Cerros de Escazu, 2 km S Antonio, 1650 m, 13 June 1997, R. Anderson #186880C, 1 worker (WEMC: USNMENT00757593). **PANAMA: Chiriqui:** Volcan Hartman`s, Finca #17815, 1450 m, 14 June 1996, R.S. Anderson, 1 worker (WEMC: USNMENT00757752).

Diagnosis. *Brachymyrmex santschii* morphologically resembles *B. iridescens*, because both species have the head and the mesosoma with strongly alveolate sculpture. However, they can be distinguished from one another because *B. santschii* has a metanotal groove that is wider than the diameter of the metathoracic spiracles, scapes that surpass the posterior margin of the head, and a gaster with scattered pubescence.

Additional material examined measurements (mm) (n=4). HL₁ 0.40-0.44; HL₂ 0.29-0.30; HL₃ 0.08-0.10; HW 0.37-0.40; SL 0.39-0.42; EL 0.09-0.11; PnL 0.11-0.13; PnW 0.24-0.28; ML 0.09; MW 0.13-0.17; *Indices* CI 89.80-91.82; SI₁ 102.27-109.76; SI₂ 136.36-138.24; OI₁ 24.39-26.84; OI₂ 20.00-24.44.

Worker description. Head. Longer than wide in full face view; posterior cephalic margin flat or slightly concave. Dorsum of the head with subdecumbent hairs. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior margin of the head by a length approximately equal to the maximal diameter of the eye; they bear appressed hairs. Three conspicuous ocelli are present. Eyes are positioned on the cephalic midline and have 8-9 ommatidia along their maximal diameter.

Mesosoma. Dorsum subsinusoidal in lateral view. Without erect hairs, but with decumbent hairs on the promesonotum. The mesonotum is variable, typically not or weakly inflated, and not or slightly bulging dorsally above the pronotum in lateral view. Metanotal groove wider than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsal position, not protruding and not touching any sutures. Dorsum of the propodeum slightly convex and shorter than the propodeal slope. Propodeal spiracles circular, positioned on the posterior propodeal margin, at the middle of the propodeal slope. Legs with appressed hairs. Petiole short and inclined forward.

Gaster. With scattered pubescence and long erect hairs at the edges of the segments.

Color and sculpture. Head and dorsum of the mesosoma finely alveolate, those parts that are not sculptured, including the gaster, are smooth and shiny. The body is brownish, but sometimes the antennae, tarsi, and articulations of the legs are more yellowish.

Intercaste description. The morphology of the putative worker-queen intercaste differs from that of the worker by its larger body size, the eyes that have around 10 ommatidia along their maximal diameter, its strongly expanded mesonotum, the absence of a metanotal groove, the

dorsolateral position of the metathoracic spiracles, the less convex dorsum of the propodeum, and a markedly expanded gaster with dense pubescence.

Distribution (Supplementary material Fig. S37). *Brachymyrmex santschii* is known from Costa Rica and Panama.

Biology. Unknown.

Remarks. Menozzi (1927) considered *B. santschii* to differ from any other *Brachymyrmex* species by its sculpture and pubescence. He described the sculpture as strongly punctuate-reticulate, however, following the terminology of Harris (1979) we consider it rather alveolate. We do not designate a lectotype here, as we have not studied the type series, which would be deposited at the German Entomological Institute in Berlin-Dahlem.

Brachymyrmex sosai NEW SPECIES

(Fig. 51, supplementary material Fig. S38)

Holotype worker (UNMSM: USNMENT00757760) and **paratype workers** (USNM: USNMENT00759061, 00759062): 3 workers. **PERU: Cusco:** Paucartambo, Kcosñipata, Predio Los Wayqechas, ACCA [Asociacion para la Conservacion de la Cuenca Amazonica], -13.17956 - 71.60556, 2825 m, Andean Forest, J. Sosa-Calvo, JSC040920-04.

Additional material examined. BOLIVIA: Santa Cruz: 32.8 km N Comparapa, Kara Huasi, - 18.05972 -63.91056, 21 Jan. 1999, R. Anderson #18567, 1 worker (WEMC:

USNMENT00759024); **PERU: Lima:** Zárate forest, 2850 m, N. Valencia, I. Frank, 16 workers
(MCZC: USNMENT00757314-00757320).

Etymology: In honor of Dr. Jeffrey Sosa-Calvo, the collector, for his unconditional support and
friendship.

Diagnosis. *Brachymyrmex sosai* **n. sp.** does not have a specific unique feature but rather a unique
combination of features that render it distinct: its scapes surpass the posterior margin of the head
by a length approximately equal to the maximal diameter of the eye, the dorsum of the mesosoma
does not have conspicuous sculpture, a metanotal groove is present, the metathoracic spiracles are
in dorsal position, and the dorsal margin of the mesonotum is strongly antero-posteriorly inclined.
Some features of this species are reminiscent of *B. antennatus*, however, *B. sosai* differs from this
species in body color, the color of the hairs, the length of the scapes, and in having an antennal
funiculus with the second segment shorter than the first.

Holotype measurements (mm) HL₁ 0.57; HL₂ 0.35; HL₃ 0.16; HW 0.53; SL 0.59; EL 0.14; WL
0.68; PnL 0.21; PnW 0.33; ML 0.16; MW 0.21; **Indices** CI 93.10; SI₁ 111.11; SI₂ 166.67; OI₁
25.93; OI₂ 27.59.

Paratypes measurements (n=3) HL₁ 0.60-0.62; HL₂ 0.41-0.43; HL₃ 0.16-0.20; HW 0.57-0.60; SL
0.59-0.62; EL 0.14-0.16; WL 0.68-0.72; PnL 0.20-0.23; PnW 0.41; ML 0.18-0.20; MW 0.14-
0.27; **Indices** CI 93.55-96.88; SI₁ 103.23-103.45; SI₂ 142.86-145.45; OI₁ 22.58-27.59; OI₂ 25.81-
31.25.

4107

4108 **Description. *Head.*** Slightly longer than wide in full face view; posterior cephalic margin flat or
4109 slightly concave. Dorsum of the head with scattered appressed hairs. Clypeus with a rounded
4110 anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the
4111 anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs
4112 on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior
4113 clypeal margin in oblique anterodorsal view. The scapes surpass the posterior margin of the head
4114 by a length that exceeds the maximal diameter of the eye. Ocelli typically appear to be absent but
4115 some workers have a central ocellus. Eyes are positioned on the cephalic midline and have 9-10
4116 ommatidia along their maximal diameter.

4117 ***Mesosoma.*** With several semi-erect hairs on the pronotum and scattered decumbent hairs on the
4118 promesonotum. The mesonotum is slightly inflated, antero-posteriorly inclined, and it bulges
4119 dorsally above the pronotum in lateral view. Metanotal groove present and wider than the
4120 diameter of the metathoracic spiracles. Metathoracic spiracles in fully dorsal position, not
4121 protruding, and not touching any sutures. Dorsum of the propodeum weakly convex and shorter
4122 than the propodeal slope. Propodeal spiracles circular, positioned slightly ventral of the posterior
4123 propodeal margin; they are posterior of the middle of the propodeal slope. Legs with appressed
4124 hairs. Petiole short and inclined forward.

4125 ***Gaster.*** With dense pubescence and scattered long hairs at the edges of the segments.

4126 ***Color and sculpture.*** Body smooth and shiny, and usually dark brown, but with conspicuously
4127 lighter hairs. Additionally, the bulbi of the antennae, the terminal funiculus, the tarsi and the
4128 articulations of the legs are conspicuously yellowish.

4129

Distribution (Supplementary material Fig. S38). *Brachymyrmex sosai* is known from Bolivia and Peru.

Biology. This species was collected from sandy soil, from below a rock.

Remarks. The single specimen of *B. sosai* known from Bolivia (WEMC: USNMENT00759024) differs in color from the specimens from Peru: its head and thorax are more yellowish than brown and the gaster is darker than the rest of the body. We consider it to be part of *B. sosai* as all other traits match. Currently *B. sosai* is only known from three localities, and more specimens from additional localities will be required to characterize the intraspecific variation in body color.

Brachymyrmex termitophilus Forel

(Fig. 52, supplementary material Fig. S39)

Brachymyrmex heeri var. *termitophilus* Forel, 1895b: 179 (w.). **Lectotype worker** (MHNG: USNMENT00757137) and **paralectotype workers, queen** (MHNG: USNMENT00757136-00757138; NHMB: USNMENT00758159; MSNG: USNMENT00757139; **here designated**): 6 workers, 1 queen [examined]. **BRAZIL: Rio Grande do Sul:** San Leopoldo, col. Wasmann. Raised to species: Wild (2007: 44).

Additional material examined. BRAZIL: São Paulo: Tapirai, -24.03208 -47.46556, 08-14 Jan. 2001, R.R. Silva & Everhardt, 2 workers (ICN: MZSP170). **COLOMBIA: Norte de Santander:** Parque Nacional Natural Tamá, Vereda El Diamante, Alto Herrera, 7.12278 -72.23472, 1000 m, 26 Nov. 1999, 1 worker (IAvH: USNMENT00759060). **COSTA RICA: Guanacaste:** Maritza

field Station, 10.95694 -85.49389, 03 May 1995, R. Anderson #17716, 3 workers (WEMC: USNMENT00757632); **DOMINICAN REPUBLIC: Pedemales:** Parque Nacional Sierra Baoruco, "Las Abejas", 18.15 -71.62, 1320 m, 02 Sep. 2001, A.L. Wild #AW1359, 1 worker, 1 male, 1 queen (ALWC: USNMENT00757918). **MEXICO: Puebla:** 17 km NE Teztlutlán, 1940 m, 07 June 1988, W. MacKay #10879, 1 worker, 1 queen (WEMC: USNMENT00758036). **PARAGUAY: Itapúa:** San Miguel Potrero, c/Villa Yacyreta, -27.03 -56.20, 17 Jan. 1996, N.E. Lopez #ibn 227, 1 worker (ALWC: USNMENT00757662). **UNITED STATES: Texas:** Sabino Co., 14.5 km E Nemphil, 11 May 1988, R. Anderson #12763, 1 worker (WEMC: USNMENT00758031).

Diagnosis. *Brachymyrmex termitophilus* morphologically resembles *B. aphidicola*, *B. australis*, *B. cordemoyi* and *B. obscurior* because these species have scapes that are usually surpassing the posterior cephalic margin, their eyes are positioned on the cephalic midline, they have two erect hairs on the pronotum and two on the mesonotum, and their mesonotum does not bulge dorsally above the pronotum in lateral view. *Brachymyrmex termitophilus* differs from *B. australis* and *B. aphidicola*, however, by having dense pubescence on the gaster, and from *B. cordemoyi* and *B. obscurior* by having a yellowish body instead of brownish. *Brachymyrmex termitophilus* also resembles *B. bahamensis* somewhat, but *B. termitophilus* typically bears two erect hairs on the pronotum whereas *B. bahamensis* approximately six that are moreover much longer.

Lectotype and paralectotype measurements (mm) (n=2). HL₁ 0.45; HL₂ 0.29-0.31; HL₃ 0.10-0.12; HW 0.39; SL 0.41-0.43; EL 0.10; Pnl 0.12; PnW 0.25-0.27; ML 0.08; MW 0.18; *Indices* CI 89.96; SI₁ 105.00-110.00; SI₂ 131.25-146.67; OI₁ 25.00; OI₂ 21.74-26.09.

4178 *Additional material examined measurements* (mm) (n=2). HL₁ 0.43-0.44; HL₂ 0.30; HL₃ 0.10;
4179 HW 0.38-0.39; SL 0.33-0.40; EL 0.10; WL 0.42; PnL 0.12; PnW 0.25-0.27; ML 0.08-0.09; MW
4180 0.16-0.18; *Indices* CI 89.80-90.00; SI₁ 85.23-101.11; SI₂ 110.29-133.82; OI₁ 25.56-26.14; OI₂
4181 22.00-22.45.

4182
4183 **Description. Head.** Slightly longer than wide in full face view; posterior cephalic margin flat.
4184 Dorsum of the head with sparse appressed hairs. Clypeus with a rounded anterior margin and five
4185 long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs
4186 are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly
4187 shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique
4188 anterodorsal view. The scapes surpass the posterior margin of the head by a length equal to the
4189 maximal diameter of the eye or less; they have appressed hairs. Ocelli inconspicuous. Eyes are
4190 positioned on the cephalic midline and have 7-9 ommatidia along their maximal diameter.

4191 **Mesosoma.** Typically with two erect hairs on the pronotum and two on the mesonotum. The
4192 mesonotum is not inflated and does not bulge dorsally above the pronotum in lateral view.
4193 Metanotal groove absent or narrower than the diameter of the metathoracic spiracles.
4194 Metathoracic spiracles in dorsolateral position, not protruding, and usually touching the
4195 propodeal sutures. Dorsum of the propodeum is convex and shorter than the propodeal slope.
4196 Propodeal spiracles circular, positioned slightly ventral of the posterior propodeal margin, at the
4197 middle of the propodeal slope. Legs with appressed and scattered hairs. Petiole short and inclined
4198 forward.

4199 **Gaster.** Usually with dense pubescence, and scattered long erect hairs, among others at the edges
4200 of the segments.

4201 **Color and sculpture.** Body smooth, shiny and yellowish.

Distribution (Supplementary material Fig. S39). *Brachymyrmex termitophilus* is known from Brazil, Colombia, Costa Rica, the Dominican Republic, Mexico, Paraguay and the United States.

Biology. Forel (1895b) indicated that this species was collected in association with termites.

Remarks. The type material of *B. termitophilus* at the MHNG is somewhat problematic and may have caused confusion as to the diagnostic traits of the species (see below). This material consists of specimens mounted on three pins of which one (USNMENT00757136) holds an undescribed queen; the second (USNMENT00757137) holds a brownish worker with dense pubescence on the gaster, which is here designated as lectotype, and the gaster of another worker of which the rest of the body is missing; the third pin (USNMENT00757138) holds two workers with yellowish heads and mesosoma, and a darker gaster which bears scarce pubescence. Originally, Forel (1895b) described *B. termitophilus* as a variety of *B. heeri* that is slightly smaller than the typical form, that has longer scapes, and a somewhat sparser pubescence but denser, thicker erect hairs, mainly on the gaster. Wild (2007) subsequently elevated *B. termitophilus* to species level reporting two differences with *B. heeri*, i.e. the length of the scapes and the lateral morphology of the mesosoma. The first trait is suspect, however, as he reports the scapes of *B. termitophilus* to barely reach the posterior margin of the head, which contrasts strongly with the original statement by Forel (1895b). We believe that this error caused Wild (2007) to suggest that *B. termitophilus* may be conspecific with *B. fiebrigi*. The latter species has indeed scapes that do not reach the posterior margin of the head. Rather than *B. fiebrigi*, *B. termitophilus* resembles the species here mentioned in the diagnosis. The status of *B. termitophilus* is unclear: Several of the specimens in the type series of *B. termitophilus*

morphologically resemble *B. australis* and *B. aphidicola* in having scarce pubescence on the gaster. Additionally, Santschi (1923a) mentioned that *B. termitophilus* and *B. australis* are both found in association with termites. As mentioned in the diagnosis also the differences with *B. cordemoyi* and *B. obscurior* are limited, and *B. termitophilus* may be conspecific with one or several of these four species mentioned in the diagnosis. We tentatively preserve the current status of *B. termitophilus* awaiting more material and study.

***Brachymyrmex tristis* Mayr**

(Figs. 53, supplementary material Fig. S40)

Brachymyrmex tristis Mayr, 1870: 389 (w.). **Lectotype worker** (NHMW: ANTWEB CASENT0915737; **here designated**): 1 worker [examined]. **COLOMBIA**: Santafé de Bogotá. See also: Santschi (1923a: 673).

Additional material examined. COLOMBIA: Boyacá: Chinququirá, 07 Dec. 1975, W. & E. MacKay #572, 2 workers (WEMC: USNMENT00757574); **Cundinamarca:** Mosquera to La Mesa, km 8, >2600 m, arid slope, under rock, 30 June 1976, W.L. & D.E. Brown, 18 workers, 2 queens, 3 males (MCZC: USNMENT00757280-00757282, 00757306-00757311).

Diagnosis. *Brachymyrmex tristis* morphologically resembles *B. degener* and *B. coactus*, because all three species have scapes that surpass the posterior margin of the head, they have faint sculpture on the mesosoma, their mesonotum bulges dorsally above the pronotum in lateral view, their metanotal groove is wider than the diameter of the metathoracic spiracles, the metathoracic

spiracles slightly protrude, and the gaster has sparse pubescence. *Brachymyrmex tristis* differs from *B. coactus* by having a uniform body color and dense decumbent hairs on the head. It differs from *B. degener* by having many decumbent hairs on the head.

Lectotype worker measurements (mm). HL₁ 0.61; HL₂ 0.38; HL₃ 0.15; HW 0.56; SL 0.61; EL 0.15; WL 0.70; PnL 0.17; PnW 0.39; ML 0.17; MW 0.30; *Indices* CI 92.50; SI₁ 108.11; SI₂ 160.00; OI₁ 27.03; OI₂ 25.00.

Description. Head. Slightly longer than wide in full face view; posterior cephalic margin slightly concave. Dorsum of the head with dense decumbent pubescence. Clypeus with a rounded anterior margin and five long, erect hairs of which a single, usually conspicuous hair is near the anterior margin, two hairs are in mediolateral position and two more near the toruli; other hairs on the clypeus are markedly shorter and appressed or decumbent. Toruli surpassing the posterior clypeal margin in oblique anterodorsal view. The scapes surpass the posterior margin of the head by a length up to 1.5× the maximal diameter of the eye; they have appressed hairs. Three ocelli are present. Eyes are positioned on the cephalic midline and have 10-12 ommatidia along their maximal diameter.

Mesosoma. With two erect hairs on the pronotum and usually also two on the mesonotum. The mesonotum is slightly inflated and bulges dorsally above the pronotum in lateral view. Metanotal groove wider than the diameter of the metathoracic spiracles. Metathoracic spiracles in dorsolateral position, slightly protruding, and not touching any sutures. Dorsum of the propodeum slightly convex and shorter than propodeal slope. Propodeal spiracles circular, positioned ventral of the posterior propodeal margin, at the middle of the propodeal slope. Legs with appressed hairs. Petiole short and inclined forward.

Gaster. With scattered pubescence and several scattered long erect hairs.

Color and sculpture. Head and gaster are smooth and shiny, whereas the mesosoma has faint sculpture; body uniformly dark brown apart from the tarsi of the legs which are lighter in color.

Distribution (supplementary material Fig. S40). *Brachymyrmex tristis* is only known from Colombia.

Biology. Unknown.

Remarks. *Brachymyrmex tristis* is as mentioned morphologically very similar to *B. degener* and *B. coactus* and further studies are required to assess whether these species are distinct or conspecific. For now, we follow previous authors in maintaining them as separate species. Forel (1899) initially considered *B. musculus* to be a race of *B. tristis*, however, we agree with his later decision to consider *B. musculus* distinct (Forel 1901a). Santschi (1923a) also considers *B. musculus* to be closely related to *B. tristis*, however, the first species has a mesonotum that does not bulge dorsally above the pronotum in lateral view, and its metathoracic spiracles are not protruding.

Additional taxonomic remarks.

We could not include information on *B. longicornis* var. *pullus* Santschi, 1933 in the above because the type series consists of a single, destroyed worker (NHMB). As such, we could only re-examine the morphological descriptions of Santschi (1933), from which we conclude that *B. longicornis* var. *pullus* seems to be morphologically similar to *B. patagonicus* and *B. bruchi*. *Brachymyrmex longicornis* var. *pullus* has a shiny body that is black or dark brownish, the scapes

surpass the posterior margin of the head, it has large eyes that occupy a third of the sides of the head, and the thorax would have been similar to that of *B. longicornis* which indicates that the mesonotum did not bulge dorsally above the pronotum in lateral view. Santschi (1933) did not describe the pubescence on the gaster, and so in the above we consider the pubescence to be similar to that of typical *B. longicornis* (here synonymized to *B. australis*), *B. longicornis* var. *hemiops* (here synonymized to *B. aphidicola*) and *B. longicornis* var. *immunis* (here synonymized to *B. admotus*). If this assumption were not true *B. longicornis* var. *pullus* would resemble *B. cordemoyi* and *B. obscurior* more than *B. bruchi* and *B. patagonicus*.

Morphometric measurements.

Although the abovementioned identifications mention morphometric measurements, indices and count data, our identification system and the key were constructed before analysis of quantitative data, and thus somewhat independent from the quantitative comparison that follows. Here, we examine how well measurements corroborate the established identification system.

The morphospace occupation of the various species is displayed in Fig. 54. The stress associated with nmMDS is small (5.70), indicating that this ordination is reliable and the risk of drawing false inferences very limited. The contribution of the individual morphometric variables (measurements, indices and counts) to the morphospace is indicated with a biplot. Permutation tests revealed that all variables contributed significantly to the morphospace occupation of taxa, apart from OI_1 , and therefore we excluded this index from further statistical tests. Overall, many of the 38 species included occupy very similar regions of the morphospace, which testifies to the cryptic nature of morphological differences among these taxa, and therefore to the legacy of difficulties with species identifications that have plagued workers of *Brachymyrmex* (see Wheeler

1903; Santschi 1923a; Creighton 1950; Kusnezov 1959; Wilson and Taylor 1967). Indeed, the observation that several species overlap in the central region of the morphospace suggests that the genus is overall characterized by a large degree of morphological conservatism. However, upon more detailed examination we also perceive that most taxa occupy rather restricted regions of the morphospace, despite measurements typically deriving from specimens obtained from distant localities. For example, even widespread species, such as *B. patagonicus* occupy a rather restricted region of the morphospace. One notable exception is *B. bruchi*, which displays large variation on both nmMDS1 and 2, and which is difficult to characterize morphologically (although molecular analyses suggest our identification system works well for this species too [see below]). Beyond the measured traits, the first nmMDS axis also reflects general differences in body size, with small species (*B. depilis*, *donisthorpei*, *fiebrigi*, *iridescent*, and *feitosai*) plotting along the most negative and large species (*B. admotus*, *cavernicola*, and *degener*) along the most positive values. The overall restricted morphospace occupation of individual species testifies to the possibility to distinguish many species in one-on-one comparisons, and we examine this issue for univariate variables, because such univariate comparisons may be more helpful than multivariate comparisons for colleagues aiming to identify specimens directly in the field.

Boxplots (Figs. 55, 56) highlight similarities and differences among 20 *Brachymyrmex* species for the 16 univariate variable (after exclusion of OI_1) with statistical pairwise comparisons. Here we will not exhaustively compare all these species for each of the variables, as this would lead to 3040 pairwise comparisons. Rather, we will focus on comparing five species pairs that are difficult to distinguish, i.e. *aphidicola-australis*, *bruchii-patagonicus*, *coactus-degener*, *cordemoyi-obscurior* and *donisthorpei-modestus*, with the aim to find additional criteria that may

allow differentiating these taxa. *Brachymyrmex aphidicola-australis* differ significantly in SI₁ and SI₂, but not in other variables. *Brachymyrmex bruchi-patagonicus* display significant differences in HL₁, HL₂, HW, SL, EL, WL, PnL, and PnW suggesting that the main difficulty differentiating these taxa relates to the very variable nature of *B. bruchi*, as already highlighted above. *Brachymyrmex coactus* and *B. degener* are effectively very difficult to distinguish as the only significant difference we found is in OI₂, which was admittedly very variable for *B. degener*. Although *B. cordemoyi* and *B. obscurior* overlapped strongly in morphospace occupation, they can nevertheless be distinguished based on HL₁, HL₂, HL₃, HW, EL, PnL, PnW, MI, MW, SI₁, and the number of ommatidia. For several of these variables, *B. obscurior* showed limited variation, despite the inclusion of 10 specimens from 4 different countries, which may have driven statistical significance. Finally, *B. donisthorpei* and *B. modestus* differed significantly in HL₁, HL₃, HW, SL, WL, MW, CI, and OI₂. In summary, the morphometric variables confirm significant morphological differences for all five species pairs. Interestingly, as we will document in the next section, the two species pairs with the most limited number of differences, i.e. *aphidicola-australis* and especially *coactus-degener* are phylogenetically closely related (see below).

Phylogenetic inference.

Our phylogenetic analyses with maximum parsimony (MP), maximum likelihood (ML) and Bayesian Inference (BI) on five gene fragments (three nuclear, two mitochondrial) for 19 *Brachymyrmex* species, 5 species of its sister clade *Myrmelachista* and outgroups retrieved *Brachymyrmex* and *Myrmelachista* as a well-supported monophyletic clade (MP = 98, ML = 100, BPP=1.00; Fig.57). This finding agrees with recent studies of the deep phylogenetic relationships within the subfamily Formicinae based on UCEs (ultraconserved elements: Blaimer et al. 2015;

Ward et al. 2016), however, this previous study contained only two *Brachymyrmex* and one *Myrmelachista* species. Under expanded taxon sampling *Brachymyrmex* and *Myrmelachista* were found to be reciprocally monophyletic, with high support for each genus (MP = 98, ML = 100, BPP = 1.00 and MP = 96, ML = 82, BPP=1.00, respectively). This finding suggests that the morphological criteria currently used to delimit these genera are unambiguous autapomorphies. Examining *Brachymyrmex* in more detail, many of the nodes of intermediate depth are poorly supported, indicating that more markers are required, or at least more complete sampling of markers across taxa, to reveal the phylogenetic relationships between individual *Brachymyrmex* species. Given that our analysis includes half of the currently recognized *Brachymyrmex* species, increased taxon sampling may also help to resolve phylogenetic relationships among the species.

Despite ambiguity as to interspecific relationships, species-level nodes (indicated in bold in Fig. 57) are overall well-supported, and of the 14 *Brachymyrmex* species that were sampled with 2-15 specimens, 13 proved to be monophyletic. This finding largely confirms our assessment of intraspecific and interspecific components of morphological variation, the phylogenetic value of the morphological traits used, and thus the significance of our proposed morphological system of species delimitations. The only species that was not retrieved as monophyletic is *B. coactus*, which included the monophyletic *B. degener*. *Brachymyrmex coactus* and *B. degener* are morphologically very similar (as indicated already above in the taxonomic treatment and morphometrics), and they mainly differ in body color, which may be a trait with large intraspecific variation. Significant differences between both species were also found in OI_2 , although *B. degener* is very variable as to this index. On the other hand, the genetic differentiation between *B. coactus* and *B. degener* is substantial, as indicated by the branch lengths in Fig. 57, suggesting that both may be part of a larger clade with cryptic diversity, and

that the observed bimodal distribution in body color may hint at interspecific differences. Considering the substantial genetic differentiation, we do not synonymize both species but rather postpone our assessment until more specimens become available, especially of *B. coactus* from Brazil. Another possible indication of cryptic species diversity relates to *B. cavernicola*, which contains two well-supported subclades, one with specimens from Central America, and the other clade with specimens from South America. More in-depth studies are required to test whether this split relates to different species, or rather variation between geographically-separated populations. The hypothesis of cryptic diversity is furthermore supported by the ABGD analysis (see below).

For *B. feitosa*, *B. nebulosus*, *B. pilipes*, *B. brasiliensis* and *B. bicolor* **n. sp.** only a single individual per species was included in the phylogenetic analyses so that it is difficult to make conclusions on the integrity of these species, however, all these species are deeply split from other *Brachymyrmex* species, suggesting that they are truly distinct. It was particularly important for us to include *B. pilipes*, because this species has very distinctive and different morphological traits (see species description) in comparison to most other *Brachymyrmex* species. Interestingly, the species seems to have a basal position in our phylogeny and revealing its position in the future may yield important insights into trait evolution within the genus. Nevertheless, our phylogenetic analysis confirms that *B. pilipes* is part of *Brachymyrmex*, rather than an independent lineage.

Automated species delimitation.

A total of 24 hypothetical species entities were retrieved within *Brachymyrmex* upon analyzing the barcoding fragment of COI (658 basepairs) with ABGD. Overall these entities are in good agreement with the morphologically-recognized species indicated in Fig. 57, and the differences

are limited to the potential further subdivision of morphologically recognized species by ABGD. Within *B. heeri* four groups are recognized, with each group containing the specimens from one country in the phylogeny. *Brachymyrmex antennatus* is subdivided in two groups, with one group consisting of specimen CX81 from Peru and the other contains the additional specimens. *Brachymyrmex cavernicola* was subdivided in two groups also, along the main subdivision observed in Fig. 57 and discussed above, indicating that differentiation and perhaps cryptic speciation is taking place along a geographic gradient. The final difference relates to the *B. coactus/degener* clade. The ABGD analysis recognized three groups: one group containing only specimen CX37 from Brazil, the remainder of *B. coactus* as a second group, and the third group contains the specimens identified as *B. degener*. In summary, the ABGD analysis corroborates our morphological classification system. It suggests that this classification is conservative and that more cryptic diversity may exist within *Brachymyrmex*.

CONCLUSIONS

For over a century the ant genus *Brachymyrmex* has been in dire need of revision, and here we present such a revision based on the morphology of workers, validated with morphometric and molecular data. Currently the strategy to focus on workers is the most effective solution to revise the genus, because other castes (queens and males) are poorly known for most *Brachymyrmex* species. We studied 1303 samples that have been assigned to 40 species based on the established morphological identification system as represented in a dichotomous identification key, which we tested with previous and new material. Additionally, this key was tested independently by several colleagues (Fabiana Cuezso (Argentina), John Lattke and Livia Pires do Prado (Brazil)), and the obtained identifications were in good agreement with our own diagnoses, suggesting that it effectively allows discerning interspecific differences from intraspecific variation. Beyond these

qualitative tests we also complemented our identifications with measurements to reconstruct the distribution of species in morphospace, and we statistically analyzed individual measurements as univariate variables. These efforts suggest that even species pairs that are qualitatively difficult to discern can be separated statistically, and they illustrated that taxonomically problematic cases relate to taxa that have high intraspecific trait variance. The species pair that was most difficult to discern based on measurements proved to be *B. coactus* and *B. degener*, and interestingly, these taxa represent the only disagreement between our morphological identification system and our phylogenetic analysis based on five gene fragments. *Brachymyrmex degener* was nested within *B. coactus* but considering the deep phylogenetic splits in the *coactus-degener* clade and the results from automated species delimitation, we await more material to resolve the status of the morphospecies in this clade. In summary, 13 of the 14 morphologically-identified species that were included in molecular work with 2-15 individuals each were recovered as monophyletic, indicating the overall robustness of our proposed morphological identification system, and by extension our taxonomic revision. Finally, we have reported dimorphic workers for some *Brachymyrmex* species and the existence of a putative worker-queen intercaste in others. As such, the genus altogether may represent a promising system to study caste evolution in ants.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

DATA AVAILABILITY

Sequence data is deposited in NCBI Genbank [upon acceptance of the manuscript], and Genbank accession numbers are indicated in Supplementary Table S1. Measurement data are provided as an online supplementary file.

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FIGURE CAPTIONS

Fig. 1 Morphological measurements for *Brachymyrmex* workers. See text for details

Fig. 2 Habitus of a selection of queens of *Brachymyrmex*: head and lateral view of (a,b) *B. admotus*; (c,d) *B. antennatus*; (e,f) *B. aphidicola* and (g,h) *B. giardi*

Fig. 3 Habitus of a selection of males of *Brachymyrmex*: head and lateral view of (a,b) *B. coactus*; (c,d) *B. myops*; (e,f) *B. longicornis* var. *immunis* (junior synonym of *B. admotus*) and (g,h) *B. australis* var. *curta* (= *B. australis*)

Fig. 4 The native distribution range of *Brachymyrmex* as reconstructed from the unique georeferenced localities of the here studied material (black circles) and the *Brachymyrmex* records available in the Global Ant Biodiversity Informatics database (Guénard et al. 2017) as viewed in www.antmaps.org (Janicki et al. 2016; shaded area)

Fig. 5 Morphological characteristics of the head of *Brachymyrmex*. (a1) clypeus with five hairs of which a single long apical hair is positioned near the anterior margin, two in mediolateral position and two near the toruli (black arrow); (a2) clypeus with a row of long, thick hairs near the anterior margin (black arrow), toruli touching but not surpassing the posterior clypeal margin in oblique anterodorsal view (grey arrow); (a3) toruli surpassing the posterior clypeal margin in oblique anterodorsal view (grey arrow); (b1) eyes below the cephalic midline; (b2) eyes on cephalic midline; (c1) eyes with 3 or 4 ommatidia along the maximal diameter of the eye; (c2) eyes with more than 4 ommatidia along the maximal diameter of the eye; (d1) scapes short and not reaching the posterior margin of the head; (d2) scapes just reaching the posterior margin of the head; (d3) scapes long and surpassing the posterior margin of the head; the length by which the scapes surpass this margin is compared to the length of the maximal diameter of the eye; (e1) anterior clypeal margin with the medial portion forming a “lip”; (e2) anterior clypeal margin

evenly convex without antero-medial “lip”; (**f1**) head with dense pilosity; (**f2**) head with sparse decumbent hairs; (**g1**) second segment of the antennal funiculus shorter than the first; (**g2**) second segment of the antennal funiculus as long or longer than the first

Fig. 6 Morphological characteristics of the mesosoma and gaster of *Brachymyrmex*. (**a1**)

metathoracic spiracles tumiliform; (**a2**) metathoracic spiracles not protruding; (**a3**) metathoracic spiracles slightly protruding, but not tumiliform; (**b1**) mesonotum inflated and bulging dorsally above the pronotum in lateral view; (**b2**) mesonotum not inflated or bulging dorsally above the pronotum in lateral view; (**c**) dorsal margin of the mesosoma of conspicuous sinusoidal shape; (**d1**) mesometanotal suture inconspicuous (dashed line); (**d2**) mesometanotal suture directly visible; (**e1**) mesonotum strongly antero-posteriorly inclined and thus elongated in lateral view; (**e2**) mesonotum weakly antero-posteriorly inclined in lateral view; (**f1**) metanotal groove deep and wider than the diameter of the metathoracic spiracles; (**f2**) metanotal groove shallow and narrower than the diameter of the metathoracic spiracles; (**g1**) gaster with scattered pubescence; (**g2**) gaster with dense pubescence, in both cases illustrated with long erect hairs near the edges of the segments; (**h1**) mesonotum laterally extended and oval in dorsal view; (**h2**) mesonotum almost circular in dorsal view

Fig. 7 *Brachymyrmex admotus*: (**a,c,e**) head, dorsal and lateral view of the lectotype worker;

(**b,d,f**) = *B. longicornis* var. *immunis* **n. syn.**: head, dorsal and lateral view of a syntype worker

Fig. 8 *Brachymyrmex antennatus*: (**a,b,c**) head, dorsal and lateral view of the lectotype worker

Fig. 9 *Brachymyrmex aphidicola*: (**a,d,g**) head, dorsal and lateral view of the lectotype worker;

(**b,e,h**) = *B. heeri* var. *fallax*: head, dorsal and lateral view of a syntype worker; (**c, f**) = *B.*

longicornis var. *hemiops* **n. syn.**: head and dorsal view of a syntype worker

Fig. 10 *Brachymyrmex attenuatus*: head, dorsal and lateral view of the lectotype worker (**a,b,c**)

Fig. 11 *Brachymyrmex australis*: (a,d,g) head, dorsal and lateral view of the lectotype worker;
 (b,e,h) = *B. australis* var. *curta* **n. syn.**: head, dorsal and lateral view of a syntype worker; (c,f)
 = *B. longicornis* **n. syn.**: head and dorsal view of a syntype worker

Fig. 12 *Brachymyrmex bahamensis* n.sp.: (a,b,c) head, dorsal and lateral view of the holotype
 worker

Fig. 13 *Brachymyrmex bicolor* n. sp.: (a,c,e) head, dorsal and lateral view of a paratype worker;
 (b,d,f) head, dorsal and lateral view of a syntype specimen of the putative worker-queen inter-
 caste. (from www.AntWeb.org; photographer: Ryan Perry)

Fig. 14 *Brachymyrmex bonariensis* n. st.: (a,b,c) head, dorsal and lateral view of the lectotype
 worker

Fig. 15 *Brachymyrmex brasiliensis*: (a,b,c) head, dorsal and lateral view of the holotype worker

Fig. 16 *Brachymyrmex bruchi*: (a,c,e) head, dorsal and lateral view of the lectotype worker;
 (b,d,f) = *B. giardi* var. *nitida*: head, dorsal and lateral view of a syntype worker

Fig. 17 *Brachymyrmex bruchi*: (a,c,e) = *B. laevis* var. *andina*: head, dorsal and lateral view of a
 syntype worker; (b,d,f) = *B. bruchi* var. *rufipes*: head, dorsal and lateral view of a syntype worker

Fig. 18 *Brachymyrmex cavernicola*: (a,b,c) head, dorsal and lateral view of a worker (from
www.AntWeb.org; photographer: Estella Ortega)

Fig. 19 *Brachymyrmex coactus*: (a,c,e) head, dorsal and lateral view of the lectotype worker,
 (b,d,f) = *B. coactus* var. *nictitans* **n. syn.**: head, dorsal and lateral view of a syntype worker

Fig. 20 *Brachymyrmex coactus*: (a,c,e) = *B. constrictus* **n. syn.**: head, dorsal and lateral view of a
 syntype worker; (b,d,f) = *B. robustus*: head, dorsal and lateral view of a syntype worker

Fig. 21 *Brachymyrmex cordemoyi*: (a,c,e) = *B. laevis* var. *fuscula* **n. syn.**: head, dorsal and lateral
 view of a syntype worker; (b,d,f) = *B. cordemoyi* var. *nigricans*: head, dorsal and lateral view of a
 syntype worker

Fig. 22 *Brachymyrmex cordemoyi*: (a,b,c) =*B. brevicornis* n. syn. head, dorsal and lateral view of a syntype worker

Fig. 23 *Brachymyrmex cordemoyi*: (a,c,e) =*B. brevicornoides* n. syn. head, dorsal and lateral view of a syntype worker (from www.AntWeb.org; photographer: Zach Lieberman); **(b,d,f) =*B. cordemoyi* var. *distincta* n. syn.** head, dorsal and lateral view of a syntype worker

Fig. 24 *Brachymyrmex degener*: (a,c,e) head, dorsal and lateral view of the lectotype worker; **(b,d,f) =*B. admotus* r. *niger* n. syn.** head, dorsal and lateral view of a syntype worker

Fig. 25 *Brachymyrmex degener*: (a,c,e) =*B. incisus* n. syn.: head, dorsal and lateral view of a syntype worker; **(b,d,f) =*B. luederwaldti* n. syn.:** head, dorsal and lateral view of a syntype worker

Fig. 26 *Brachymyrmex delabiei*: (a,b,c) head, dorsal and lateral view of the holotype worker

Fig. 27 *Brachymyrmex depilis*: (a,c,e) head, dorsal and lateral view of the lectotype worker; **(b,d,f) =*B. depilis* subsp. *flavescens*:** head, dorsal and lateral view of a syntype worker

Fig. 28 *Brachymyrmex donisthorpei*: (a,b,c) head, dorsal and lateral view of the lectotype worker

Fig. 29 *Brachymyrmex feitosai*: (a,b,c) head, dorsal and lateral view of a worker (from www.AntWeb.org; photographer: Erin Prado)

Fig. 30 *Brachymyrmex fiebrigi*: (a,c,e) head, dorsal and lateral view of the lectotype worker; **(b,d,f) =*B. fiebrigi* var. *fumida* n. syn.:** head, dorsal and lateral view of a syntype worker

Fig. 31 *Brachymyrmex fiebrigi*: (a,b,c) =*B. fiebrigi* var. *funicularis* n. syn.: head, dorsal and lateral view of a syntype worker

Fig. 32 *Brachymyrmex gagates*: (a,b,c) head, dorsal and lateral view of the lectotype worker

Fig. 33 *Brachymyrmex gaucho*: (a,b,c) head, dorsal and lateral view of a worker

Fig. 34 *Brachymyrmex giardi*: (a,c,e) head, dorsal and lateral view of the lectotype worker;

(b,d,f) head, dorsal and lateral view of a putative worker-queen intercaste

Fig. 35 *Brachymyrmex heeri*: (a,c,e) head, dorsal and lateral view of the lectotype worker;

(b,d,f) = *Brachymyrmex* var. *goeldii* **n. syn.**: head, dorsal and lateral view of a syntype worker

Fig. 36 *Brachymyrmex heeri*: (a,c,e) = *B. giardi* var. *cordobensis*: head, dorsal and lateral view

of a syntype worker; **(b,d,f)** head, dorsal and lateral view of a syntype of the putative worker-

queen intercaste

Fig. 37 *Brachymyrmex iridiscens* n. sp.: (a,b,c) head, dorsal and lateral view of the holotype

worker

Fig. 38 *Brachymyrmex micromegas*: (a,c,e) head, dorsal and lateral view of the lectotype

worker; **(b,d,f)** head, dorsal and lateral view of a soldier

Fig. 39 *Brachymyrmex minutus*: (a,b,c) head, dorsal and lateral view of the lectotype worker

Fig. 40 *Brachymyrmex modestus*: (a,b,c) head, dorsal and lateral view of the lectotype worker

Fig. 41 *Brachymyrmex musculus*: (a,b,c) head, dorsal and lateral view of the lectotype worker

Fig. 42 *Brachymyrmex myops*: (a,b,c) head, dorsal and lateral view of the lectotype worker

Fig. 43 *Brachymyrmex nebulosus*: (a,b,c) head, dorsal and lateral view of a worker (from

www.AntWeb.org; photographer: Ryan Perry)

Fig. 44 *Brachymyrmex obscurior*: (a,b,c) head, dorsal and lateral view of the lectotype worker

Fig. 45 *Brachymyrmex oculatus*: (a,b,c) head, dorsal and lateral view of the lectotype worker

Fig. 46 *Brachymyrmex patagonicus*: (a,c,e) head, dorsal and lateral view of the lectotype

worker; **(b,d,f)** = *B. laevis* **n. syn.**: head, dorsal and lateral view of a syntype worker

Fig. 47 *Brachymyrmex patagonicus*: (a,b,c) = *B. patagonicus* var. *atrátula*: head, dorsal and

lateral view of a syntype worker

Fig. 48 *Brachymyrmex pictus*: (a,b,c) head, dorsal and lateral view of a syntype worker (from www.AntWeb.org; photographer: Zach Lieberman)

Fig. 49 *Brachymyrmex pilipes*: (a,c,e) head, dorsal and lateral view of the minor worker lectotype; (b,d) head, dorsal and lateral view of a major worker

Fig. 50 *Brachymyrmex santschii*: (a,c,e) head, dorsal and lateral view of a worker (from www.AntWeb.org; photographer: Will Ericson); (b,d,f) head, dorsal and lateral view of a putative worker-queen intercaste

Fig. 51 *Brachymyrmex sosai* n. sp.: (a,b,c) head, dorsal and lateral view of the holotype worker

Fig. 52 *Brachymyrmex termitophilus*: (a,b,c) head, dorsal and lateral view of the lectotype worker (from www.AntWeb.org; photographer: Zach Lieberman)

Fig. 53 *Brachymyrmex tristis*: (a,b,c) head, dorsal and lateral view of the lectotype worker

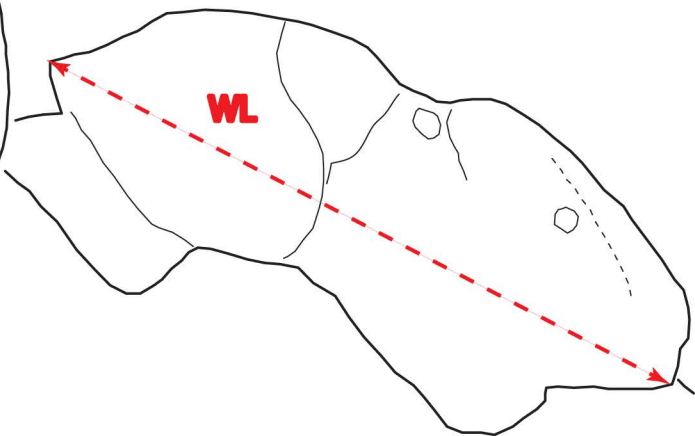
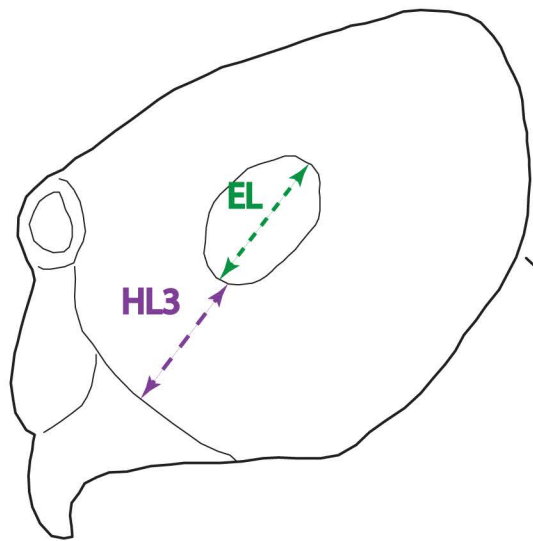
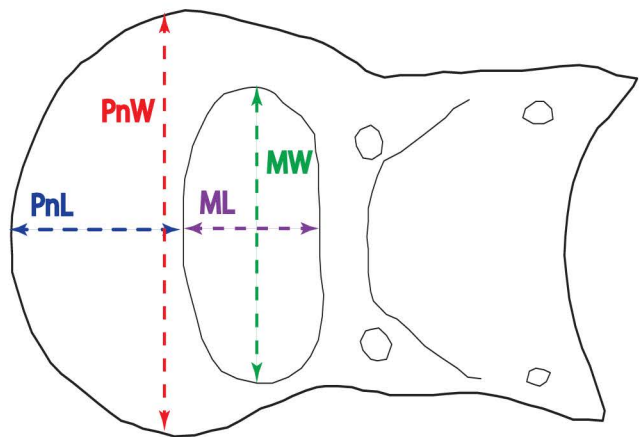
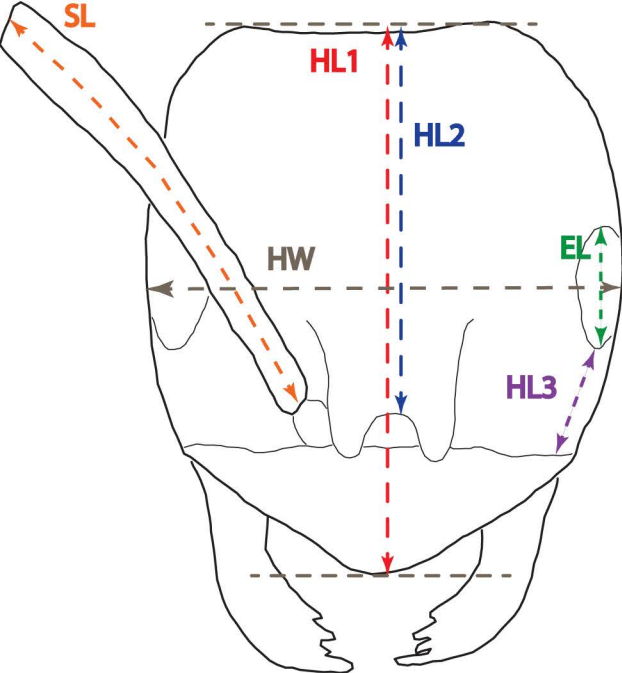
Fig. 54 Morphospace occupation of 38 of the here studied *Brachymyrmex* species as reconstructed with non-metric multidimensional scaling. The limited stress (5.70) indicates that the ordination is robust and the biplot displays how the various morphometric variables contribute to the morphospace occupation. OI₁ is indicated in gray, as this variable did not contribute significantly to the morphospace

Fig. 55 Boxplots representing intraspecific variation and interspecific differences for eight morphometric traits. Interspecific differences are tested with Benjamini-Hochberg corrected pairwise Dunn's tests, with significance levels indicated by letter codes (if species carry at least one identical letter than observed differences are insignificant, if they carry no identical letter, the observed differences for the studied trait are significant)

Fig. 56 Boxplots representing intraspecific variation and interspecific differences for eight morphometric traits. Interspecific differences are tested with Benjamini-Hochberg corrected pairwise Dunn's tests, with significance levels indicated by letter codes (if species carry at least

one identical letter than observed differences are insignificant, if they carry no identical letter, the observed differences for the studied trait are significant)

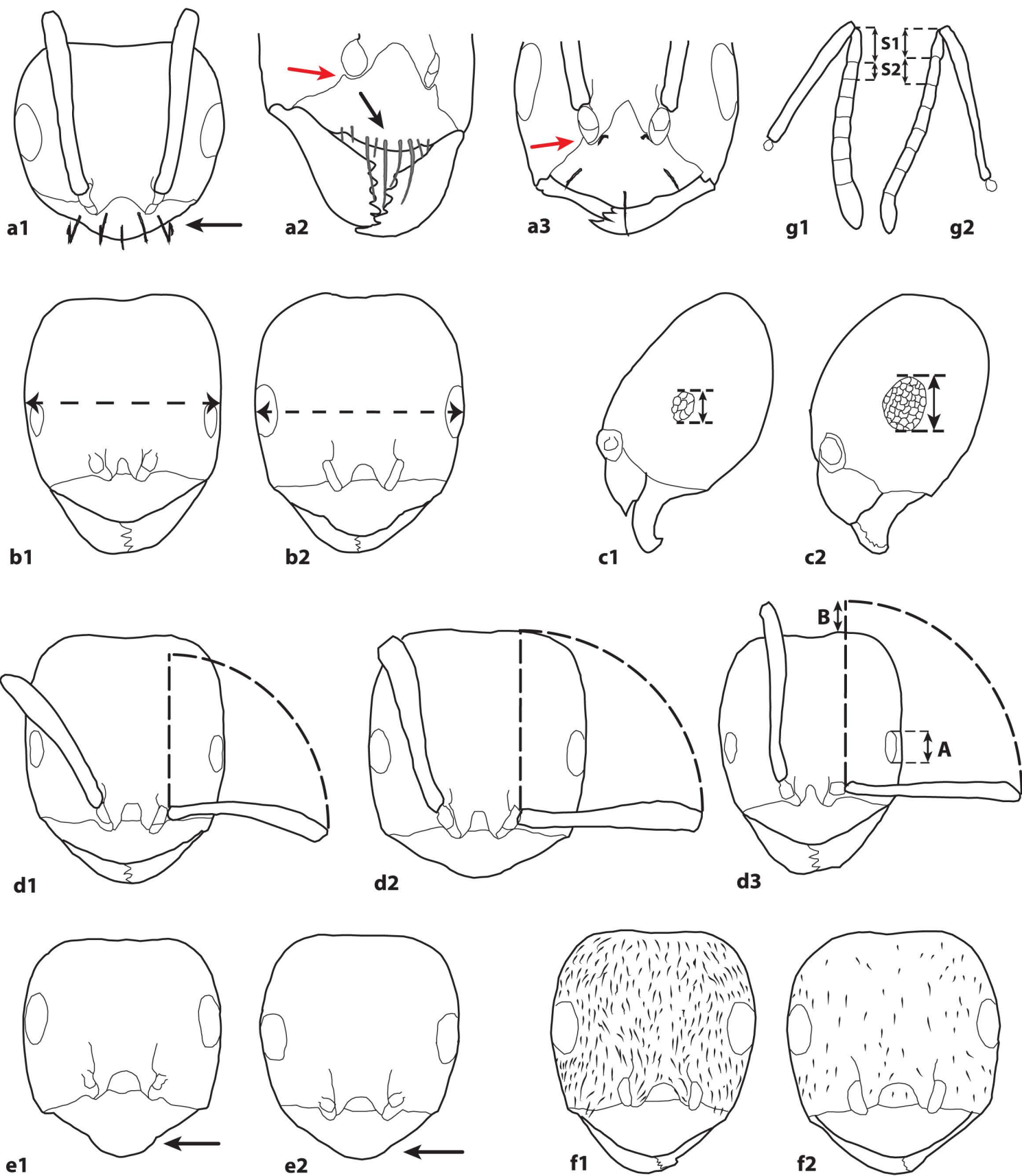
Fig. 57 Maximum clade credibility tree of *Brachymyrmex* and *Myrmelachista* based on five gene fragments (see Supplementary material Table S1). Analyses were run under maximum parsimony (MP), maximum likelihood (ML) and Bayesian inference (BI) with bootstrap support values and Bayesian posterior probabilities indicated above nodes (MP/ML/BI). Support for species-level clades is indicated in bold; specimens were assigned to clades based on the morphological identification system, which proves to be overall in good agreement with the genealogy, apart from *B. degener* and *B. coactus*

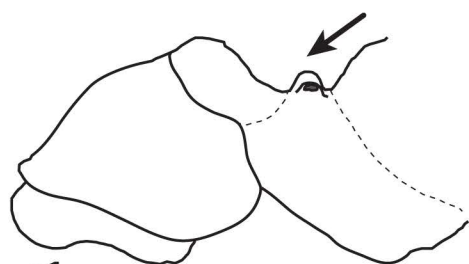




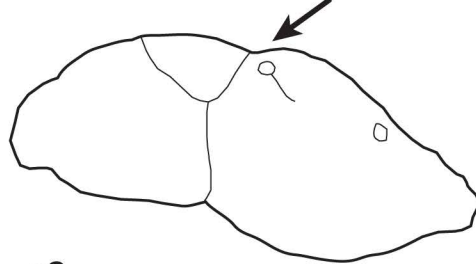




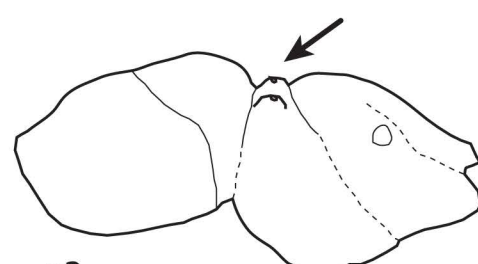




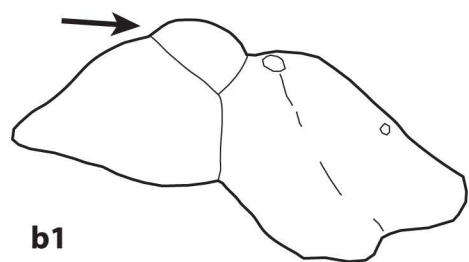
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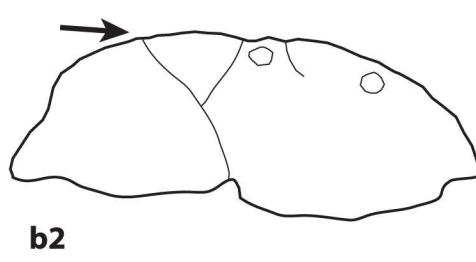
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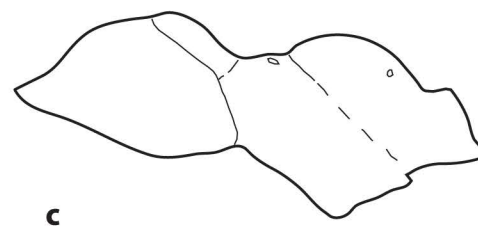
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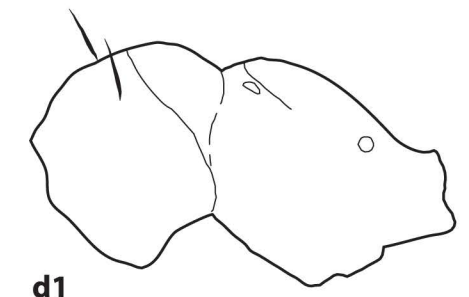
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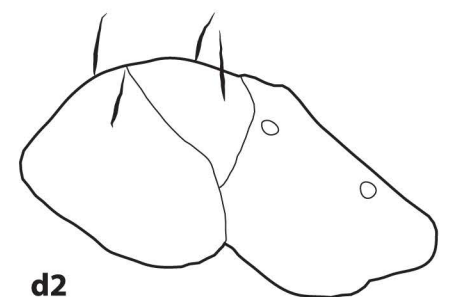
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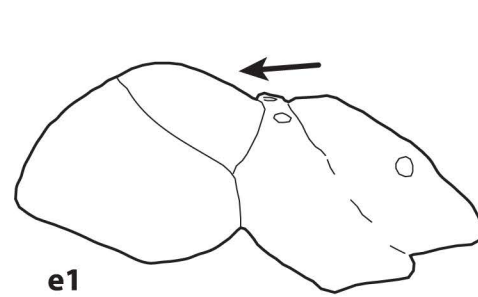
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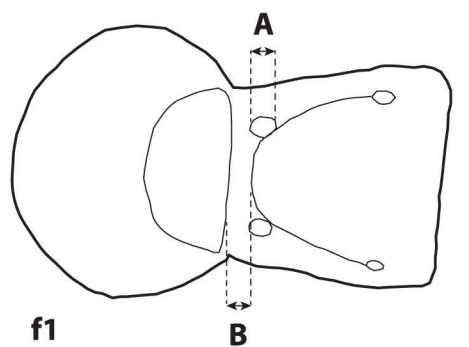
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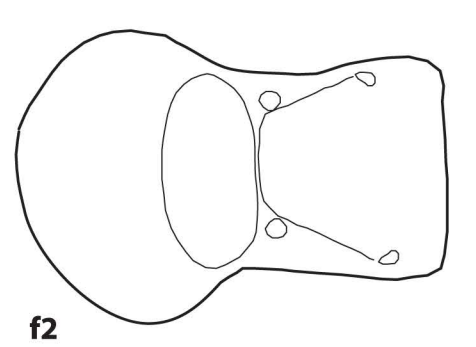
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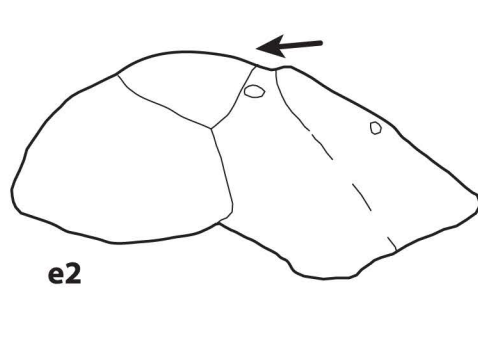
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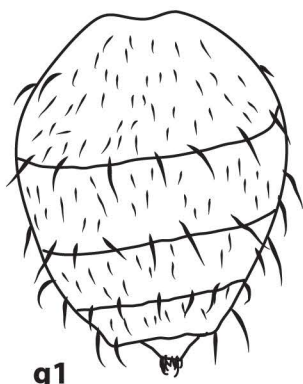
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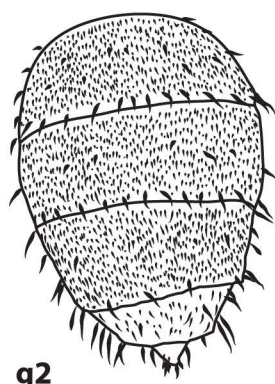
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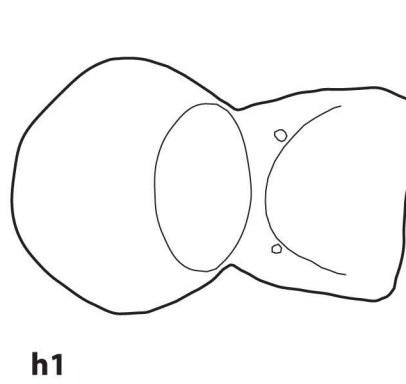
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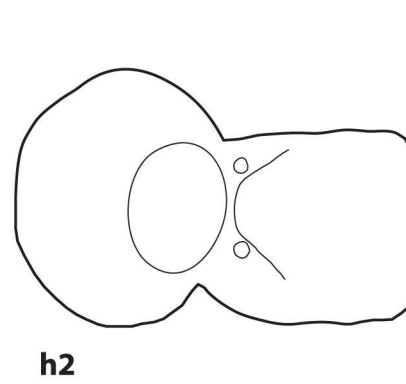
g1



g2



h1



h2



















































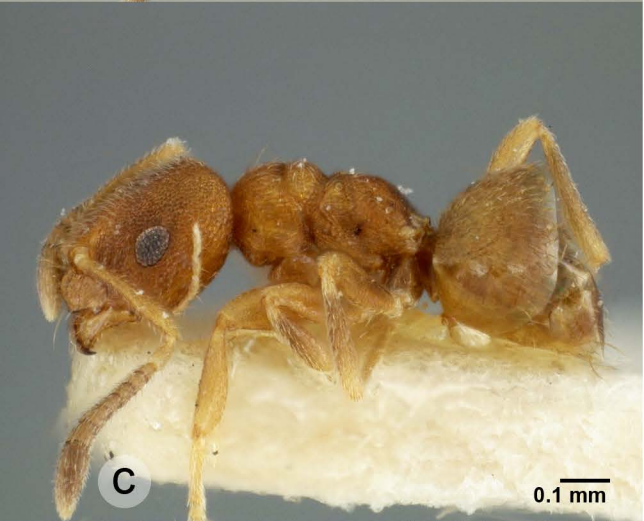
























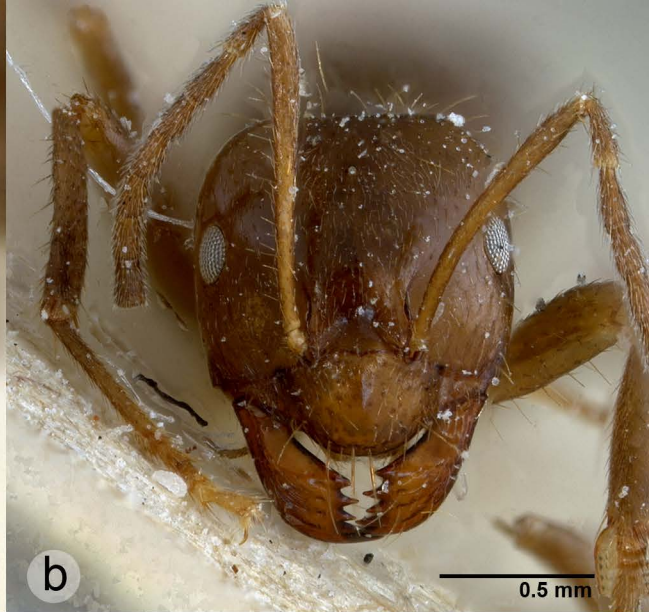
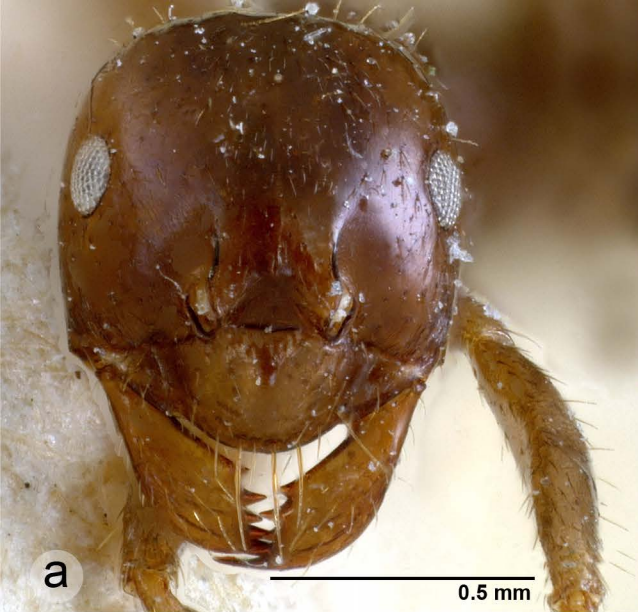










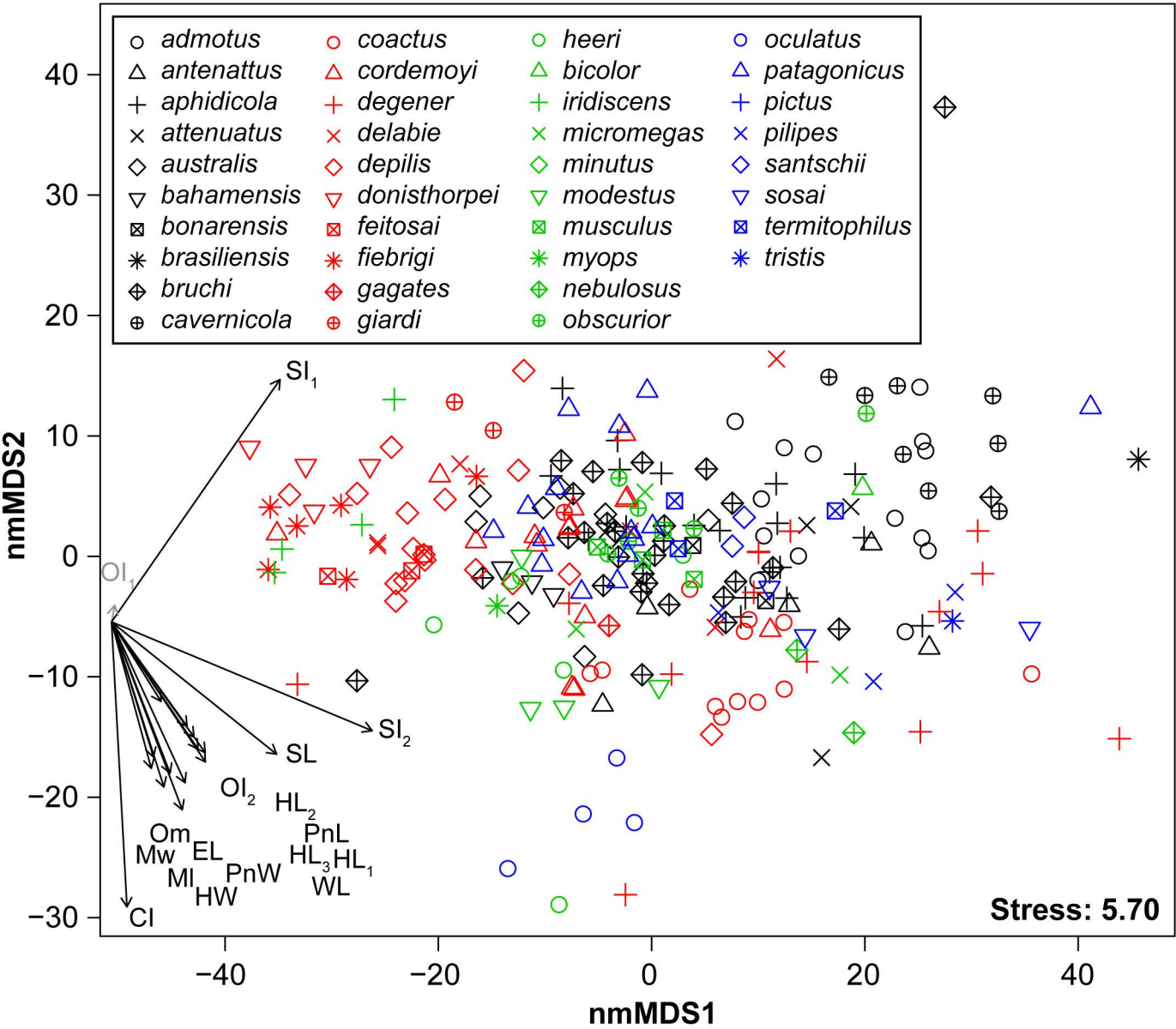


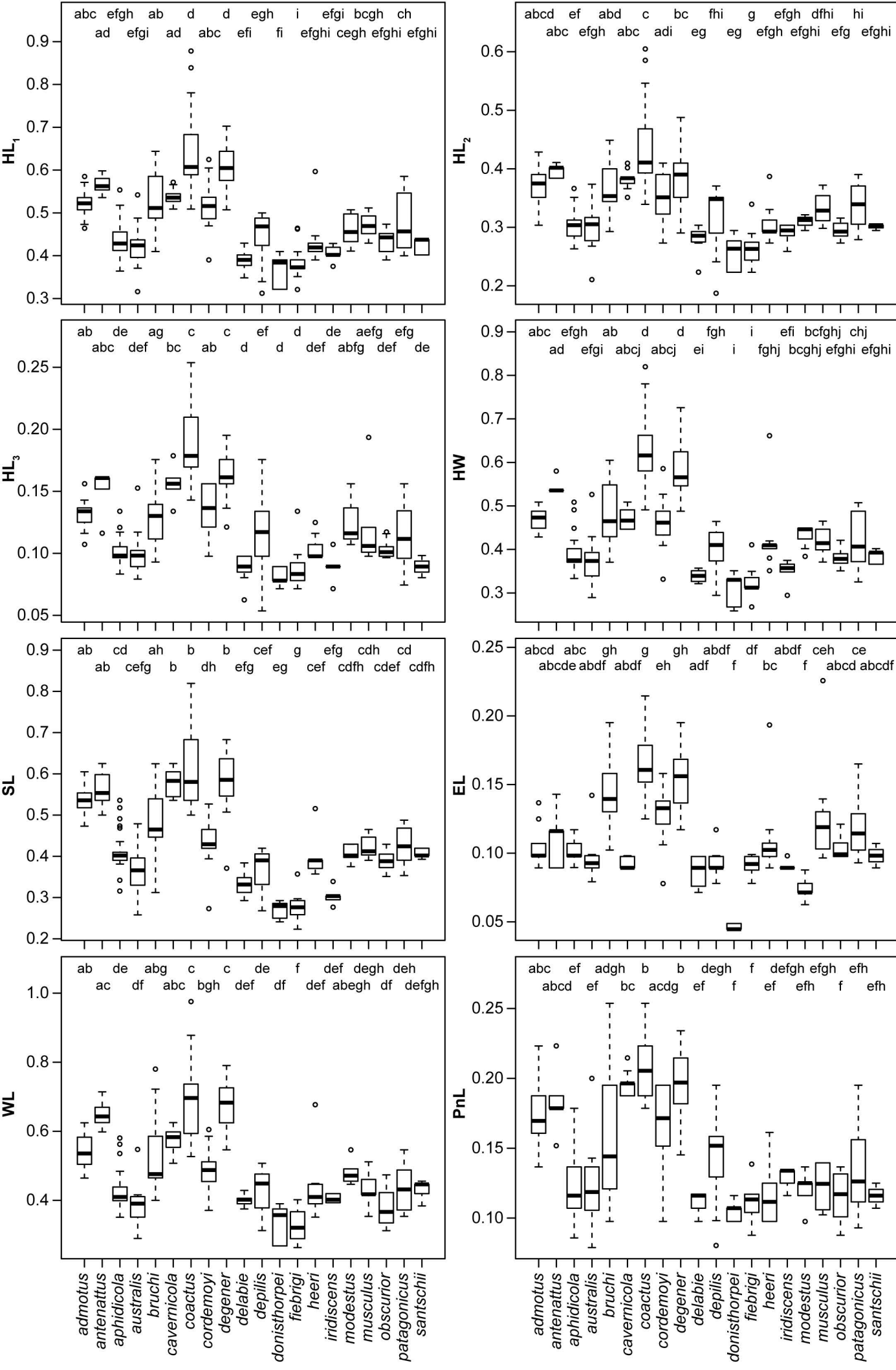


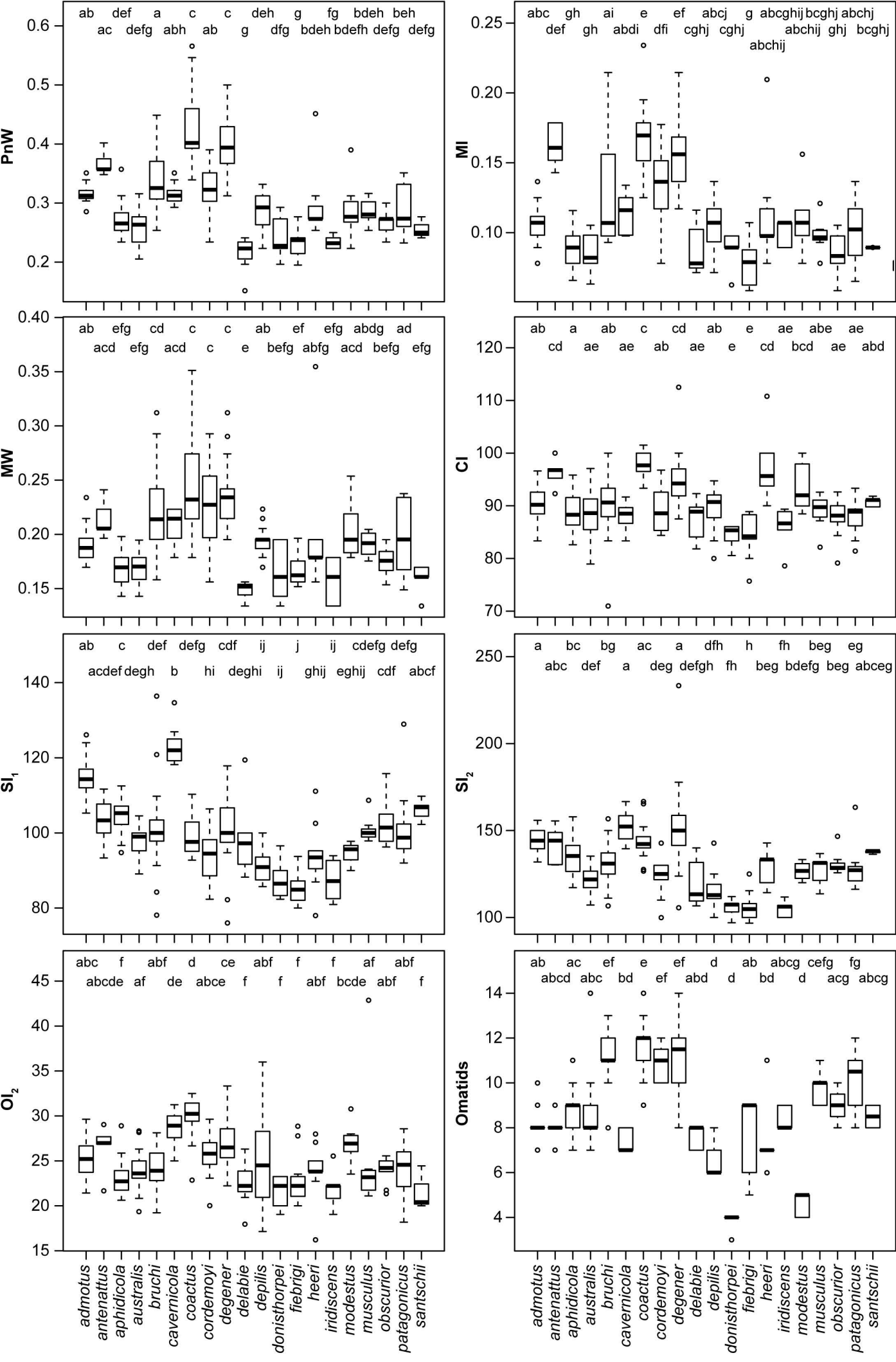












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