A review of the subgenus *Hemioptica* Roger of the genus *Polyrhachis* Fr. Smith with description of a new species (Hymenoptera: Formicidae: Formicinae)

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Dorow, W.H.O. & R.J. Kohout. A review of the subgenus *Hemioptica* Roger of the genus *Polyrhachis* Fr. Smith with description of a new species (Hymenoptera: Formicidae: Formicinae).
Zool. Med. Leiden 69 (8), 31.vii.1995: 93-104, figs 1-3.— ISSN 0024-0672.
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Key words: Formicidae; *Polyrhachis*; *Hemioptica*; systematics; biology; distribution.
The genus-group taxon *Hemioptica* Roger is reviewed and treated as a subgenus of *Polyrhachis* Fr. Smith. Three species are recognised: *P. bugnioni* Forel, *P. scissa* (Roger), and *P. boltoni* spec. nov. Previously included taxa *P. abrupta* Mayr, *P. aculeata* Mayr and *P. pubescens* Mayr are transferred to the subgenus *Polyrhachis (Myrma)* Billberg. A key to species of *Hemioptica* is provided; distribution ranges of individual species are given and known ecological data summarised. A lectotype is designated for *P. scissa* (Roger).

Introduction

The genus *Hemioptica* was established by Roger (1862) as a genus close to *Polyrhachis* Fr. Smith (1858), but characterised by posteriorly truncated eyes and a deep transverse furrow between the mesonotum and the propodeum. Subsequent myrmecologists have been undecided as to whether *Hemioptica* should be regarded as a 'good' genus, a subgenus of *Polyrhachis* or a synonym of the latter. Roger (1862, 1863), Emery (1893, 1896, 1901, 1902, 1923, 1925), Dalla Torre (1893), Ashmead (1905), Ruzskij (1905), Yano (1911), Donisthorpe (1942, 1943), Chapman & Capco (1951), and Hung (1962, 1967) accepted generic rank for *Hemioptica*, while Mayr (1862, 1866, 1867, 1868, 1879), Fr. Smith (1871), Forel (1878, 1879, 1916) and Bingham (1896, 1903) were evidently uncertain, since each published changing or conflicting opinions.

Mayr (1862, 1866) initially accepted *Hemioptica* as a genus, but in 1867 described *P. abrupta* as *Polyrhachis* 'Turma' *abrupta*, an intermediate between *Hemioptica* and *Polyrhachis*. In 1868 he listed *Hemioptica* again as a genus, but in 1872 apparently reversed this opinion by incorporating *Hemioptica* with the genus *Polyrhachis*. In 1878 he established *'abrupta (Hemioptica* Rog.)' as a sixth essentially subgeneric group within *Polyrhachis*, including the species *abrupta* and *'scissa (Hemioptica)* Rog.' and added two new species, *P. aculeata* Mayr and *P. pubescens* Mayr. Frederick Smith (1871) was evidently uncertain as to the generic status of *Hemioptica* and listed its only constituent species as *'Hemioptica (Polyrhachis?) scissa* Roger'. Emery (1893) accepted *Hemioptica* as a monotypical genus, and noted that the other species of Mayr's 'Turma' *abrupta* did not constitute a distinct group, but were in fact, related to the *relucens*-group of *Polyrhachis*. Emery maintained this opinion in later studies (1896, 1902, 1925). In 1921, however, he suggested that the generic status of *Hemioptica* was a matter of 'personal appreciation'. Bingham initially (1896) listed *scissa* under

Polyrhachis, but in 1903 treated the whole of Mayr's 'Turma' *abrupta* as constituents of genus *Hemioptica*. Forel (1879, 1916) accepted *Hemioptica* as a subgenus of *Polyrhachis*, describing *P. (Hemioptica) pubescens* var. *alatisquamis* in 1893 and, despite some apparent reservations, *P. (Hemioptica) bugnioni* in 1908. In 1908 he also described *P. aculeata* var. *gibbosa*, without indication of its subgeneric classification. In 1915 Forel again listed *Hemioptica* as a subgenus of *Polyrhachis*, containing only *P. bugnioni* and *P. scissa*. Wheeler (1911a, 1911b, 1919, 1922) treated *Hemioptica* as a subgenus of *Polyrhachis*, and described *P. aculeata* ssp. *cybele* in 1919. He recognised the subgenus in the sensu lato version of Mayr's 'Turma' *abrupta*. Emery (1925) accepted *Hemioptica* as a genus but followed Forel (1915) in recognising only *bugnioni* and *scissa* as bona fide constituent species. He transfered *abrupta, aculeata* and *pubescens* to the subgenus *Myrma* of *Polyrhachis*. Chapman & Capco (1951) on the other hand accepted all species of Mayr's 'Turma' *abrupta* as members of the genus *Hemioptica*. In recent studies (Brown, 1973; Hölldobler & Wilson, 1990) *Hemioptica* is listed simply as a synonym of *Polyrhachis*, while Bolton (1994) accepts its subgeneric rank.

The conflicting views outlined above, arose from different considerations regarding the two main characters defining *Hemioptica*. In 1862, the year of its description, Mayr pointed out that *Hemioptica* and *Polyrhachis* 'share the habits and most characters' but considered the truncate eyes, not the form of the mesosoma, to justify treatment of *Hemioptica* as a separate genus. Emery (1893) on the other hand considered the truncate eyes of less taxonomic importance than the unusual characteristics of the mesosoma. The opinion that presence of ocular blinkers does not justify separate generic status of *Hemioptica* is supported by the fact that the closely related species, *P. bugnioni* Forel, has the eyes more or less entire, while the other species of Mayr's 'Turma' *abrupta* (*P. abrupta, P. aculeata* and *P. pubescens*) undoubtedly belong to *Polyrhachis (Myrma)* despite having truncate eyes. The Indian species *Polyrhachis (Myrma) hemiopticoides* Mukerjee, 1930 has truncate eyes and similar structures have evolved also in the African species *P. (Myrma) concava* André, 1889 (Bolton, 1973). Forel (1908) pointed out the presence of blinkers also in *Leptogenys* species (subfamily Ponerinae). Hung (1962) reported truncate eyes in *P. latona* Wheeler, 1909 and considered that the formation of the mesosoma (where the mesothorax 'is oppressed by the metathorax') was the main character distinguishing *Hemioptica*. The furrows between the thoracic segments also vary within *Polyrhachis*. For example the African *P. (Myrma) monista* Santschi, 1910, has a deeply impressed promesonotal suture and a deep metanotal groove, while other species of the same subgenus lack both (Bolton, 1973). Forel (1908) pointed out the similarities in mesosomal structure between *Hemioptica, Echinopla* and *Polyrhachis (Cyrtomyrma) rastellata* (Latreille, 1802), which he attributed to convergence.

Despite these considerations, we believe that *Hemioptica* is clearly enough delimited to retain its status as a subgenus of *Polyrhachis*. We follow Forel (1908, 1915) and Emery (1925) by including only *P. bugnioni* and *P. scissa*, along with the new species *P. boltoni*, as its constituents. *Polyrhachis abrupta, aculeata* and *pubescens*, which have been formerly included by authors in *Hemioptica*, are considered to be members of *Polyrhachis* subgenus *Myrma*.

The illustrations were prepared with a Hitachi S-530 Scanning Electron Microscope at low voltage using uncoated specimens.

Measurements and indices are those used by Kohout (1990): TL - Total length (the necessarily composite measurement of the entire ant); HL - Head length (the maximum measurable length of the head in perfect full face view, measured from the anteriormost point of the clypeal border or teeth, to the posteriormost point of the occipital margin); HW - Head width (width of the head in perfect full face view, measured immediately in front of eyes); CI - Cephalic index (HW × 100/HL); SL - Scape length (length of the antennal scape, excluding the condyla); SI - Scape index (SL × 100/HW); PW - Pronotal width (width of the pronotal dorsum measured at the bases of the pronotal spines, or across humeri in species without spines); MTL - Metathoracic tibial length (maximum measurable length of the tibia of the hind leg).

Abbreviations for institutions (with the names of co-operating curators) are: ANIC - Australian National Insect Collection, CSIRO Division of Entomology, Canberra (Drs R.W. Taylor, S.O. Shattuck); BMNH - Natural History Museum, London, U.K. (Barry Bolton); BPBM - Bernice P. Bishop Museum, Honolulu, Hawaii, U.S.A. (Dr G.M. Nishida); FRIM - Forest Research Institute Malaysia, Kepong, Selangor (Dr Tho Yow Pong); MCZC - Museum of Comparative Zoology, Harvard University, Cambridge, Mass., U.S.A. (Dr A.F. Newton, Jr.); MHNG - Muséum d'Histoire Naturelle, Geneva, Switzerland (Dr C. Besuchet); MNHN - Muséum National d'Histoire Naturelle, Paris, France (Dr J. Casevitz-Weulersse); MNHU - Museum für Naturkunde, Humboldt-Universität, Berlin, Germany (Dr F. Koch); OXUM - University Museum, Oxford, U.K. (Dr C. O'Toole); QMBA - Queensland Museum, Brisbane, Australia (Dr G.B. Monteith); RMNH - Nationaal Natuurhistorisch Museum, Leiden, The Netherlands (Dr Ing. C. van Achterberg); SMF - Forschungsinstitut Senckenberg, Frankfurt am Main, Germany (Dr J.-P. Kopelke); USNM - Systematic Entomology Laboratory, c/o U.S. National Museum, Washington, D.C., U.S.A. (Dr D.R. Smith).

Systematics

Polyrhachis (*Hemioptica*) Roger, 1862

Hemioptica Roger, 1862: 238.
Myrma (Hemioptica) Roger; Wheeler, 1911b: 164.
Polyrhachis (Hemioptica) Roger; Forel, 1915: 107.
Type species (by monotypy): *Hemioptica scissa* Roger, 1862: 240.

Characters of the subgenus *Polyrhachis* (*Hemioptica*) Roger

The subgenus *Hemioptica* can be defined within the genus *Polyrhachis* by the possession of following characters:

1. Eyes posteriorly truncate in *P. boltoni* and *P. scissa*.
2. Sides of head with sharply defined longitudinal carinae separating the genae from the ventral parts of the head.
3. Anterior clypeal margin arcuate, entire.
4. Pronotum convex, shield-shaped, extending posteriorly and concealing the median portion of mesonotal dorsum.
5. Mesosoma lacking any traces of armament.
6. The metanotal groove deeply impressed and elaborate.

Key to species of the subgenus *Hemioptica* Roger based on worker caste

1. Smaller (HL <1.47); body covered with appressed silvery pubescence; eyes more or less entire ..... ***P. bugnioni*** Forel
— Larger (HL >1.57); dorsal surfaces of body virtually without appressed pubescence; eyes posteriorly truncate ..... 2.
2. Dorsum of mesosoma highly polished; lateral angles of petiole broadly, obtusely dentate ..... ***P. boltoni*** spec. nov.
— Dorsum of mesosoma closely sculptured, semiopaque; lateral angles of petiole acutely spinose ..... ***P. scissa*** (Roger)

Polyrhachis (*Hemioptica*) *boltoni* spec. nov.
(fig. 1)

Material.— Holotype: Malaysia, Selangor: Ulu Gombak Research Centre, 5.ii.1987 (W.H.O. Dorow #933) (worker). Nidoparatypes: data as for holotype (49 workers, 29 alate females, 9 males and immature stages (eggs, larvae and pupae in cocoons). Paratypes: Malaysia, Negri Sembilan: Pasoh Forest Research Centre, 28.i.1987 (W.H.O. Dorow #890) (85 workers, 21 alate females, 8 males and immature stages (eggs, larvae and pupae in cocoons). Holotype, most nidoparatypes and paratypes deposited in SMF; 8 nidoparatypes (6 workers, 1 alate female, 1 male) and 6 paratypes (4 workers, 1 alate female, 1 male) in QMBA; 2 nidoparatype workers, 2 paratypes (1 worker, 1 female) in each ANIC, BMNH and RMNH; 2 paratype workers in each BPBM, FRIM, MCZC, OXUM and USNM.

Worker.— Dimensions (holotype cited first): TL c. 7.60, 6.35-7.60; HL 1.84, 1.57-1.84; HW 1.28, 1.14-1.28; CI 69, 67-71; SL 2.46, 2.00-2.50; SI 192, 175-203; PW 1.37, 1.12-1.37; MTL 2.71, 2.21-2.71 (17 measured).

Mandibles with 5 teeth, progressively reducing in length towards the base. Clypeus in profile sinuate with posterior margin moderately impressed; the anterior margin arcuate, entire. Frontal carinae prominent, with moderately raised lobes, the area between them longitudinally concave; frontal furrow marked anteriorly, lacking posteriorly. Antennal scapes with a distinct bend at their bases. Eyes large, truncate posteriorly, with peculiar posterior blinkers. Face with a distinctly elongated appearance, with the eyes set well back on its sides. Ocelli lacking. Head with well-defined longitudinal lateral carinae commencing on each side at the base of mandible and extending towards the occipital border. These separate the gena from the ventral parts of the cranium. Pronotum with shallow transverse impression behind its collar-like anterior margin; humeri gently rounded. Pronotal dorsum convex, extending posteriorly towards the metanotal furrow as a shield which conceals the greater portion of the mesonotal dorsum. The exposed lateral margins of the mesonotum appear as short, carinate protuberances. Metanotal groove a deeply impressed transverse furrow which reaches on each side to the metathoracic spiracle. Propodeal dorsum twice as long as declivity, gently curved in profile; anterior margin arcuate, feebly medially emarginate, projecting anteriorly towards the pointed posterodorsal extremity of the pronotum, and partly bridging the furrow. Posteriorly the propodeal dorsum is separated from the declivity by a distinct, arch-shaped, transverse carina, which often has a minute median notch or slight interruption; declivity short, gently concave. Petiole with dorsal margin sinuate, lateral angles blunt, indistinct; in side

view the petiolar node forms a triangle with anterior face almost straight and posterior face slightly convex. Base of first gastral tergite very shallowly truncated.

Mandibles closely shagreened, with numerous piliferous pits, notably towards their external margins. Anterior clypeal margin medially with distinct pits from which a tight cluster of relatively long setae arise. Body dorsally highly polished, at most only very finely microscopically shagreened and shallowly punctate.

Mandibles with numerous short, semierect hairs. Medial portion of anterior clypeal margin with a few relatively long, anteriorly directed setae. Lateral branches of mesosoma and coxae covered with a pile of white, appressed pubescence. Gaster ventrally and around apex with scattered long hairs. The dorsum of the body is virtually hairless, except for some microscopic semierect hairs raising from shallow piliferous pits.

Black throughout; front and middle tibiae sometimes reddish brown.

Female. — Dimensions: TL c. 7.86-8.16; HL 1.84-1.89; HW 1.23-1.28; CI 67-68; SL 2.46-2.56; SI 195-206; PW 1.50-1.62; MTL 2.65-2.87 (12 measured).

Besides the characters identifying full sexuality, including three ocelli, complete thoracic structure and wings, the female resembles the worker very closely. Mesoscutum slightly transverse, 1.25 × wider than long, lateral margins distinctly contracting anteriorly, forming a rather narrowly rounded anterior margin; median line short, parapsides slightly elevated posteriorly; in profile the mesoscutum is relatively low with gently curved dorsum. Mesoscutellum convex, transverse; only slightly elevated above the dorsal plane of mesosoma. Metanotal groove narrow, distinctly impressed. Propodeal dorsum gently sinuate in profile, slightly longer than declivity; posterior margin forming a well defined, arch-shaped transverse carina. The remaining features, including sculpturation, virtual lack of dorsal pubescence and highly polished appearance are the same as in the worker.

Males present in the SMF collection. The larvae were described by Wheeler & Wheeler (1990) as *Polyrhachis (Hemioptica) scissa* (Roger) and are stored together with pupae in the Wheeler collection (Dorow #933 6 larvae on slides, 9 larvae and 7 pupae in alcohol; Dorow #890 9 larvae on slides).

Additional material examined.— Malaysia, Sabah: Labuk Road, 45 mi ex Sandakan (Lungmanis), 12-13.vi.1968 (R.W. Taylor acc. 68.452, workers); Tawau Residency, Kalabakan Riv., 9-18.xi.1957 (T.C. Maa, workers); Sandakan Bay, Sepilok Forest Reserve, 1-10 m, 31.x.1957 (J.L. Gressitt, worker); Sepilok Forest Reserve, nr Sandakan, 10.vi.1968 (R.W. Taylor, worker); Sarawak: Semengoh Forest Reserve, 11 mi SW of Kuching, 28-31.v.1968 (R.W. Taylor acc. 68.165, worker); Selangor: Gombak Forest Reserve, nr Kuala Lumpur, i-ii.1989 (M. Edmunds #78, worker). Brunei, Temburong Distr.: Kuala Belalong Field Studies Centre, 21-29.vi.1994 (R.J. Kohout accs 94.26, 27, 33, 55, 73, workers); Tutong Distr.: c. 1-2 km S of Tasek Merimbun, 3.vii.1994 (R.J. Kohout acc. 94.78, workers); Belait Distr.: Ulu Belait, c. 5 km SE of Melilas Longhouse, 20.iv.1993 (R.J. Kohout acc. 93.23, workers); Kuala Ingai, Ulu Belait, 12-15.vii.1994 (R.J. Kohout acc. 94.100, workers). Indonesia, Sumatra: Pematang Siantar, 1937 (W.M. Mann, NGS SI Exp., worker).

Biology.— With only two partial nests and a relatively small number of individual foragers collected, *P. boltoni* appears to be rather uncommon. The type-colony nested in the secondary forest area of Ulu Gombak Field Studies Centre. It was situated about 4 m high on a leaf on a tree. The nest was partly sheltered by a torn-off part of the leaf and was built using a coarsely woven silk net to which small pieces of dead

leaves, wood fragments up to 4 × 0.1 mm, and other detritus were attached. One nest wall between the parts of the leaf was built from a translucent thin layer of pure silk. The nest comprised one chamber of 3 × 2.5 cm with a height of 1.5 cm. The leaf surface in the nest was not lined with a silk layer as is the case in many other species of *Polyrhachis*. One side of the nest's leaf wall had a fensterfrass (leaf skeletonized by insects leaving one cuticle intact) of 6 × 6 mm. On the nest leaf there were attached several shiny black fungus hyphae (1.5-2 mm in diameter) which were also partly integrated into the nest. In the nest small larvae were attached in clumps on the leaf surface. The nest contained 50 workers, 29 alate females, 9 males and uncounted pupae in cocoons, larvae and eggs.

The second nest was found 1.80 m above the ground on a leaf of a small tree in primary forest near the Field Studies Centre at Pasoh. The nest was attached to the upper side of a dead leaf (17 × 9 cm), which was hanging in the tree attached only by some fungus hyphae of the type mentioned above. It can be assumed that this is not the normal position of the nest, but that it had been damaged recently and was now repaired. The nest measured 6 × 6 cm and consisted of a relatively coarsely woven silk net covered with detritus (pieces of leaves up to 4 × 3 mm, pieces of wood up to 2.5 × 1.5 mm). It contained 85 workers, 21 alate females, 8 males, and uncounted pupae in cocoons, and larvae.

P. boltoni appears to be diurnal. Workers were observed during the daytime on bushes and low herbaceous vegetation collecting detritus from leaves with insect fensterfrass and from rotting pieces of wood. During the night, when the nest was collected, there was no activity. The ants were sitting regularly distributed on the leaf within the partially built nest.

Some interesting conclusions and questions arise from these findings: the fact that no queen was found in the nests leads to the conclusion that *P. boltoni* is polydomous, as are many other species in *Polyrhachis*. The two nests mentioned above, with their high numbers of alates, were collected at the end of January and the beginning of February. A dealate queen was collected at the end of February. Further studies should investigate whether *P. boltoni* queens forage during colony foundation. Further studies are also necessary to determine whether there is a seasonality in colony foundation with nuptial flights after the rainy season in the first quarter of the year, as appears to be indicated by the above data. The findings of the same type of fungus hyphae in and near both nests could indicate that *P. boltoni* normally nests in the higher parts of trees, possibly in epiphytes or other places, where dead foliage is accumulated and fungi common.

Polyrhachis (*Hemioptica*) *bugnioni* Forel, 1908
(fig. 2)

Polyrhachis (Hemioptica) bugnioni Forel, 1908: 11, pl. i. Syntype workers, female. Type locality: Sri Lanka (as Ceylan), Puwakpitiya (Bugnion), MHNG (2 workers examined).

Material.— Syntypes, 2 workers (MHNG); Sri Lanka: Gilimale, Primary forest, 7.iii.1977 (U. Maschwitz #WD565 worker, #WD566 dealate ♀); Sri Lanka, Rat. Dist., Induruwa Jungle, Gilimale, 06°46'N, 80°26'E, 18-20.vii.1993 (K.V. Krombein & B.B. Norden, 26 workers, dealate ♀).

Worker.— Dimensions (syntypes cited first): TL c. 5.49-5.74, 4.89-5,40; HL 1.43-

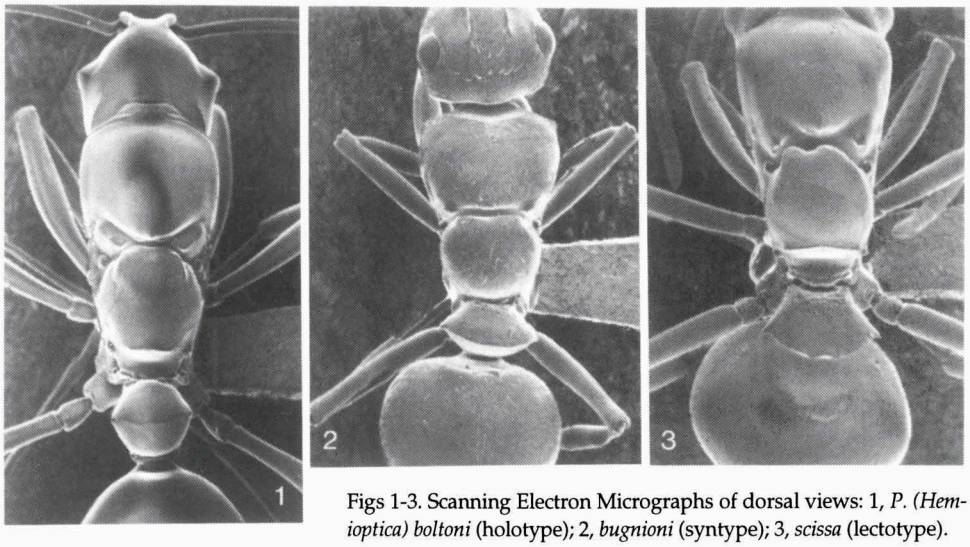
1.47, 1.25-1.43; HW 1.18-1.25, 1.00-1.15; CI 82-85, 80-82; SL 1.65-1.72, 1.47-1.62; SI 138-140, 138-147; PW 1.28, 1.03-1.22; MTL 1.50-1.53, 1.25-1.47 (10 measured).

Mandibles with 5 teeth. Clypeus in profile straight, with the base weakly impressed; the anterior margin arcuate, entire. Frontal carinae only moderately raised; area between them gently excavated anteriorly, weakly convex posteriorly; frontal furrow only marked anteriorly. Antennal scapes distinctly bent at their bases. Eyes entire, moderately large, rather flat; in full face view the eyes at most only marginally exceed the cephalic outline. Ocelli lacking. Sides of head with distinct longitudinal carina, which separates gena from ventral parts of head. Pronotal humeri obtusely angulated; dorsum gently arched, extended posteriorly, shielding greater part of the mesonotal dorsum. Metanotal groove deep, reaching on each side the metathoracic spiracles. Propodeal dorsum arched, anterior angles bluntly angulated; anterior margin gently sinuate, produced forward and partly overhanging the metanotal furrow; dorsum separated from declivity by a distinct, arch-shaped, transverse carina which extends on each side to the propodeal spiracles; declivity shorter than dorsum, concave. Petiole transverse; dorsal edge somewhat emarginated medially; lateral angles terminating in short, distinct denticles. First gastral tergite concave basally.

Mandibles very finely shagreened, with numerous piliferous pits. Anterior clypeal margin with few, moderately large, shallow, setae-bearing pits. Head, mesosoma and gaster rather closely shagreened.

Mandibles with short, semierect hairs. Anterior clypeal margin medially with a few forward directed setae. Head, mesosoma and gaster covered with moderately long, silvery adpressed pubescence, which tends to be somewhat diluted on pronotal dorsum and anterior and posterior faces of petiole. Relatively long erect hairs rather abundant over the whole of the body.

Generally black, with antennae very dark brown, save for their distal ends which are a shade lighter. Legs in syntypes and a queen (Maschwitz coll.) very dark brown



Figs 1-3. Scanning Electron Micrographs of dorsal views: 1, *P. (Hemioptica) boltoni* (holotype); 2, *bugnioni* (syntype); 3, *scissa* (lectotype).

to black, with tibiae, except their proximal ends, mostly yellowish to reddish brown. In the recently collected specimens, the legs of the workers and a queen (Krombein & Norden coll.) are generally very light, yellow, with trochanters, proximal half of femora, proximal ends of tibiae and tarsi dark brown or black. The femora and tibiae were described as white, when the ants were collected (see below), but apparently darkened after the ants died.

Female. — Dimensions: TL c. 6.55-7.06; HL 1.56-1.62; HW 1.25-1.31; CI 80-81; SL 1.68-1.85; SI 134-141; PW 1.43-1.53; MTL 1.53-1.75 (2 measured).

Two dealate queens available for examination closely resemble the workers and differ only by possessing the characters identifying full sexuality, including three ocelli, complete thoracic structure and wings.

Male unknown. Immature stages (eggs, larvae and pupae in cocoons) are present in the USNM collection.

Biology.— *P. bugnioni* is known only from Sri Lanka, where it might be endemic. It is apparently an inhabitant of primary forests. The following data on their nesting habits are by courtesy of Drs Karl V. Krombein and Beth B. Norden who found a nest of *P. bugnioni* in the myrmecophyte *Humboldtia laurifolia* (Fabaceae) during their field-work in Sri Lanka in 1993: '... The colony did not occupy an internode, but made a nest by sealing together the edges of the pair of stipules immediately above the internode. The stipules were unusually long, 45 mm, with a maximum width of 16 mm near the base. Their acuminate apices, 7 mm long, were not sealed. The edges below the apices were sealed together with silk and debris spun by the ant larvae. A sizable mass of debris and silk, 1.5 mm thick, sealed off the top of the nest 7 mm from the tips of the stipules. Access to the nest was at the base of the stipules. The inner surface of the stipules was not coated with a sheet of silk. A few small ant larvae were still attached along the edges of the stipules where, apparently, they were being used to strengthen the seal at the time we placed the nest in alcohol. The nest population consisted of the queen, 27 workers, and a number of brood (9 in cocoons, 15 small larvae and 12 eggs). The coloration of this species is unique among the ant species nesting in *Humboldtia*. The white femora and tibiae are a marked contrast to the black body' (Krombein, pers. comm.).

Polyrhachis (*Hemioptica*) *scissa* (Roger, 1862)
(fig. 3)

Hemioptica scissa Roger, 1862: 240. Syntype workers, females. Original localities: Sri Lanka (as Ceylon), NMHU (2 workers examined); 'Ostindien', MNHN (3 workers, 2 females - all presumed lost).
Hemioptica scissa Roger; Forel, 1893: 27 (description of ♂ ♂).
Polyrhachis (Hemioptica) scissa Roger; Forel, 1908: 13.

Material.— Syntypes, 2 workers, one here designated lectotype: two syntype workers of *P. scissa* (NMHU) were examined by Kohout. Both specimens are in good condition and bear three identical labels reading (1) 'Ceylon Nietner' (on yellow tag), (2) '*Hemioptica scissa*' Rog., and (3) 'Type' (on red tag). One specimen also bears two additional labels (1) with printed number '10581', and (2) a hand-written label which reads '*Hemioptica scissa* Rog.*'. Examination of other Roger types (e.g. *P. ammonoeides, latifrons*) suggests that he used asterisks to indicate a particular specimen of the series, much as we would now select the holotype (Kohout, 1994: 135). Accordingly the specimen bearing the label with asterisk is here designated lectotype. The second specimen consequently becomes the paralecto-

type and both were so labelled. Sri Lanka: (as Ceylon), 4 workers, 1 ♀ (BMNH); Anuradhapura, 14-17.ii.1972 (U. Maschwitz #WD542 ♀, 552 ♀); Yala Park, 4.iii.1977 (U. Maschwitz #WD560, 3 workers). S. India: Dohnavur, 350', Tinnevelly Dt., 8.x.1938 (B.M.-C.M. Expdn. to S. India, ix-x.1938, 3 workers, 1 ♀, 2 ♂♂); Tenmalai, 500-800', Travancore, 11-17.x.1938 (B.M.- C.M. Expdn. to S. India, ix-x.1938, 3 workers).

Worker.— Dimensions (lectotype cited first, paralectotype second): TL c. 6.36, 6.61, 7.00-7.21; HL 1.65, 1.78, 1.81-1.93; HW 1.22, 1.26, 1.48-1.50; CI 74, 71, 78-82; SL 1.90, 2.06, 2.15-2.18; SI 156, 163, 145; PW 1.28, 1.33, 1.43-1.47; MTL 1.81, 1.96, 2.09-2.12 (12 measured).

Mandibles with 5 teeth. Clypeus in profile sinuate, slightly concave anteriorly, moderately convex posteriorly with weakly impressed basal margin; anterior margin arcuate with medially situated 'V' shaped minute notch. Frontal carinae prominent with moderately raised lobes; area between them gently excavated. Eyes relatively large, truncate posteriorly (blinkers). Ocelli lacking (relative position of median ocellus marked by a minute shallow depression). Pronotum in front with shallow transverse depression, humeri dentate, continuous posteriorly for short distance as ill defined lateral margins; pronotal dorsum convex, extending posteriorly as a shield which conceals the greater portion of the mesonotal dorsum. Metanotal groove deeply impressed, extending on each side past metathoracic spiracles. Propodeal dorsum convex; anterior margin deeply medially emarginated, projecting forward, partly bridging the furrow (the propodeal dorsum appears to be consistently asymetrical and distinctly twisted to the left in all *scissa* specimens examined, including types - see fig. 3). Posteriorly the propodeal dorsum is separated from declivity by arched, laterally angulated carina; declivity abrupt. Petiole in side view biconvex, armed with a pair of short, acute spines situated on the dorsolateral angles and separated by the transversely convex, acute, medially emarginated dorsal edge of the segment. First gastral tergite with base shallowly truncate.

Mandibles closely shagreened, with piliferous pits. Clypeus, frontal areas of head and occiput finely shagreened with scattered shallow pits; sculptural intensity more distinct laterally, with sides of head rather densely punctate. Lateral branches of mesosoma shagreened, with sculptural intensity markedly decreasing dorsally; mesosomal dorsum very finely, closely shagreened, resulting in peculiar semiopaque effect, quite contrasting with more or less glossy appearance of the rest of the body. Gastral dorsum shagreened with numerous piliferous pits, reflective.

Mandibles with short, semierect hairs. Anterior clypeal margin with a single seta arising from median 'V'-shaped notch; 3 to 4 pairs of setae arise along the midline from clypeus to the occiput. Numerous adpressed and semierect short hairs arise from piliform pits scattered over whole of the body. Gaster on ventral aspect and apex with scattered long hairs.

Black throughout.

Female. — Dimensions: TL c. 8.44-8.72; HL 1.96-2.03; HW 1.42-1.50; CI 72-74; SL 2.12-2.28; SI 149-152; PW 1.81-1.93; MTL 2.17-2.34 (2 measured).

The female resembles the worker and, besides the obvious characters identifying full sexuality, differs in lack of the peculiar semiopaque effect of the mesosoma. The mesoscutum, mesoscutellum and propodeal dorsum are regularly shagreened with numerous piliferous pits, reflective.

Males are present in the BMNH collection.

Biology.— The known distribution of *P. scissa* ranges from Southern India to Sri Lanka. Little is known about its biology. Wroughton (1892) noted that the nest was 'very small and composed almost entirely of some spun material', while Forel (1892, 1893) described it as a carton nest in leaf rolls built by gall-inducing insects. However, in his classification of nests, Forel (1909) listed the nest of *scissa* under 'doubtful nests' and remarked that these seem to be made of pure carton. Escherich (1917) reported a carton nest made of plant particles glued together with glandular substances. Forel (1908) described the habitat of the species as 'under a bamboo at the border of the jungle, isolated on the bamboo, at the border of the forest'. Maschwitz (pers. comm.) observed a nest of *P. scissa* in a relatively dry monsoon forest close to the shore at Yala National Park, Sri Lanka in March 1977. It was built on a shrub in about 2 m height as a flexible silk web with incorporated detritus around a branch of 2-3 cm in diameter. The nest was about 5 cm long. Maschwitz also collected 2 dealate *scissa* females at Anuradhapura at the end of January and at the beginning of February 1972. The workers of *scissa* behave in the manner typical of most *Polyrhachis* species - in danger they hide below the leaves.

Acknowledgments

We are grateful to the co-operating curators listed above, including Prof. Dr Ulrich Maschwitz, Johann Wolfgang Goethe-Universität, Frankfurt am Main and Drs Karl V. Krombein and Beth B. Norden, National Museum of Natural History, Smithsonian Institution, Washington, D.C., who generously provided valuable data, loans of types and access to the collections in their care. Our special thanks are due to Barry Bolton of The Natural History Museum, London, for his valuable advise in various aspects related to this study. We are also indebted to Drs R.W. Taylor of ANIC, CSIRO Division of Entomology, Canberra and G.B. Monteith of Queensland Museum, Brisbane, for reading and commenting on draft manuscript.

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Received: 16.xi.1994
Accepted: 12.i.1995
Edited: C. van Achterberg