SIX NEW SPECIES OF ANTS (INSECTA: HYMENOPTERA: FORMICIDAE) FROM EGYPT

HASSAN H. FADL, REDA F. BAKR, RAWDA M. BADAWY AND MOSTAFA R. SHARAF

Entomology Dept., Fac. Science, Ain Shams University, Cairo, Egypt.

ABSTRACT

Six new ant species from Egypt *Cerapachys collingwoodi, Cataglyphis agostii, Messor eglalae, Pheidole fadli, Solenopsis bakri* and *Tetramorium shirlae* were described.

INTRODUCTION

Despite all the records of the Egyptian ant fauna, there are only two analytical studies. The first one was carried out by Mohammed (1979) who revised the family Formicidae in Egypt. The author gave keys and descriptions of the subfamilies, genera and species. As a result of this study 36 varieties, 35 subspecies, 54 species under 22 genera are listed. Subsequent field work has revealed further new species and records new of ant species to the Egyptian ant fauna such as those given by Mohamed *et. al.* (2001) who presented a comparative study of ants from Dakahliya and South Sinai governorates, giving keys to the collected species. The authors recorded and described 7 new records, one from Dakahliya and 6 from South Sinai and a new species *Tetramorium salwae* Mohammed *et. al.* 2001 from Sinai.

Prior to the mentioned study of Mohammed (1979), very few fundamental works were carried out on the Egyptian Formicidae. The only notable contributions being the papers produced by Mayr (1904), Forel (1907), Santschi (1908), Karavaeiv (1911), Wheeler and Mann (1916), Menozzi (1929), Viehmeyer (1923), Santschi (1927), Alfieri (1931), Finzi (1936), Santschi (1936), Donisthorpe (1942) on the Egyptian ant fauna. It is worth mentioning that the work of Mohammed (1979) included keys to subfamilies, genera and species recorded from Egypt but which are now very much out of date and difficult to use or depend on them .

In 2003, another study was conducted by Galhoum and Basuony in which the authors studied the ant fauna of the Mediterranean coastal desert but this study cannot be considered as a true contribution to the knowledge of the Egyptian Formicidae. They recorded only eleven ant species from the surveyed areas, and this number does not reflect the high diversity of the ants in similar ecosystem areas and

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is not comprehensive enough. Moreover, they referred to keys and illustrations from the literature without referring to them especially that of Mohammed et .al. (2001). In addition, the introduction was not relevant to the subject of the paper and also all the diagnostic characters of the recorded species were general and related to the genera! Moreover, many references were wrong and years of publication not correct. In brief, this work is not dependable and has to be discussed here.

The most important taxonomic works carried out on the Egyptian Formicidae were done by Finzi, Wheeler and Mann, Donisthorpe, Santschi and Alfieri.

Wheeler and Mann (1916) studied ant species of the Phillips expedition to Palestine during 1914 and described 5 new taxa. In addition, they recorded 28 species from Egypt. Many entomological trips were conducted to different Egyptian governorates to survey insect fauna. The ant fauna included 13 species, 8 subspecies and 2 varieties from several localities in Egypt (Alfieri, 1931). In 1936, Finzi identified the Formicidae of Della Torre expedition to Egyptian Nile and Sinai peninsula; recording 27 species, 10 subspecies and 43 varieties with notes on their distribution in the world. Moreover, the author discovered 2 subspecies and 3 varieties. These were *Cardiocondyla emeryi* subsp. *schatzmayri* from Helwan, Barrage, Kirdassa, Atar el-Nabi; *Solenopsis orbula* subsp. *kochi* from Salloum, Helwan, Ikingi Mariout, Cairo; *Cardiocondyla elegans* var.*torre-tassoi* from Wadi Hoff, El-Tor, Wadi Garawi; *Acantholepis frauenfeldi* var. *aegyptiaca* from Wadi Hoff; and *Acantholepis frauenfeldi* var.*opaciventris* from Sinai.

Siwa oasis was surveyed entomologically by the Armstrong college expedition and yielded 27 ant species. Descriptions of two new taxa were also given, *Tetramorium minutum* and *Monomorium atomus cooperi* (Donisthorpe, 1942). In (1945) the same author gave a list of the important terms used in myrmicolgy. In another study of Siwa oasis ants, Donisthorpe (1947) listed 14 taxa and described a new species *Solenopsis cooperi*. Many more additional studies were carried out on the Egyptian ant fauna but the bulk of them consisted largely of isolated descriptions of new taxa. Seldom pertinent illustrations were provided and sometimes very short descriptions. Finally, the authors believe that there is no doubt that many more native species remain to be added to the Egyptian ant fauna as the territory becomes more carefully explored.

Measurements and indices (according to Bolton, 1982)

TL: The total outstretched length of the ant from the mandibular apex to the gastral apex.

EL: Eye length, the maximum diameter of the eye.

HL: The length of the straight line from the mid-point of the anterior clypeal margin to the mid-point of the occipital margin, in full-face view.

HW: The maximum width of the head in full-face view, measured from the eyes.

PL: Petiole length.

PW: Petiole width.

PPL: Postpetiole length.

PPW: Postpetiole width.

SL: Scape length, excluding basal neck.

SI: Scape index:=SL X 100 divided HW.

CI: Cephalic Index = HW X 100 divided HL

All measurements are in millimeters.

Type depositories: The holotypes of all the new species are deposited in the entomological collection of the Egyptian Entomological Society, Cairo (EESC), and the paratypes are divided between the entomological collection of the Entomology Department, Faculty of Science, Ain Shams University, Cairo (ASUC) and in the entomological collection of the Ministry of Agriculture, Giza (MAC).

RESULTS AND DISCUSSION

Cerapachys collingwoodi Sharaf, n. sp.

Holotype: 1 ♂, Egypt, Port Said, 26.VIII.2003; N: 31.17; E: 32.18; M. R. Sharaf **(SHC).**

Type-locality: Egypt, Port Said.

Measurements of the holotype: TL:3.12; HL:0.55; HW:0.55; SL:0.27; SI:50; EL:0.27; AL:0.77; AW:0.4; PL:0.3; PW:0.32; CI:100

Diagnosis: (Figures 1, 2) **(Male):** Head, alitrunk, petiole and appendages reddish brown, gaster blackish brown. Head smooth and shining, as long as broad, with many scattered long hairs and strongly curved sides; antennae 13-segmented, with raised antennal sockets; scapes short, thin, near antennal sockets and more thick at its end, all the antennae with dense short hairs and pubescence; mandibles triangular, articulated at corners of anterior margin of head, armed with 11 reduced teeth and provided with many long hairs; eyes very large, occupying about half of head length; ocelli present; occiput convex.

Alitrunk box-like, smooth and shining, with abundant long and short hairs and without distinct sutures, only the promesonotal one distinct on the pleuron to

the prospiracle; the dorsal face of propodeum descending abruptly to its declivity. Petiole nearly as long as broad, with abundant pubescence and long hairs directed backwards and a free posterior face; petiole dorsum convex.

Gaster smooth and shining with very faint reticulate pattern; the first and the second gastral tergites with a distinct constriction which is transversely striated; the first gastral tergite with abundant pale pubescence and a row of long hairs at its posterior margin while the remaining gastral segments with abundant long hairs; pygidium armed with a row of denticles; hypopygium armed with 2 lateral relatively long teeth and another reduced median one.

Local distribution: Port Said.

Etymology: This species is named after the British ant taxonomist Mr. Cedric A. Collingwood who examined the specimen and determined its taxonomic status and recommended its description.

Comments: This subfamily has never been listed in the revisionary work of Mohammed (1979) in spite of recording it by Donisthorpe (1942) from Maragi (Siwa oasis). It is represented in Egypt by one genus *Cerapachys* F. Smith, 1857 and one species *Cerapachys longitarsus* (Mayr,1878) but the last author did not collect it from all the surveyed localities during the field study and it is believed that this species is relatively rare and the worker caste is less abundant. The record of such species was frequently based on males collected by light traps. *Cerapachys collingwoodi* n. sp.was described from Port Said, only one male was collected being the only specimen of this genus collected during the period of study, and this may reveal the rareness of this genus in Egypt. This species was collected form leaf litter inhabited by many groups of terrestrial invertebrates.

Cataglyphis agostii Sharaf, n. sp.

Holotype: 1 worker, Egypt, Gebel Ras Abuhebeig, Gebel Serbaal, S.Sinai 23.V.1997; M. R. Sharaf **(SHC)**.

Type locality: Egypt, Gebel Ras Abuhebeig, Gebel Serbaal, S.Sinai.

Measurements of Holotype: TL:10.79; HL:3.32; HW:2.73; SL:3.56; SI:130.4; CI: 82.2

Diagnosis: (Figures 3, 4) **(Worker):** Color dark brown, anterior part of the head and the distal part of the femur yellowish; antennae, mandibles and tarsi clear yellow; femur brown or pale brown. Head longer than broad; the area

between the short frontal carinae finely longitudinally striated; the whole head with fine sculptures; mandibles smooth and shining, longitudinally striated, armed with five strong brown teeth and having many long yellow hairs; posterior part of clypeus having a pair of long yellow hairs; occiput straight with four pairs of hairs.

Pronotum with one pair of short hairs, mesonotum bare, propodeum moderately low with 9 long yellow hairs. Petiole is a truncated node with a flat dorsal surface slopping forward and having relatively dense whitish pubescence in the dorsal and lateral sides and 2 pairs of hairs.

Gaster globular and shining; the first gastral tergite bare while the second with one pair of hairs at the posterior margin; the end of the gaster with few long scattered yellow hairs.

Affinities: This species belongs to the *albicans* group and it appears taxonomically closest to *C. minimus* Collingwood, 1985 which was described from Saudi Arabia. Both of them are shining black, appendages yellow, body smooth and shining almost without sculpture but *C. agostii* is consistently larger, TL 10.79 versus 4.4 mm; and has a larger scape index, SI 130.4 versus SI 106.5. Moreover, both species are different in pilosity, *C. agostii* has one pair of short hairs on pronotum, mesonotum bare, propodeum with 9 long yellow hairs.

Etymology: This species is named after the Swiss ant taxonomist, Dr. Donat Agosti, the specialist of the genus *Cataglyphis*, research associate, American Museum of Natural History, New York.

Remarks: This species was collected from an elevated and semi-isolated site on Gebel Sebaal, over 1500 m, and was found nesting under a rock. Only one individual was collected (the holotype).

Messor eglalae Sharaf, n. sp.

Holotype: 1 worker, Egypt, Zaranik, North Sinai, 7.V.2003; N: 31.08; E: 33.48; M.R.Sharaf; **Paratype:** 1 worker, Zaranik, North Sinai, 4.V.2003; N: 3 1.08; E: 33.48; M.R.Sharaf.

Measurements of Holotype: TL: 8.8; HL: 1.9; HW: 1.9; SL: 1.7; SI: 89.4; CI: 100

Type-locality: Egypt, Zaranik, North Sinai.

Diagnosis: (Figures 5, 6) Unicolorous black, tarsi, funiculus and mandibles reddish. Head as long as braod with dense granulate sculpture; the area between frontal carinae and infront and back of the eyes with longitudinal striations; the area adjacent to the antennal insertions with pale pubescence; underside of head with long J-shaped hairs; antennal scape with dense short hairs; mandibles edentate, shining, with strong longitudinal striae and few sparse short hairs; clypeus with reddish lateral parts and longitudinal striations; eyes relatively large; occiput straight with abundant pairs of short hairs. Alitrunk sides with strong granulate sculpture whereas its dorsum with strong irregular sculpture; propodeal spines short and abrupt; propodeal spiracles well developed; the whole alitrunk dorsum with abundant short yellow hairs. Petiole and postpetiole with very fine granulate sculpture and abundant hairs. Gaster smooth and shining, with abundant short yellow pilosity.

Affinities: This species cannot be separated from Bolton's key in (1982) on the Afrotropical *Messor* or from Collingwood and Agosti's key in (1996) on the Arabian *Messor*. It resembles *M. murayiwahus* Collingwood & Agosti (1996) which was described from Saudi Arabia in the following characters: the first finicular segment distinclty longer than the second; first gaster tergite hairy with long pale hairs; occiput has four or five prjecting hairs at each side of the midline; genae below the eyes with few short projecting hairs. But differ from the mentioned species by the following characters: propodeum armed with two well developed and relatively long acute spines; subcephalic hairs more profuse forming a distinct psammophore; Petiole and postpetiole pilosity more abundant, eight pairs of hairs on the petiole and eleven pairs on the postpetiole.

Etymology: This species is named after the name of Mrs. Eglal H. El-Saadany (mother of the last author, Mostafa Sharaf).

Pheidole fadli Sharaf, n. sp.

Holotypes: (1 Major worker, 1 Minor worker), Egypt, Aswan, Nagh El-Shadeed, 8.III.2003; N: 24.05; E: 32.56; M.R.Sharaf; **Paratypes:** 12 minor workers, same series as holotype; 12 minor workers, Fiala temple, Aswan, 7.III.2003, N:24.05; E:32.56; M. R. Sharaf.

Type-locality: Egypt, Aswan, Nagh El-Shadeed, N: 24.05; E: 32.56

Major Worker (Figures 7, 8)

Measurements of Holotype: TL: 2.8; HL: 0.8; HW: 0.8; SL: 0.35; SI: 43.7; PPL: 0.12; PPW: 0.17; CI: 100

Diagnosis: Head, alitrunk, postpetiole and gaster reddish yellow, legs and petiole yellow. Head as long as broad, with strong longitudinal striae running back to the occiput then diverging laterally to the posterior corners of the head; antennal scapes very short reaching half of the head length and without pubescence or hairs; funiculus with dense yellow hairs and pubescence; mandibles massive, smooth and shining; masticatory margin armed apically with 2 large blunt brown teeth followed by a long diastema and then armed basically with two blunt teeth; mandibles with few sparse hair pits; clypeus smooth and shining; occiput sharply emarginate. Pronotum very high; pro- and mesonotum with strong irregular sculpture and each with two pairs of hairs; propodeum with granulate sculpture and one pair of hairs; propodeal spines long and acute. Petiole and postpetiole each with granulate sculpture and without projecting hairs. Gaster smooth and shining and with sparse hairs.

Minor worker (Figures 9, 10)**:** TL: 1.63; HL: 0.48; HW: 0.41; SL: 0.36; SI: 90; PPL: 0.07; PPW: 0.11; CI: 85.41

Diagnosis: Unicolorous yellow. The whole body except the gaster with dense regular sculpture; gaster smooth and shining. Head clearly longer than broad with convex sides; antennal scapes reaching occiput if held back and with few long yellow hairs; funiculus with dense hairs and pubescence; clypeus nearly smooth and shining; the area just behind the posterior border of the occiput strongly depressed; occiput emarginate with three pairs of short hairs. Alitrunk with a strongly depressed mesopropodeal suture that appears concave in lateral view; mesonotum with one pair of hairs; propodeal spines long, thin, acute and directed upwards. Petiole with a high rounded node and long peduncle. Postpetiole clearly broader than long. Petiole and postpetiole without projecting hairs. Gaster bare, smooth and shining.

Etymology: This species was named after Dr. Hasan H.Fadl, Professor of Insect Taxonomy, Entomology Department, Ain Shams University, Cairo.

Affinities: This species is one of the smallest *Pheidole* species recoded from Egypt. It appears taxonomically closest to *P. minuscula* Bernard, 1951 which was described from North west Africa. Both species are much smaller in size and all body dimensions as compared to the recoded species from Arabia and middle

east, but *P. fadli* n. sp. is consistently smaller than *P. minuscula*, HL< 0.5 mm (=0.48) versus HL< 1 mm, HW< 0.5 mm (0.41) versus HW < 1 mm (0.84).

Ecological observations: This species was collected from Nag El-Shadded, Aswan, under a rock near the river Nile; it was observed that the number of the major workers in the colony was very low as compared to the minor workers.

Solenopsis bakri Sharaf, n. sp.

Holotype: (1 worker, 1 ♀, 1 ♂), Egypt, Saloga Islands, Aswan, 2.V.2002; N:24.05; E:32.56; M.R.Sharaf; **Paratypes:** 31 workers, 5 ♀, 7 ♂, same series as holotypes; 1 worker, Abu-Swelam (El-Minyia), 29.VI.2003; N: 28.06; E:30.45

Type-locality: Egypt, Saloga Islands, Aswan.

Measurements of Holotype: TL:1.64 ; HL:0.42 ; HW:0.31 ;SL:0.26 ;SI:87; BFP:0.12; DFP:0.09; CI:73.8

Diagnosis (Worker) (Figures 11, 12): Unicolorous yellow, smooth and shining; hairy species. Head clearly longer than broad with shallowly convex and nearly parallel sides, head dorsum smooth and shining with scattered hair-pits; antennae with dense hairs and pubescence; the head in full-face view with the antennal scape, when laid back from their insertions, fails to reach the occipital margin; mandibles armed with 4 brown teeth; eyes very tiny composed of only a single ommatidium; occiput almost transverse, with about 5 pairs of hairs. Promesonotum in profile shallowly convex and sloping posteriorly to the narrow but conspicuously impressed mesopropodeal groove; basal face of propodeum forming an obtuse angle with the descending face and clearly longer than the latter; propodeal spiracles circular and relatively large; pilosity abundant on pronotum, mesonotum each with 3 pairs of hairs; propodeum with one or two pairs. Petiole with a dome like node and 3 pairs of long hairs; the petiolar ventral surface clearly convex. Postpetiole faintly sculptured and with 2 or 3 pairs of hairs. Gaster smooth, shining and with scattered yellow hairs.

(Queen) (Figures 13, 14) TL: 4.05; HL: 0.75; HW: 0.55; SL: 0.5; SI: 90.9; EL: 0.2; CI: 73.3

Bicolored species. Head, alitrunk, petiole and postpetiole brown; antennae, legs and gaster yellow; smooth and shining; hairy ant. Head clearly longer

than broad, with abundant scattered long hairs on its dorsum; antennae with dense pubescence and hairs; the first half of the scape length thinner than the second half; the first funicular segement clearly longer than broad; mandibles with longitudinal striae and armed with 4 brown teeth; eyes relatively large; occeli well developed and with black dot adjacent to each ocellus; occiput shallowly conacve and fringed with 7 pairs of hairs. Alitrunk robust and hairy; the basal face of propodeum forming an angle with the descending face. Petiole and postpetiole with abundant long hairs. Postpetiole with fine granulate sculpture. Gaster smooth, shining and with abundant pilosity.

(Male) (Figures 15, 16) TL: 3.37; HL: 0.47; HW: 0.47; SL: .2; SI: 42.5; EL: 0.25; CI: 100

Unicolorous brown; antennae and legs yellow. Head as long as broad; eyes large occupying more than half of the head length; ocelli prominent; occiput strongly concave. Alitrunk hairy, robust and with a distinct mesopropodeal groove. Petiole anterior part with fine granulate sculpture. Gaster smooth and shining, with abundant long yellow hairs.

Affinities: This species is related to *S.lou* Forel, 1902 which was described from Algeria, both species have the basal face of propodeum forming an angle with the descending face but S. bakri differs by the following characters: eyes much tiny composed of only one ommatidium and the occiput is straight in full-face view.

Etymology: This species is named after the first author Dr. Reda F. Bakr, Professor of Entomology, Faculty of Science, Ain Shams University, Cairo.

Tetramorium shirlae Sharaf, n. sp.

Type-locality: Wadi Abha, Abha city, Saudi Arabia.

Diagnosis: (Figures 17, 18)

Worker HL: 1.7; HL: 0.56; HW: 0.48; SL: 0.39; SI: 81.25; EL: 0.12; PL: 0.21; PW: 0.15; PPL: 0.14; PPW: 0.19; CI: 85.7

Bicoloured species, head, alitrunk, petiole and postpetiole pale brown, antennae and legs yellow, gaster dark brown or blackish brown.

Head longer than broad, frontal carinae long and well developed reaching back about two thirds of head length; strong and longitudinal striations extending in front and behind eyes and between frontal carinae; antennae 12 segments with

dense pubescence and short hairs; mandibles with feeble longitudinal striation; armed with 5 brown teeth, the terminal tooth in the largest, the third is smaller than the fourth, the latter and the fifth nearly equal. The whole mandibles surface with several long hairs; median portion of clypeus with 3 strong, longitudinal carinae; occiput weakly concave with four pairs of hairs. Alitrunk, in lateral view, without distinct sutures; meso- and metapleura with well developed granulate sculptures; propodeal spines short and acute with a broad base; pronotal anterior corners, in dorsal view, sharply angulate; pronotum dorsum with strong reticulate sculptures while mesonotum with longitudinal sculptures; pronotum with 2 pairs of stiff hairs, mesonotum with 5 pairs of hairs; propodeum bare. Petiole longer than broad, Postpetiole nearly as long as broad, each faintly sculptured and having 2 pairs of hairs. Gaster smooth and shining, anterior and posterior parts of the first gastral tergites with several pairs of hairs while the middle part bare.

Material examined: Elqasmia (Belbis), 21.II.2003 (16) Leg. M.R. Sharaf; Hawamdiya (Giza), 2.XI.2002 (8) Leg. M.R. Sharaf; Ismailiya, 10.IV.2002 (7) Leg. M.R. Sharaf; Abuzabal (Qalyubiya), 13.VI.2003 (11) Leg. M.R. Sharaf. **(SHC).**

Etymology: This species is named after Mrs. Shirley Judd, wife of Dr. Stephen Judd, Head of Zoology department, Liverpool National Museum, UK.

Remarks: *Tetramorium shirlae* n. sp. was collected from Abha (Asir province) Saudi Arabia by Mostafa Sharaf and it is believed that it has a more wide distributional range in Egypt.

Geographical distribution: Egypt and Saudi Arabia.

ACKNOWLEDGEMENTS

The authors are indebted to Mr. Cedric A. Collingwood, ant taxonomist and entomological consultant, Skipton, North Yorkshire, UK; who spent much time helping us in identifying ant species and determining the taxonomic status of all the new species described. Many thanks to Dr. Brian Taylor and Dr. Donat Agosti for their continuous help, encouragement and for providing the last author (Mostafa Sharaf) with many papers. Many heartfelt are due to: Dr. Stephen Judd, head of Zoology, National Museum, Liverpool, UK; his wife Mrs. Shirley Judd and their sons William and Samuel for their gracious hospitality to Mostafa Sharaf during his visit to UK; Dr. Guy Knight, curator of Entomology, National Museum, Liverpool, UK who provided many facilities to examine the Palaearctic ant collection there.

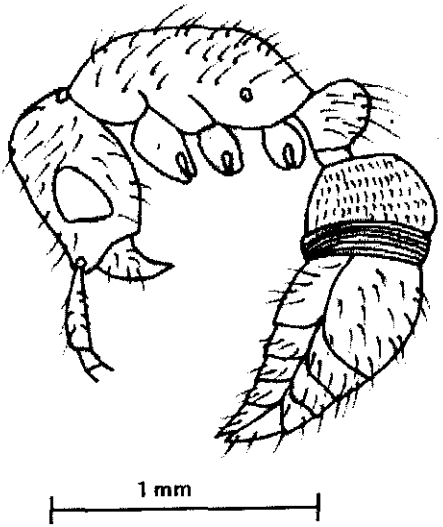

Figure (1): Lateral view of the body of *Cerapachys collingwoodi*

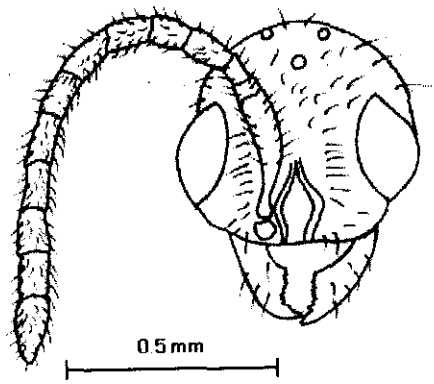

Figure (2): Frontal view of head of *Cerapachys collingwoodi*

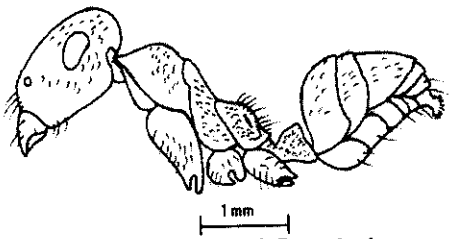

Figure (3): Lateral view of *Cataglyphis agostii*

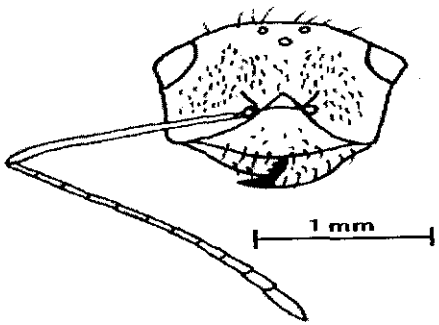

Figure (4): Head of *Cataglyphis agostii*

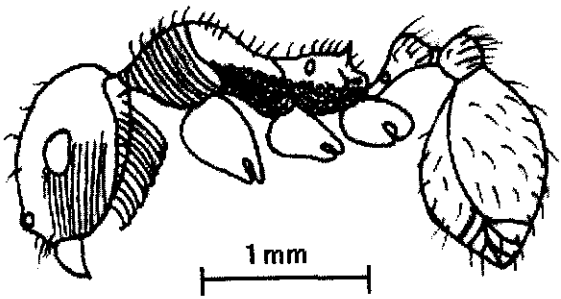

Figure (5): Lateral view of *Messor eglalae*

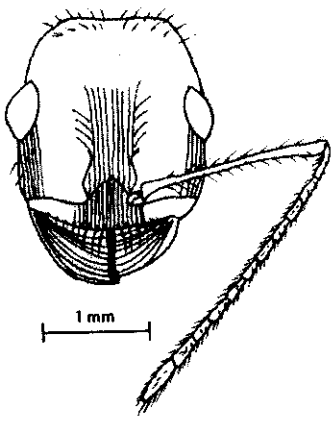

Figure (6): Head of *Messor eglalae*

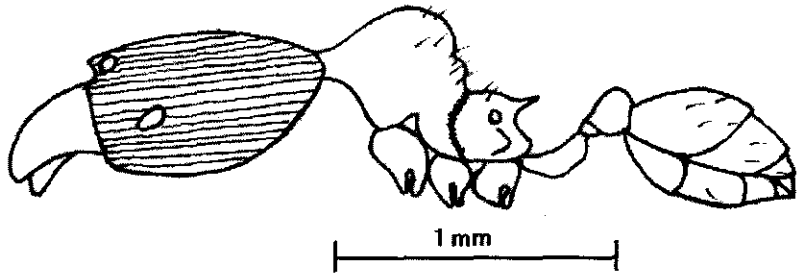

Figure (7): Lateral view of major worker of *Pheidole fadli*

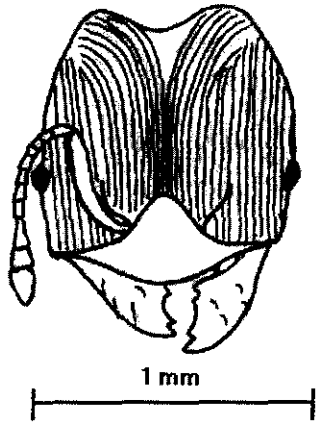

Figure (8): Head of major worker of *Pheidole fadli*

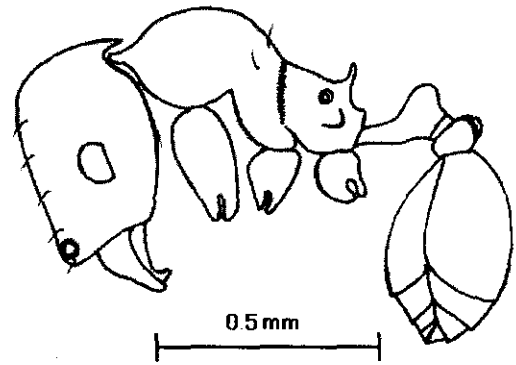

Figure (9): Lateral view of minor worker of *Pheidole fadli*

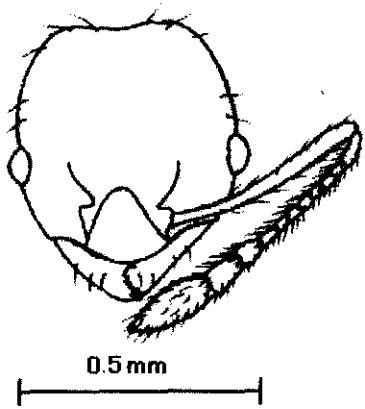

Figure (10): Head of minor worker of *Pheidole fadli*

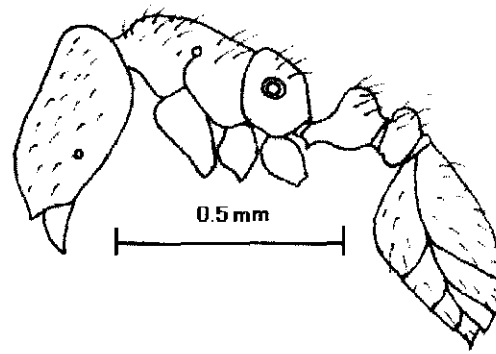

Figure (11): Lateral view of worker of *Solenopsis bakri*

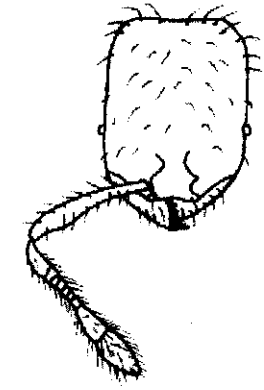

Figure (12): Head of worker of *Solenopsis bakri*

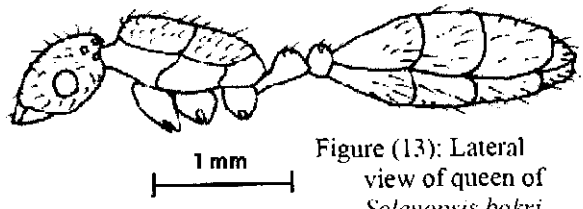

Figure (13): Lateral view of queen of *Solenopsis bakri*

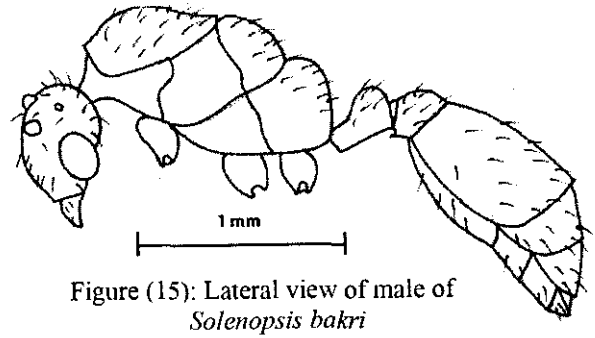

Figure (15): Lateral view of male of *Solenopsis bakri*

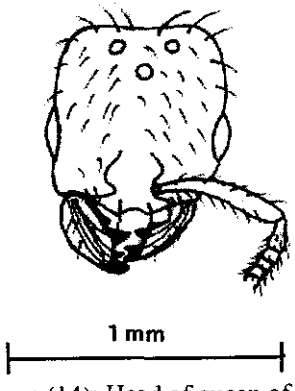

Figure (14): Head of queen of *Solenopsis bakri*

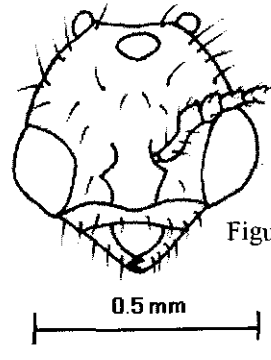

Figure (16): Head of male of *Solenopsis bakri*

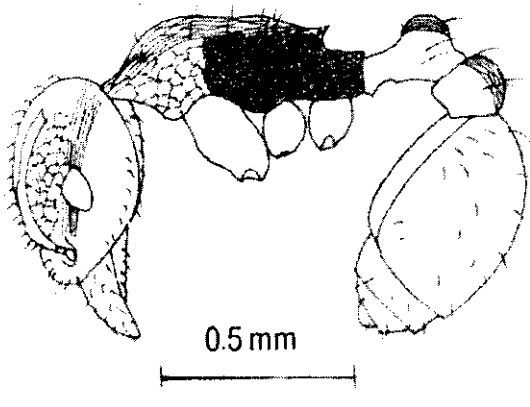

Figure (17): Lateral view of *Tetramorium shirlae*

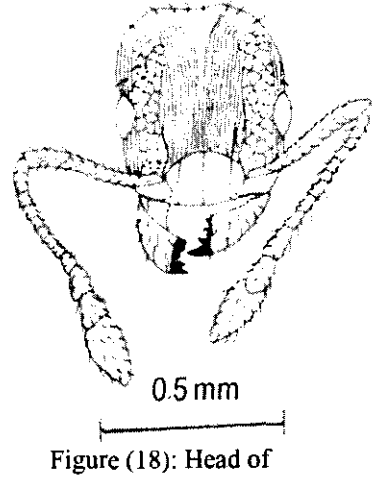

Figure (18): Head of *Tetramorium shirlae*

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