

Identification key to common urban pest ants in Malaysia

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Abstract. A total of 23 species (*Monomorium pharaonis*, *Monomorium floricola*, *Monomorium destructor*, *Monomorium orientale*, *Paratrechina longicornis*, *Paratrechina* sp., *Anoplolepis longipes*, *Tapinoma sessile*, *Tapinoma melanocephalum*, *Crematogaster* sp., *Solenopsis invicta*, *Solenopsis germinata*, *Solenopsis molesta*, *Tetramorium* sp., *Dolichoderus bituberculata*, *Camponotus* sp., *Technomyrmex albipes*, *Pheidole* sp., *Oecophylla smaragdina*, *Linepithema humile*, *Dolichoderus bituberculata*, *Prenolepis imparis*, *Formica* sp.) from four subfamilies (Dolichoderinae, Formicinae, Myrmicinae and Ponerinae) of common household ants were found from household surveys in Penang, Malaysia. We describe a morphological key to the workers of common species that were found in and around living premises. Close-up photographs for various species described were also provided.

INTRODUCTION

Household ants are a group of common nuisance insect pest in Malaysian homes (Chong & Lee, 1999; Lee, 2000). Several species had been reported to be potential mechanical vector of human diseases, and was also shown to penetrate dressed wounds and contaminate sterile equipments in hospitals (Beatson, 1972). A questionnaire survey conducted on 814 houses in Penang, Malaysia in 1995 revealed that household ants were the most important pest after mosquitoes and cockroaches (Lee *et al.*, 1999). Yap & Lee (1994) reported the species composition of common household ants in Malaysia, in which they found the Pharaoh ant (*Monomorium pharaonis*) as the most dominant species, followed by Odorous house ant (*Tapinoma sessile*) and Crazy ant (*Paratrechina longicornis*). Despite the importance of household ants in Malaysia, no identification key is presently available to pest control workers and researchers in the field of urban entomology. Here, we describe a key to

workers of common household ant species in Malaysia. Worker ants are chosen for identification because they are the most common caste sighted by householders and pest control operators. Identification plates of various species of worker ants are also provided.

MATERIALS AND METHODS

Worker ants were collected in living premises from various locations in Penang Island, Malaysia using honey- and peanut butter-baited index cards. Table 1 showed the distribution and locations where the ants were sighted or collected within a residential structure or building. Upon collection, the ants were brought back to the laboratory and kept in 90% alcohol in vials. The ants were then examined under a dissecting scope and identified according to descriptions provided in Bingham (1975), Bennett *et al.* (1997), Hedges (1998), Holldobler & Wilson (1990) and Bolton (1997). Digitized photographs of the worker ants were

taken using a colour video camera (Sony CCD-IRIS) mounted onto a microscope (Olympus Model SZ-PT), and linked to a personal computer with an image analysing computer program. The coloured photographs were then converted into gray scale and saved under jpeg format for publication purposes.

RESULTS AND DISCUSSION

Morphological key to workers of common species of Malaysian household ants

1. Pedicel with one node (petiole); usually without sting 2.
Pedicel with two nodes (petiole and postpetiole); sting is present14.
2. Tip of the abdomen with a circle of hairs..... 3.
Tip of the abdomen without a circle of hairs10.
3. Node with sharp peak 4.
Node without sharp peak (other characteristics: antennae with 12 segments and without club, head and thorax without hair, elongate-triangular mandibles with 10 teeth each, low and elongated petiole)***Oecophylla smaragdina*** (weaver ant) (Plate 1)
4. Thorax looks uneven on sideview; workers are monomorphic 5.
Thorax looks evenly rounded on sideview; workers are polymorphic (other characteristics: black body, gaster heavily covered with greyish recumbent hairs).....
***Camponotus* sp. (carpenter ant)** (Plate 2)
5. Antennae with 12 segments 6.
Antennae with 11 segments (other characteristics: antennae without club; head with two rows of erected hairs in pairs; no erected hair on first antennal segment [scape] and thorax;

thin body with very long legs; light reddish brown body..... ***Anoplolepis longipes*** (red crazy ant) (Plate 3)

6. Head and thorax not heavily sculptured 7.
Head and thorax heavily sculptured with transverse and circular grooves; pronotum with a pair of laterally directed teeth; mandibles with five distinct teeth; clypeus with 7 – 9 blunt short teeth; sting is present
***Odontoponera* sp.** (Plate 4)
7. Scape extends top of the head; ocelli absent 8.
Scape does not extend top of the head; ocelli present (other characteristics: about 10 mm in body length; mandible with at least eight teeth; 3rd tooth distinctly smaller than the 4th tooth) ***Formica* sp.**
8. Length of scape is more than 1½ the length of head 9.
Length of scape is 1½ the length of head (other characteristics: scape and body covered with erected hairs, but not arranged in distinct pairs; mandible with six teeth; yellow brownish in colour
Prenolepis imparis (small honey ant) (Plate 5)
9. Length of scape is two times the length of the head (other characteristics: no erected hair on scape; dark brown to black in colour; head and thorax are covered by erected hairs arranged in distinct pairs) ***Paratrechina* sp.** (Plate 6)
Length of scape is 2½ times the length of the head (other characteristics: with erected hair on scape, thin body with extremely long legs; dark brown to black in colour; head and thorax are covered by erected hairs arranged in distinct pairs) ***Paratrechina longicornis*** (crazy ant) (Plate 7)

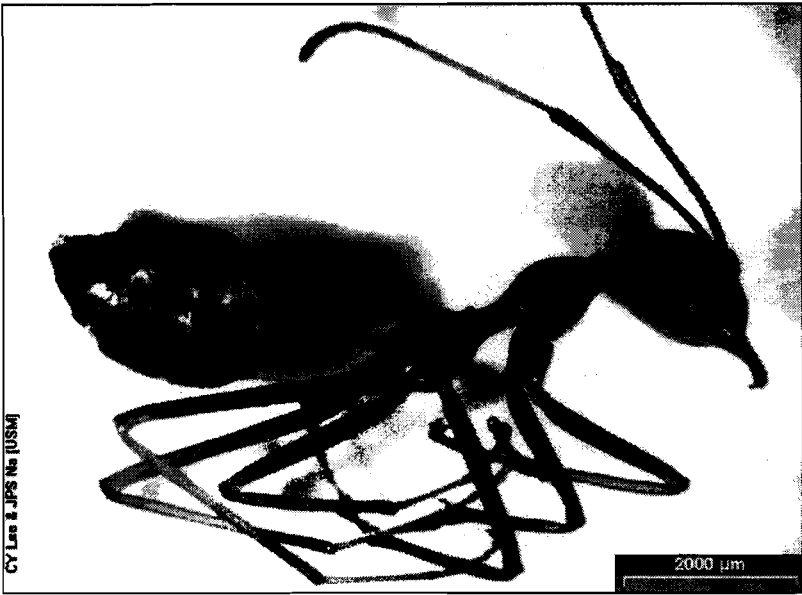


Plate 1: *Oecophylla smaragdina* (weaver ant)

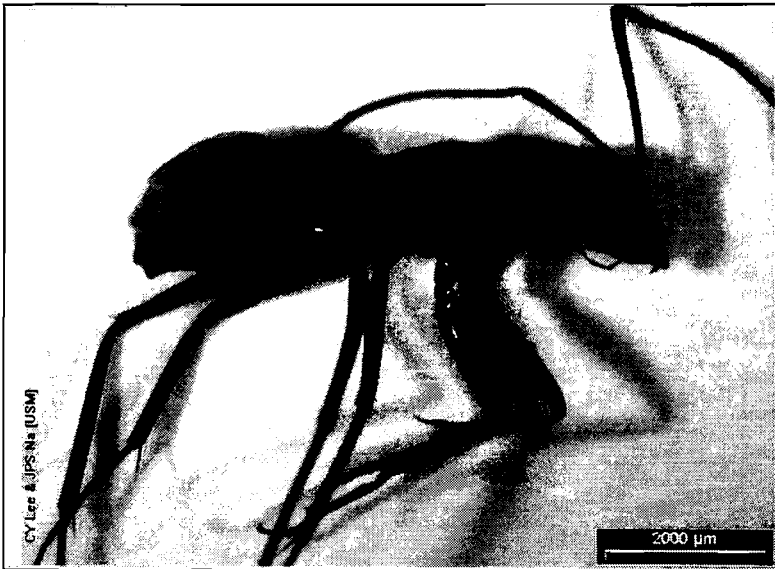


Plate 2: *Camponotus* sp. (carpenter ant)

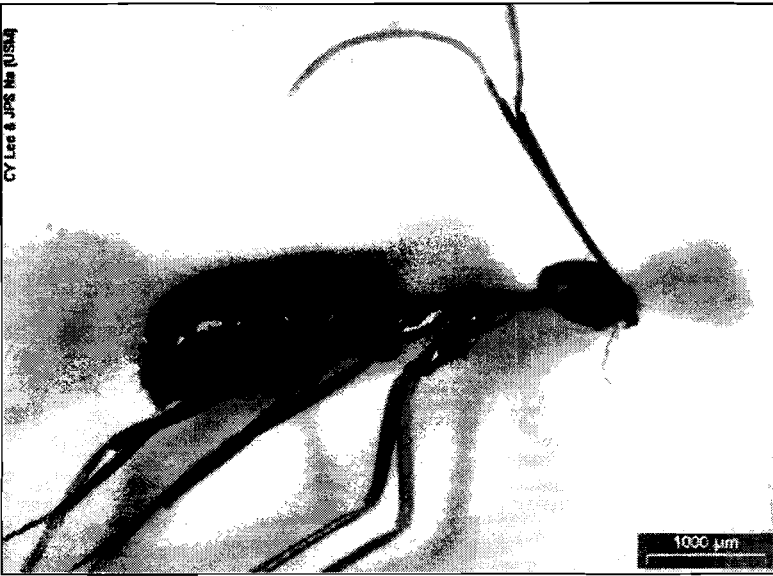


Plate 3: *Anoplolepis longipes* (red crazy ant)

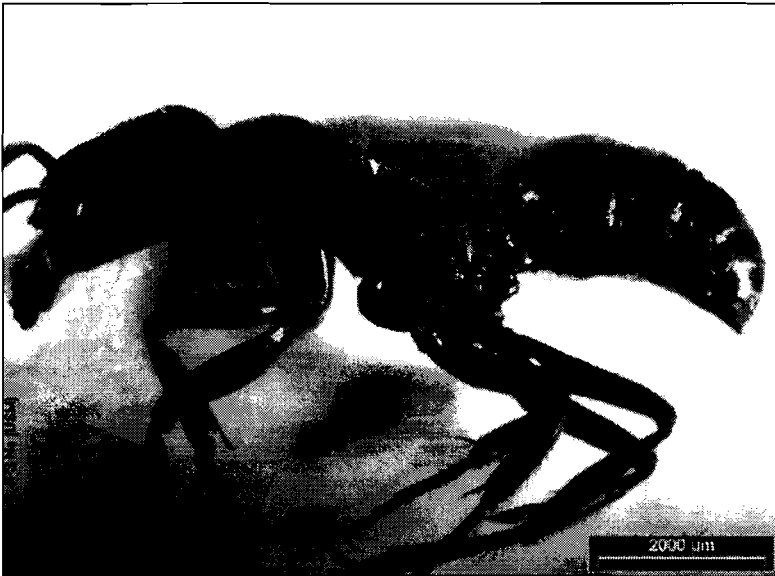


Plate 4: *Odontoponera* sp.

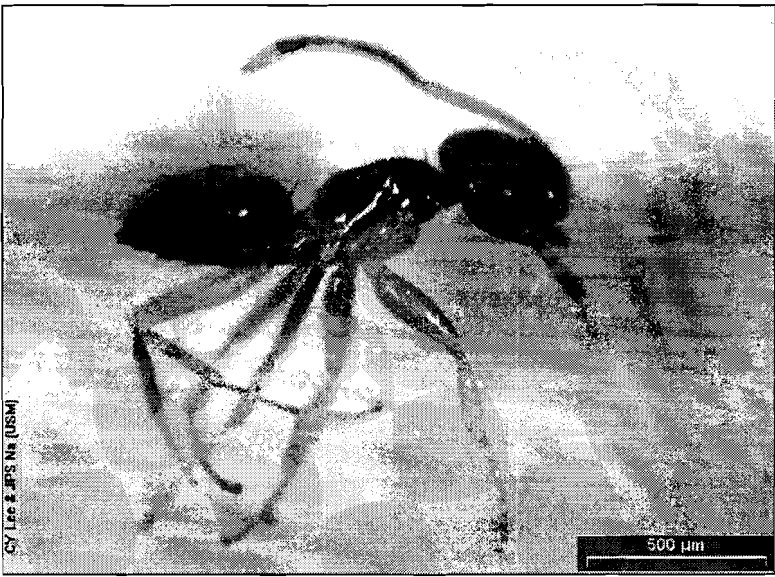


Plate 5: *Prenolepis imparis* (Small honey ant)



Plate 6: *Paratrechina* sp.

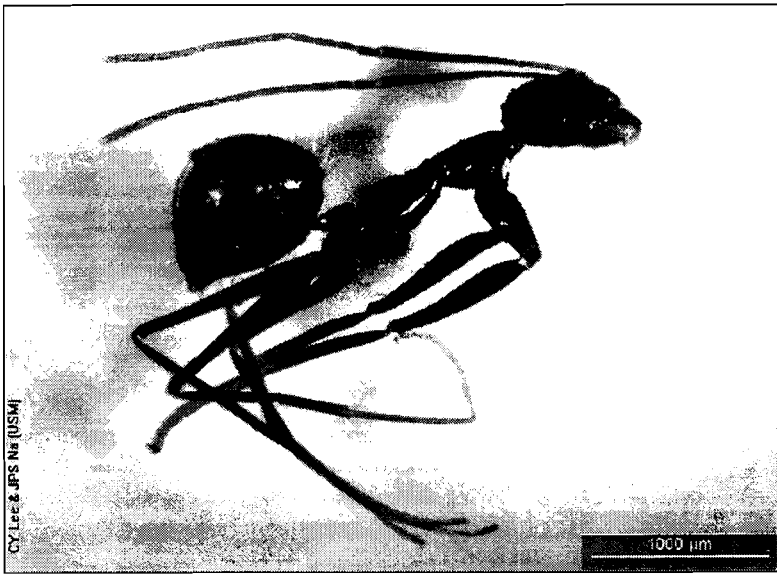


Plate 7: *Paratrechina longicornis* (crazy ant)

- | | |
|---|---|
| <p>10. Flat node 11.
Peaked node 13.</p> <p>11. Four gastral tergites visible from dorsal view; legs in proportion to body 12.
Five gastral tergites visible (other characteristics: legs not in proportion to body; top of body covered with a few long hairs; dark brown to black coloured body; tarsi yellow to white in colour) <i>Technomyrmex albipes</i> (white-footed ant) (Plate 8)</p> <p>12. Head and thorax dark brown to black in colour; yellowish to almost translucent petiole, gaster and legs..... <i>Tapinoma melanocephalum</i> (ghost ant) (Plate 9)
Dark brown body and femur; tibia and tarsi have a lighter colouration <i>Tapinoma sessile</i> (odorous house ant) (Plate 10)</p> | <p>13. Blunt peaked node (other characteristics: hard and strongly sculptured integument; rear of thorax with single projection on top; black body colour)
<i>Dolichoderus bituberculata</i> ('rambutan' ant) (Plate 11).
Sharp peaked node (other characteristics: thin and weakly sculptured integument; rear of thorax without projection on top; dark brown to black body colour)
<i>Linepithema humile</i> (Argentine ant) (Plate 12).</p> <p>14. Rear of thorax (propodeum) without spine on top 15.
Rear of thorax with one pair of spines 21.
Rear of thorax with two pairs of spines (other characteristics: 12-segmented antennae which ended in three segmented club; head, thorax and petiole strongly grooved)
<i>Tetramorium</i> sp. (pavement ant) (Plate 13)</p> |
|---|---|



Plate 8: *Technomyrmex albipes* (white-footed ant)



Plate 9: *Tapinoma melanocephalum* (ghost ant)



Plate 10: *Tapinoma sessile* (odorous house ant)

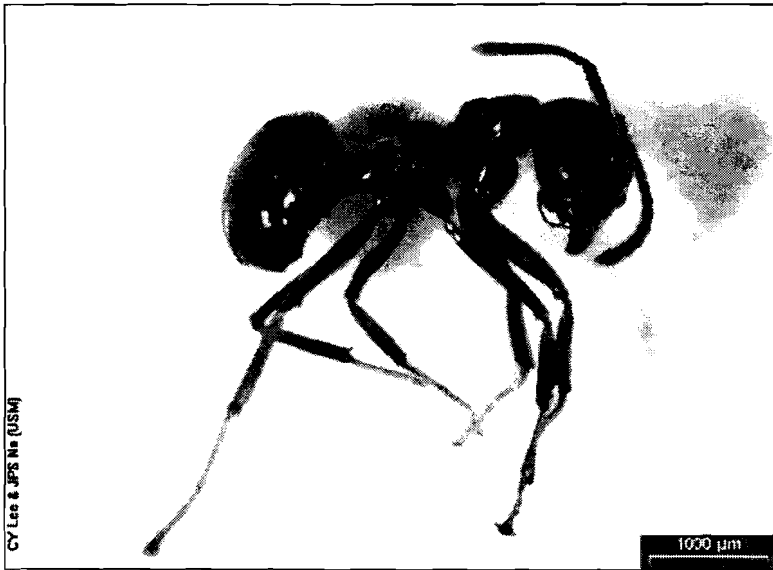


Plate 11: *Dolichoderus bituberculata* ('rambutan' ant)

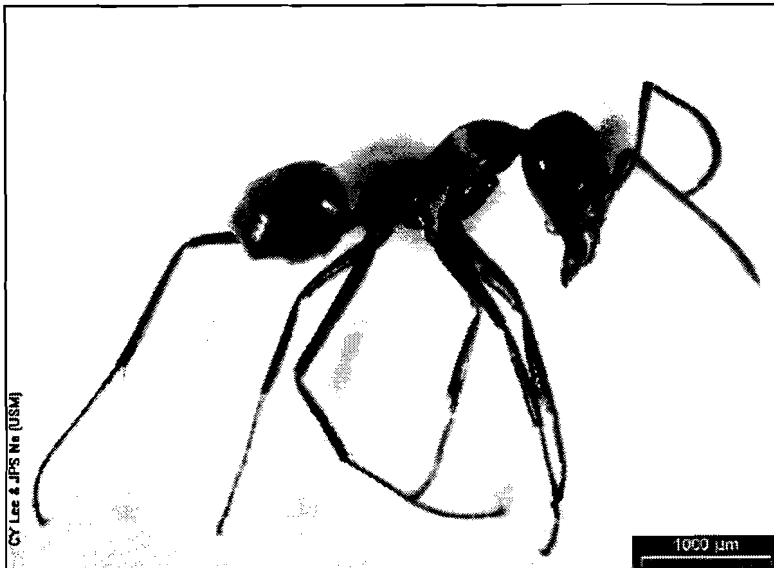


Plate 12: *Linepithema humile* (Argentine ant)

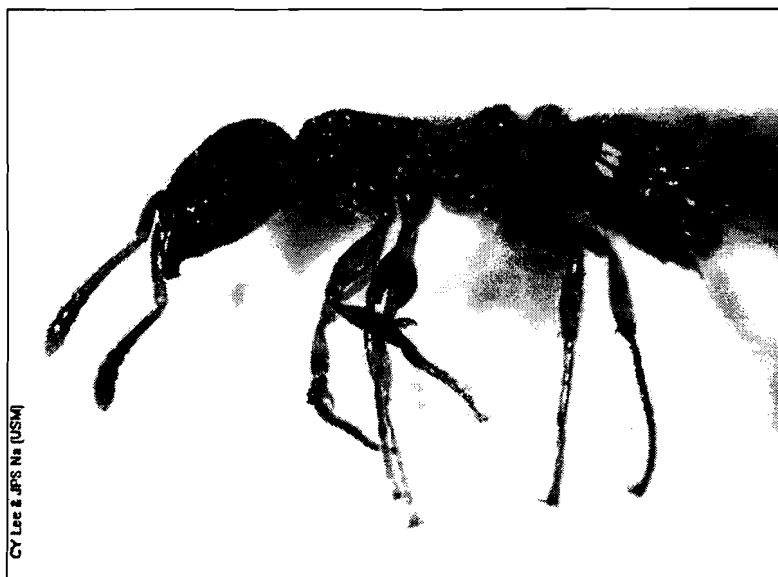


Plate 13: *Tetramorium* sp. (pavement ant)

15. 11 - 12 segmented antennae which ended on a 3-segmented club 16.
 10-segmented antennae which ended on a 2-segmented club 19.
16. Body length of 2.5 - 3.0 mm; 12-segmented antennae 17.
 Body length of 1.5 - 2.0 mm; 11 - 12-segmented antennae 18.
17. Sting is present, but usually not visible (other characteristic: head, thorax and petiole are sculptured with pits) ***Monomorium pharaonis*** (pharaoh ant) (Plate 14)
 Sting is present and usually visible (other characteristics: head and thorax with transverse wrinkles) ***Monomorium destructor*** (Plate 15)
18. 12-segmented antennae (other characteristics: head and gaster are dark in colour; sting is visible) ***Monomorium floricola*** (Plate 16)
- 11-segmented antennae (other characteristics: head and gaster are yellow brownish in colour, sting is usually not visible) ***Monomorium orientale*** (Plate 17)
19. Body length of >3 mm (other characteristics: whole body covered with long hairs; polymorphic workers; reddish brown body colour) 20.
 Small body size (about 1.5 mm) (other characteristics: sting is not visible; monomorphic workers; yellowish brown body colour)..... ***Solenopsis molesta*** (thief ant) (Plate 18)
20. Broad mandible without distinct teeth (other characteristic: head distinctly large compared to body) ***Solenopsis geminata*** (tropical fire ant) (Plate 19)
 Mandible with four distinct teeth (fourth teeth of major worker is not distinct); size of head relatively similar to that of body ***Solenopsis invicta*** (Plate 20)



Plate 14: *Paratrechina* sp.

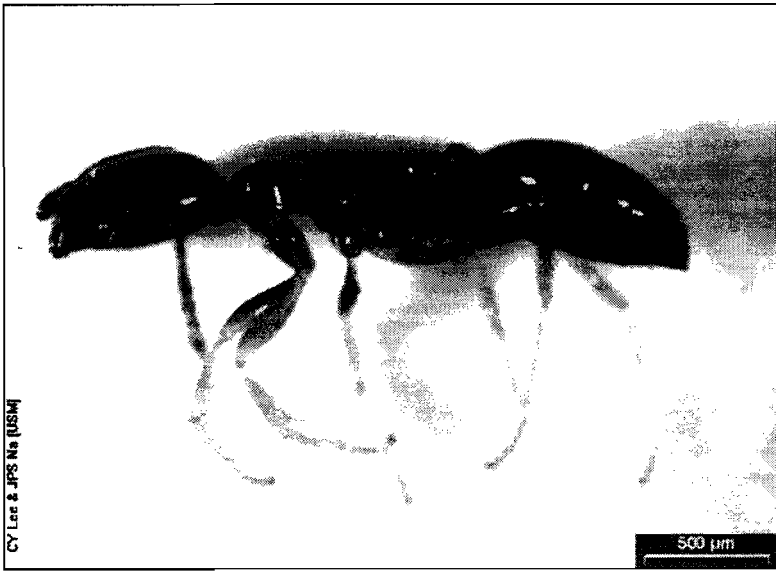


Plate 15: *Monomorium destructor*

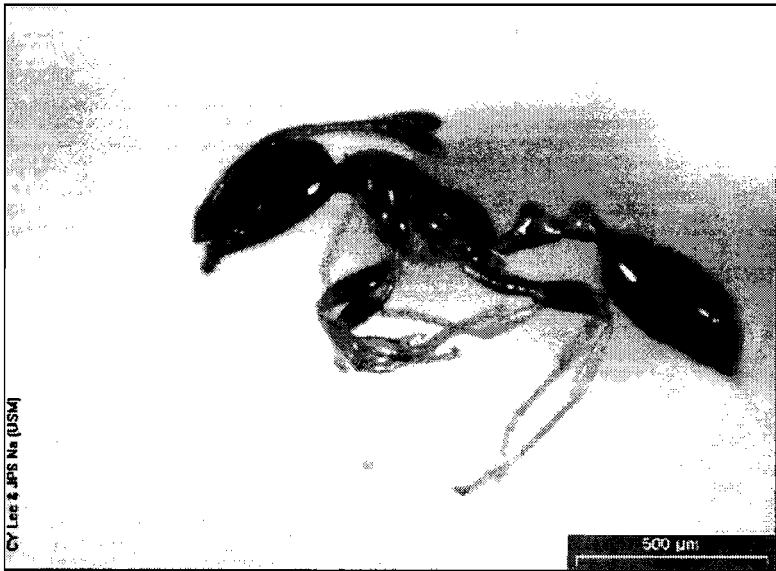


Plate 16: *Monomorium floricola*



Plate 17: *Monomorium orientale*

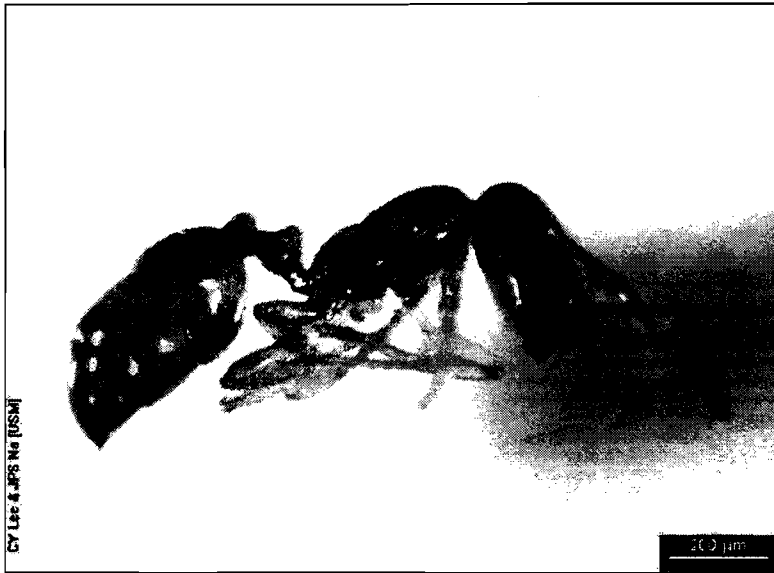


Plate 18: *Solenopsis molesta* (thief ant)

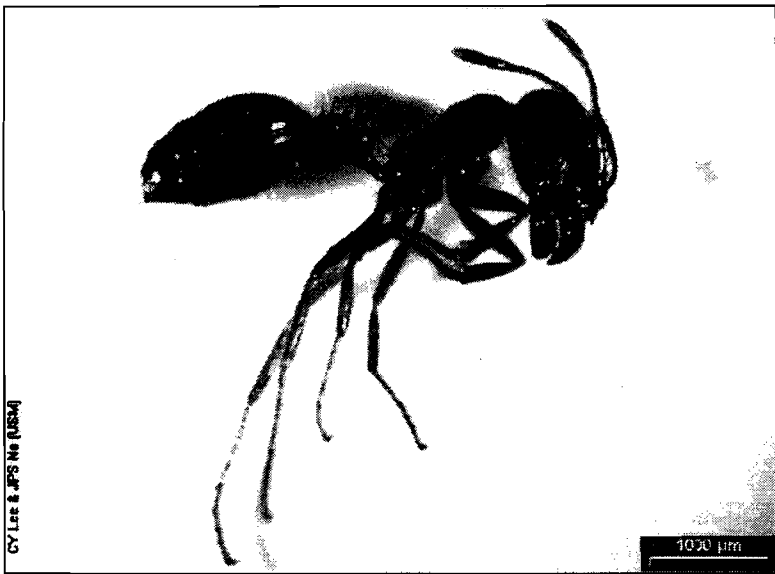


Plate 19: *Solenopsis geminata* (tropical fire ant)

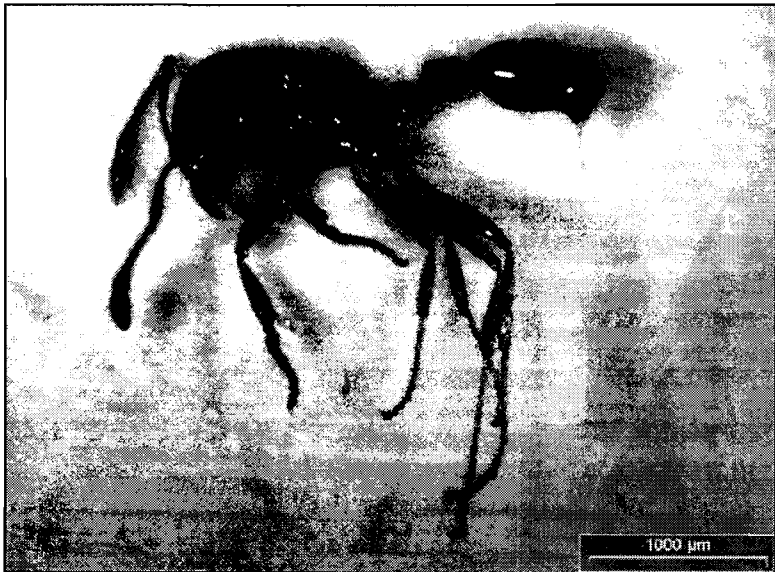


Plate 20: *Solenopsis invicta*

21. 11-segmented antennae which ended on 3-segmented club (other characteristics: dark brown to black body; pedicel attached to the top of gaster; flattened petiole from dorsal-ventral view)..... ***Crematogaster* sp. (acrobat ant)** (Plate 21).

12-segmented antennae which ended on 3-segmented club (other characteristics: reddish brown body; pedicel attached to the middle of gaster; dimorphic workers – major: enlarged head and slightly grooved; minor: head not enlarged, slightly grooved and pitted)

***Pheidole* sp.** (Plate 22 [major] & 23 [minor]).

This paper provides the first identification key to common species of urban pest ants in Malaysia. As correct species identification is essential to a successful control programme, the key will be useful to pest control operators and research workers in the field of urban entomology in this region.

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Plate 21: *Crematogaster* sp. (Acrobat ant)



Plate 22: *Pheidole* sp. (big-headed ant)



Plate 23: *Pheidole* sp. (big-headed ant)

Table 1: Distribution and locations within a structure/building where the pest ants were sighted or collected

Species (common name)	Location where ants were found within a structure/building		
	Indoor	Perimeter	Outdoor
<i>Monomorium pharaonis</i> (pharaoh ant)	x		
<i>Monomorium destructor</i>		x	x
<i>Monomorium orientale</i>	x	x	
<i>Monomorium floricola</i>	x		
<i>Tapinoma sessile</i> (odorous house ant)	x	x	
<i>Tapinoma melanocephalum</i> (ghost ant)	x	x	
<i>Pheidole</i> sp.	x	x	
<i>Prenolepis imparis</i> (small honey ant)		x	
<i>Linepithema humile</i> (Argentine ant)	x	x	
<i>Paratrechina longicornis</i> (crazy ant)	x	x	x
<i>Paratrechina</i> sp.		x	x
<i>Anoplolepis longipes</i> (red crazy ant)		x	
<i>Oecophylla smaragdina</i> (weaver ant)			x
<i>Camponotus</i> sp. (carpenter ant)		x	x
<i>Technomyrmex albipes</i> (white-footed ant)		x	
<i>Dolichoderus bituberculata</i> ('rambutan' ant)	x	x	x
<i>Odontoponera</i> sp.		x	x
<i>Formica</i> sp.		x	x
<i>Tetramorium</i> sp. (pavement ant)		x	
<i>Solenopsis geminata</i> (tropical fire ant)	x	x	x
<i>Solenopsis invicta</i> (fire ant)	x	x	x
<i>Solenopsis molesta</i> (thief ant)	x		
<i>Crematogaster</i> sp.		x	

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