A PRELIMINARY STUDY ON THE SPECIES COMPOSITION OF HOUSEHOLD ANTS ON PENANG ISLAND, MALAYSIA

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Abstrak: Satu kajian awalan ke atas komposisi spesies semut isi rumah di Pulau Pinang, Malaysia telah dijalankan. Empat lokasi yang meliputi kawasan bandar, subbandar dan luar bandar telah ditinjau. Umpan yang terdiri daripada 1% larutan sukros dan serbuk hati lembu di atas bung kapas dalam piring petri diletakkan di setiap kediaman yang dikaji dengan sekurang-kurangnya 20 kediaman per lokasi. Keputusan menunjukkan semut pharaoh, *Monomorium pharaonis*, sebagai spesies yang paling dominan (41.9%), diikuti oleh semut rumah `odorous' *Tapinoma sessille* (21.2%), dan semut `crazy', *Paratrechina longicornis* (16.6%). Taburan spesies mengikut lokasi menunjukkan semut pharaoh adalah lebih dominan di kawasan bandar dan subbandar, manakala di kawasan luar bandar, lebih semut rumah `odorous' dan semut `crazy' didapati.

Abstract: A preliminary study on the species composition of household ants in Penang Island, Malaysia was conducted. Four locations situated in urban, sub-urban and rural areas were surveyed. In each location, a minimum of 20 premises was assessed using bait stations each consisting of a petri dish with a 1% sucrose solution and beef liver powder on cotton bung as baits. The pharaoh ant, *Monomorium pharaonis*, was the predominant species (41.9%), followed by the odorous house ant, *Tapinoma sessile* (21.2%) and the crazy ant, *Paratrechina longicornis* (16.6%). Distribution of ant species by locations showed that the pharaoh ants were more dominant in the urban and sub-urban areas, while in the rural area, the odorous house ants and the crazy ants were more abundant.

Awareness of the importance of household insect pests has gradually increased in Malaysia in the last two decades. Throughout these years, various studies on infestation by household pests such as cockroaches have been reported (Yap *et al.* 1991, Lee *et al.* 1993). Survey on domicilliary ants in Britain (Cornwell 1978) and California (Knight & Rust 1990) had been documented. Through a questaionaire survey on the importance of household pests in Penang, Malaysia, Yap & Foo (1984) reported that householders considered ants as one of the important household pests besides mosquitoes and cockroaches.

To date, there is no published report on household ants infestation in Malaysia. In addition, information on various types of ant species infesting household in this country is not available. The present report summarizes the preliminary findings on the species composition of household ants on Penang Island, Malaysia.

Four locations were chosen for this study, viz. Georgetown (Lebuh Macallum), Universiti Sains Malaysia (USM) Minden Campus, Gelugor and Balik Pulau (Kampung Sungai Burung). Georgetown is an urban area with a high density of commercial and residential buildings. USM Minden Campus and Gelugor are sub-urban settings with more residential areas in a semi-sylvan environment.

Kampung Sungai Burung is a Malay village in a rural area with residential houses scattered in a sylvan environment. At each location, at least 40 baits stations were set in living premises particularly in the kitchen area with a minimum of two bait stations per premise. In the USM Minden Campus, baiting was done in the cafeterias and student hostels. The study was conducted in November 1993.

The bait station used in this study consisted of an uncovered petri-dish (diameter: 9 cm) containing a cotton bung wetted with 1% sucrose solution sprinkled with dry beef liver powder. The bait station was then placed for a period of two to four hours at an area where ant-trials had been observed. After the exposure period, the petri-dish was closed with its cover with the foraging ants in it, labelled, and brought back to the laboratory for identification of ant species using relevant references (Bennett *et al.* 1988, Bingham 1975, Holldobler & Wilson 1990)

Results from the survey indicated that a minimum of thirteen species of ants were found in the living premises of the four study locations on Penang Island, Malaysia. Overall household ants population appeared to be higher in the sub-urban and rural surroundings compared with the urban location. The USM Minden campus appeared to have the highest diversity of ant species among all the four locations surveyed (Table 1).

The pharaoh ant, *Monomorium pharaonis* was the most dominant species (41.9%), followed by the odorous house ant, *Tapinoma sessille* (21.2%) and the crazy ant, *Paratrechina longicornis* (16.6%). This concurs well with the status of pharaoh ants as the most important nuisance ant globally (Bennett *et al.* 1988) Generally, *M. pharaonis* prefers warm habitats and usually depends on artificial heating associated with human habitation especially in the temperate region. Infestation of this species commonly occurs in food handling places. In addition,it is also found abundantly in hospitals attacking the wounds of the patients, thus serving as a potential mechanical vector for pathogenic contamination (Bennett *et al.* 1988).

The pharaoh ant was found to be predominant in three locations, ie. Georgetown (51.2%), USM Minden Campus (37.8%) and Gelugor (70.8%). However, in the rural area, it

Table 1: Species composition of household ants in four location on Penang Island, Malaysia, Bait stations consisted of cotton bung wetted with sucrose solution (10%) and beef liver powder in petri dishes.

Species	Location (numbers of ants trapped)				Total (%)
	Georgetown (urban)	USM Campus (suburban)	Gelugor (suburban)	Balik Pulau (rural)	
Crematogaster sp. (acrobat ant)	-	143	-	-	143 (0.9)
Formica sp. (field ant)	-	-	-	3	3 (< 0.1)
Hypoclinea bituberculata	-	114	-	241	355 (2.3)
Monomorium pharaonis (pharaoh ant)	354	1891	4038	214	6497 (41.9)
Monomorium floricola	62	60	91	-	213 (1.4)
Monomorium sp.	-	74	28	-	102 (0.7)
Paratrechina longicornis (crazy ant)	25	1181	174	1190	2570 (16.6)
Paratrechina melanogaster	-	179	-	616	795 (5.1)
Prenolepis sp. (small honey antt)	-	29	-	-	29 (0.2)
Solenopsis germinata (fire ant)	10	194	406	481	1091 (7.0)
Solenopsis molesta (thief ant)	-	55	-	-	55 (0.4)
Tapinoma sessille (odorous house ant)	236	748	961	1341	3286 (21.2)
Tetramorium caespitum (pavement ant)	5	243	2	16	266 (1.7)
unidentified Dolichoderinae	-	98	1	-	99 (0.6)
Total number of ants per location (%)	692 (4.5)	5009 (32.3)	5701 (36.8)	4102 (26.5)	15504 (100)

only made up 5.2% of the total number of ants trapped. This species has always been considered an urban insect pest in many parts of the world (Mallis 1990). This may be due to its natural food requirement that corresponds well with that for humans. Mallis (1990) reported that pharaoh ants preferred food of high protein content such as liver and meat products. The incorporation of beef liver powder as part of the ant bait in this study takes into consideration the above information.

The highest number of ants trapped in the rural area was the odorous house ant, *T. sessille* (32.7%), followed by the crazy ant, *P. longicornis* (29.0%). The odorous house ant prefers to nest beneath boards, cracks and crevices of the stone walks and walls. In the present study, this species was found trailing in cracks and crevices on the cemented floor. The crazy ant, *P. longicornis* was found to be dominant in the rural area, where heavy vegetation was abundant. Its name is derived from its fast and erratic movement when disturbed.

Further studies on the bionomics and economic importance of the household ants in different parts of Malaysia are urgently needed as the requirement for ant control will definitely be on the increase due to rapid socio-economic development in this region. Information generated from such studies will provide the basic background information for the management of household ants in Malaysia and neighbouring countries in the years to come.

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