A PRELIMINARY SURVEY OF AEDES AEGYPTI IN SELANGOR, PENINSULAR MALAYSIA

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INTRODUCTION

The presence of *Aedes aegypti* in Malaya has been noted very early by Leicester (1908) and Stanton (1914). One of the earliest survey carried out on the species was by Reid (1954). Macdonald(1965a) submitted a paper dealing extensively with the distribution and dispersal of the species in Malaya. At that time, the interest in *Ae. aegypti* centered on it being a potential vector of yellow fever in Malaya but presently, its importance is as a vector of Dengue Haemorrhagic Fever (DHF).

Ae. aegypti breeds in both artificial and natural water containers as reported by Macdonald (1956b) and Cheong (1966). In Malaysia, the *Ae. aegypti* density is presently monitored by house searches using the single larva per container method devised by Sheppard *et al* (1969).

The aims of the present survey are firstly to provide information on the distribution of the species as related to different housing types and secondly, to observe the preferred larval habitats. Finally, it is to determine the accuracy of the single larva method of survey.

DESCRIPTION OF AREA

Fig. 1 shows the area selected for the survey.

Kampung Pandan is new village of approximately 1,000 houses. The population is entirely Malays. Individual houses are sited less than 20 metres apart and are supplied with piped water. Water pressure is low and most families have to resort to storing water.

Seri Kembangan is another new village populated mainly by Chinese. There are about 2,000 houses. Certain houses are supplied with piped water but majority obtain their supply from wells and stand pipes.

Sungei Besar is a coastal town. The town consists of shophouses. There is piped water but water pressure is frequently low. Most shops store or collect water in large metal tanks of some 500 litres capacity.

Tebuk Sultan and Tebuk Mufrat are 2 kampungs in the district of Sabak Bernam. There are over 200 houses in each kampung. Distance between houses varies from a few metres to 500 metres or more. Water is collected from natural sources and stored.

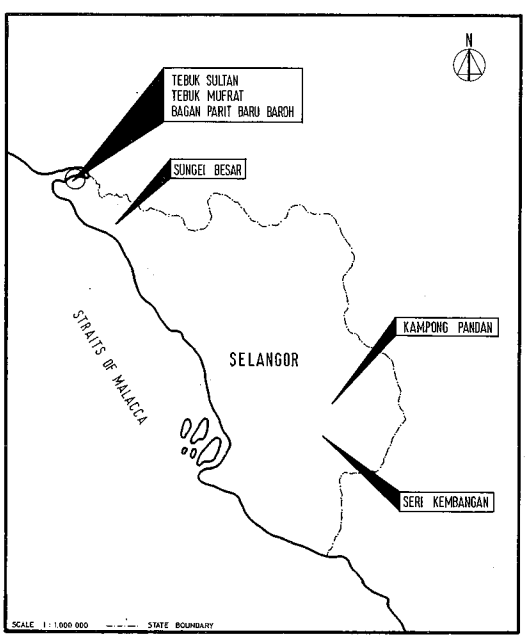

Fig. 1. A map of Selangor showing the area surveyed.

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Table 1: Summary of Ae. aegypti and Ae. albopictus densities.

Area	Housing	Total number of premises inspected	Total number of premises		Total number of containers		Percent of premises (%)		Number of containers per 100 house	
			with *Ae. aegypti*	with *Ae albopictus*	with *Ae. aegypti*	with *Ae albopictus*	with *Ae. aegypti* (House index)	with *Ae albopictus*	with *Ae. aegypti* (Breteau index)	with *Ae albopict*
Kampong Pandan	Kampong Baru	376	58	33	68	39	15.4	8.8	18.1	10.4
Seri Kembangan	New Village	117	49	38	75	55	41.9	32.5	64.1	47.8
Bagan Parit Baru baroh	Fishing Village	34	20	2	33	34	58.8	5.9	97.1	100.0
Sungei Besar	Shophouse	212	10	1	11	1	4.7	0.5	5.2	0.5
Tebuk Sultan	Kampong	15	7	10	22	25	46.7	66.7	146.7	166.7
Tebuk Mufrat	Kampong	17	5	7	16	10	29.4	41.2	94.1	58.8

Bagan Parit Baru Baroh is a fishing village of about 90 houses. 60% of these are built on stilts above the sea shore. Water is supplied through pipes but storage of water in containers of 1,000 litres approximately is common.

METHOD

Premises were searched within and without. Descriptions of containers with larvae breeding were recorded on standard forms. Larvae up to a maximum number of 20, were randomly sampled from each container. These were kept in collection bottles; one bottle for each container. Samples were taken back to the laboratory and identified on the same day. Pupae were collected too. These were allowed to hatch into adults which were then identified.

RESULTS AND DISCUSSIONS

Table 1 summarises the densities of *Ae. aegypti* and *Aedes albopictus*. The house indices and Breteau indices of Seri Kembangan, Bagan Parit Baru Baroh, Tebuk Sultan and Tebuk Mufrat were higher than the 5% and 20 levels respecitvely, below which there was no serious risk of transmission of DHF.

On comparison of the percentage of premises with *Ae. aegypti* and *Ae. albopictus,* it is interesting to note that there are no significant difference ($p > 0.05$) in Seri Kembangan and the rural areas of Tebuk Sultan and Tebuk Mufrat. The indices of *Ae. aegypti* were higher in Kampung Pandan, Sungei Besar and Bagan Parit Baru Baroh; indicating that *Ae. aegypti* is more established in and around premises than *Ae. albopictus*

The relative distribution of larval habitats is shown in Table 2. In the new villages, *Ae. aegypti* has a preference for the bathroom tank indoors while outdoors, it is drums and earthenware jars. The number of larval habitats of *Ae. aegypti* indoors and outdoors is similar ($p > 0.05$). *Ae. albopictus* prefers breeding indoors in drums, discarded tins and miscellaneous containers. Mixed breeding is common in miscellaneous containers (buckets, aquarium, frying pans, basins, bowls, etc.).

Indoors, in shophouses, *Ae. aegypti* breeds most frequently in the bathroom tank and earthenware jars. Only one sample of *Ae. albopictus* in containers were found outdoors.

Macdonald (1956b) stated that in shops and slum-houses, ant-traps were among the most frequent breeding places. This was further supported by Cheong (1966) who found ant-traps and earthenware jars to be preferred larval habitats in urban areas. In our survey in urban areas, the relative distribution

TABLE II

Relative distribution of larval habitats

Area	Housing	Species	Total number of Collections	Relative distributions in containers (%)																			
				Indoor										Outdoor									
				Bathroom tank	Storage tank	Jar	Drum	Ant-trap	Flower Vase	Tin	Tyre	Bottle	Miscellaneous	Bathroom tank	Storage tank	Jar	Drum	Ant-trap	Flower vase	Tin	Tyre	Bottle	Miscellaneous
Kampung Pandan	New Village	*Ae. aegypti*	68	25	–	2	4	2	7	–	–	4	6	–	3	3	24	–	2	6	4	2	6
		Ae. albopictus	39	5	–	–	3	–	5	–	–	5	8	3	–	10	28	–	–	15	5	–	13
		Culex quinquefasciatus	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	100
		Others	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Seri Kembangan	New Village	*Ae. aegypti*	76	8	9	4	3	9	8	–	1	–	4	–	5	18	1	–	–	7	3	–	20
		Ae. albopictus	55	2	2	4	–	2	–	–	2	–	2	2	5	11	4	2	–	18	4	–	40
		Culex quinquefasciatus	11	–	–	9	–	–	9	–	–	–	9	–	–	9	9	–	–	–	–	–	55
		Others	5	–	–	20	–	–	–	–	–	–	20	–	–	20	–	–	–	–	–	–	40
Sungei Besar	Shophouse	*Ae. aegypti*	11	36	9	27	9	9	–	–	–	–	10	–	–	–	–	–	–	–	–	–	–
		Ae. albopictus	1	–	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Culex quinquefasciatus	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Others	1	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

TABLE II

Relative distribution of larval habitats

Continued

Area	Housing	Species	Total number of Collections	Indoor										Outdoor									
				Bathroom tank	Storage tank	Jar	Drum	Ant-trap	Flower vase	Tin	Tyre	Bottle	Miscellaneous	Bathroom tank	Storage tank	Jar	Drum	Ant-trap	Flower vase	Tin	Tyre	Bottle	Miscellaneous
Tebuk Sultan	Kampong	*Ae. aegypti*	22	–	–	–	–	–	–	–	–	–	–	–	5	95	–	–	–	–	–	–	–
		Ae. albopictus	25	–	–	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–
		Culex quinquefasciatus	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Others	1	–	–	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–
Tebuk Mufrat	Kampong	*Ae. aegypti*	16	–	–	–	6	–	–	–	–	–	–	–	–	94	–	–	–	–	–	–	–
		Ae. albopictus	10	–	–	–	10	–	–	–	–	–	–	–	10	80	–	–	–	–	–	–	–
		Culex quinquefasciatus	1	–	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–	–
		Others	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Bagan Parit Baru Baroh	Fishing Village	*Ae. aegypti*	34	9	18	6	21	–	–	–	–	–	5	–	9	9	15	–	–	5	–	3	–
		Ae. albopictus	2	–	–	–	–	–	–	–	–	–	–	–	–	50	–	–	–	50	–	–	–
		Culex quinquefasciatus	4	25	–	25	–	–	–	–	–	–	–	–	–	25	25	–	–	–	–	–	–
		Others	2	50	–	–	–	–	–	–	–	–	–	–	50	–	–	–	–	–	–	–	–

in ant-traps was low, at most about 9% in Seri Kembangan and Sungei Besar. The decrease in preference may be due to the replacement of water normally used in the traps, with oil, kerosene or other chemicals.

In the kampungs, Tebuk Sultan and Tebuk Mufrat, most breeding of both *Ae. aegypti* and *Ae. albopictus* occurs in earthenware jars. This is expected because there were few containers keep indoors and earthenware jars form at least 90% of all water storing receptacles.

Macdonald (1956b) found *Ae. aegypti* larvae in tree-holes, tree-stumps and bamboo stumps. In this survey, an area of about 25 metres around each kampung house was searched but no breeding in such natural receptacles were found. It is possible that if the search area is increased, some breeding may be detected.

Ae. aegypti was found in abundance in the fishing village. The common storage tanks and drums are preferred indoor larval habitats while outdoors, only drums. The difference in number of larval habitats indoors and outdoors is not significant ($p > 0.05$).

In the comparison of positive rate in containers with *Ae. aegypti* with the number of larvae examined (see Figure 2), the accuracy obtained when a single larva per container was examined is 82.5% + 14.5%. When 5 larvae were examined, the accuracy is 95.5% + 4.5%. 100% accuracy was attained when 8 larvae were examined. After examination of 5 larvae, all containers with *Ae aegypti* were identified in all areas surveyed except Bagan Parit Baru Baroh. Accuracy of houses searches will be greatly increased if 5 or more larvae per container are identified.

SUMMARY

A preliminary survey of *Aedes aegypti* was carried out in 6 areas in the state of Selangor, Malaysia.

The densities of *Ae. aegypti* and *Ae. albopictus* in the areas were discussed.

Results indicated that the distribution of larval habitats varied with the housing type. The most common indoor larval habitat in urban areas is the bathroom tank. In both urban and rural areas, outdoor preference is for the earthenware jars. Ant-traps have decreased in importance as larvae breeding habitats.

The accuracy of house searches can be increased by increasing the number of larvae examined per container to 5 or more.

Further study is required to determine whether

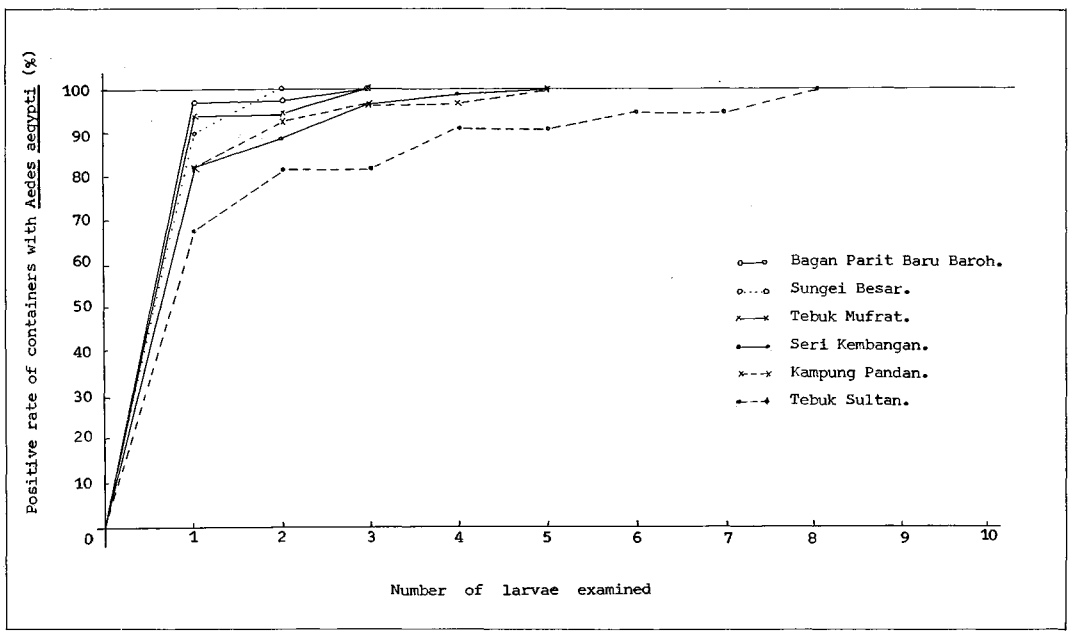

Fig. 2 A comparison of the positive rate of containers with *aedes aegypti*, with the number larvae examined.

the findings of this survey is peculiar to the areas surveyed or is representative of the whole country, and whether there is a seasonal fluctuation in the types of preferred larval habitats.

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