Mapping of mosquito breeding sites in malaria endemic areas in Pos Lenjang, Kuala Lipis, Pahang, Malaysia

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Abstract

Background: The application of the Geographic Information Systems (GIS) to the study of vector transmitted diseases considerably improves the management of the information obtained from the field survey and facilitates the study of the distribution patterns of the vector species.

Methods: As part of a study to assess remote sensing data as a tool for vector mapping, geographical features like rivers, small streams, forest, roads and residential area were digitized from the satellite images and overlaid with entomological data. Map of larval breeding habitats distribution and map of malaria transmission risk area were developed using a combination of field data, satellite image analysis and GIS technique. All digital data in the GIS were displayed in the WGS 1984 coordinate system. Six occasions of larval surveillance were also conducted to determine the species of mosquitoes, their characteristics and the abundance of habitats.

Results: Larval survey studies showed that anopheline and culicine larvae were collected and mapped from 79 and 67 breeding sites respectively. Breeding habitats were located at 100-400 m from human settlement. Map of villages with 400 m buffer zone visualizes that more than 80% of Anopheles maculatus s.s. immature habitats were found within the buffer zone.

Conclusions: This study amplifies the need for a broadening of the GIS approach which is emphasized with the aim of rejuvenating the dynamic aspect of entomological studies in Malaysia. In fact, the use of such basic GIS platforms promote a more rational basis for strategic planning and management in the control of endemic diseases at the national level.

Background

Malaria is one of the most widespread diseases in the world. It is endemic in the tropical and subtropical regions of the world [1,2]. Malaria remains a public health problem in Malaysia, especially in the state of Sabah, Sarawak and in the interior central regions of Peninsular Malaysia where Perak, Pahang and Kelantan share their borders and where the population is made up of aborigines [3]. In recent years however, there are also reports of malaria outbreak occurring in states previously known to be free of malaria, such as Penang and Negeri Sembilan in 2008 [4].

Malaysia is currently in the pre-elimination stage and aiming towards malaria elimination by 2015 [5]. The effort to combat malaria started in 1967 with the launching of Malaria Eradication Programme (MEP) in Peninsular Malaysia. In 1980, MEP objectives were further improved towards employing a more realistic approach that is, towards controlling the disease, known as the Malaria Control Programme (MCP) [6]. MCP was extended to Sabah and Sarawak in 1986. By then, the programme was reorganized to include other vector borne diseases namely; dengue, filariasis, typhus, Japanese encephalitis, yellow fever and plague, and came to

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