Larval Ecology of Anopheles Mosquitoes in Kudat, Sabah

ABSTRACT

The emergence of human Plasmodium knowlesi malaria appeared to have been precipitated by the displacement of the natural environment of macaques and Anopheles mosquitoes resulting from deforestation and land-use changes in Malaysia. A longitudinal survey of larval habitats was conducted from May 2015 to April 2016 in the District of Kudat, Sabah to better understand how these changes have affected mosquitoes across six land use categories. Larvae were collected by dipping and reared in the laboratory for the identification of adults. Five anopheline and three culicine species were present: Anopheles balabacensis, An. barbirostris, An. lesteri, An. borneensis, An. umbrosus, Aedes albopictus, Culex gelidus, and Toxorhynchites sp. An. Balabacensis was found in all six land-use types. Biodiversity by genera was high in all land-use types. The relative importance of land use types and larval habitats as sources of potential vectors was analyzed by the Kruskal-Wallis H test by ranks. In decreasing order Anopheles larvae were found in rubber tree plantation > coconut plantation > clearing site > palm oil plantation > forest > settlement area. Important larval habitats were intermittent stream > ditch > pond > artificial container > puddle > river > slow-flowing stream. Eighteen breeding sites of An. Balabacensis were within (500 m) the average maximum flight range of the species and houses at risk for malaria. Knowledge gained from the study can be used to assess the need for vector control in preventing the spread of P. Knowles in vulnerable areas.