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Distribution of Malaria-Infected Anopheles Mosquitoes in Kudat, Ranau and Tenom of Sabah, Malaysia

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Abstract : In Malaysia, it was realized that while the incidence of human malaria is decreasing, the incidence of Plasmodium knowlesi malaria appears to be on the rise, especially in rural areas of Sabah, East Malaysia. The primary vector for P. knowlesi malaria in Sabah is An. balabacensis a species found abundant in rural areas, shown to rest and feed outdoor throughout the night, which makes its control very challenging. This study aims to examine the distribution of malaria-infected Anopheles mosquitoes in three areas in Sabah, namely Kudat, Ranau, and Tenom, known as areas in Sabah that presented high number of malaria cases. Briefly, mosquitoes were caught every 6 weeks for the period of 18 months using Human Landing Catching (HLC) technique from May 2016 to November 2017. Identification of species was done using microscopy and molecular methods. Molecular method is also used to detect malaria parasite in all mosquito collected. An. balabacensis was present in all the study areas. In Kudat, six other Anopheles species were also detected, namely, An. barumbrosus, An. latens, An. letifer, An. maculatus, An. sundaicus and An. tesselatus. In Ranau five other Anopheles species were detected, namely, An. barumbrosus, An. donaldi., An. hodgkini, An. maculatus, and An. tesselatus while in Tenom seven more species An. donaldi, An. umbrosus, An. barumbrosus, An.latens, An. hodgkini, An. maculatus, and An. tesselatus were detected. This study showed 24% out of 259, 39% out of 127, and 26% out of 265 Anopheles mosquito collected in Kudat, Ranau, and Tenom were detected positive for malaria parasite respectively. In Kudat An. balabacensis, An. barumbrosus, An. latens, An. maculatus, An. sundaicus and An. tesselatus were the six out of eight Anopheles species that were found infected with malaria parasite. All Anopheles species collected in Ranau were positive for malaria while In Tenom, only five out of eight species; An. balabacensus, An. donaldi, An. hodgkini, An. maculatus, and An. latens were detected positive for malaria parasite. Interestingly, for all study areas An. balabacensis was shown to be the only species infected with four malaria species; P. falciparum, P. knowlesi, P. vivax, and Plasmodium sp. This finding clearly indicates that An. balabacensis is the dominant malaria vector in Kudat, Ranau, and Tenom.

Keywords : Anopheles balabacensis, human landing catching technique, nested PCR, Plasmodium knowlesi, Simian malaria
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