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## Bionomics of *Anopheles latens* in Kapit, Sarawak, Malaysian Borneo in relation to the transmission of zoonotic simian malaria parasite *Plasmodium knowlesi*

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### Abstract

**Background:** A large focus of human infections with *Plasmodium knowlesi*, a simian parasite naturally found in long-tailed and pig-tailed macaques was discovered in the Kapit Division of Sarawak, Malaysian Borneo. A study was initiated to identify the vectors of malaria, to elucidate where transmission is taking place and to understand the bionomics of the vectors in Kapit.

**Methods:** Three different ecological sites in the forest, farm and longhouse in the Kapit district were selected for the study. Mosquitoes were collected by human landing collection at all sites and at the forest also by monkey-baited-traps situated on three different levels. All mosquitoes were identified and salivary glands and midguts of anopheline mosquitoes were dissected to determine the presence of malaria parasites.

**Results and Discussions:** Over an 11-month period, a total of 2,504 *Anopheles* mosquitoes comprising 12 species were caught; 1,035 at the farm, 774 at the forest and 425 at the longhouse. *Anopheles latens* (62.3%) and *Anopheles watsonii* (30.6%) were the predominant species caught in the forested ecotypes, while in the farm *Anopheles donaldi* (49.9%) and *An. latens* (35.6%) predominated. In the long house, *An. latens* (29.6%) and *An. donaldi* (22.8%) were the major Anopheline species. However, *An. latens* was the only mosquito positive for sporozoites and it was found to be attracted to both human and monkey hosts. In monkey-baited net traps, it preferred to bite monkeys at the canopy level than at ground level. *An. latens* was found biting early as 18.00 hours.

**Conclusion:** *Anopheles latens* is the main vector for *P. knowlesi* malaria parasites in the Kapit District of Sarawak, Malaysian Borneo. The study underscores the relationship between ecology, abundance and bionomics of anopheline fauna. The simio-anthropophagic and acrodendrophilic behaviour of *An. latens* makes it an efficient vector for the transmission of *P. knowlesi* parasites to both human and monkey hosts.