Prediction of Mosquito Abundance with a Land Surface Hydrology Model

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Mosquitoes are vectors for numerous human pathogens including malaria, yellow fever, Dengue fever, encephalitis and filariasis. Malaria alone kills approximately two million people each year, and the cost of the disease, measured as lost productivity, medical expenses and reduced quality of life is enormous (Konradsen et al., 1997). The mosquito is essential for the perpetuation of all the diseases listed above. Like the human host, the mosquito is infected by the disease organism--that is, the vector is not merely a vessel for transmission but is a necessary medium for critical developmental stages in each pathogen's life cycle. Thus, without the mosquito, transmission of the infectious disease is not possible; control of the mosquitoes enables control of these mosquito-borne diseases. Unfortunately, hundreds of species of mosquitoes act as vectors for transmission of human pathogens. These mosquito species have highly varied ecological requirements, so that what proves an effective control strategy for one vector may not impact another. Disease management through mosquito control thus requires consideration of the ecology of the dominant vectors on a localized level.