

Environmental covariates of *Anopheles arabiensis* in a rice agroecosystem in Mwea, Central Kenya.

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Source

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Abstract

Water quality of aquatic habitats is an important determinant of female mosquito oviposition and successful larval development. This study examined the influence of environmental covariates on *Anopheles arabiensis* mosquito abundance in the Mwea Irrigation Scheme, Central Province of Kenya, prior to implementation of a malaria vector control program. Experimental rice plots were used to examine the environmental covariates responsible for regulating abundance and diversity of the aquatic stages of malaria vectors. Mosquito larval sampling and water quality analysis were done weekly from the flooding stage to the rice maturation stage. Sampling for mosquito larvae was conducted using standard dipping technique. During each larval collection, environmental covariates such as pH, temperature, conductivity, salinity, dissolved oxygen, water depth, and rice stage were measured. *Anopheles arabiensis* larval density was highest between 1 wk before transplanting and 4 wk after transplanting with peaks at weeks 0, 3, and 8. The fluctuation in values of the various environmental covariates showed characteristic patterns in different rice growth phases depending on the changes taking place due to the agronomic practices. Using a backward linear regression model, the factors that were found to be associated with abundance of *An. arabiensis* larvae at any of the rice growing phases included the following: dissolved oxygen, pH, turbidity, water depth, rice height, number of rice tillers, salinity, conductivity, and temperature. The environmental covariates associated with abundance of *An. arabiensis* were associated with early vegetative stage of the rice growth. For effective control of developmental stages of mosquito larvae, the application of larvicides should be done at the vegetative stage and the larvicides should persist until the beginning of the reproductive stage of the rice.