Comparison of Three Mosquito Traps for Lymphatic Filariasis Molecular Xenomonitoring in American Samoa Villages

Journal of Health Disparities Research and Practice

Volume 9
Issue 5 *Special Issue - NIDDK STEP UP*

Article 33

2016

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Abstract

Lymphatic filariasis (LF) is a mosquito-borne disease caused by *Wuchereria bancrofti,* which is endemic in American Samoa. The effort to eliminate LF has been highly successful, and is now in the monitoring phase to ensure continued progress. One of the monitoring methods is molecular xenomonitoring (MX) using PCR to detect *W. bancrofti* DNA in mosquitoes. Currently MX uses BG Sentinel traps to collect the LF vector *Aedes polynesiensis*. But the BG Sentinel traps catch relatively few *Ae. polynesiensis*, and most of those captured have not yet fed on blood. Gravid traps target mosquitoes that have already fed on blood, and have been used to collect large numbers of *Culex quinquefasciatus* for MX where that species is a vector. Though *Cx. quinquefasciatus* is not an LF vector in American Samoa, parasite DNA can be detected in non-vectors as well as vectors. We hypothesize that gravid traps targeting *Cx. quinquefasciatus* is more efficient for MX than the BG Sentinel trap targeting *Ae. polynesiensis*.

For our study, we compared two alternative gravid traps to the BG Sentinel trap. Two of each trap type were set in each of two villages and rotated daily in a Latin square design. The daily average catch rate for *Ae. polynesiensis* and *Cx. quinquefasciatus* were compared to assess the relative efficacy of the traps. If one or both gravid traps prove to be effective in capturing large numbers of *Cx. quinquefasciatus*, then they may provide a more efficient alternative to the BG Sentinel for LF MX in American Samoa.

Keywords

Vector-borne disease; Xenomonitoring; Gravid Traps; Aedes polynesiensis; Culex quinquefasciatus; Lymphatic Filariasis

Journal of Health Disparities Research and Practice
Volume 9, Special Edition 1, Summer 2016, pp. 52

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ABSTRACT

Lymphatic filariasis (LF) is a mosquito-borne disease caused by *Wuchereria bancrofti,* which is endemic in American Samoa. The effort to eliminate LF has been highly successful, and is now in the monitoring phase to ensure continued progress. One of the monitoring methods is molecular xenomonitoring (MX) using PCR to detect *W. bancrofti* DNA in mosquitoes. Currently MX uses BG Sentinel traps to collect the LF vector *Aedes polynesiensis*. But the BG Sentinel traps catch relatively few *Ae. polynesiensis*, and most of those captured have not yet fed on blood. Gravid traps target mosquitoes that have already fed on blood, and have been used to collect large numbers of *Culex quinquefasciatus* for MX where that species is a vector. Though *Cx. quinquefasciatus* is not an LF vector in American Samoa, parasite DNA can be detected in non-vectors as well as vectors. We hypothesize that gravid traps targeting *Cx. quinquefasciatus* is more efficient for MX than the BG Sentinel trap targeting *Ae. polynesiensis*.

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Key Words: Vector-borne disease, Xenomonitoring, Gravid Traps, *Aedes polynesiensis, Culex quinquefasciatus*, Lymphatic Filariasis

ACKNOWLEDGEMENTS

The STEP-UP HS program is supported by the National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health, Grant number: R25DK078386.