Novel Method for Determining Culex quinquefasciatus Behavioral Response to Acoustic Stimuli Utilizing a Split-tube Design

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As the human population continues to increase, aggravating mosquito disease transmission, a control measure for mosquitoes is imperative. Mosquito control using sound would be an improvement over current chemical control methods which have adverse effects, as mosquitoes have some of the best hearing in the insect kingdom. A device similar to an olfactometer was constructed and adapted to acoustic stimuli. This device was termed a flying insect auditory response differentiator or “FIARD.” It was constructed from clear PVC tubes connected to a central T junction with a speaker at an arm-end of the device. The apparatus was sealed with fine netting to allow easy propagation of sound, but prevent mosquito escape. Mosquitoes were removed from an insect tent and placed in the FIARD. A frequency was played at one end of the device. Mosquitoes which exited the release chamber and moved towards the speaker would be considered attracted - ones that moved away would be considered repulsed. Six frequencies were used for testing. A silent test served as a negative control. 450 Hz was found to be repulsive for both males and females. 550 Hz was found to be attractive only to female mosquitoes. 750 Hz was found to be repulsive to only male mosquitoes. All other frequencies tested were found to be insignificant. It is inferred that the FIARD design could later be used in other studies to determine frequencies that affect mosquitoes and could be used in an acoustic mosquito repellent or trap.

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