The Sixth Sense: Evaluation of Magnetoreception in Culex quinquefasciatus for Potential Mosquito Control

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Mosquitoes are estimated to kill between 700,000 and one million people per year through disease transmission, which is why effective mosquito control methods are imperative. An often-overlooked sense that many animals possess is magnetoreception, the ability to detect and respond to magnetic fields, which may be present in several species of mosquito. A mosquito control method exploiting magnetoreception would be attractive, as it would be quiet, non-polluting, and potentially effective over long periods of time. Previous testing indicated that C. quinquefasciatus has a response to certain acoustic frequencies, however, the use of a speaker to generate sound provided the extraneous variable of alternating magnetic fields. To evaluate magnetoreception in the mosquito species Culex quinquefasciatus, a binary choice test device was constructed. It consisted of a clear PVC tube with a gate valve in the center. A magnetic field generator was placed at one end of the device, and attraction to specific frequencies produced by the generator was determined by which end of the device test mosquitoes flew towards. The four frequencies 23, 28, 34, and 50 Hz and a negative control were used for testing. Mosquitoes were attracted to 34 and 50 Hz, and showed no statistically significant response to the other tests. Female mosquitoes were found to be, in general, more responsive than males. A prototype mosquito trap was constructed which utilized a similar magnetic field generator as the attractive component.