Despite growing developments in mosquito surveillance and control efforts, mosquitos remain one of the deadliest animals in the world, acting as the primary vectors for diseases such as malaria or the West Nile virus. While it is known that mosquitoes are attracted to specific frequencies for mating purposes, existing traps primarily rely on attractants such as carbon dioxide, heat, or light, and lack an acoustic component. There has been relatively little research into acoustic-based lures and standard traps still lack an acoustic component, opening up opportunities to create a mosquito trap that will be more effective in capturing mosquitoes. Therefore, the purpose of this project will be to help counteract the spread of mosquito-borne diseases through improving existing methods of mosquito surveillance and capture by developing more effective mosquito traps that utilize mosquito mating frequencies as an additional means of attraction.

This research could play important roles in combating the spread of vectors through capturing more mosquitoes, especially in the context of underdeveloped areas plagued by mosquito-borne diseases, as well as enabling scientists to have more chances to learn more about mosquito physiology and ways to counteract the spread of diseases via mosquitoes. Higher rates of capture of mosquitoes would also decrease the ability of mosquitoes to proliferate, serving as another method of population control.

Along these lines, the engineering goal of this project is to create a program capable of emitting frequencies through a speaker that can be used with an existing mosquito trap to increase its capture rate. This trap with the speaker is expected to capture, on average, more mosquitoes than the control trap, which lacks an audio component, since mosquitoes have been shown to be attracted to specific frequencies used in mating and flight.

A frequency-emitter will be created utilizing a java program and audio packages to synthesize frequencies equivalent to the mating frequencies of *Aedes aegypti* mosquitoes. This program will then be run on a computer and wirelessly connected to a bluetooth speaker in a simple plastic funnel trap. The trap, with the attached speaker, will be placed in the middle of a cubic feet cage. Once the setup is complete, a continuous frequency of 500 hz will be played through the speaker at a volume of 70 dB and 30 *Aedes aegypti* mosquitoes consisting of a 1:1 male to female ratio will be released into the chamber. Following a period of 30 minutes, the trap will be removed and all remaining mosquitoes will be captured. Mosquitoes captured in the trap will then be removed and the total count of female and male mosquitoes will be recorded. This procedure will be performed for three trials before being repeated with a control trap that lacks the speaker for 3 more trials. These steps will be conducted once again for a speaker producing a frequency of 600 hz and 700 hz.

There are no significant risks in conducting this experiment. While the mosquitoes used in the experiment may bite, they are from a lab-reared colony that does not harbor disease.

To measure the efficacy of the trap with the acoustic component relative to the same trap without any add-ons, the average number of mosquitoes captured at each tested frequency will first be contrasted with the mosquitoes captured by the standard trap via graphical representation. Next, an analysis of variance will be used to determine whether any differences between each frequency are statistically significant.

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