ASSOCIATION IN GEOGRAPHY AND WOLBACHIA DISTRIBUTION

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INTRODUCTION

Wolbachia is an intracellular bacteria which means it is located in the cells instead of the blood like other bacteria's. Most Wolbachia strains are located in arthropods and nematodes including a wide range of invertebrates but not Ae.aegypti. Wolbachia is maternally transmitted to the next generation through the eggs, infect reproductive tissues, and manipulate the host reproductive cycle to increase their spread. Wolbachia in most cases forms a mutualistic or parasitic relationship with the organism. An example of its mutualistic relationship is between flarial nematodes. Flarial nematodes contain Wolbachia in them, the difference in theirs compared to the others is that without the Wolbachia they can't survive. Most examples of parasitic Wolbachia relationship can be found within the mosquitoes population where some that contain the bacteria Wolbachia have various phenotypes that affect the insects which include Cytoplasmic Incompatibility, Feminization, Male Killing and Pathenogenesis. In studies Wolbachia is known to effectively block the transmission of mosquito diseases such as Dengue and Zika to the human.

Israel **New Jersey**

INQUIRY QUESTIONS

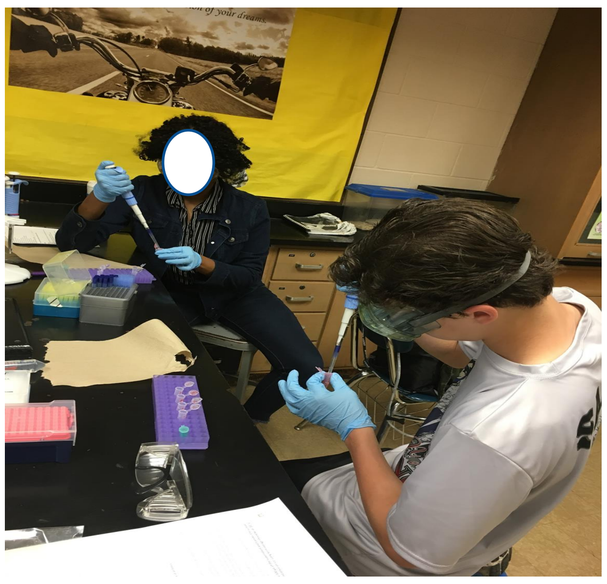
What is the relationship between the geographic area and the distribution of Wolbachia in mosquitoes?

HYPOTHESIS

There are differences between the distribution of Wolbachia in mosquitoes in Israel and New Jersey.

Due to the genus species Culex being known to carry different strains of Wolbachia we predict that it will display a high prevalence of Wolbachia.

Another factor is the difference between the climate in Israel and the climate in New Jersey. In Israel the average temperature is higher, in New Jersey the average rainfall is higher. The different climate can affect the distribution of the Wolbachia in mosquitoes.



METHODS

loading the DNA in the gel electrophoresis

First, we tested 6 mosquitoes that we didn't know if they were infected with Wolbachia. We also didn't know whether they are male or female mosquitoes. We also tested 2 flies, one of them is known to have the Wolbachia, (positive control), and the other one is known to have no Wolbachia. (negative control).

We extracted from each insect its DNA. We used different tools and solutions so we could get pure DNA.

We smashed the DNA in a lysis buffer. Next we separate the DNA from all other molecules with columns.

After we had a clean DNA of each insect, we used PCR to increase the amount of DNA.

In the PCR we used 2 kinds of primers- one for a Wolbachia gene and one for the mosquito gene.

After the PCR, we put it into a gel electrophoresis. In this device it is possible to compare different size of DNA. By comparing between the DNA in the mosquitoes and the flies, we could know whether there is DNA of the Wolbachia in the mosquitoes so we could find out if this germ is in them.

https://www.youtube.com/watch?v=oGhDPpTeHoU&feature=youtu.be

RESULTS

In the Israeli group all the 6 mosquitoes that tested carried the Wolbachia.

In the slide above we can see, from right to left - first,the negative control group, second, the positive control group, and farther to the left are the 4 mosquitos that we checked.

In Israeli school it was found that both male and female were infected with the Wolbachia

DNA -Gel Electrophoresis - the Israeli team

DISCUSSION & CONCLUSION

We cannot prove our hypothesis because we did not get the results from the New Jersey experiment.
from the Israeli results we can assume that more than 40% of the mosquitoes are infected with Wolbachia. The results on the differences between male and female were that both of them infected with the Wolbachia and it support the hypothesis.

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