

Breeding site preferences of Mosquitoes: How pH affects mosquito larvae and eggs

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Introduction

- Mosquito larvae (*Culex spp.*) is dependent on the water that it is in to develop
- One factor is pH acidic or basic in water quality
- Becoming an issue for many lakes due to acidic rain
- Mosquitoes carry lots of diseases and can help determine the amount of mosquitoes in a certain area



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Problems

Pollution



Acid Rain



More acidic
lakes and
streams



- Question: How will mosquitoes choose to lay their eggs in water with a pH of 5,7,and 9?
- Hypothesis: If mesocosms of water are left outside with a pH of 5, 7, and 9 then the mesocosm with a pH of 7 will have the most mosquito eggs in it

- Question: How will mosquitoes develop in water with a pH of 5,7,and 9?
- Hypothesis: If mosquito larvae was placed in mesocosms with a pH of 5,7,and 9 then the mosquitoes in pH of 7 would have the best survival rate

Experiment 1 variables:

- Control Variable : Temperature, location, amount of water DO
- Independent Variable: The pH of the water
- Dependent Variable: The amount of mosquito eggs in a mesocosm
- Possible sources of error: The mosquitoes can lay their eggs randomly



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Methods for experiment 1

- Distilled water will be poured in each of the mesocosms 3 will have a pH of 5, 7 will have a pH of 7, and 3 will have a pH of 9
- Mesocosms will have a dimension of 34.6cm x21cmx12.4 cm
- 6.75 liters of water will be added to each mesocosm
- Mosquito eggs will be counted daily
- There will be 4 replicates
- Water will sit for 3 days before data is collected
- pH will be measured every day and will be adjusted if needed



▸ Experiment 1 results

- There was no recordable data
- There was no organic matter in the mesocosms
- Needs to be retested

Experiment 2 Variables

- Control Variable : Temperature, location, amount of mosquito larvae, amount of water
- Independent Variable: pH levels of the mesocosms
- Dependent Variable: Amount of adult mosquitoes that emerge
- Possible sources of error:
 - The mosquitoes can lay their eggs randomly
 - pH changes



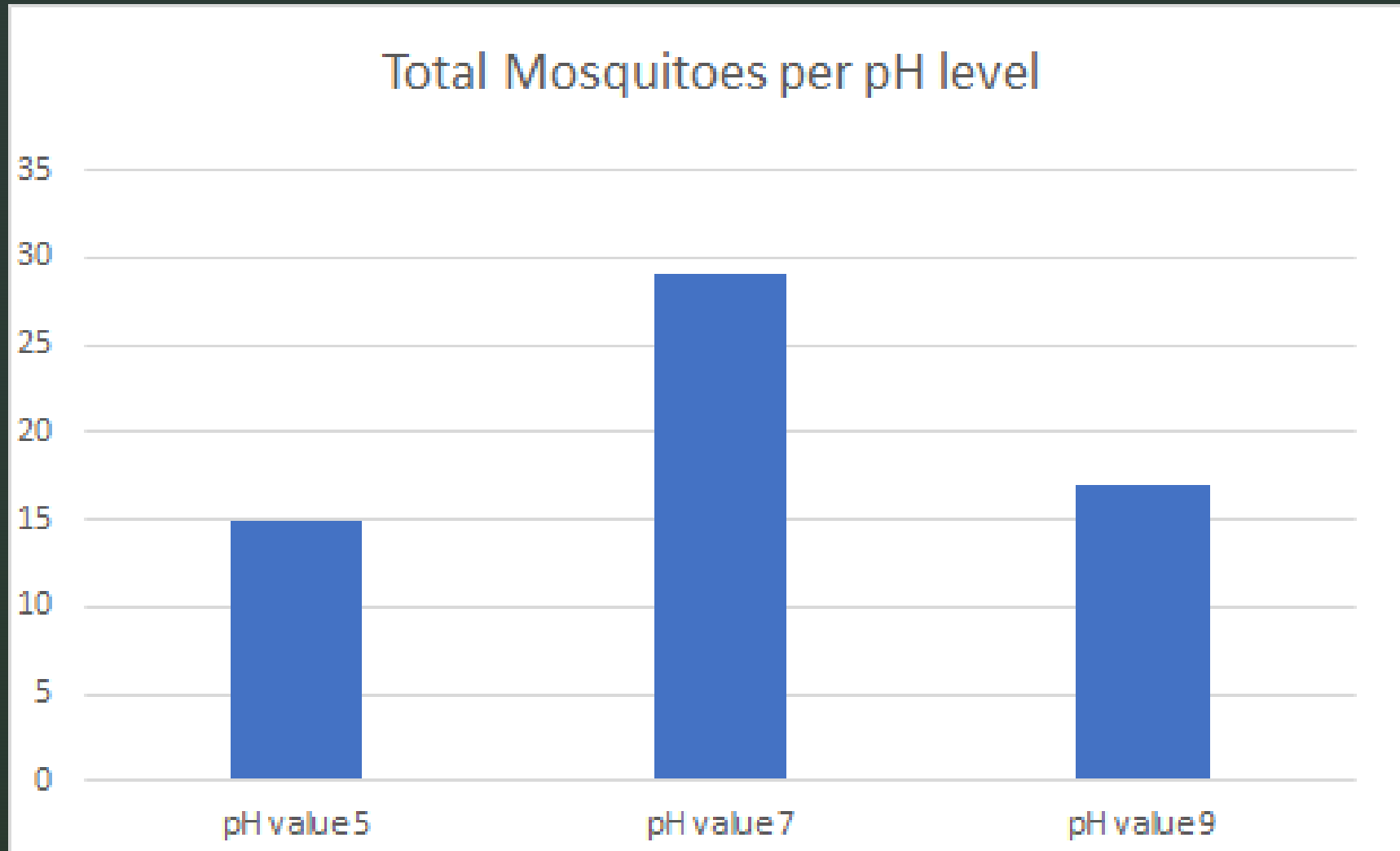
Methods

- Distilled water will be poured in each of the mesocosms 3 will have a pH of 5, 7 will have a pH of 7, and 3 will have a pH of 9
- A pH of 5,7 and 9 will be achieved using H_2SO_4 and $NaOH$
- 15 Mosquito larvae will be in each mesocosm
- Mosquito population will be counted every day
- There be 4 replicates
- On top of the mesocosm there will be a mosquito emergence trap which is designed to catch live mosquitoes and to trap them so they can be counted

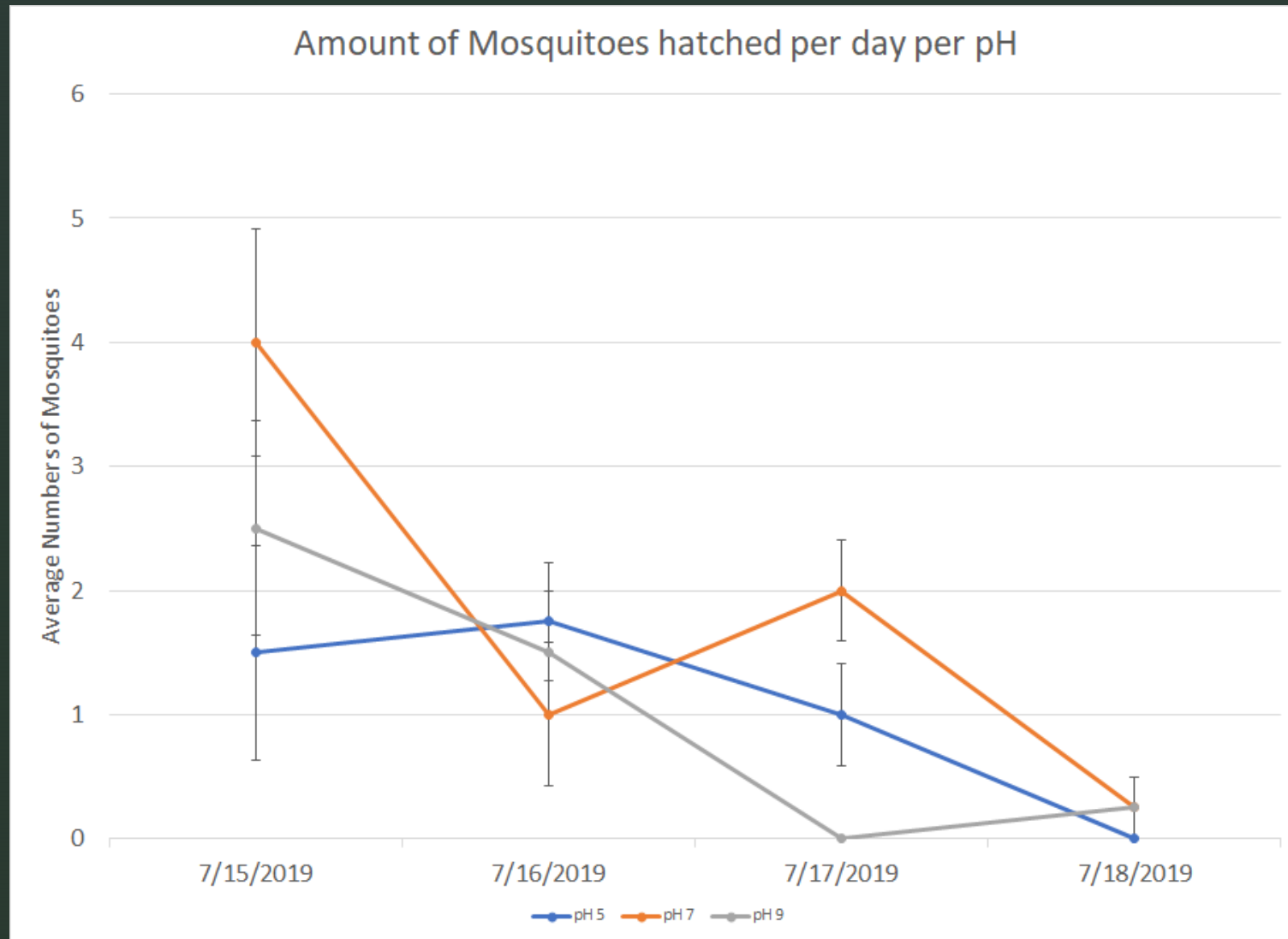
Experiment 2 results

- It was found that more Mosquitoes developed with a pH of 7
- Mosquitoes were able to develop fully for a longer time
- Most water is at a pH around 7
- Shows that Mosquitoes are relatively resilient
- Some sources of error is that there is the pH was not at a constant level
- More mosquitoes need to be tested

Experiment 2 continued

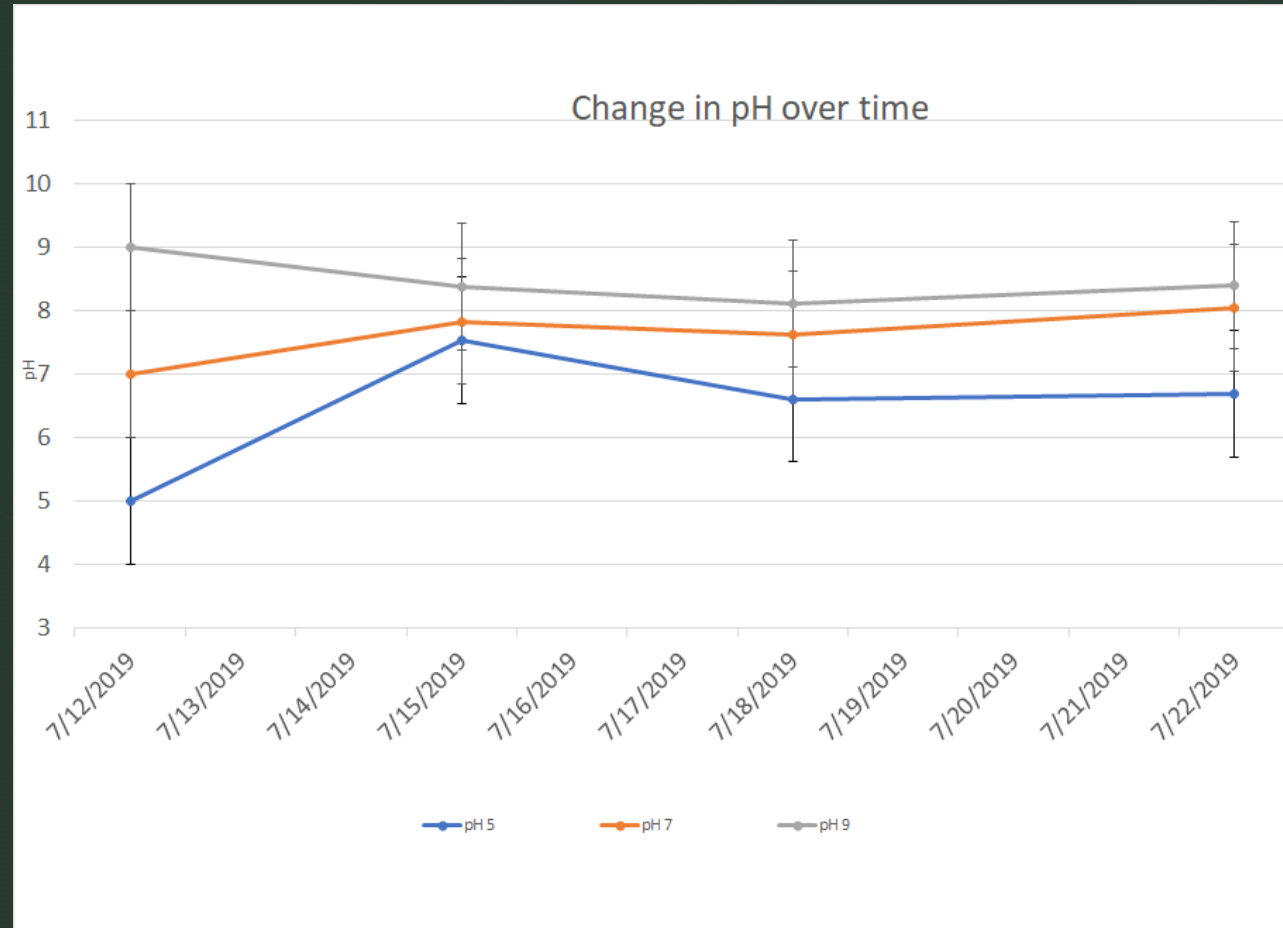


Results continued



Water quality

- The water quality of the water that mosquitoes were in was measured
- Some qualities that was measured was the pH the DO and the electric conductivity



Discussion

- The optimal pH is 7
- Mosquitoes develop better a neutral pH
- Mosquitoes are pests, they are important
- Acid rain should be limited

Future research

- Mosquitoes need to be tested in more extreme pH's
- 4,7, and 10 should be tested
- Experiment should be tested where the pH can be better balanced
- More mosquitoes should be tested

▸ Acknowledgements

- Dr. Rubbo
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- My family
- The TESA members

▶ Questions?