



Phosphorus Uptake by Various Amounts of Cattails

Joseph Bates, Michele Greebon, & Lauren Venturini

Biology Department, Baylor University, Waco, Texas 76798



Abstract: The objective of our experiment was to test if the number of cattails was a factor in the total phosphorous concentration in the soil. Based on the literature, we hypothesized that a greater number of cattails would uptake the phosphorus at a higher rate. To test this, four mesocosms were set up with soil, water, and a various number of cattails (0, 3, 6, and 9 respectively) from the Lake Waco Wetlands' Cell 2. Soil samples were collected for four weeks and tested for the concentration of phosphorus. Data did not support our hypothesis.

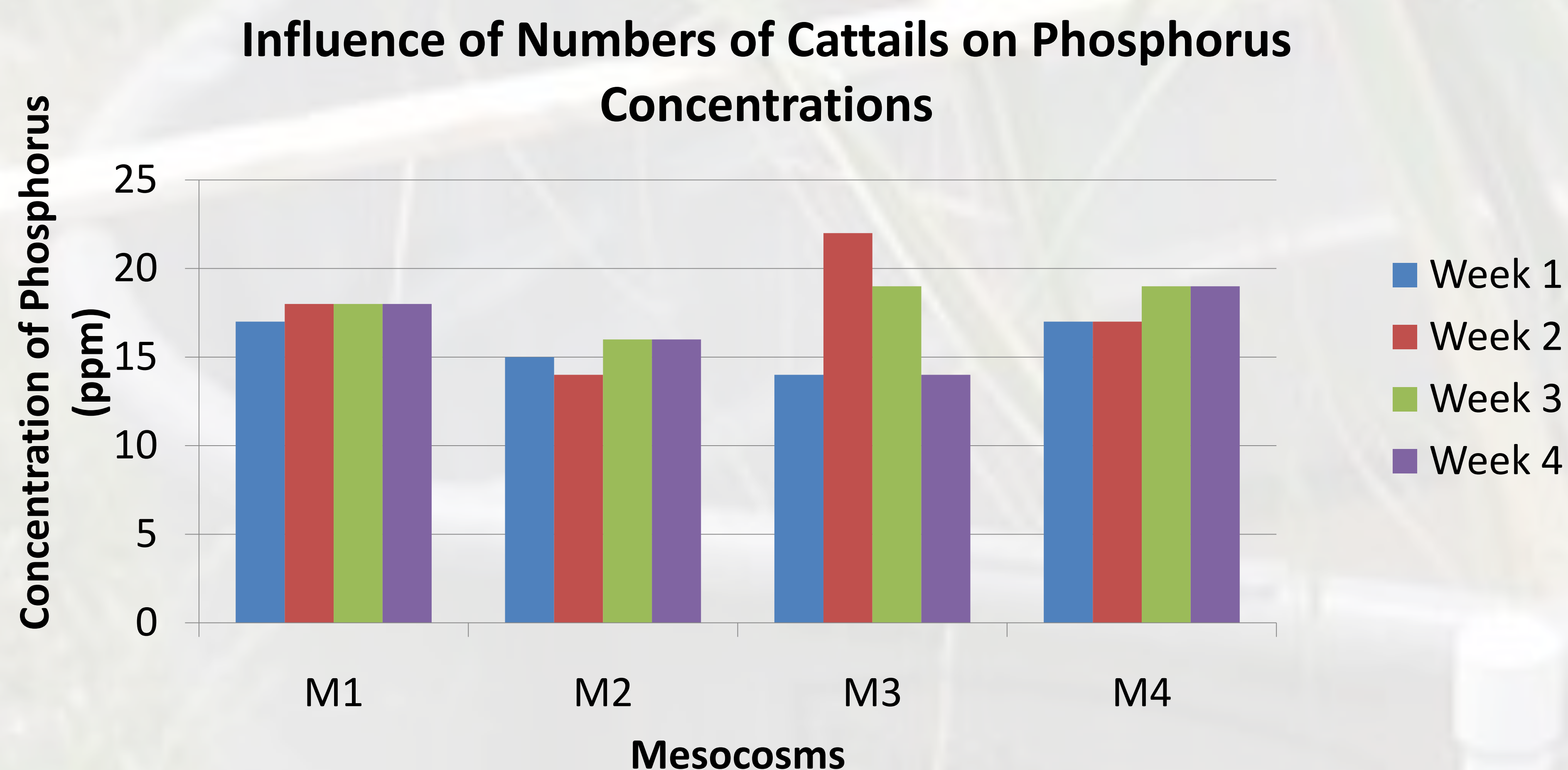
Introduction: Phosphorus is rich within the soil of the Lake Waco Wetland. According to Kadlec and Knight (1996), an excessive amount of phosphorus can cause eutrophication in lakes and rivers, which may lead to the death of other organisms inhabiting the water. Cattails are known to uptake a great amount of phosphorus. We want to determine if increasing the number of cattails in the Lake Waco Wetlands would help decrease the amount of phosphorous in the soil.

Methods and Materials:

- Four mesocosms (1136 liter Rubbermaid containers) were set-up with plastic containers (88.3 x 41.9 x 15.2 cm) that were submerged in Lake Waco Wetlands' Cell 2 water. In addition, each container was filled with soil and water from the Cell 2. Mesocosm one (M1) was a control and did not contain any cattails. The remaining three mesocosms (M2, M3, M4) had various numbers of cattails added (3, 6, and 9 respectively). All cattails also came from Cell 2.
- Soil (1/2 liter) was collected from each mesocosm once a week for four weeks (including initial week). Samples were dried in plastic trays, then bagged, labeled, and sent to the Texas A&M soil testing facility.



Acknowledgements: We would like to thank Dr. Harvill for guidance; Dr. Doyle, College of Arts and Sciences and the Baylor Biology Department for support, and Nora Schell for allowing us to use the facilities at the Lake Waco Wetlands.



Conclusion: The data did not support our hypothesis. The phosphorus levels stayed approximately constant throughout the four weeks. Mesocosm 3 (M3) showed a spike in phosphorus levels during weeks two and three.

Discussion: There were multiple possible reasons why our hypothesis was not supported by data. First, we did not have a steady flow of water through our mesocosms which could have caused some spikes in levels of phosphorus. Second, the mesocosms were exposed to weather elements. The heavy rains during week two and three might have skewed our data. Finally, in order to have a real statistical analysis this experiment should be conducted with multiple repeats of each mesocosm. From data we have right now, we cannot determine if there is any statistical difference amount the mesocosms.

Literature Cited:

Estime, L., M. O'Shea, M. Borst, J. Gerrity, and S. L. Liao (2001) Effect of phosphorus concentration on the growth of cattail callus cells. EPA . JA-03: 4 - 5.

Kadlec, R. H. and R. L. Knight (1996) Treatment Wetlands. Boca Raton: CRC P LLC.

Weng, S., G. Putz, and J. A. Kells (2006) Phosphorus uptake by cattail plants in a laboratory-scale experiment related to constructed treatment wetlands. J. Environ. Eng. Sci. 5: 295-308a.