CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)

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Project Number

22556

Project Title

Effect of Nitrate, Phosphate, and Hydrogen Ion Concentration on Synedra ulna: Diatoms as Indicators of Water Composition

Abstract

Objectives/Goals

Can an artificial environment be designed to determine if the pennate and epilithic diatom, Synedra ulna, can be used as an indicator of changing water conditions such as nitrate, phosphate, and hydrogen iox concentration.

Methods/Materials

Substrate, rocks, and stream water were taken from Limekiln Creek and distributed into control and treatment containers. Levels of nitrate, phosphate, and hydrogen ion concentrations were altered in the treatment containers using standard solutions. The percentage of Synedra ulna was determined at baseline, and 6 days after altering the treatment sample.

Results

Increased nitrate concentrations affected the reproduction of Synedra ulna when compared to controlsx There was no change in reproduction with alteration of the phosphate and hydrogen ion concentrationsx An unexpected observation in pH treatment samples was that creek water pH reverted from an altered px of 6.6 back to a baseline pH of 8.3.

Conclusions/Discussion

Synedra ulna was demonstrated to be a durable organism, able to survive in a variety of environmentsx within the following ranges: a nitrate concentration of 4.4 mg/l to 17.6 mg/l, a phosphate concentration of 0.5 mg/l to 1 mg/l, and pH of 6.6 to 8.7. An artificial environment was successfully developed to study the effects of changing water conditions on Synedra ulna.

Summary Statement

An artificial environment was developed to study the effects of nitrate, phosphate, and hydrogen ion concentration on Synedra ulna, an organism used as an indicator of water quality.

Help Received

Mentors: Craig Campbell, Sarah Spauling, Mark Abramson; Kaiser Permanente - equipment; Parents - support and encouragement

Preliminary