

The Excessive Growth of *Didymosphenia geminata*

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Under Dr. Diane McKnight

Presentation Outline

- Introduction
- Background on Sampling Sites
- Purpose for research
- Hypothesis
- Methods
- Results
- Conclusions
- Acknowledgments



Introduction

- Once considered a rare and desirable algae
- Cool, oligotrophic waters
- Adaptable to new environments
- Travels easily



Introduction

- Strange, bottle-shaped diatom
- Each cell can grow up to 100 μm long and 35 μm wide
- Attach to substrate by stalks
- Forms thick, dense mats
- Poses problems for fisheries, water supply, and recreation



Purpose of Research



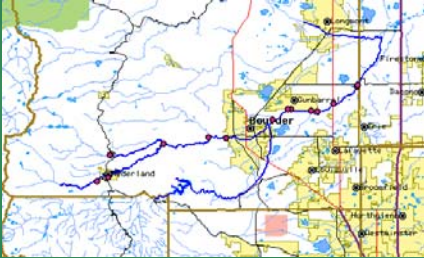
- Few studies conducted on optimal habitat
- Currently no strong links to water chemical factors
- Prevent spreading
- Stop growth

Background on Sampling Sites: South Boulder Creek

- Growth monitored 2 and 15 km from Gross Res.
- Used for irrigation and minimal recreational activity
- Little vehicle and human traffic
- Runs through Eldorado Springs



Background on Sampling Sites: Boulder Creek



- Didymo growth monitored 2, 5, 15 km from Barker Res.
- Sampling sites chosen of similar depth, light, & flow conditions
- Supplies 40% of Boulder's drinking water
- High vehicular traffic
- Heavy sanding/salting in winter

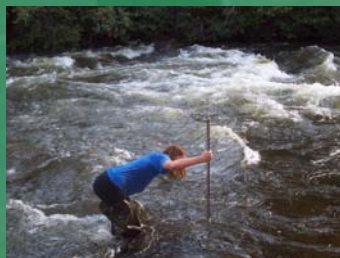
Hypothesis



- *Didymo* will grow abundantly below dam
- Boulder Creek will have higher suspended solids

Methods: Preliminary Study

- During high flows
- Conductivity, pH, temperature, DO
- Flow Rates
- Nutrients
 - Hach meter
- DOC
- Total Suspended Solids from stream surface and streambed
- Didymo rating system



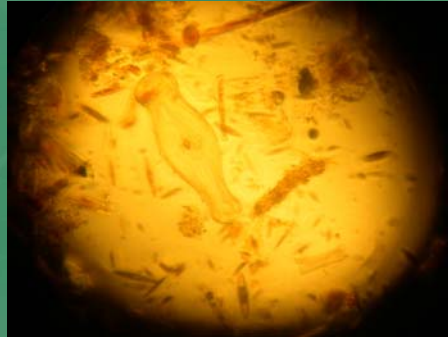
Methods: Summer Study

- Focus on quantifying *Didymo* growth
- Three attempts at collection
- Microscope action
- Same water quality measurements
- TSS & Flow rate



Methods: Lab Work

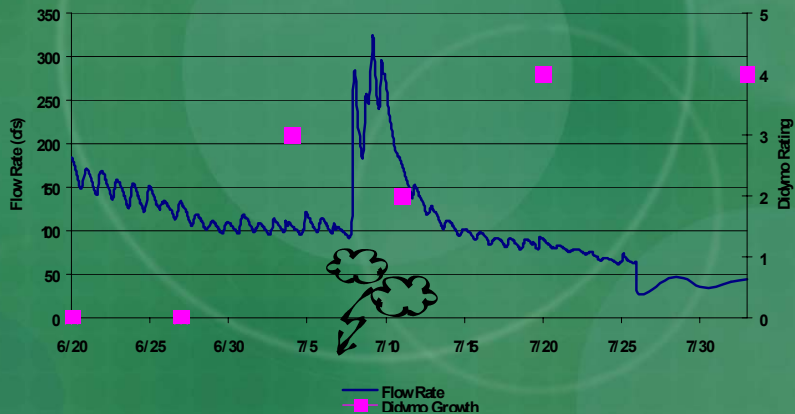
- Total Suspended Solids
 - Vacuum filtration
- Phytoplankton Identification: *Didymo*
 - 5-50 mL aliquots
 - Gravity settling chambers for 30 hrs
 - 40X magnification
 - At least 100 fields



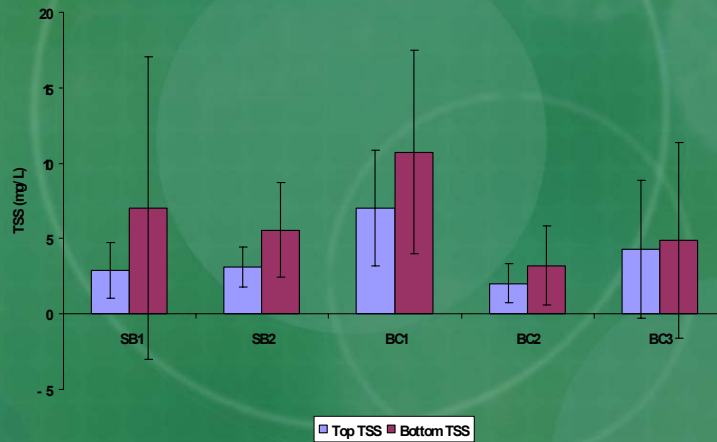
$$\frac{\text{Individuals}}{\text{meter}^2} \Rightarrow \frac{\frac{\# \text{cells}_{\text{counted}}}{\text{slide}} \times \frac{42^2}{\# \text{fields}_{\text{counted}}} \times \frac{\text{volume}_{\text{sample}}}{\text{volume}_{\text{settled}}}}{\text{area}_{\text{scraped}}}$$

Flow rate and *Didymo* growth

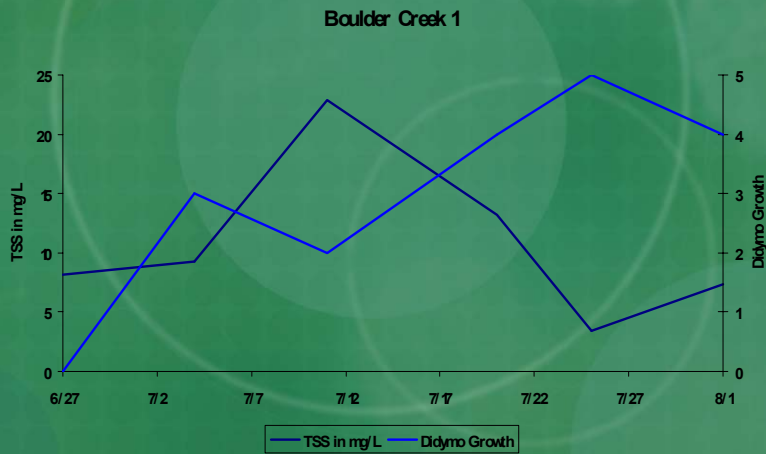
Boulder Creek Site 1



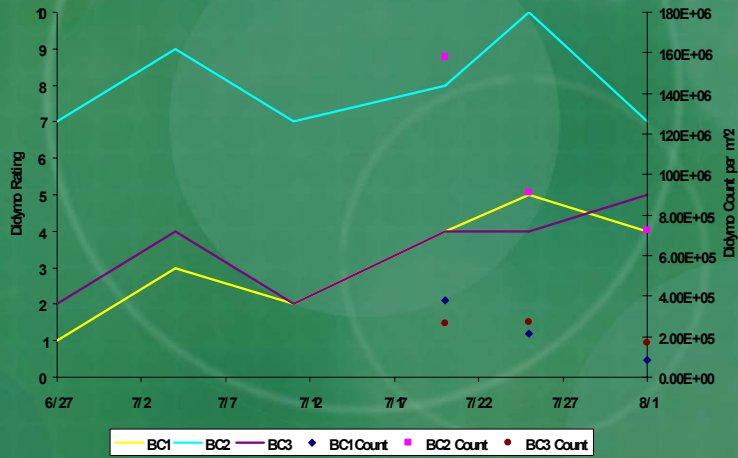
Average Total Suspended Solids



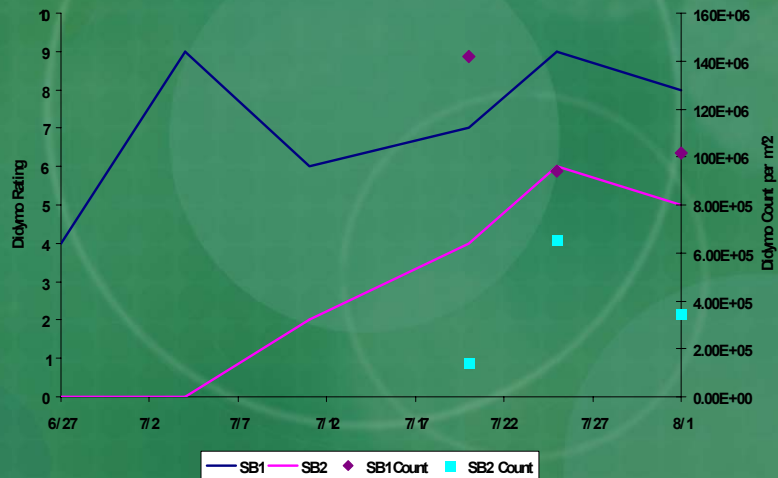
Didymo growth and TSS



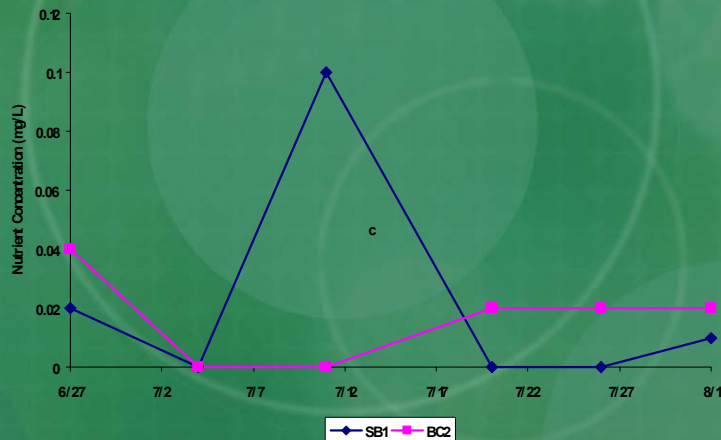
Didymo growth



Didymo growth continued...



Nutrient Levels



Conclusions

- As stream flow decreased, *Didymo* increased
- Can resist gradual changes in stream flow
- TSS directly impacts *Didymo*
- Same sediment in both streams
- Information helpful to stream managers
- Visual rating system useful
- Microscope count validation
- Mylar-strip and tile method not adequate for high flows
- Scraping rocks provides no info about growth rate
- Stepping stone to further research

Thanks to all these folks.....

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Questions?