Pond Fertilization Algal Bioassay Testing Workshop

Sponsored by:
Pond Dynamics/Aquaculture
Collaborative Research Support Program
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Aquatic Solutions

Workshop Objectives

- To better understand:
  - pond ecology as it relates to pond fertilization strategies,
  - why some fertilizers are better than others,
  - how to use the *Algal Bioassay Test Kit* to determine when a fertilizer is needed (or not needed) to turn a pond green, and,
  - how to optimize a pond fertilization strategy

Workshop Activities

Practical — Theoretical

Algal bioassay test kit

Field activities and discussions

Practical and ecological approach to pond fertilization

Introduction

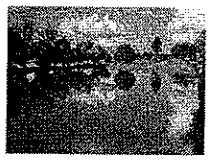
- ***Environment***
  - earthen ponds
- ***Semi-intensive fertilization***
  - Addition of fertilizers to stimulate algal (phytoplankton) growth for natural food production
    - Converting energy from sun to produce natural foods for fish
  - Maximize nutrient and economic efficiencies
- ***Pond ecology***
  - Understand dynamic processes of biological production and nutrient cycling to achieve fertilization goals

Workshop Discussion Topics

During the workshop, there will be 4 discussion topics:

1. How Does a Pond Work?

- ***Biological production***
  - Primary and secondary
  - Detritus and decomposition
- ***Physical properties***
  - Temperature
  - Turbidity
- ***Algal nutrients (making ponds green)***
  - Phosphorus, nitrogen, carbon



2. Choosing Fertilizers

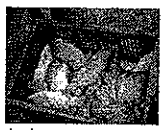
- ***Important factors***
  - Fertilization goals
  - Cost-efficiency analysis
  - Maintaining a favorable growth environment
    - Dissolved oxygen (DO) and ammonia
- ***Fertilizers***
  - Manures (animal and green)
  - Chemical fertilizers

3. Pond Characteristics Which Affect Fertilization Decisions

- ***Pond:***
  - Location
  - Source water
  - Size (area and depth)
  - Sediments
- ***Structures put in ponds:***
  - Cages, pens, hapas, and artificial substrates

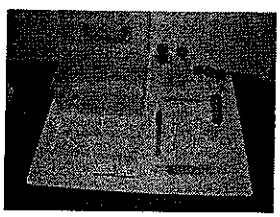
4. How to Determine Fertilization Rates

- ***Trial and error***
  - Bigger fish, it worked, smaller fish, it didn't work
- ***Fixed rates***
  - Fertilization rates fixed for growout period
- ***Water chemistry***
  - Fertilization rates based on routine measurements
- ***Computer modeling***
  - Models usually require routine water chemistry monitoring
- ***Algal bioassay***
  - Fertilization rates based on pond water responses to nutrient enrichment



Algal Bioassay Test Kit

- **Nutrient Spikes**
  - Dry N, P, C ingredients
  - Solutions
- **Filtering**
  - Filters
  - Filtering apparatus
- **Interpretation**
  - Visual table



Algal Bioassay Method

- First, collect pond water and put into 8 clear plastic bottles

Algal Bioassay Method

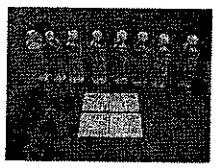
- Then, add nutrient spikes:
  - N, P, C, N+P, N+C, P+C, N+P+C, and one bottle with nothing added (control)

Algal Bioassay Method

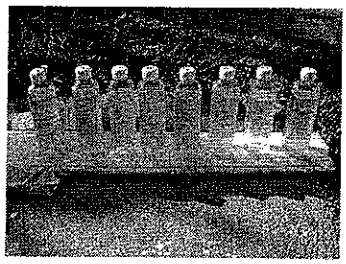
- Next, incubate samples for about 3 days under indirect sunlight
  - Mix samples regularly

Algal Bioassay Method

- After 2-3 days, visually compare bottles
  - water in the bottle
  - filter
- Then, compare visual results to table
  - fertilize according to table

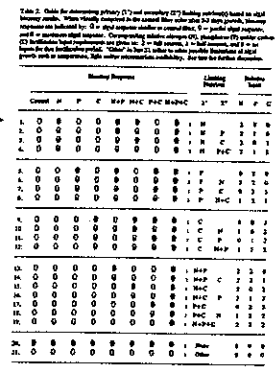


For Example, A Nitrogen Limited Pond



Algal Bioassay Interpretation Table

N-limited →



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