

# ANZ Cyanobacteria Workshop Presentation

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Junior Water Prize Winner 2023



# World Water Week, Sweden 2023



*Meeting Crown Princess  
Victoria of Sweden*



*Canada and Brazil Finalists*



*Oz'Water23 Presentation*



*Interviews  
with the  
international  
judging panel*

# Where it all began



# Northern Territory, AUS



# Case Study – Farming Dams



Cyanobacteria blooms on farmland, Selywn River, New Zealand

# 4 Main Causes of Cyanobacteria Growth



## Eutrophication

*High P and N levels from nutrient runoff and livestock manure.*



## Low DO<sub>2</sub>

*Cyanobacteria create hypoxic conditions to preserve the crucial enzyme nitrogenase.*



## Stagnant

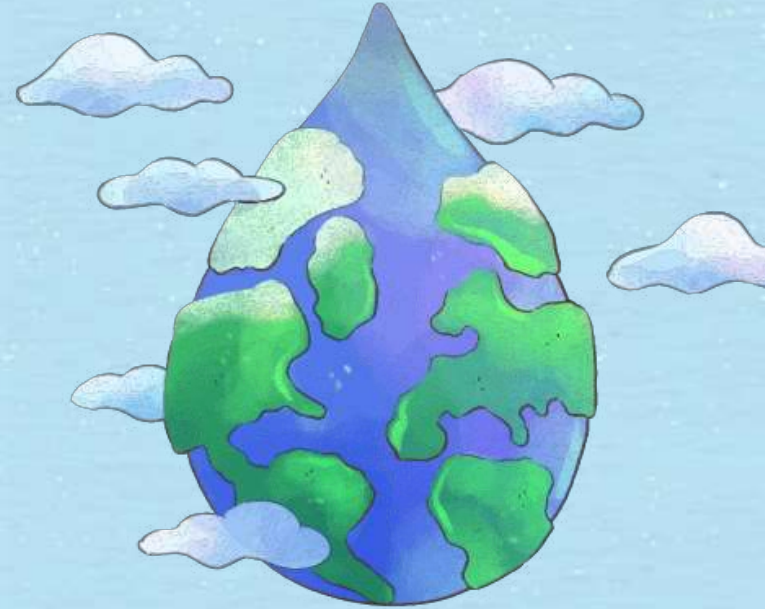
*Bacterium can buoyancy regulate to optimum conditions.*



## High temperatures

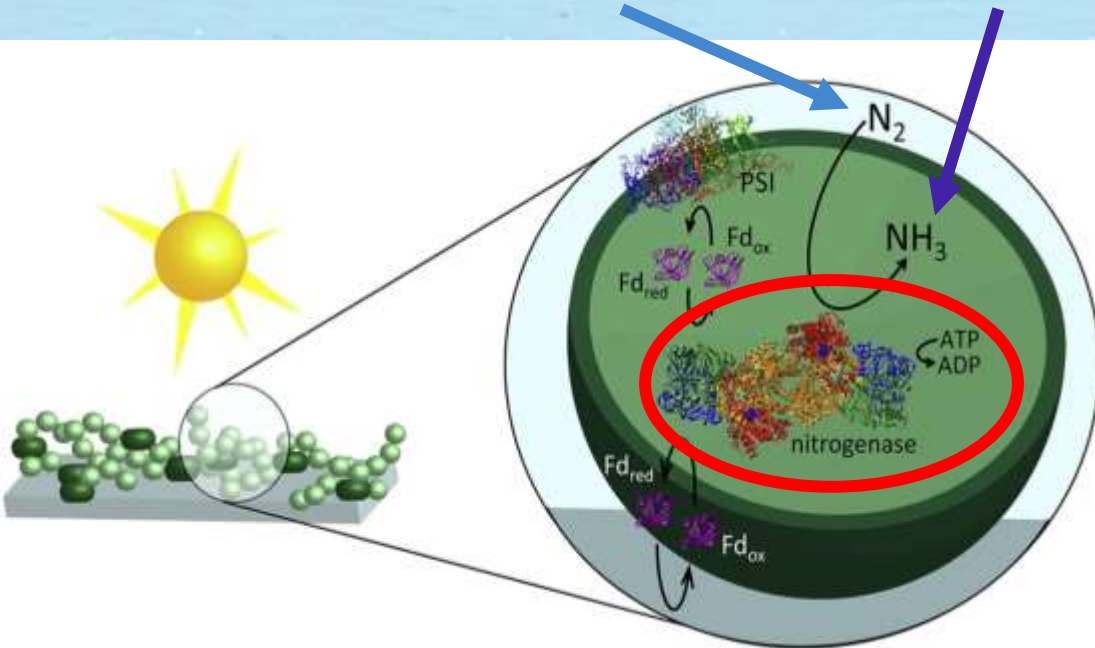
*>25°C reduces competition, O<sub>2</sub> solubility, and enhances catalytic activity.*

# SolarCyanoSlayer (SCS)



# N<sub>2</sub> Fixation & Nitrogenase

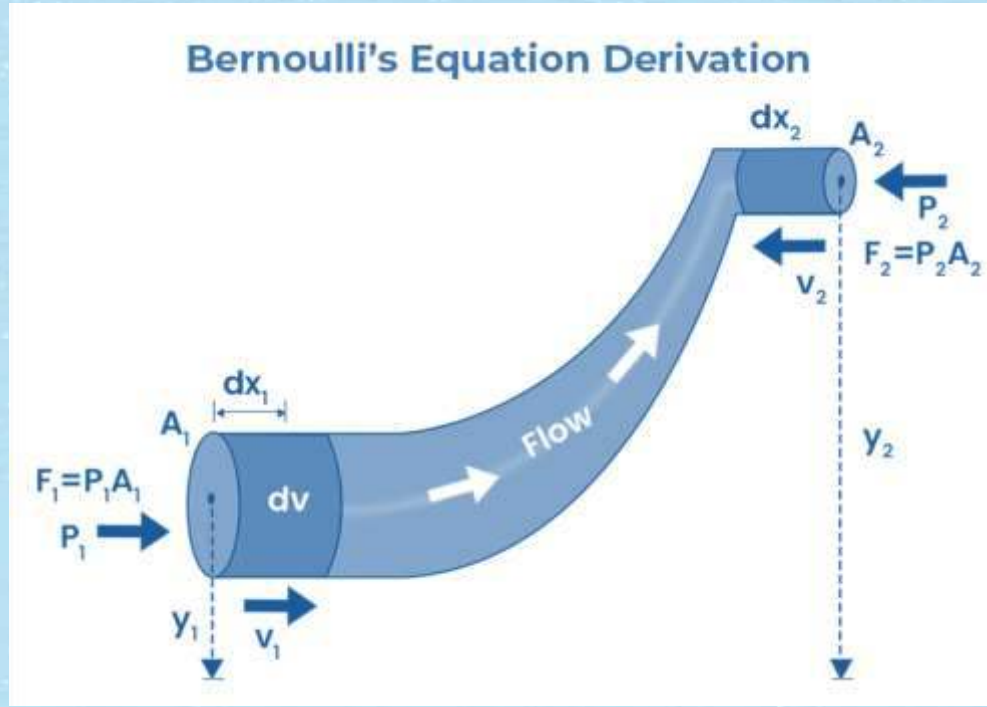
Atmospheric nitrogen  $\rightarrow$  Ammonia



Tilapia exposed to ammonia showing body lesions and necrosis, split and lesioned fins

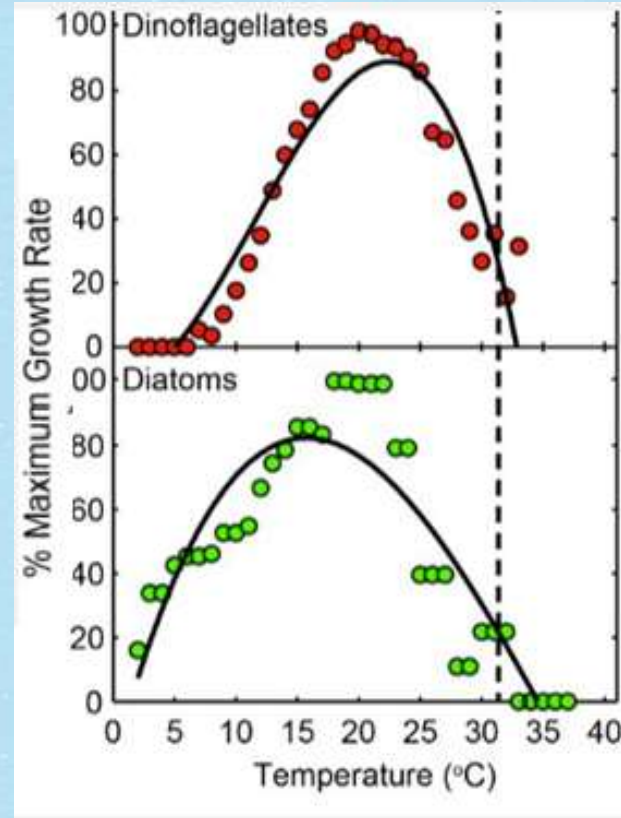
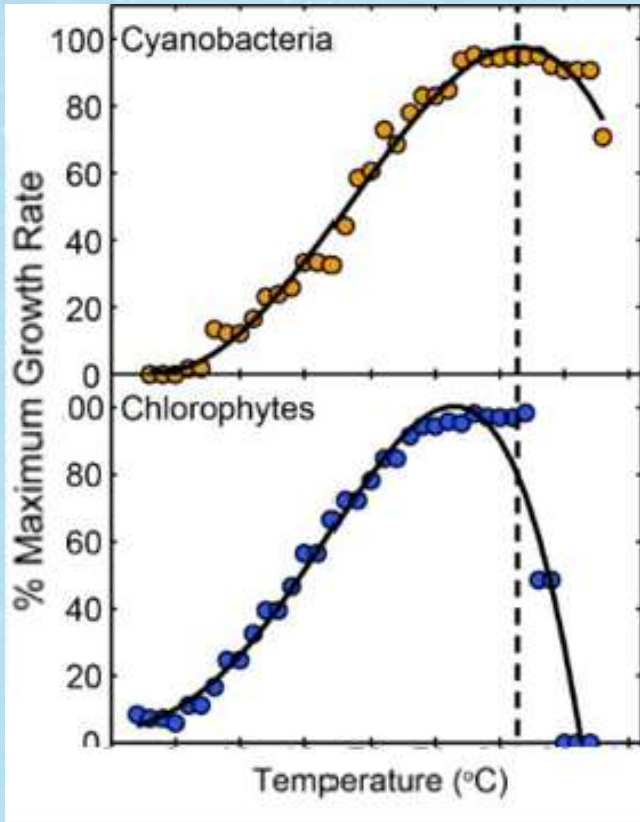


# Circulation System



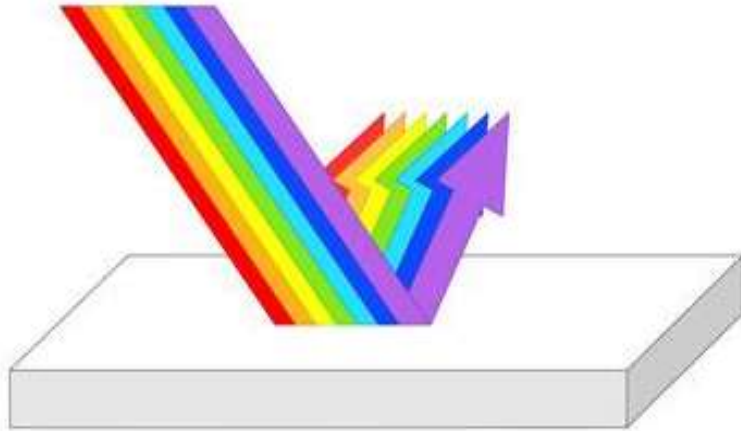
↑ Velocity, ↓ Pressure

# Impact of Temperature of photoplankton growth

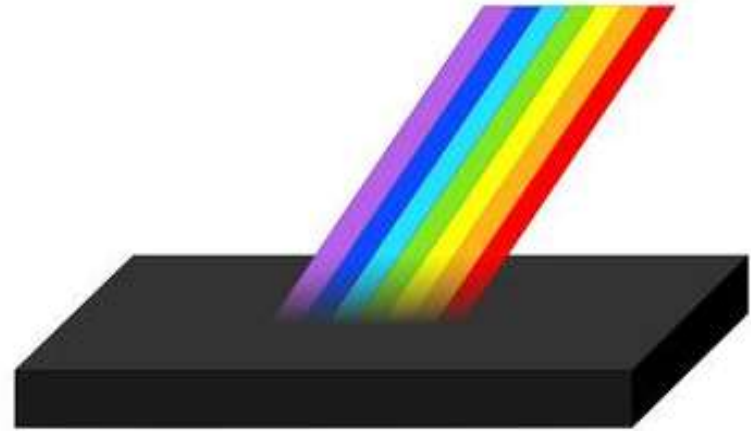


*Pearl, et al. (2014).  
Mitigating Harmful  
Cyanobacterial  
Blooms in a Human-  
and Climatically-  
Impacted World*

# Light Absorption & Reflection



A white object reflects all colors of white light equally



An object is seen as black if it absorbs all colors of white light

# Eutrophication on Farms



Damaged soil from droughts



Phosphorus and Nitrogen easily unearthed through floods



# Eutrophication on Farms



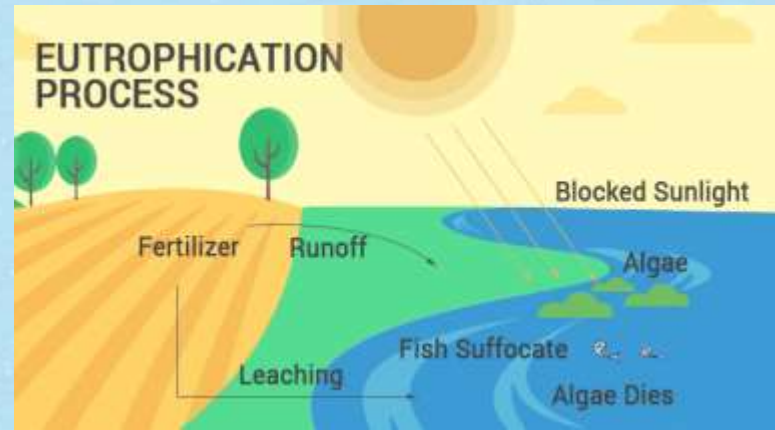
Nutrient pollution —————> Eutrophication



Increased P and N concentration in water



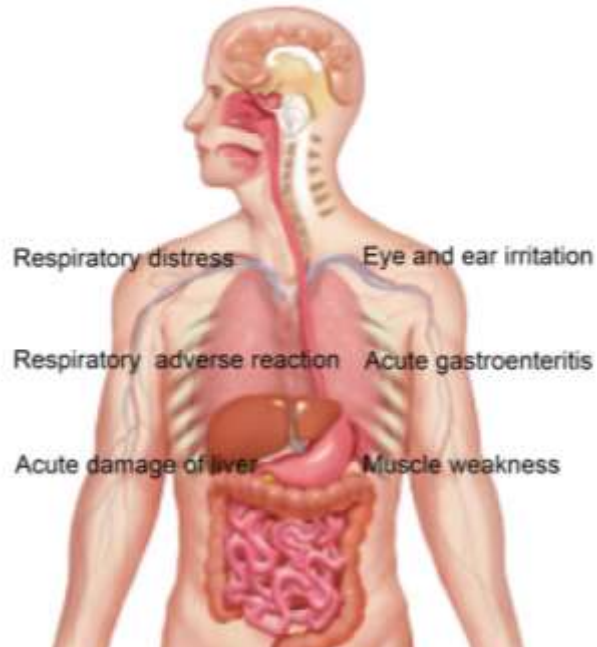
Cyanobacterial blooms



# Cyanotoxins



Effects of cyanobacteria bloom on human body



# BioFilter → BioFertiliser

	TUB		
Week	A (soil + fertiliser)	B (soil + biofilter)	C (Control: soil only)
0			
1			
2			
3			

# Qualitative Results



## TUB A (CONTROL)

Week 1 → Week 5



## TUB B (+ SolarCyanoSlayer)

Week 1 → Week 5





# Cyanobacteria History





# SolarCyanoSlayer

*When your waterway is in distress,  
You will need an SCS*