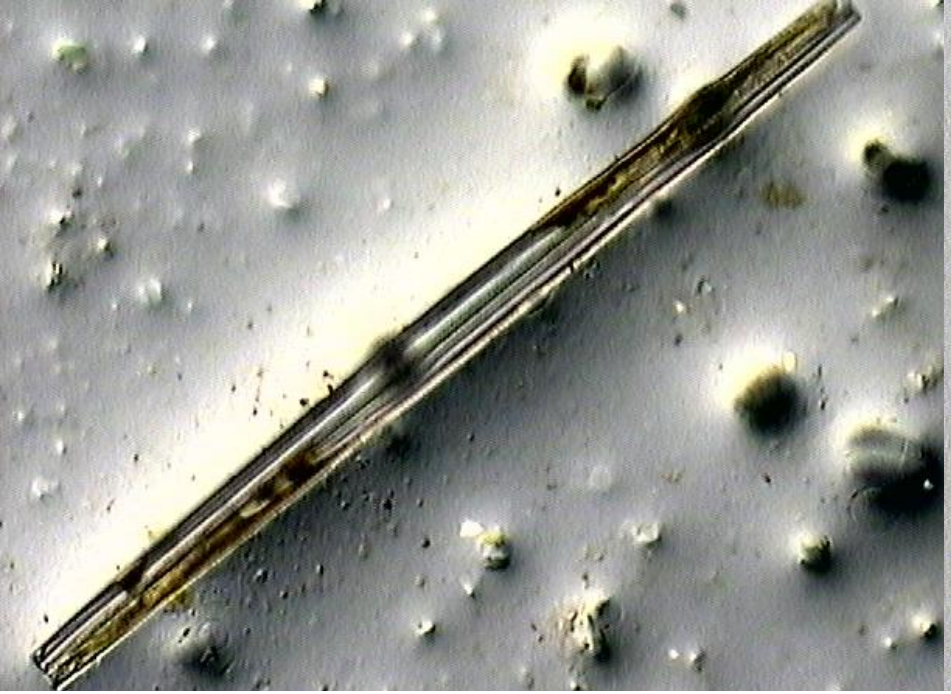


Why Do Algae Always Get a Bad Rap?
A brief primer on phytoplankton

Rick Twait, Jill Mayes and Tony Alwood, Bloomington Water Treatment Plant

Illinois Lake Management Association
33rd Annual Conference Bloomington, IL

Topics

- What they are
- What they do
- Why they are important
- What they need
- Where they are found
- When algae go wild
- How to find out more on your own

Phytoplankton

Primary Producers

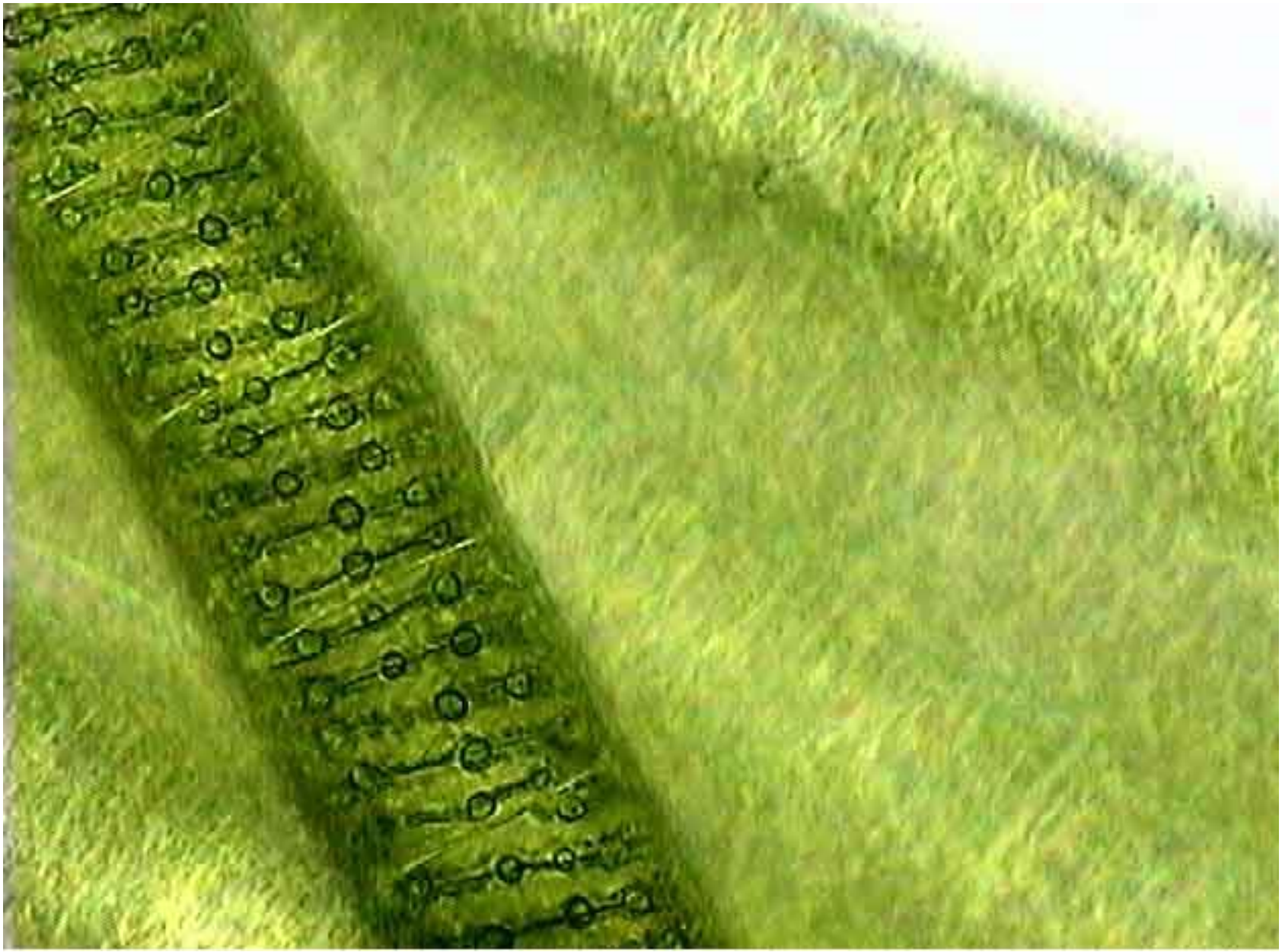
Forms and Habits

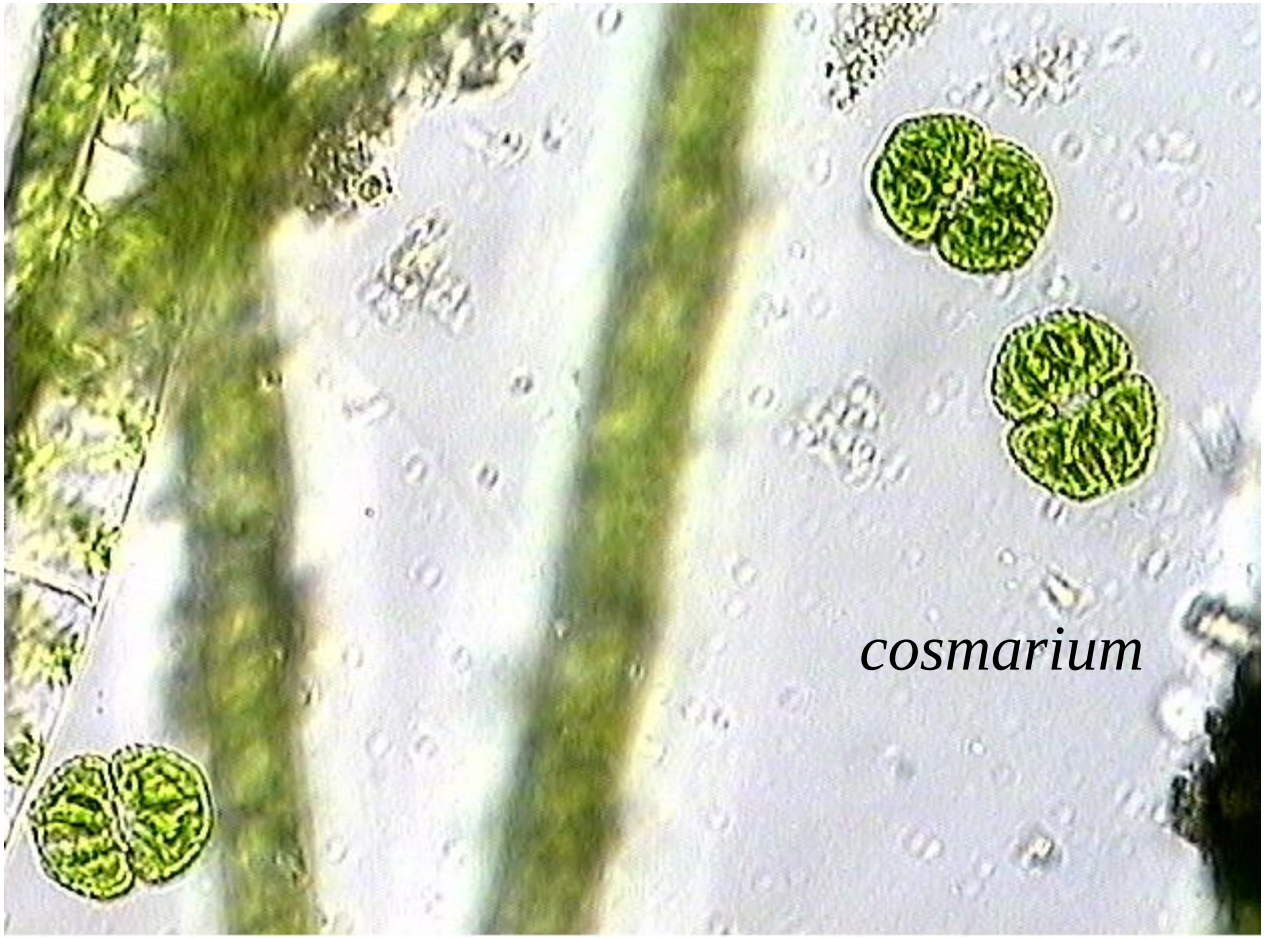
- Solitary
- Colonial
- Free floating
- Attached

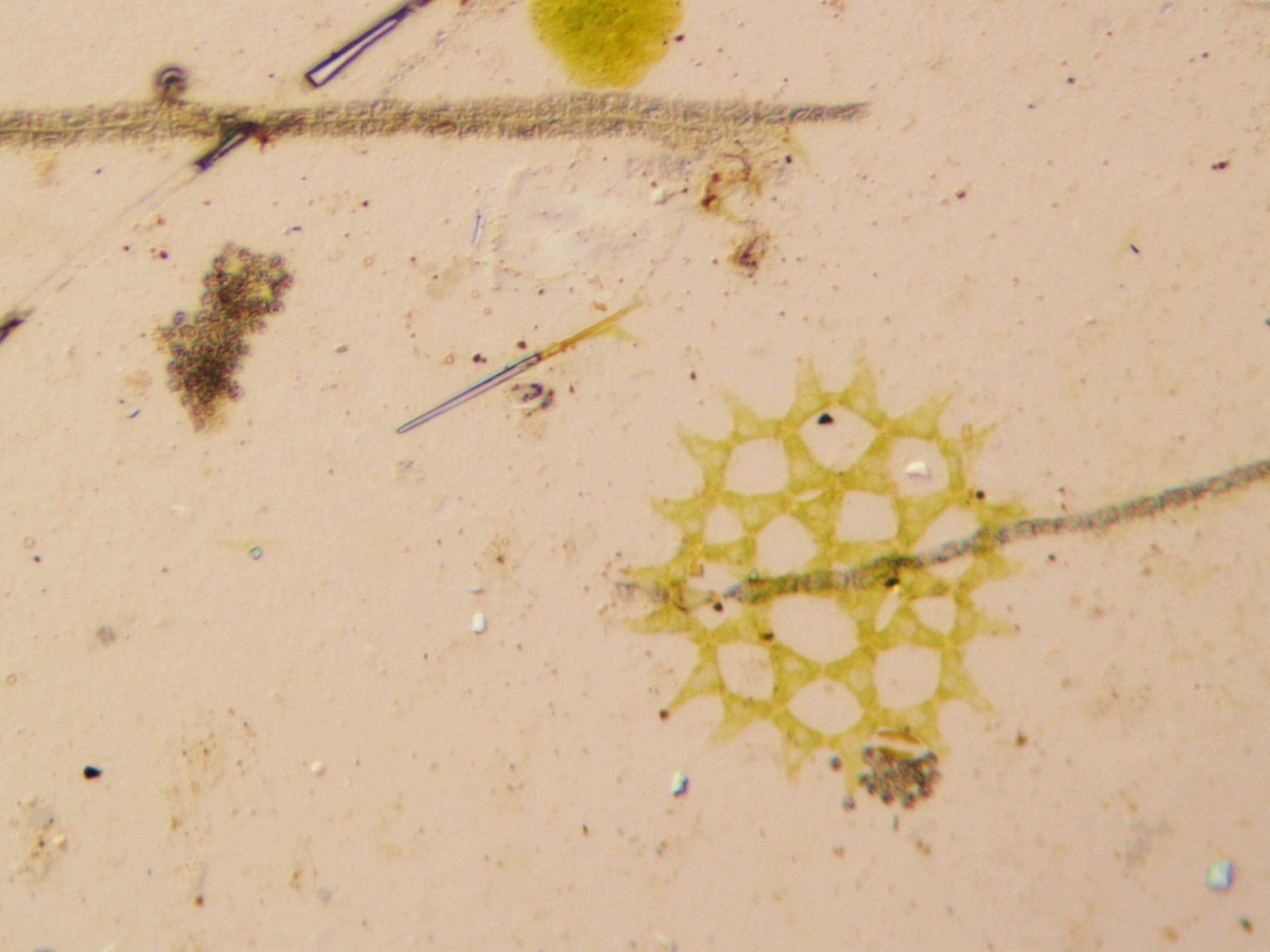
Common Phyla

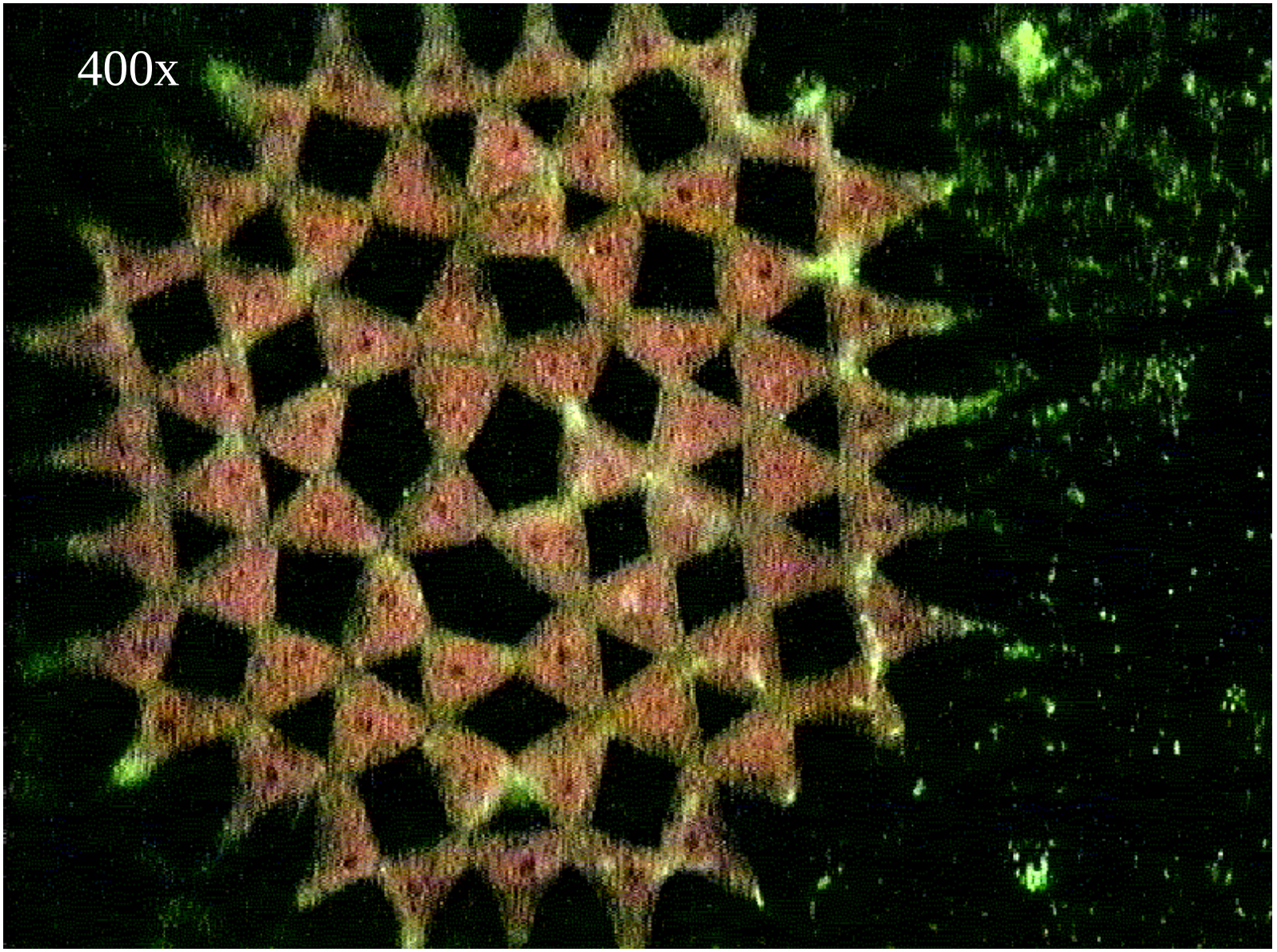
- Chlorophyta (Green Algae)
- Chrysophyta (Yellow-green or Yellow-brown algae) includes the diatoms
- Euglenophyta (Euglenoids)
- Pyrrhophyta (Dinoflagellates)
- Cyanophyta (Cyanobacteria) : Bluegreen “algae”

Green Algae




cosmarium

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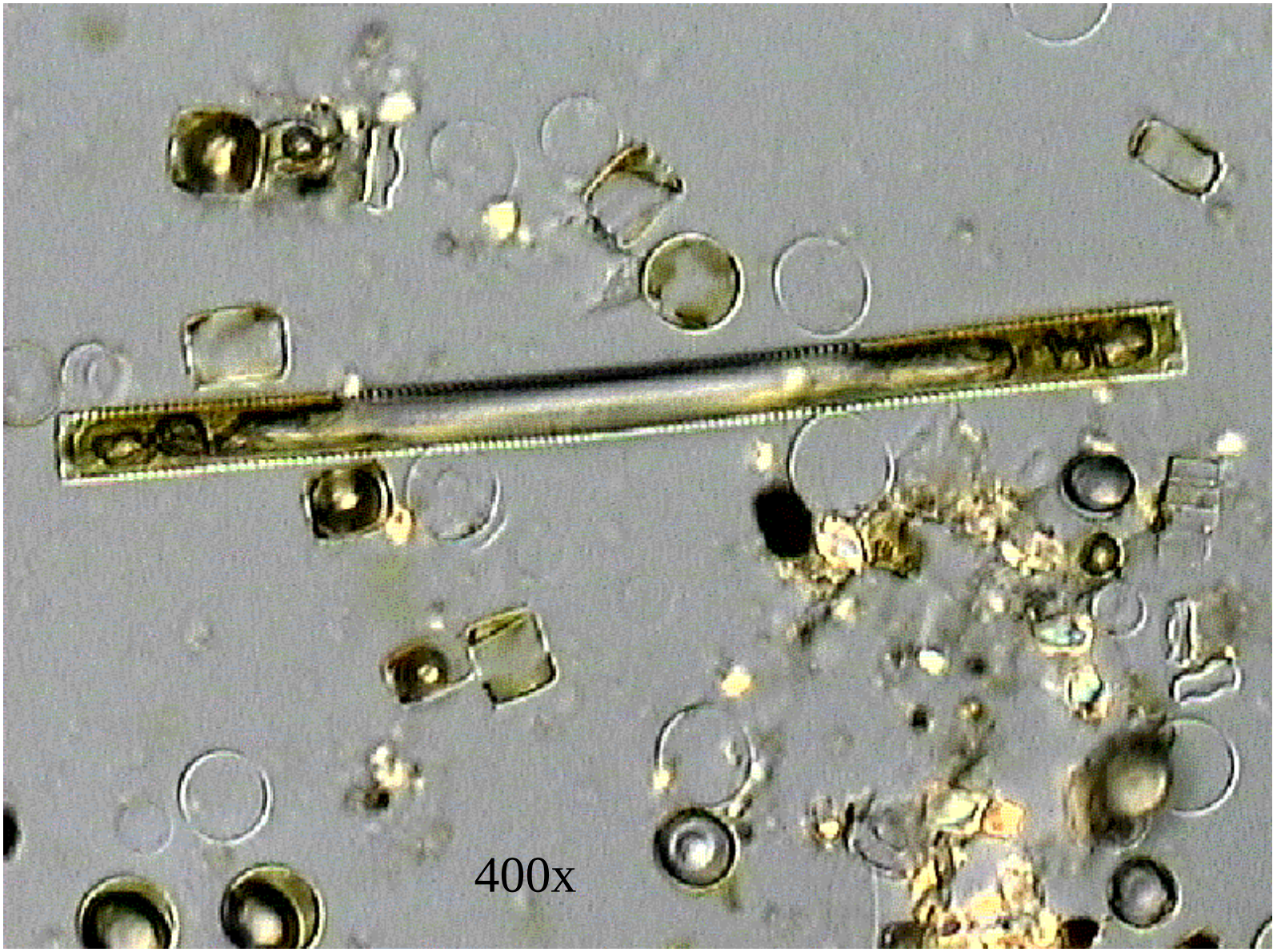
Yellow-Green Yellow-Brown Algae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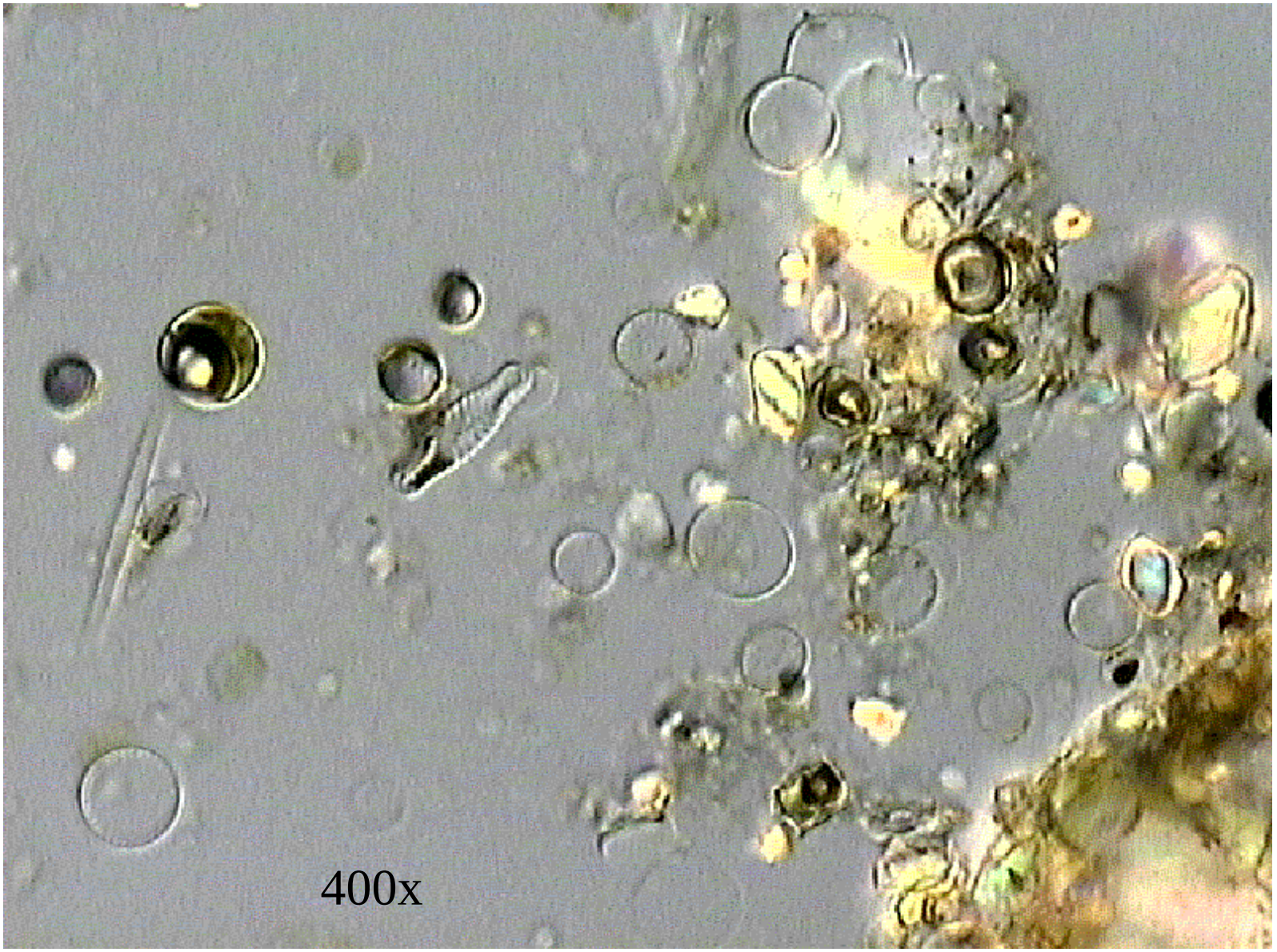
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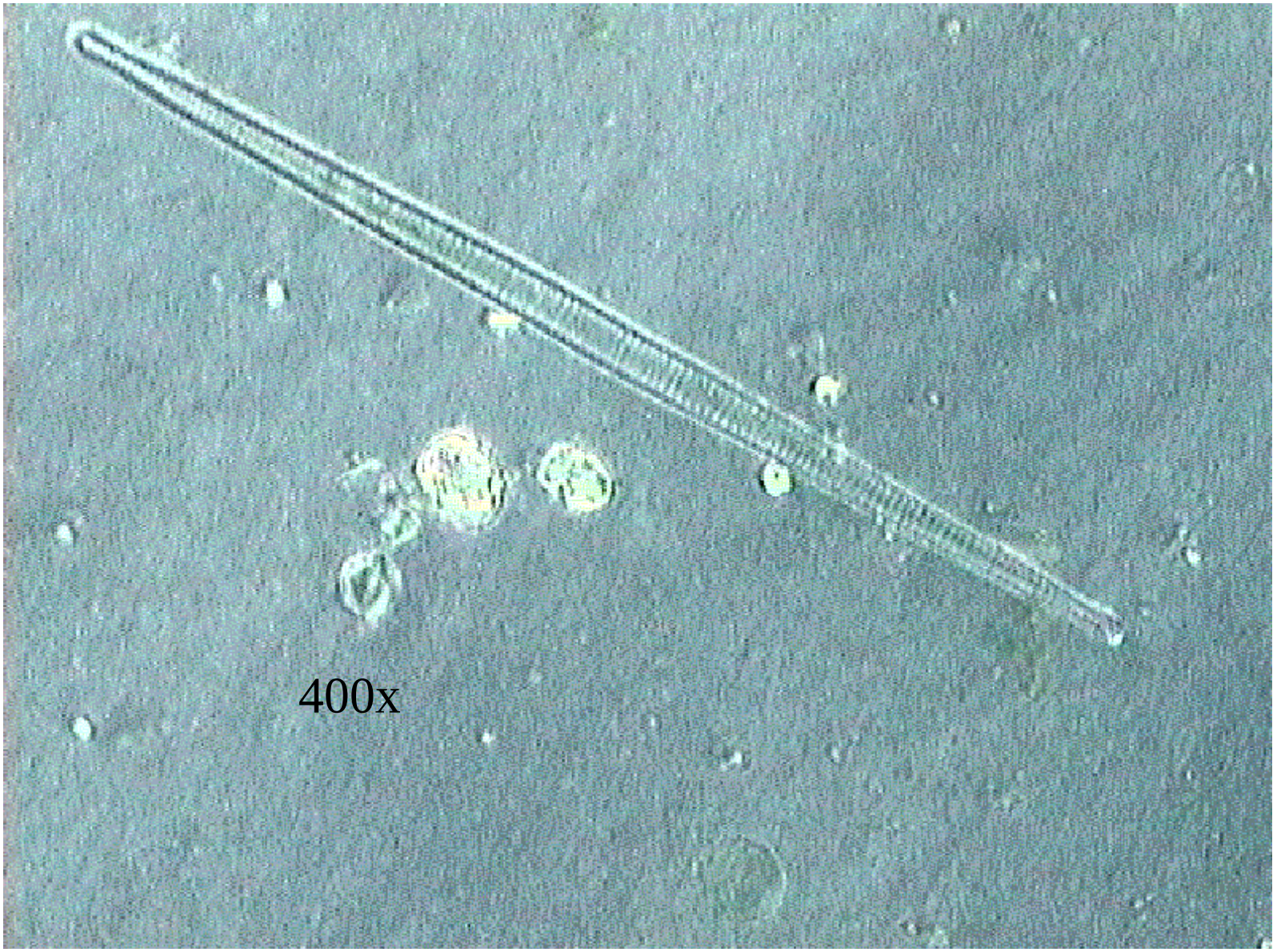
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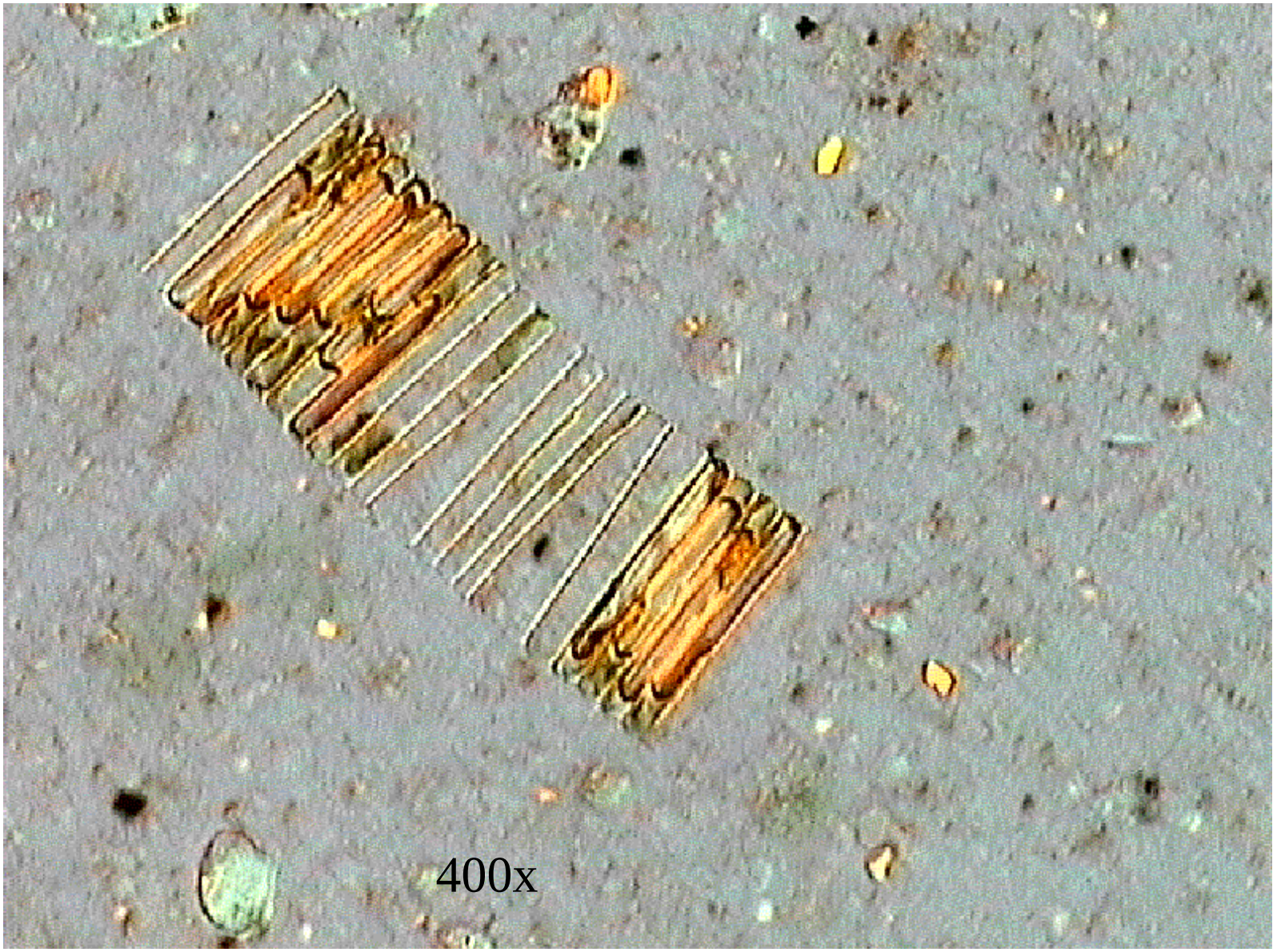
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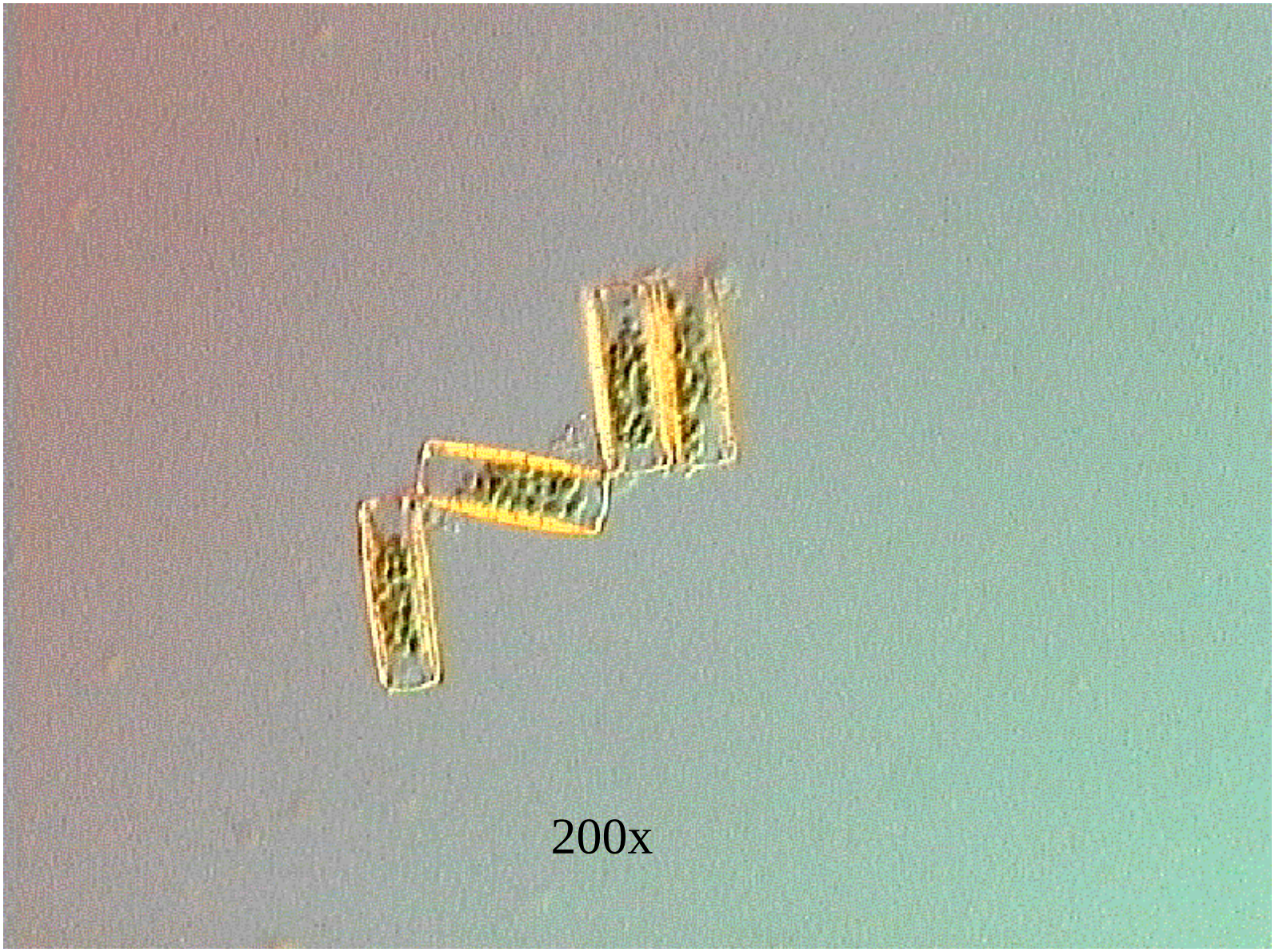
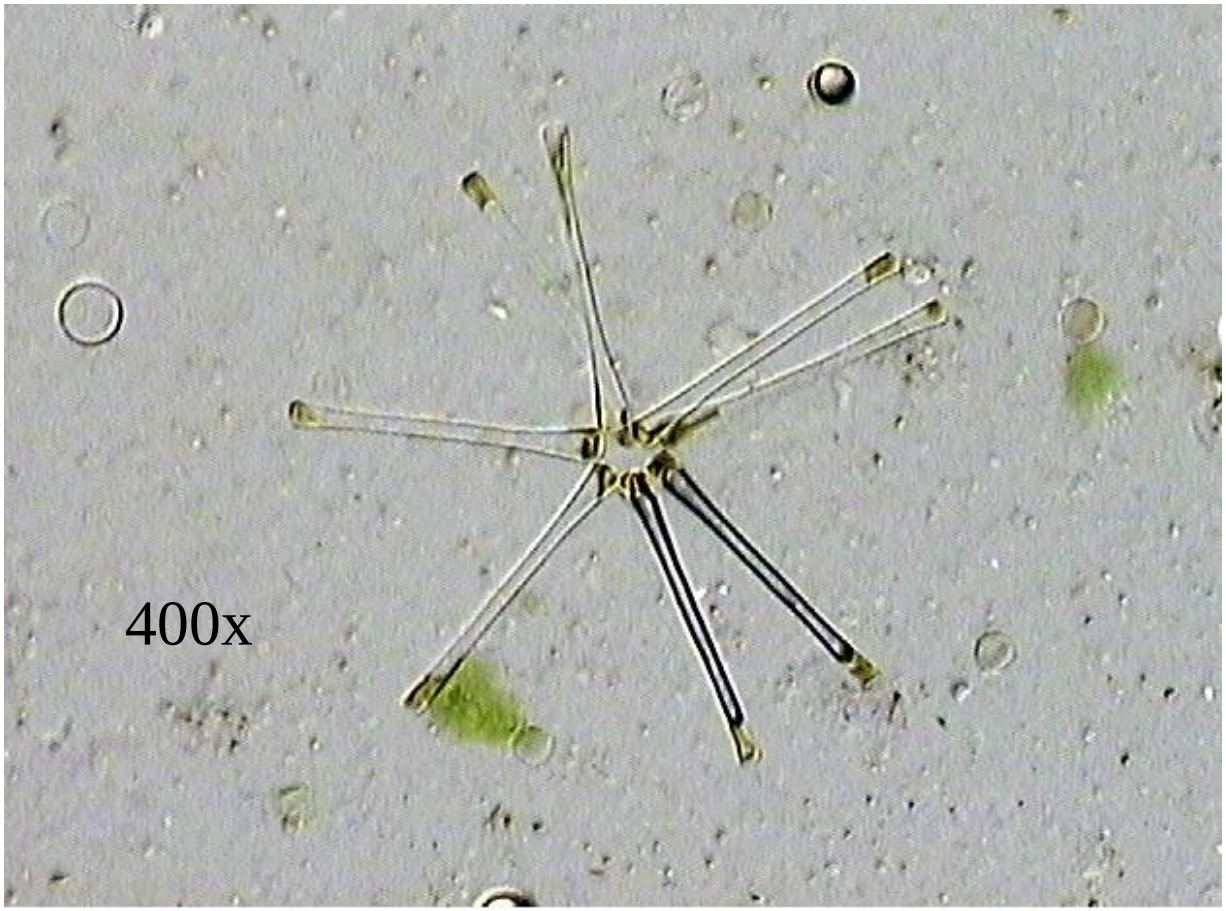


200x

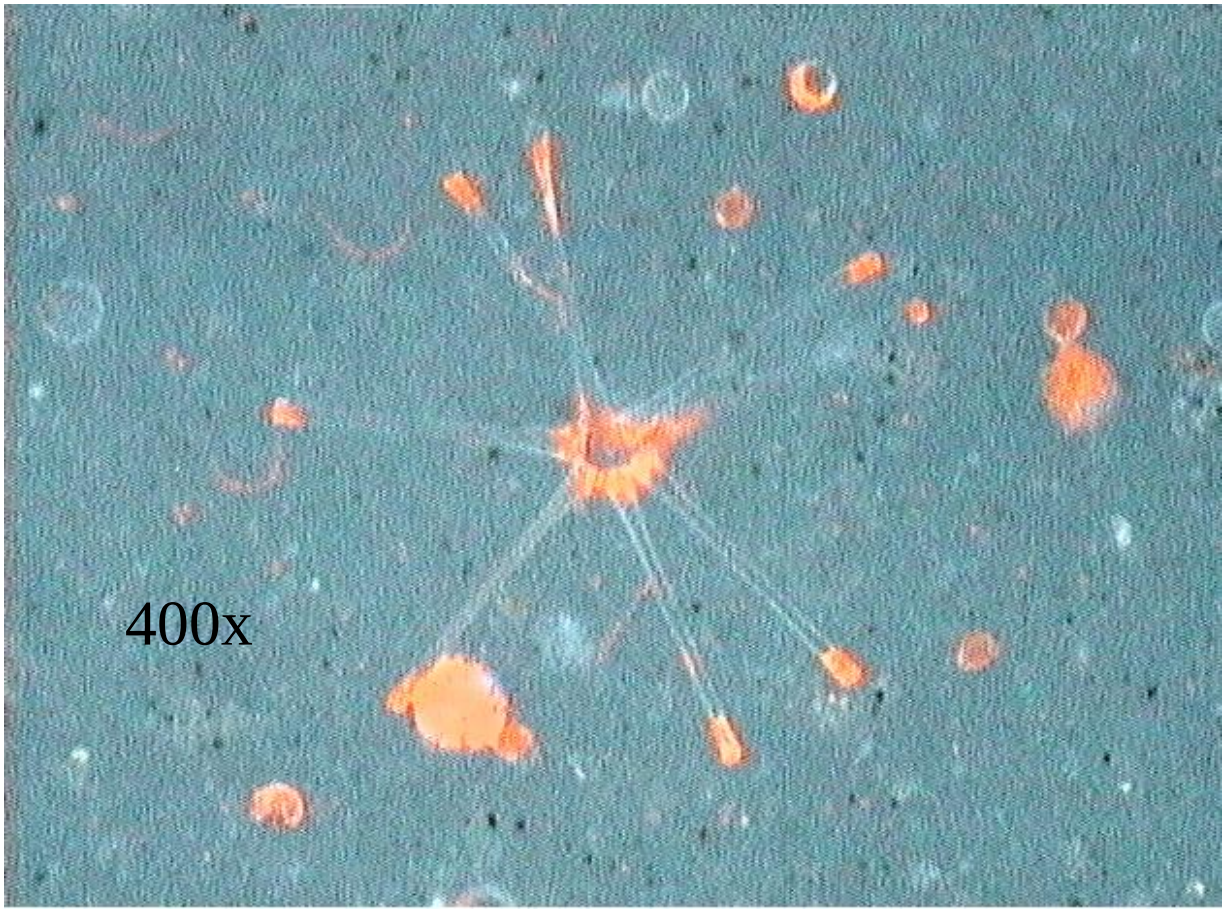
Astrionella: Diatom

DIC



Astrionella: Diatom

Fluorescence

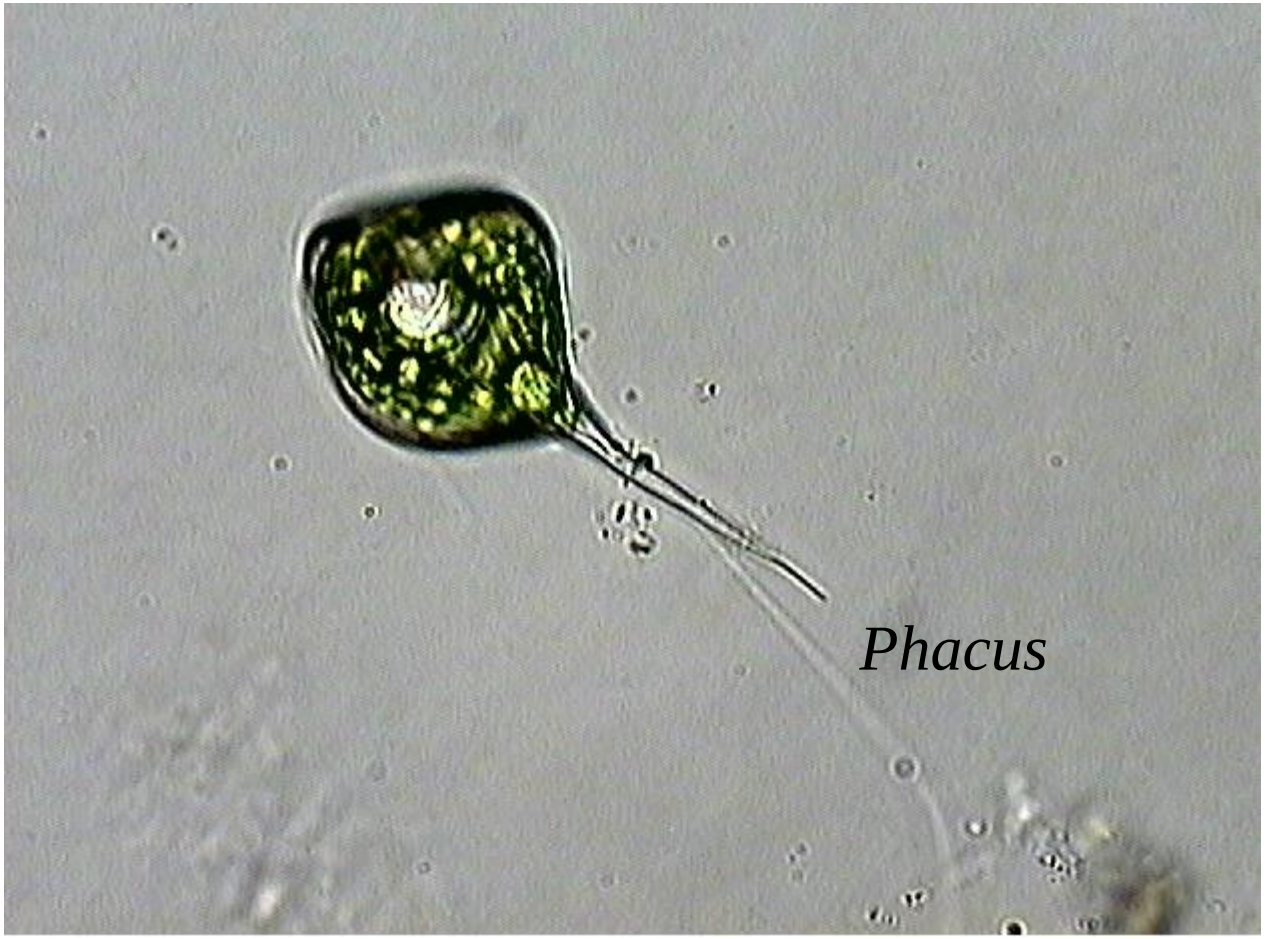


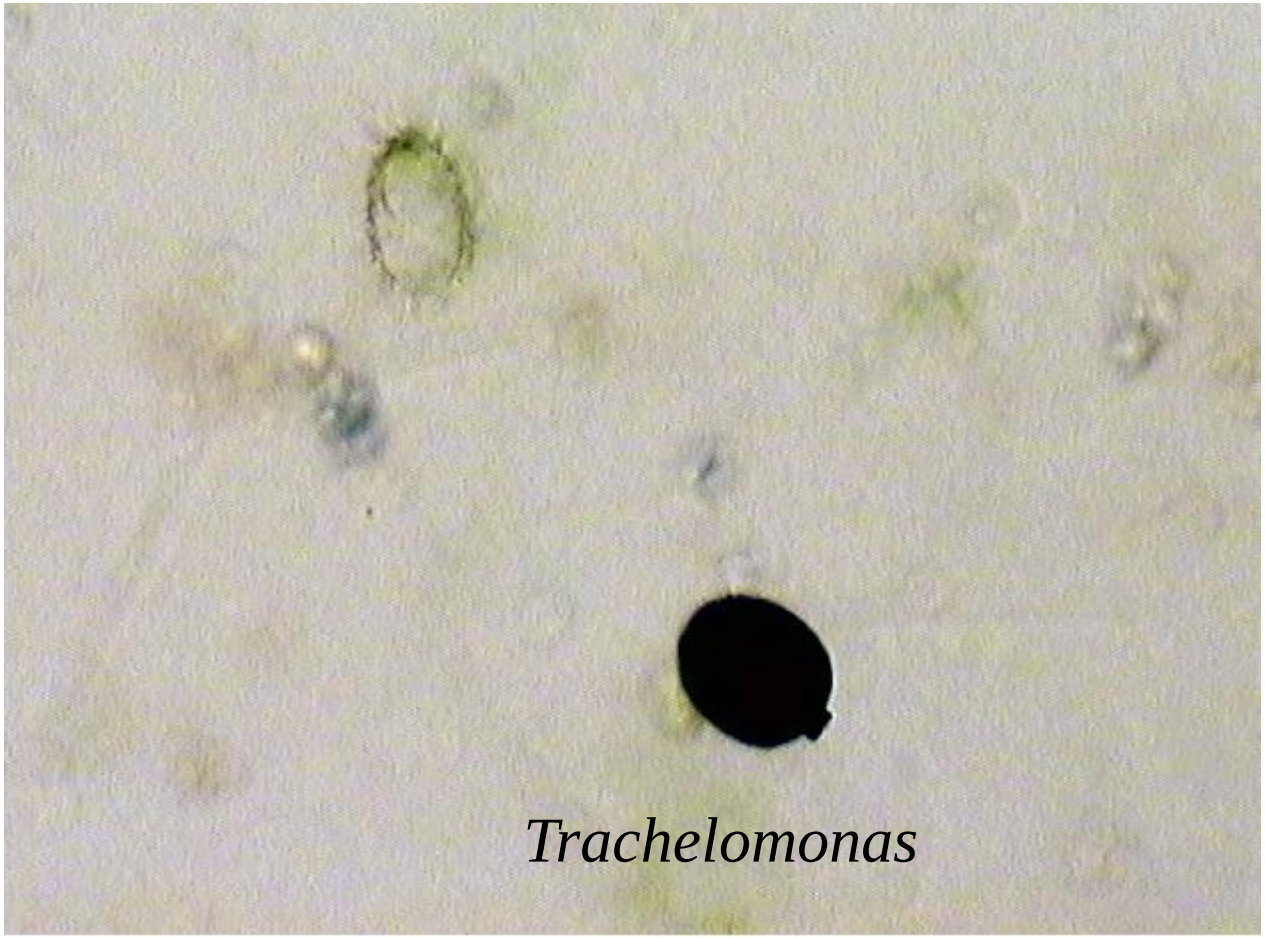

Dinobryon


Dinobryon


Dinobryon

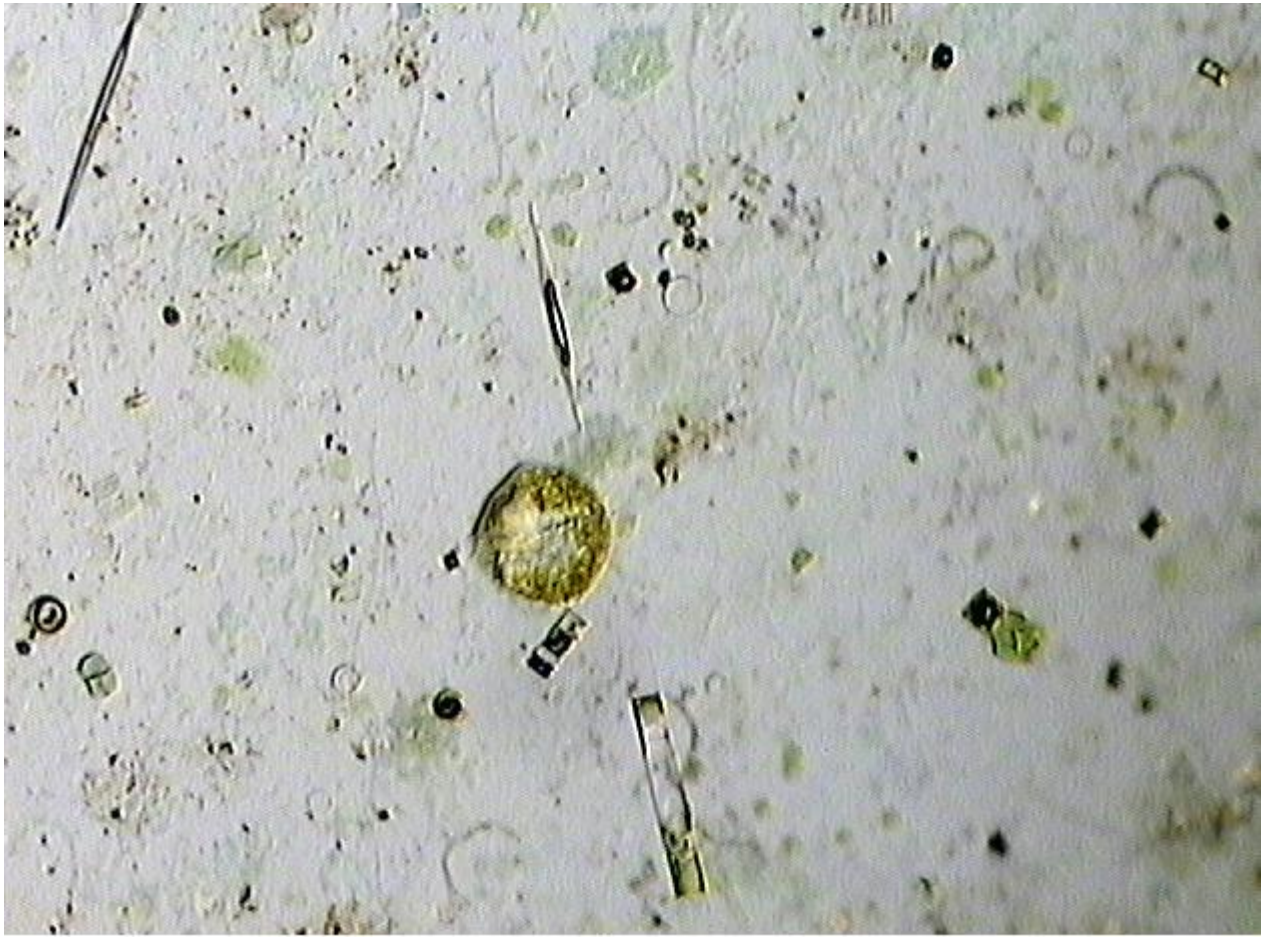
Euglenoids


Phacus


Trachelomonas

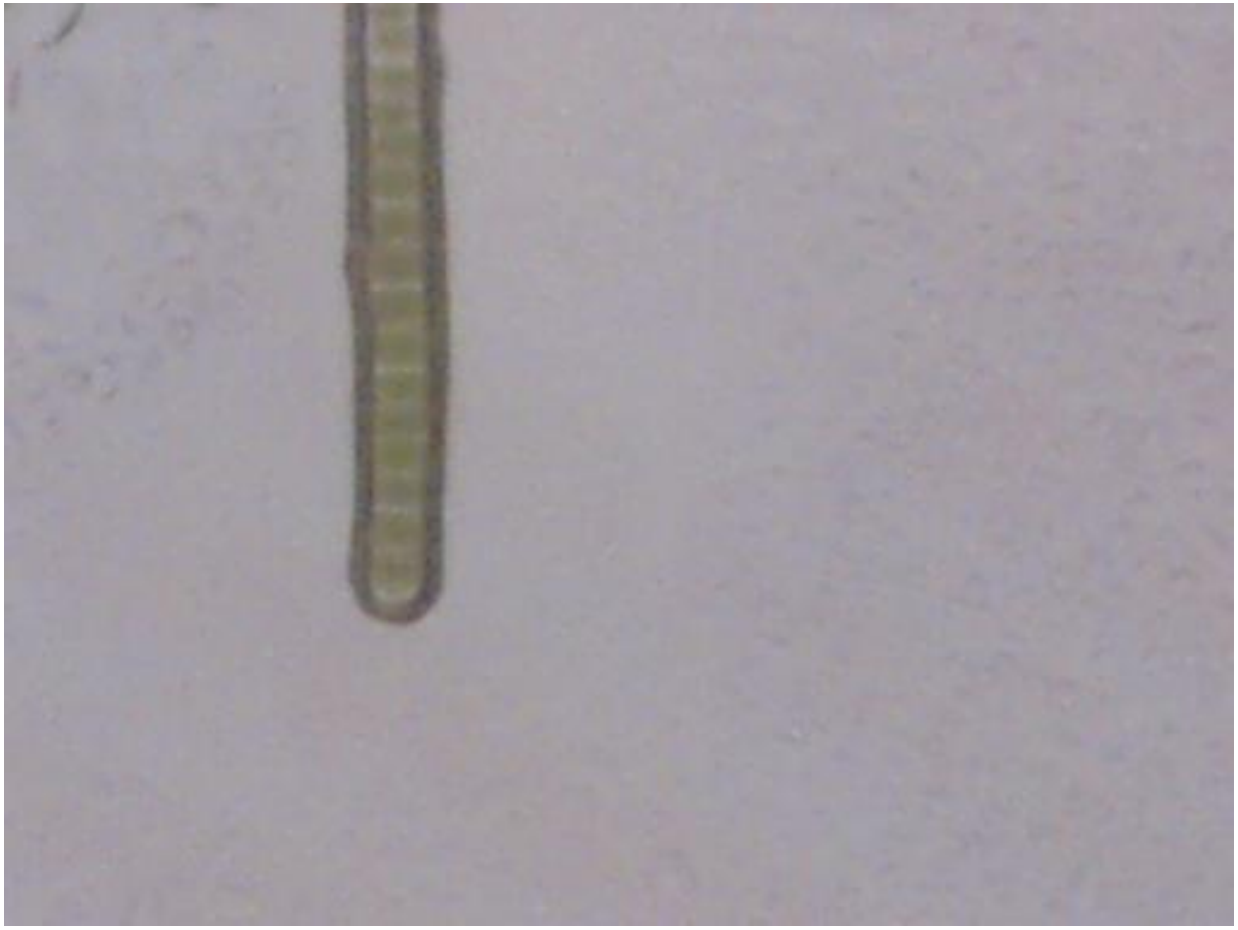
Dinoflagellates

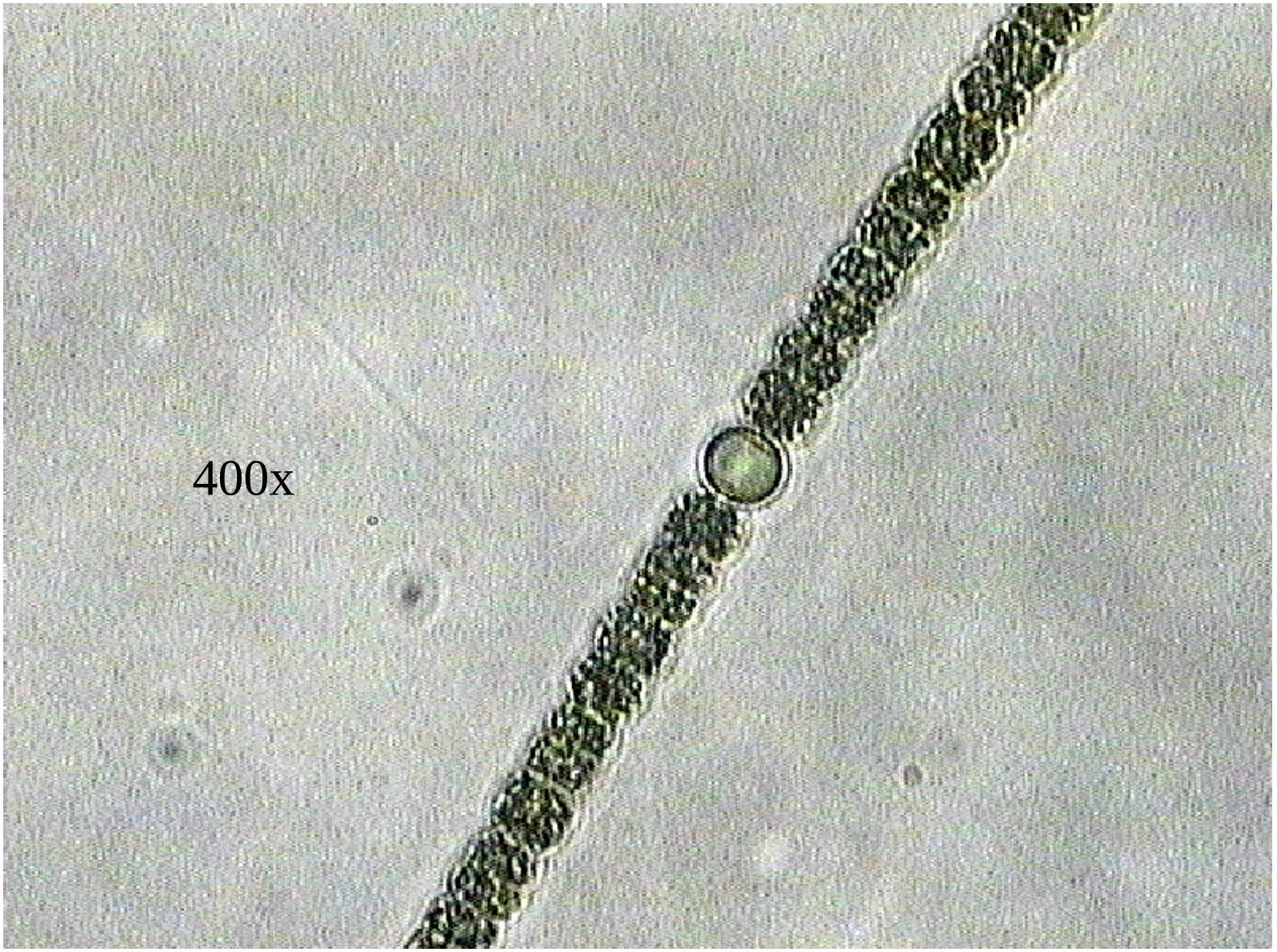

Lake Bloomington 200x
Dots: Bacterial Cells



Cyanobacteria
(Bluegreen “Algae”)

Filamentous Algae (Cyanobacterium) 200x

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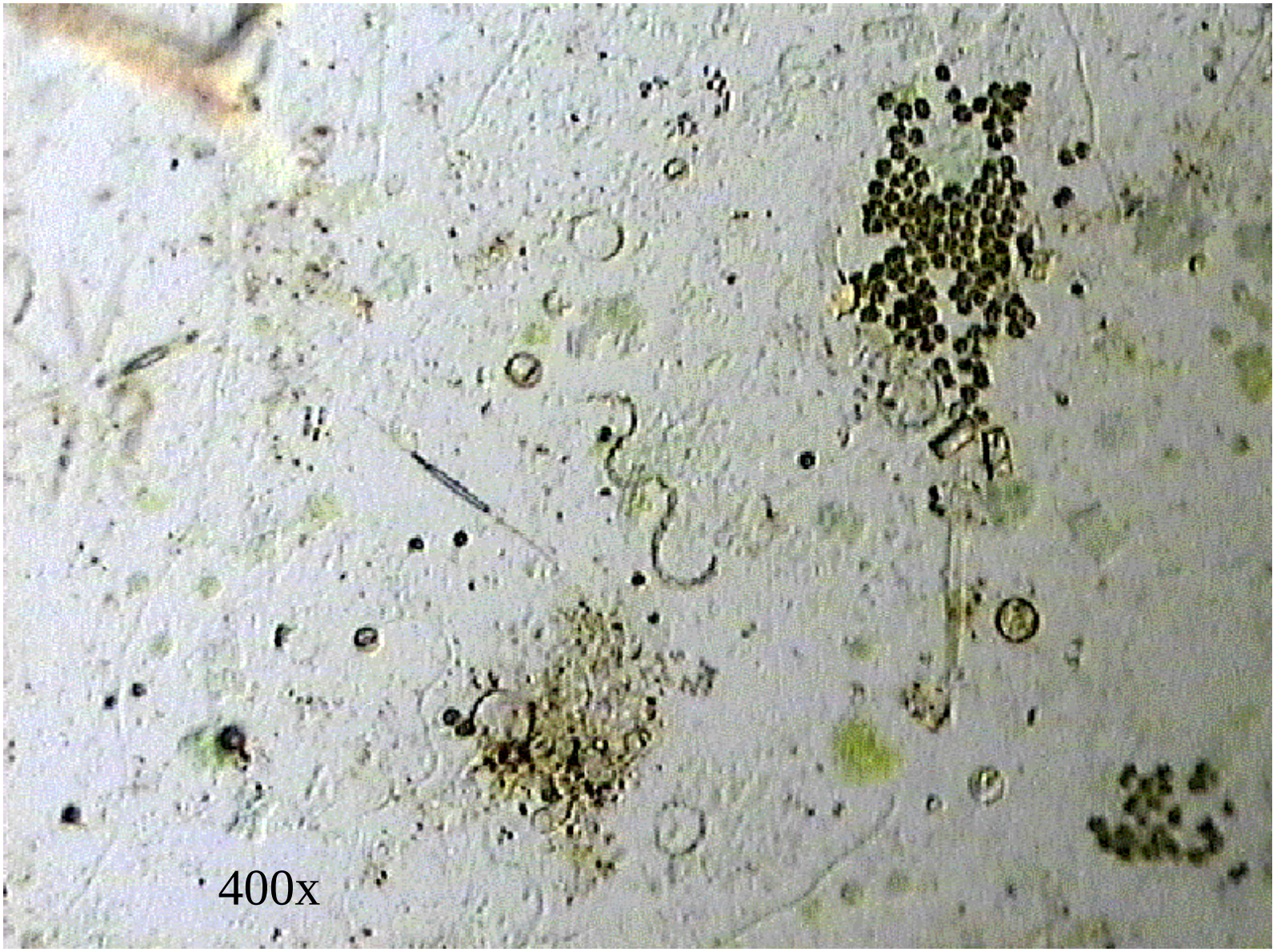
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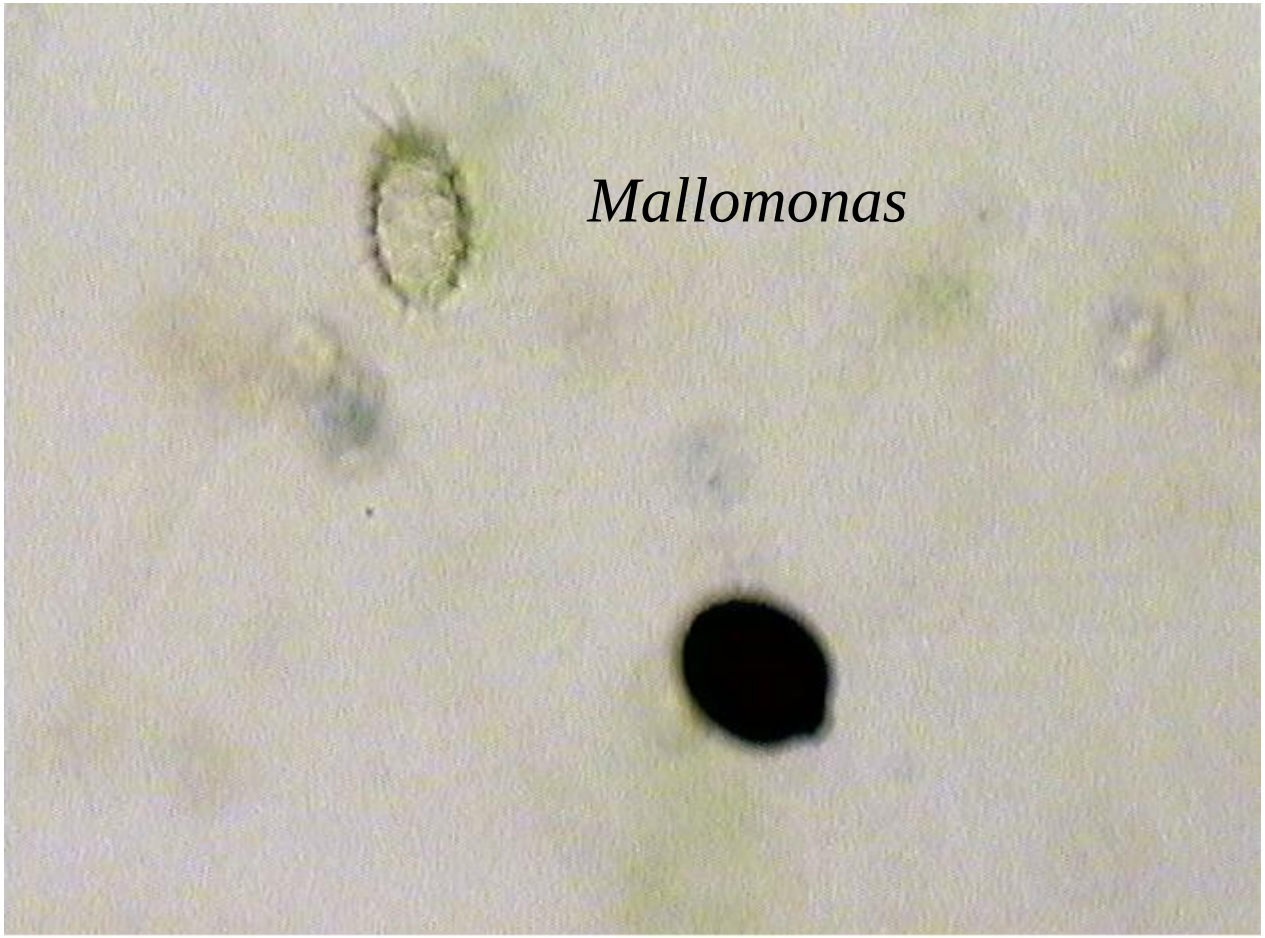
Other Types

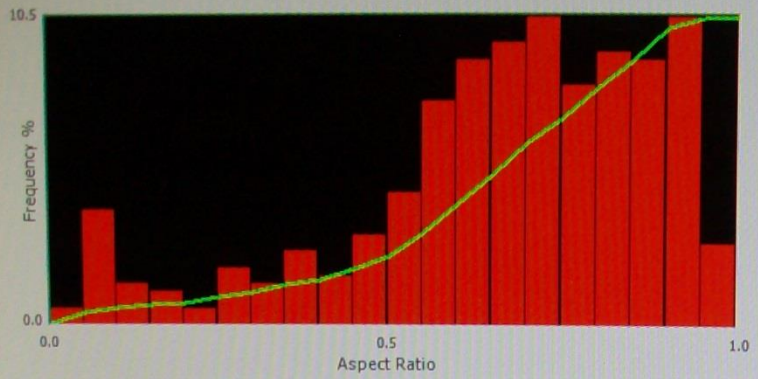

Mallomonas

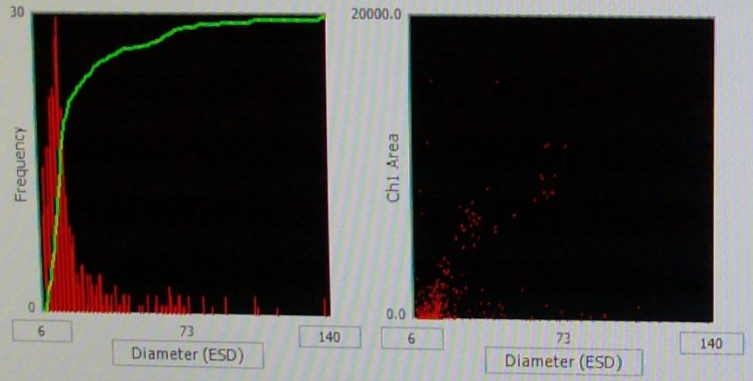
The Rise and Fall of Algal Types

- Predominance of species and population size can vary with lake conditions
  - Temperature
  - Nutrient levels (both N and P)
  - Grazing pressure
  - Light penetration and Water clarity

LB 2 09212016_edits.lst - VisualSpreadsheet

File Edit Analyze Setup Tools Preferences Help





Count	352 of 352	Efficiency	1.0%	Start Time	2016-09-21 14:26:09
Particles / ml	3609	PPUI	1.45	Sampling Time	12 min 9 sec

Summary Stats | Filters | Cumulative Stats | Context Summary

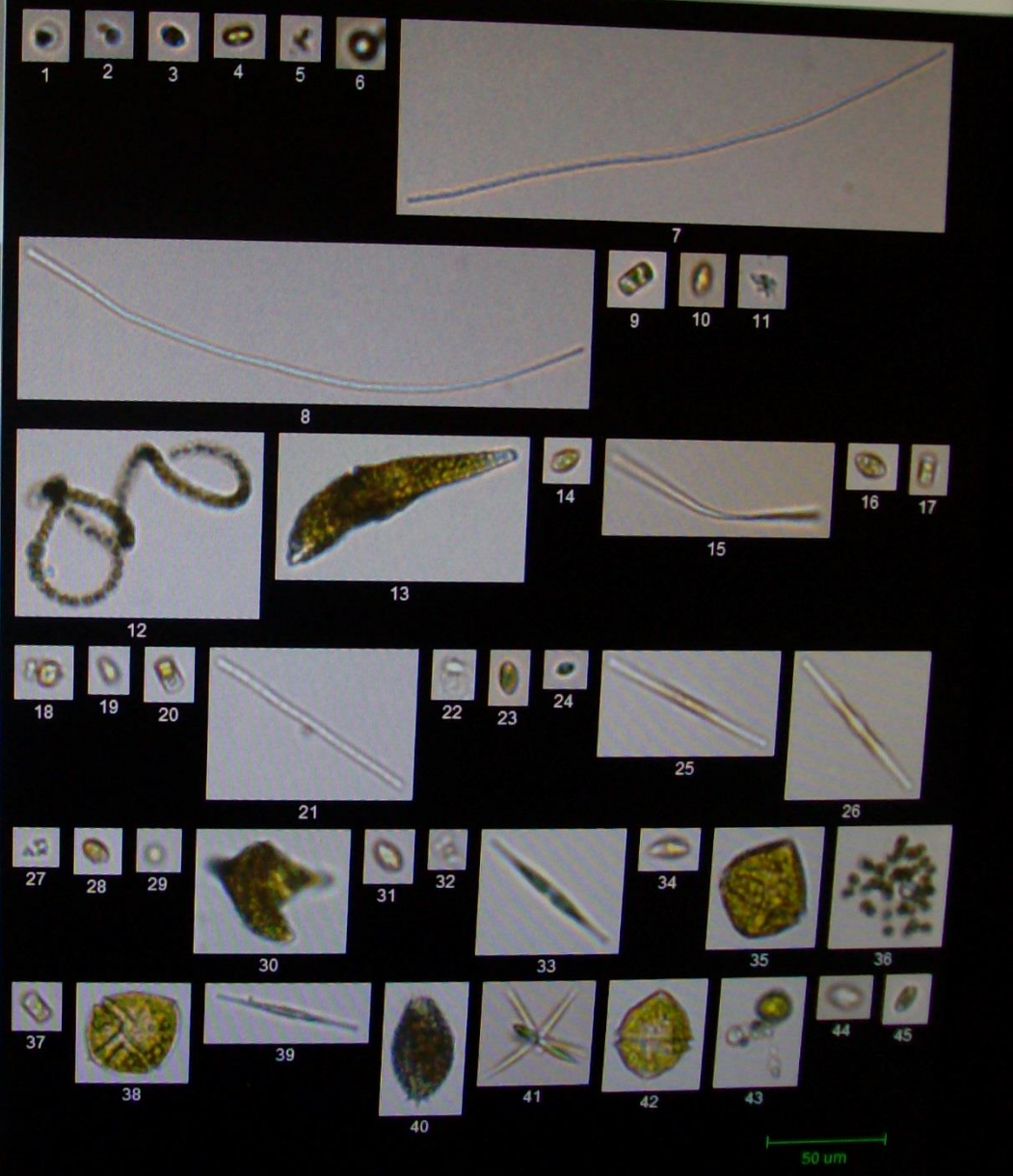
Summary Stats	Mean	Min	Max	StdDev	% CV
Aspect Ratio	0.66	0.03	0.98	0.23	34.56
Average Green	122.24	66.44	171.04	24.89	20.36
Circle Fit	0.60	0.00	0.94	0.28	46.68
Compactness	2.09	1.02	32.36	2.98	142.85
Diameter (ABD)	17.86	6.00	69.32	10.17	56.92
Intensity	124.60	67.84	172.77	24.99	20.05
Length	30.76	7.62	214.31	32.02	104.07
Perimeter	91.43	29.71	526.60	76.33	83.49
Roughness	1.12	1.04	2.04	0.09	7.94
Width	14.54	3.91	49.58	8.08	55.57

Objective 10X, Flowcell FC90FV, Trigger, Diluted

View LB 2 09212016_edits.lst

File Edit Sort Filter Statistics Show Preferences

1 of 7 | Z+ | Z- | Z1 | Show Selected



Seasonal Succession of Phytoplankton

From: The Lake and Reservoir Restoration Guidance Manual, 2nd Edition, 1990

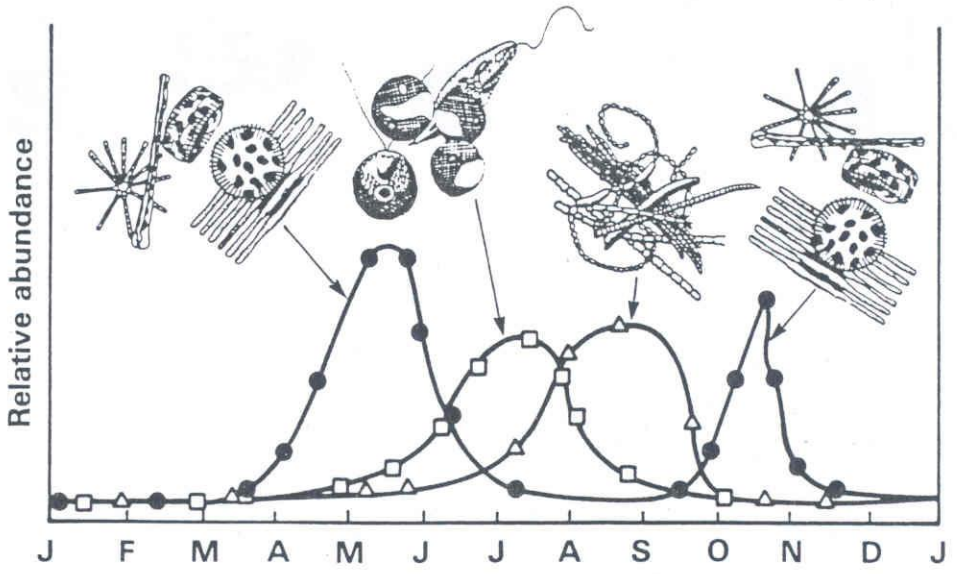
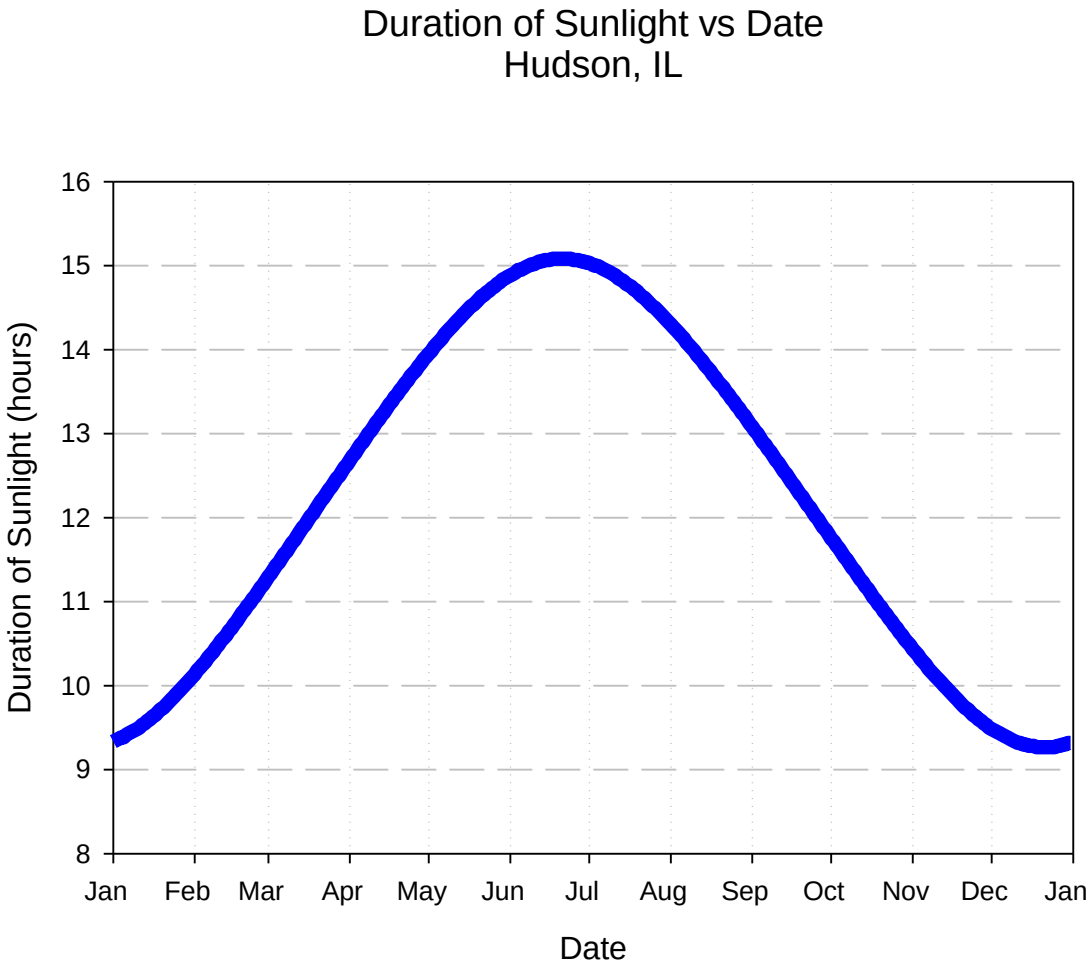
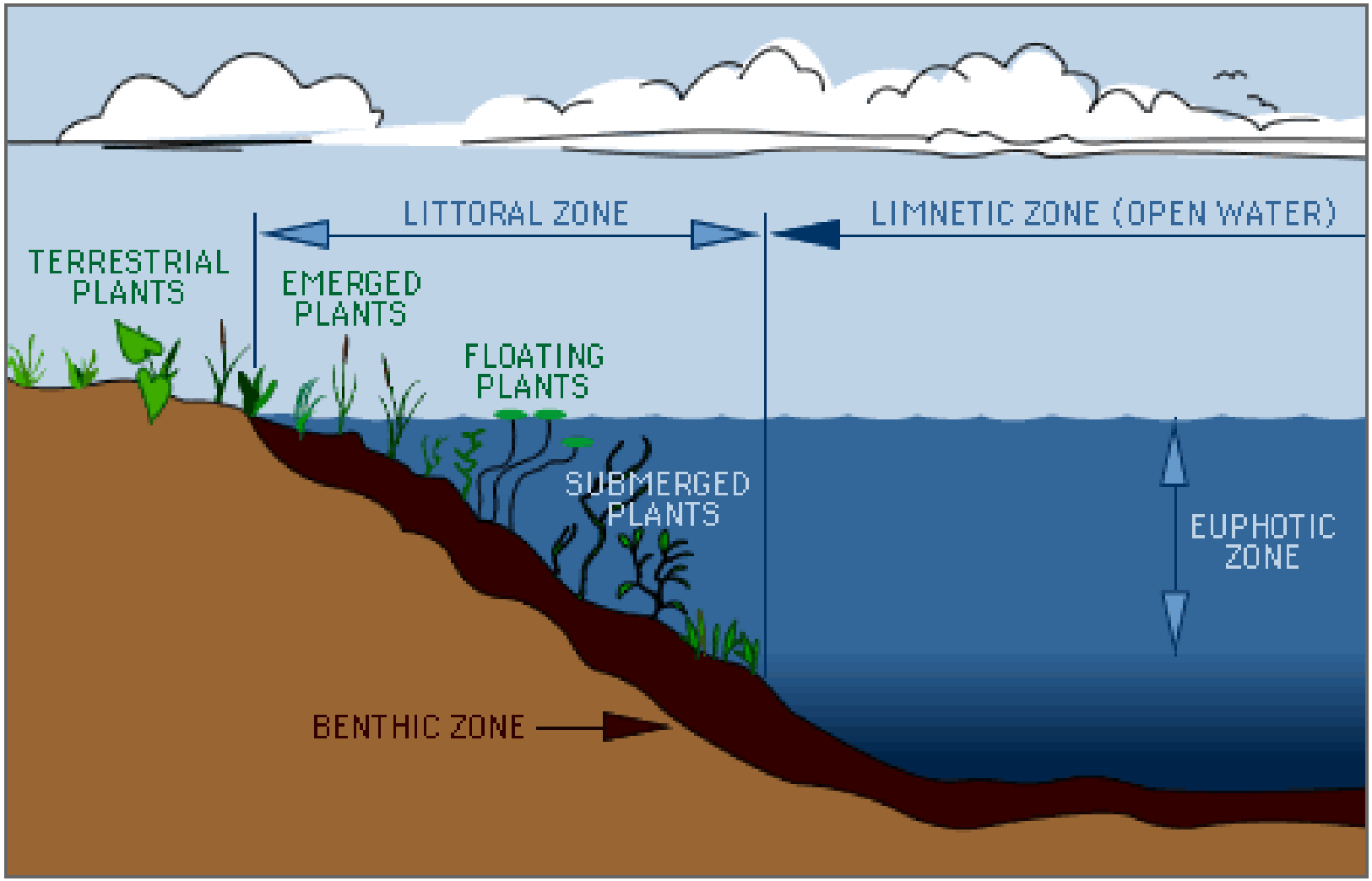


Figure 2-8.—A typical seasonal succession of lake phytoplankton communities. Diatoms dominate the phytoplankton in the spring and the autumn, green algae in midsummer, and blue-green algae (cyanobacteria) in late summer.



Source: United States Naval Observatory



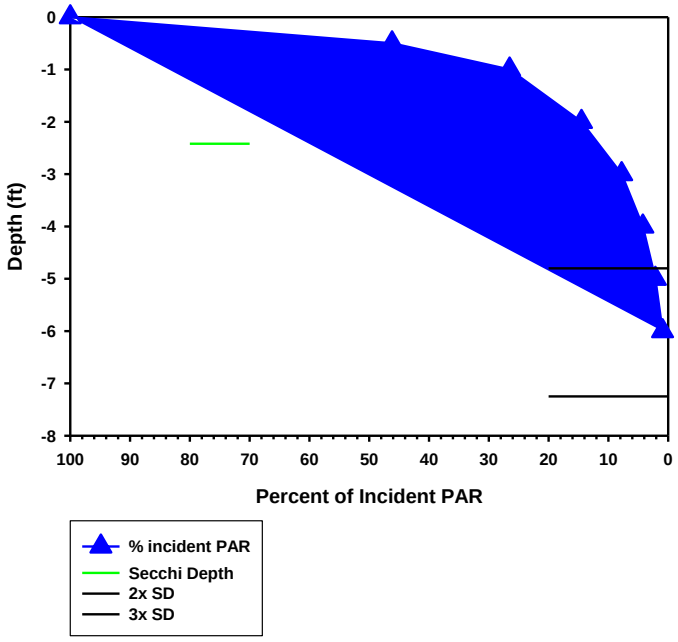
Zones of a Lake (Source: Minnesota DNR)

Lake Notes

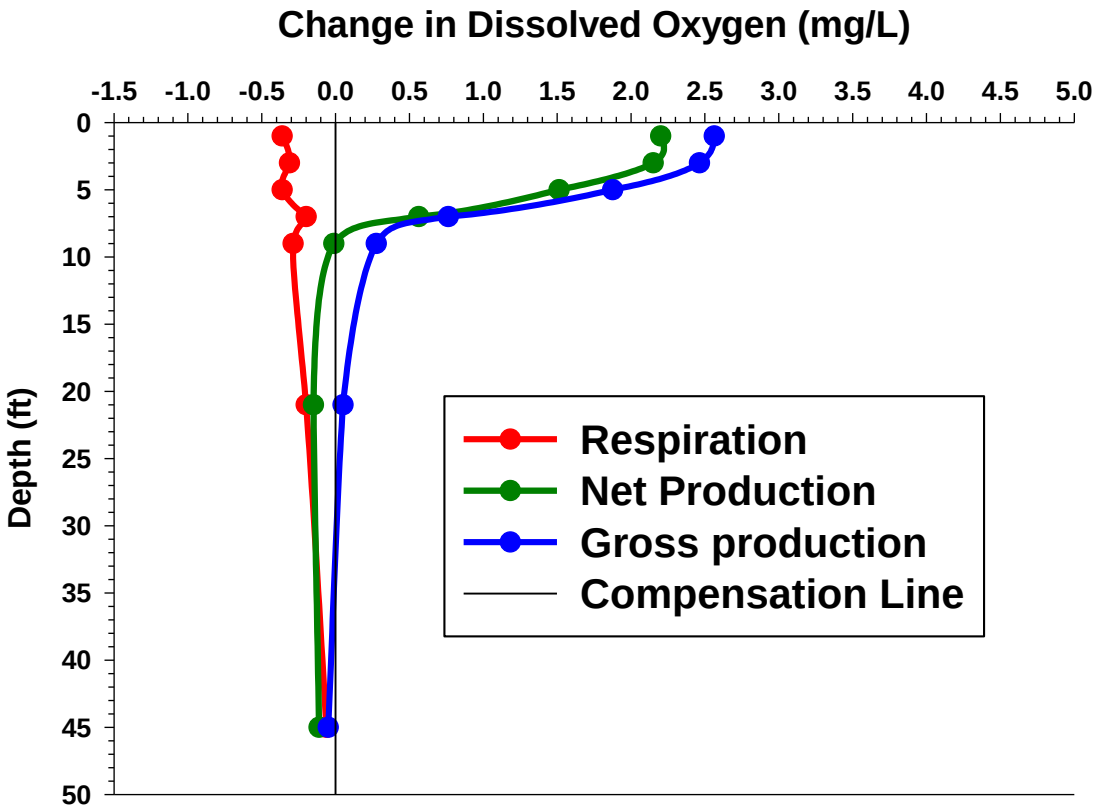
Common Lake Water Quality Parameters

	1	11	
	2	12	
	3	13	
	4	14	
	5	15	
	6	16	
	7	17	
	8	18	
	9	19	
	10	20	No Match

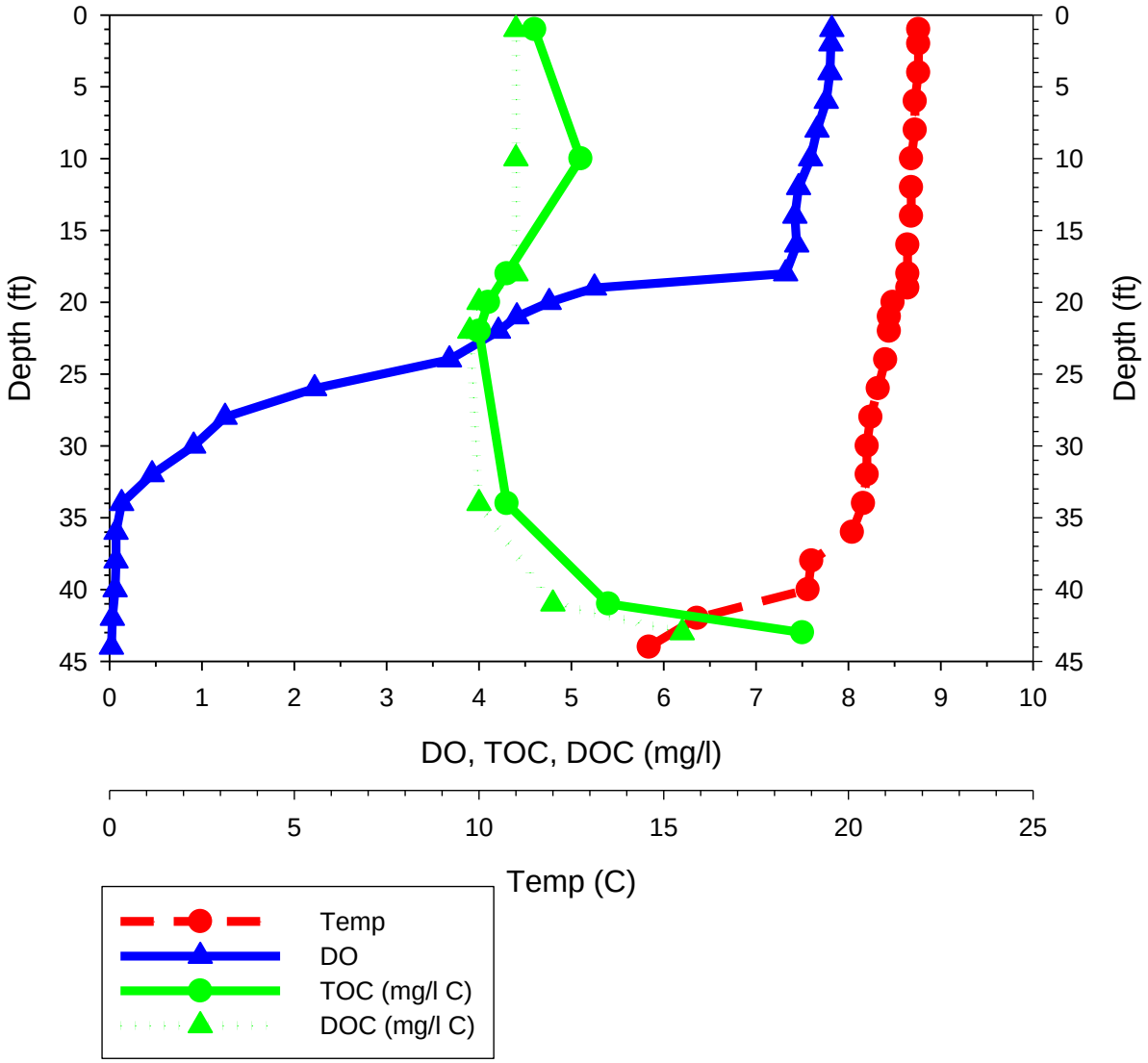
Photosynthetically Active Radiation vs Depth
Lake Bloomington Launch Ramp Dock
03/21/2018



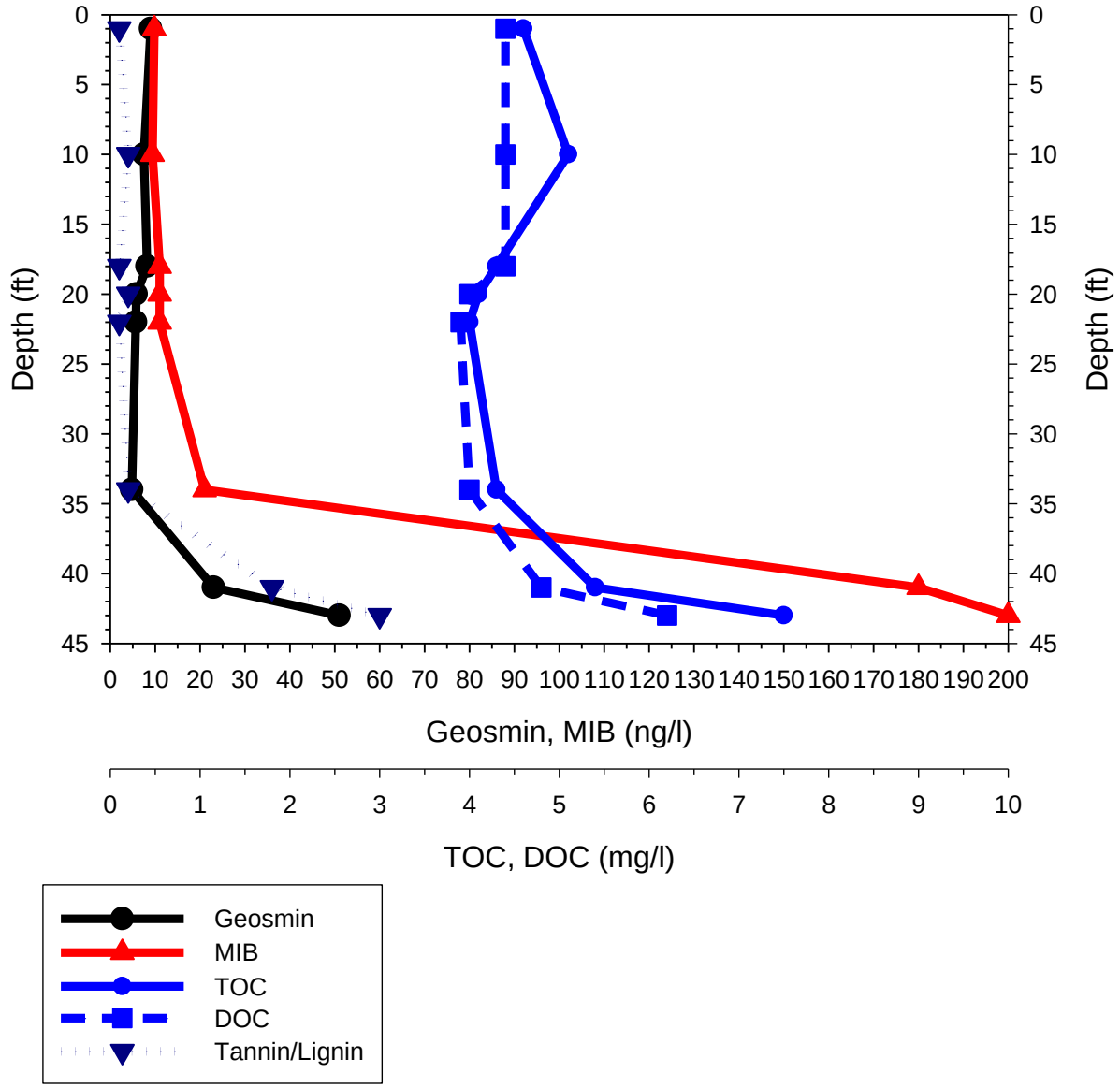
Evergreen Lake Light & Dark Bottle D.O. Study 7/22/99



Evergreen Lake Deep Station
10/04/2005



Evergreen Lake Deep Station
10/04/2005



Bloom Photos

Evergreen Lake at spillway showing attached mats of *chladophora* and *spirogyra*

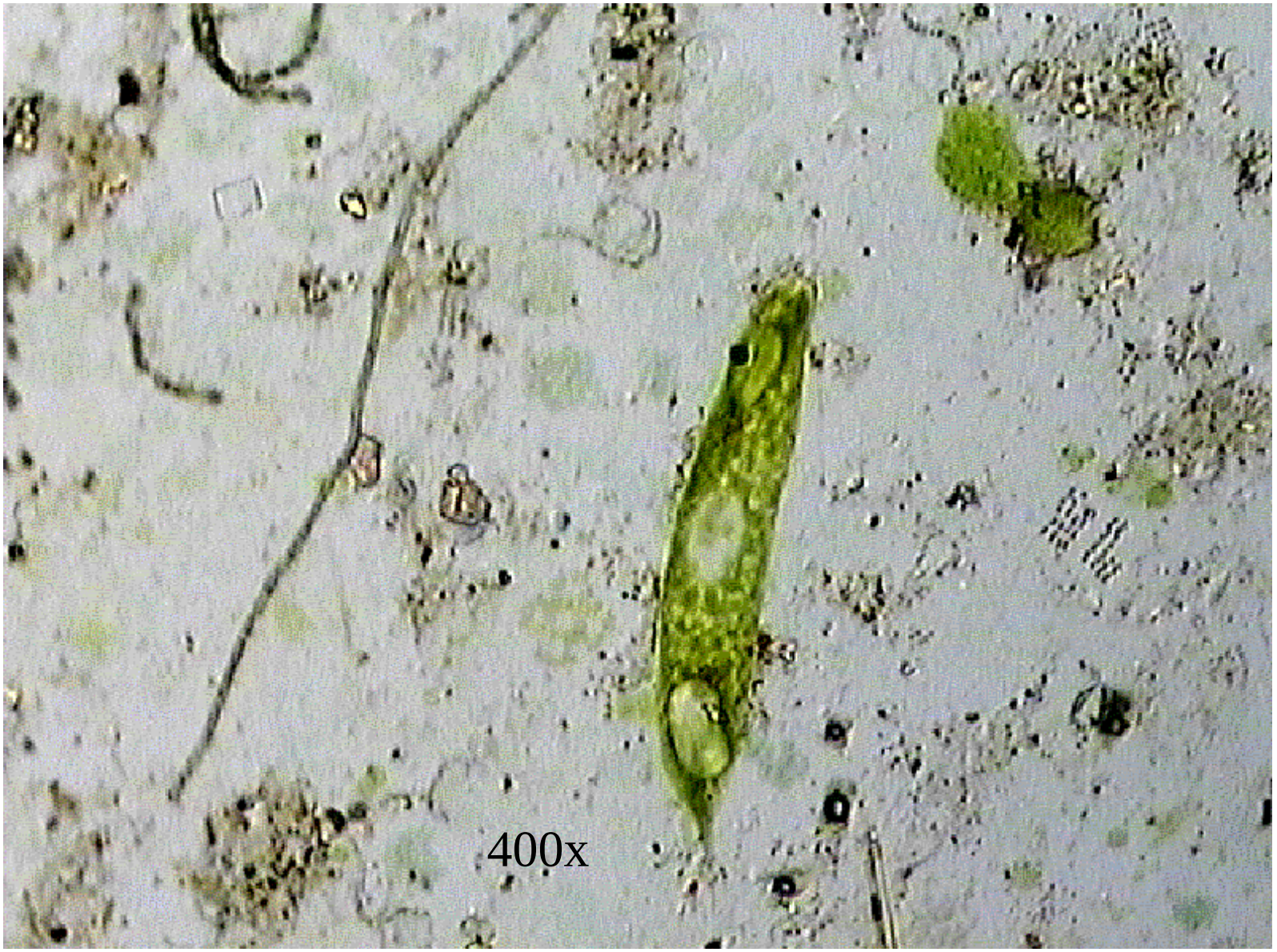

spirogyra


spirogyra


chladophora


7'27'99


7 27 '99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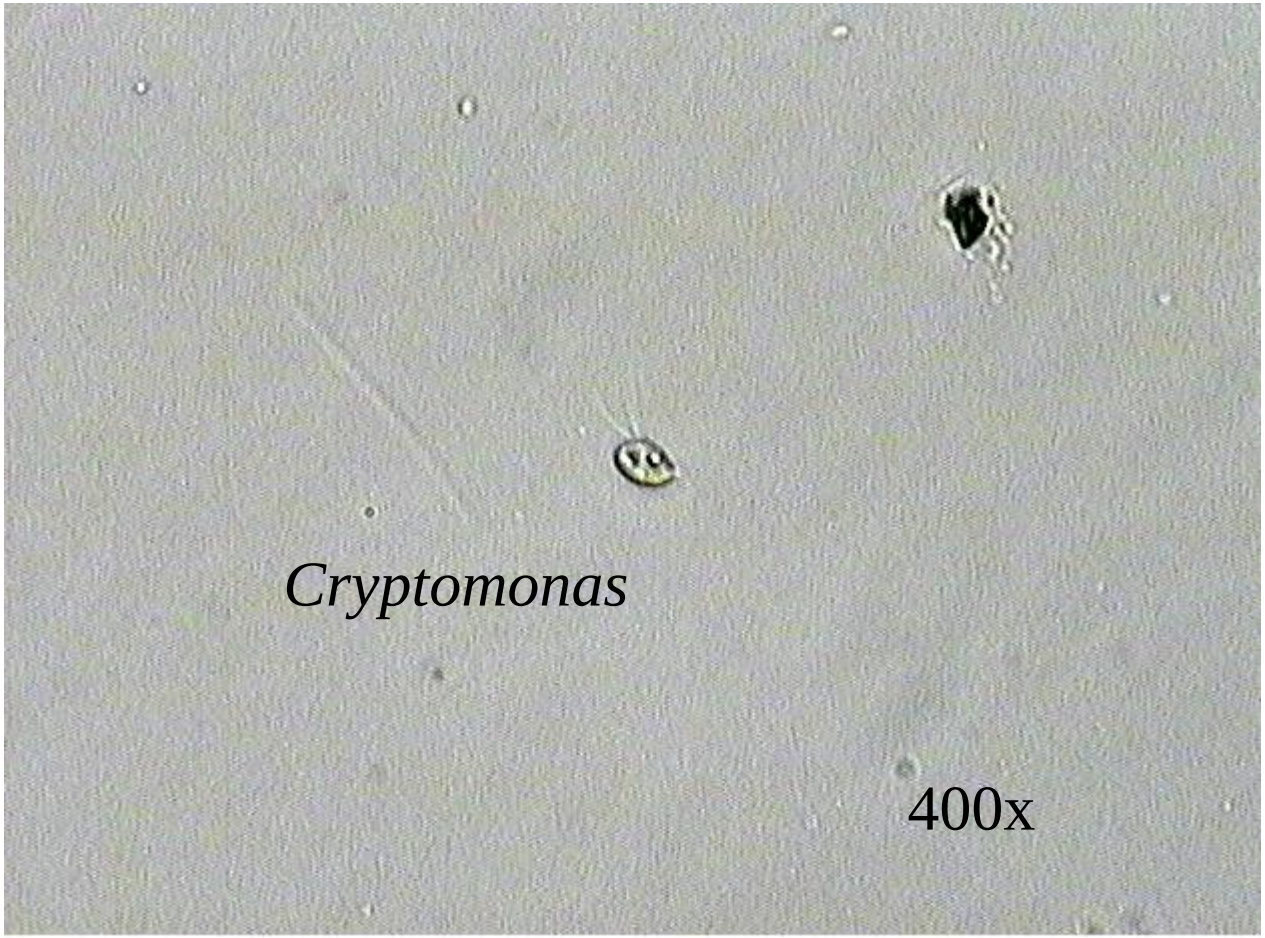
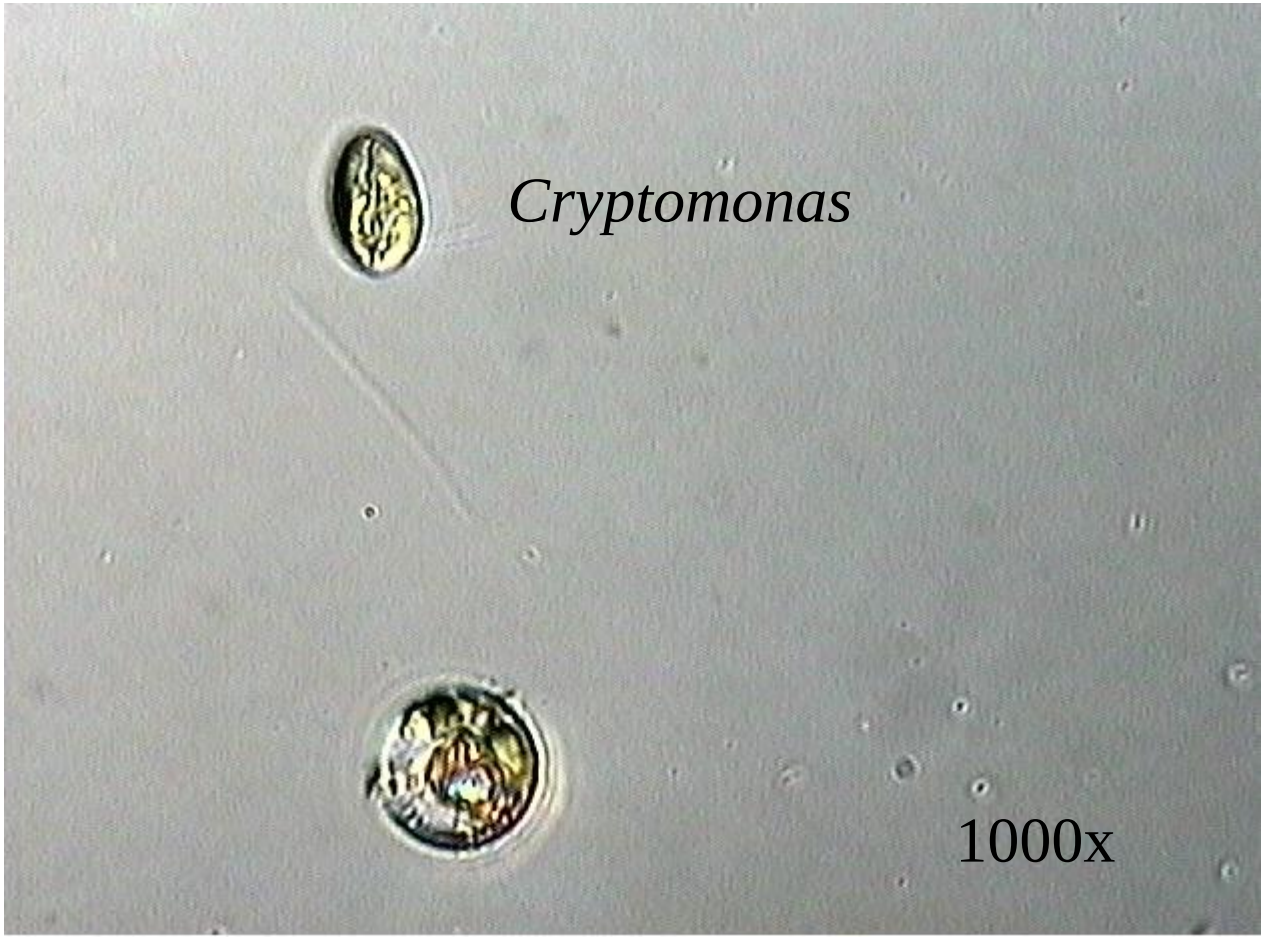
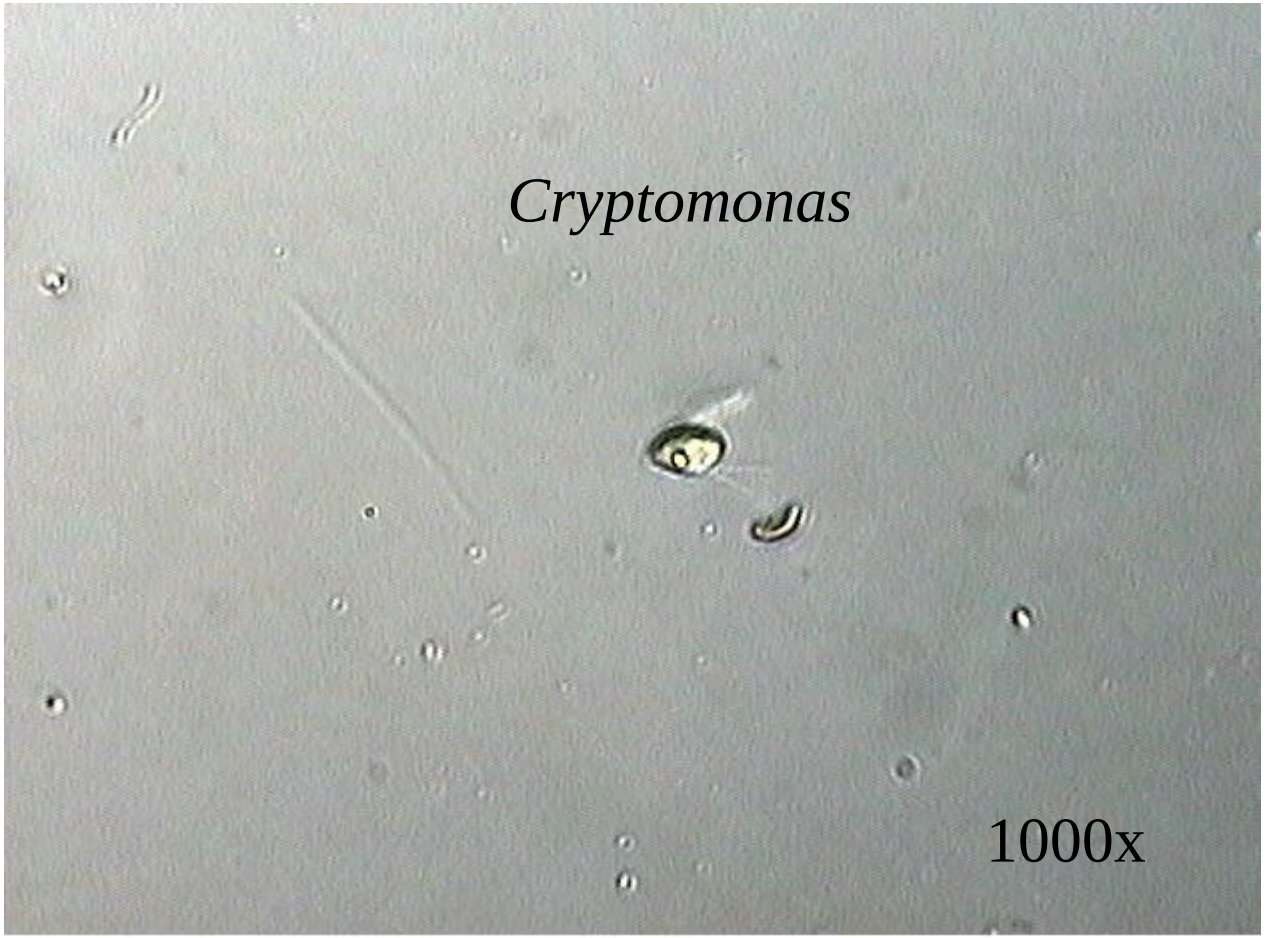
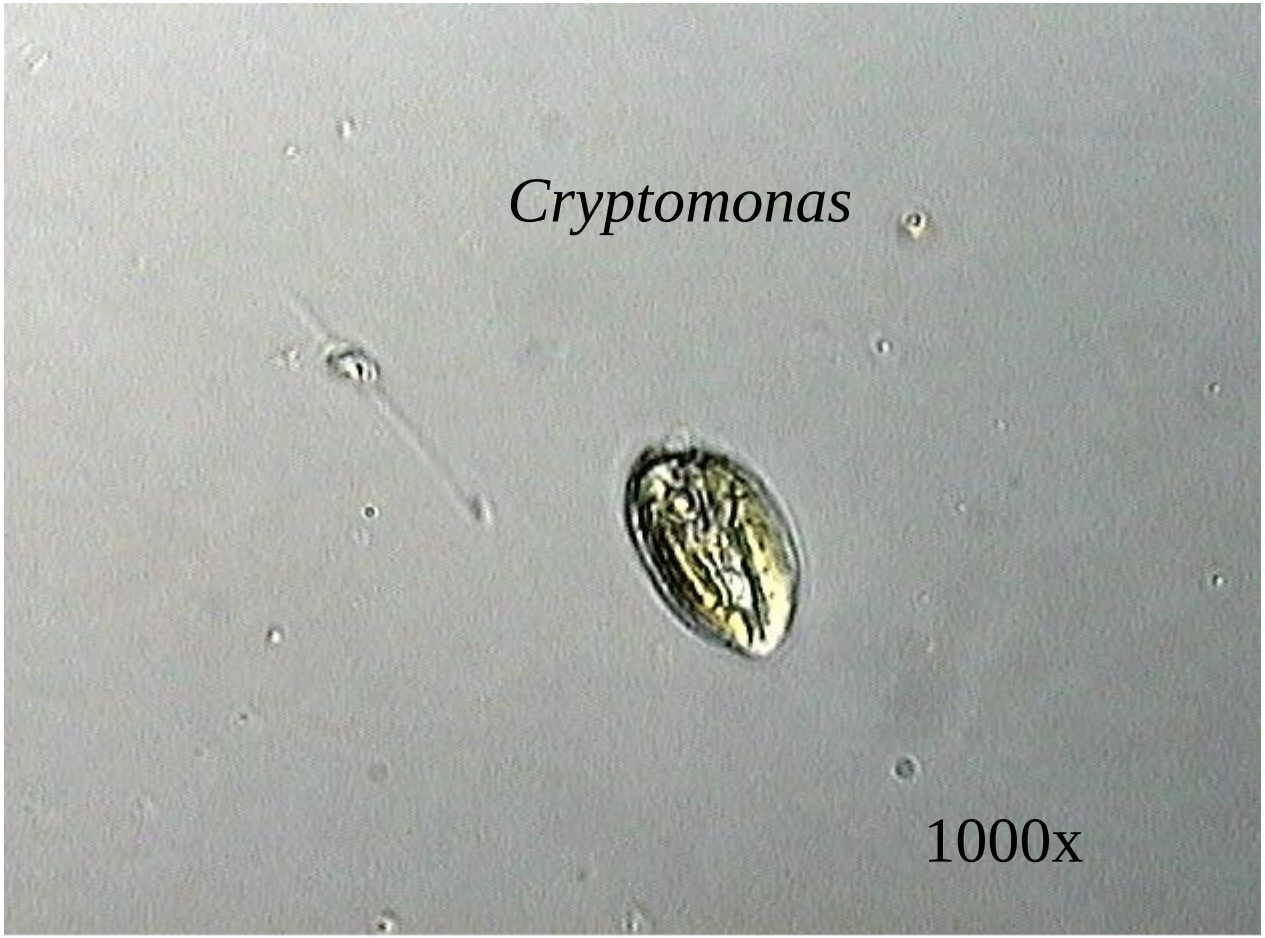
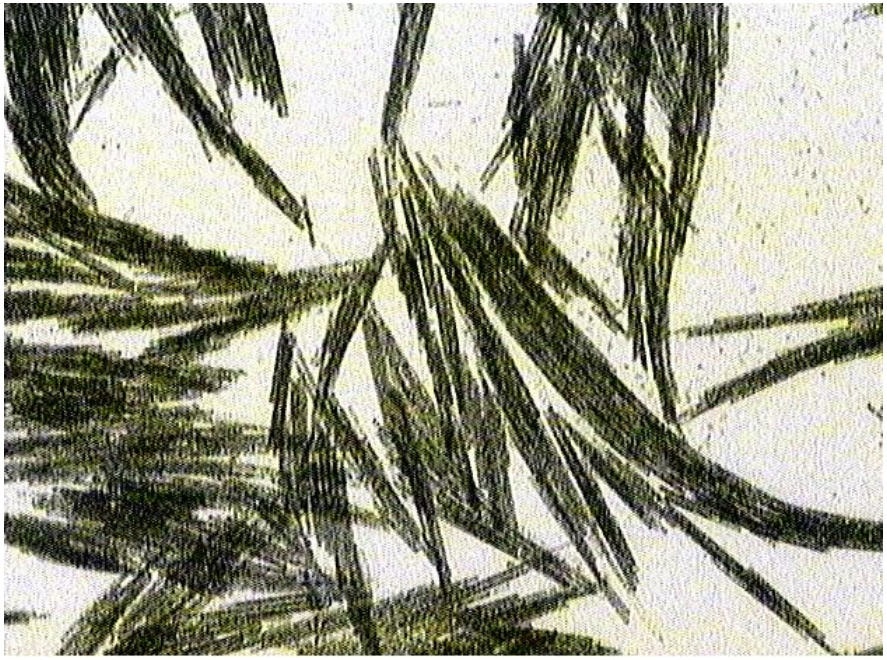

Cryptomonas
400x

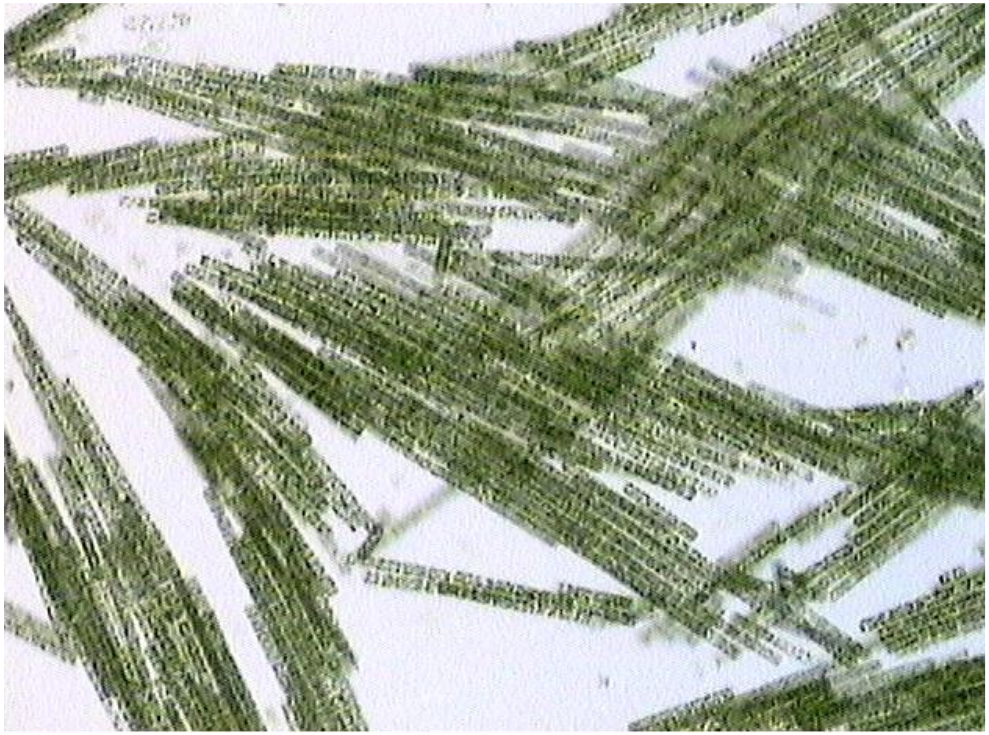

Cryptomonas
1000x

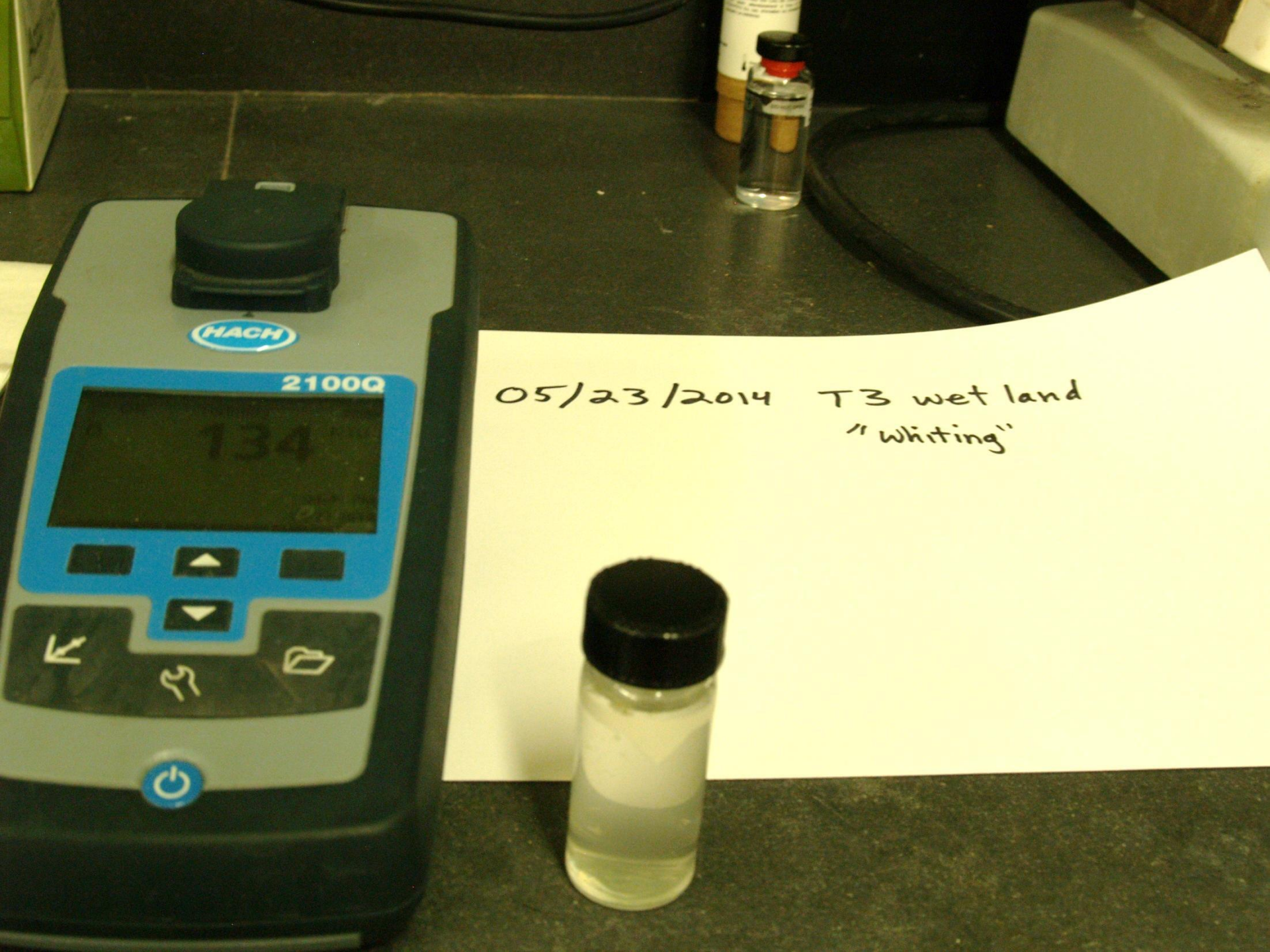

Cryptomonas
1000x

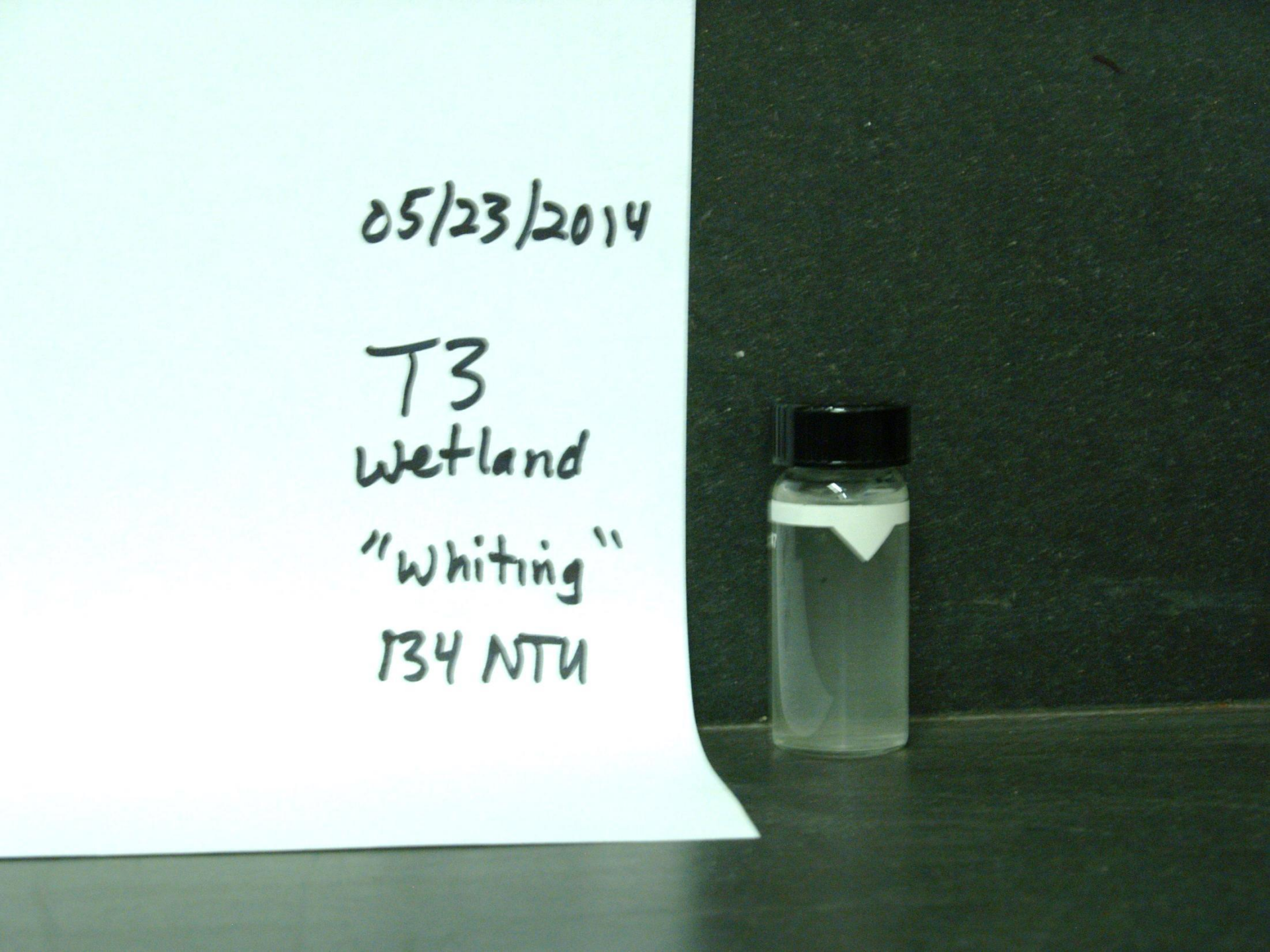

Cryptomonas
1000x

Evergreen Lake at Spillway showing green color of water due to *aphanizomenon flos aquae* bloom. July 06, 2015






HACH
2100Q
134
05/23/2014 T3 wet land
"whiting"

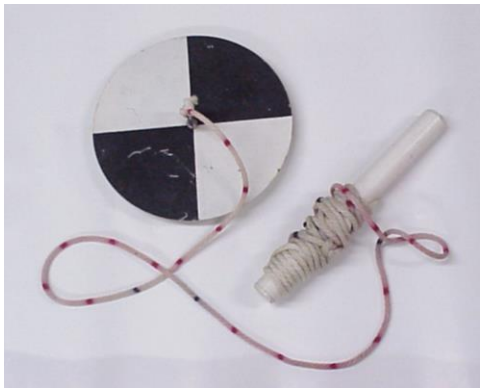

05/23/2014
T3
wetland
"whiting"
134 NTU

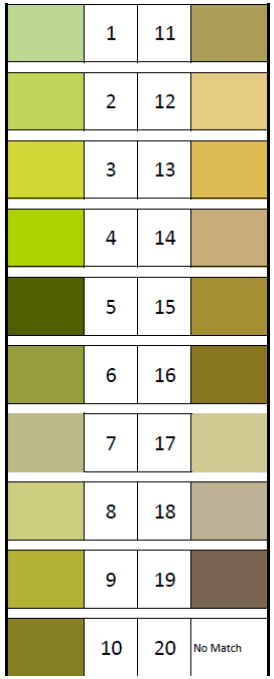
T3
wetland
"whiting"
134 NTU

6.02 NTU
after acidification

Tools you can use

- Secchi disk
- Color strip
- Digital camera
- Deer cam
- Digital microscope
- Lake Notes

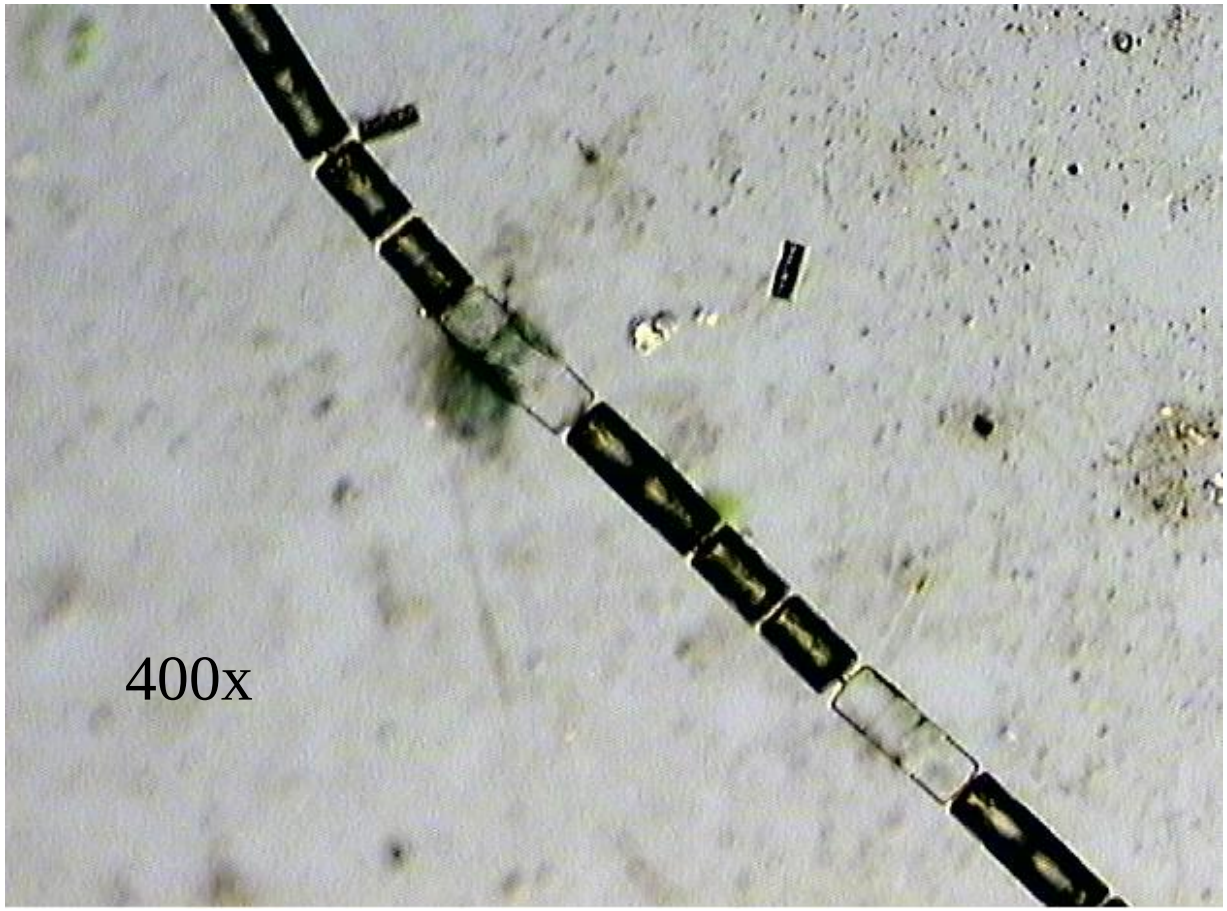




Lake Notes

Common Lake Water Quality Parameters

Questions?



Acknowledgements

City of Bloomington Water Department Staff

Bob Yehl, Water Director

Illinois EPA Lakes Unit

Our Water Customers

Thank You