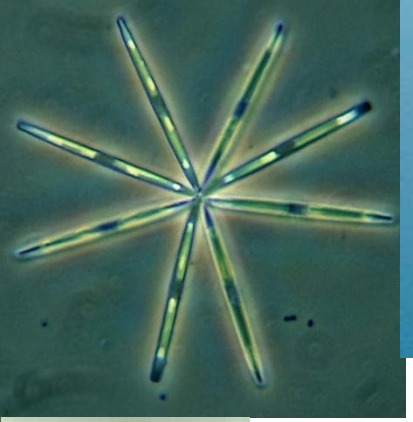
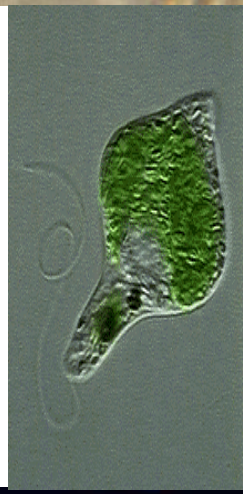
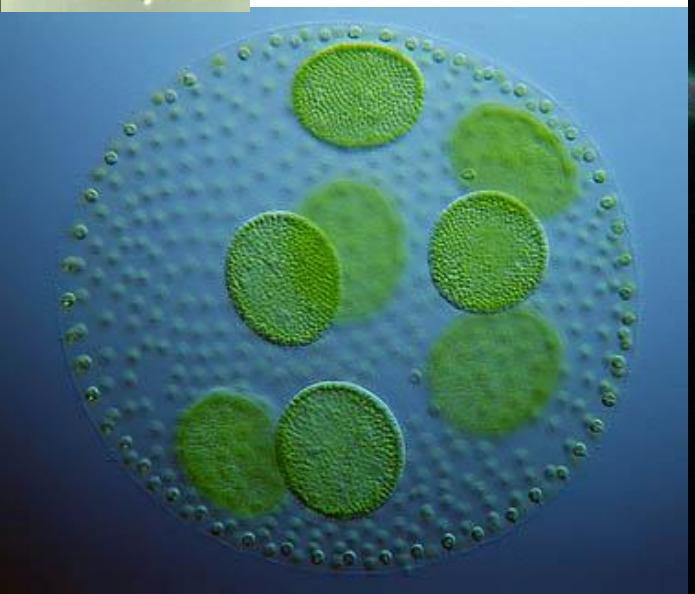
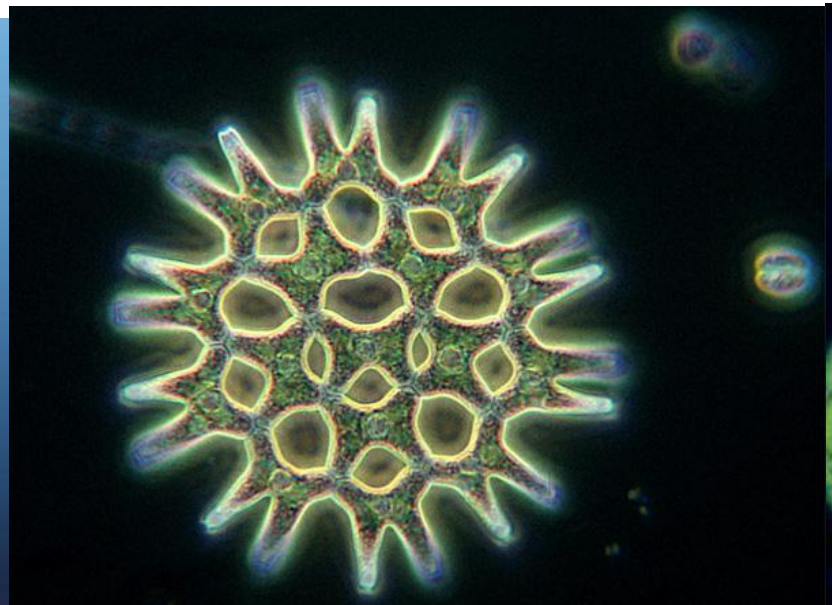
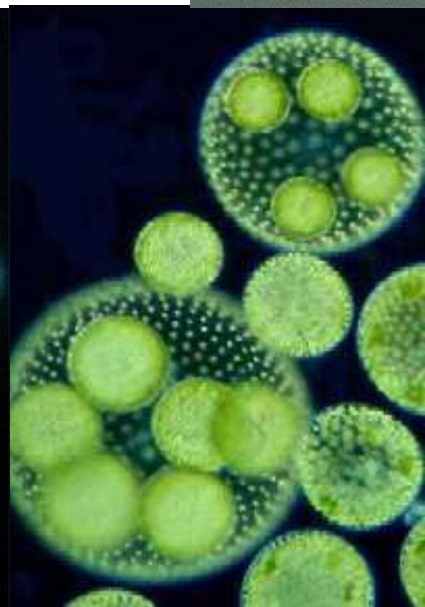
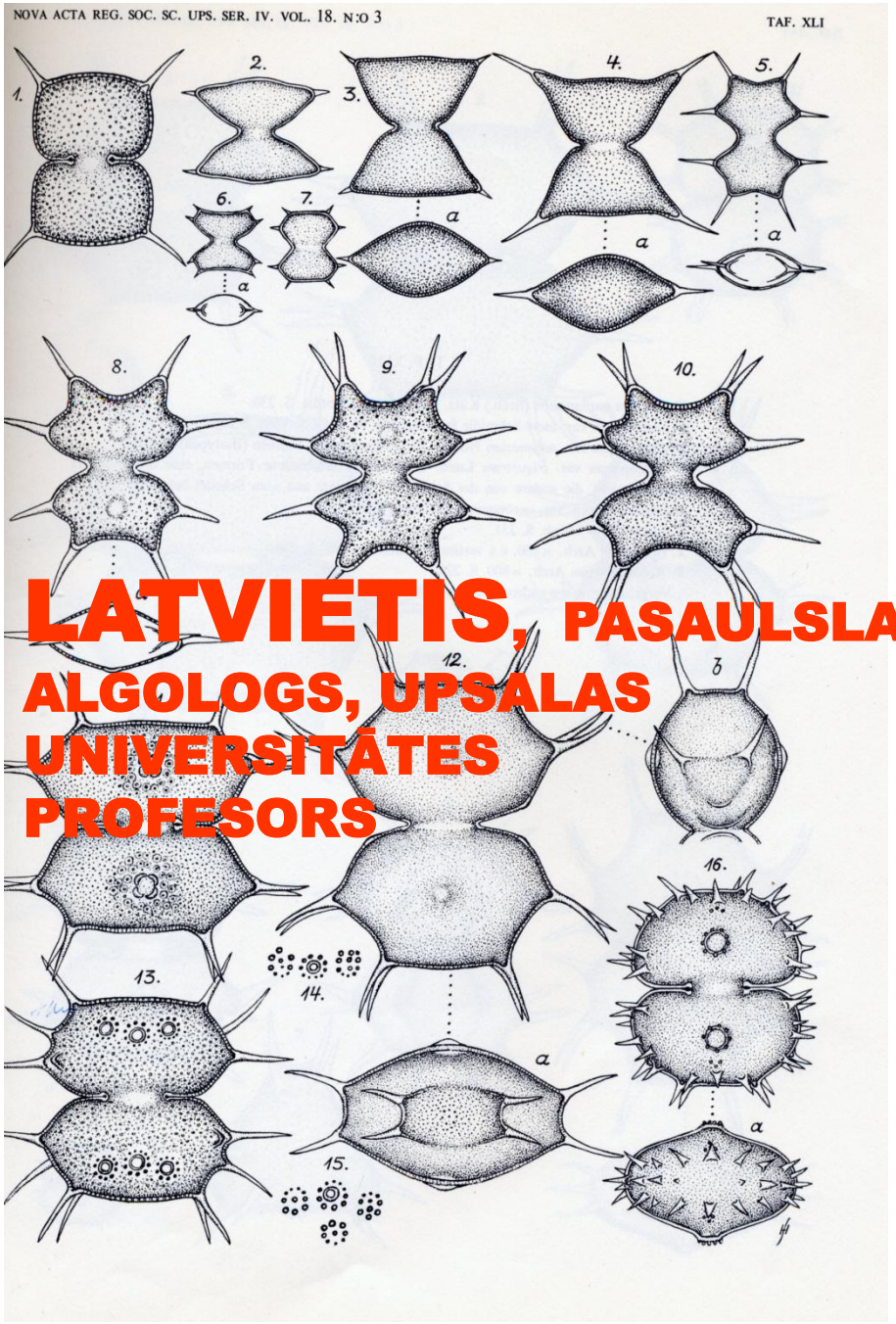



AĻĢES

(Fitoplanktons, Perifitons, Fitobentoss)

TO LOMA VIDES KVALITĀTES NOTEIKŠANĀ

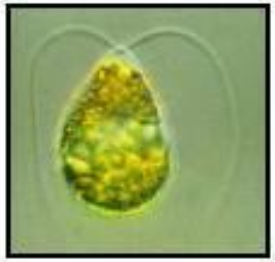







LATVIETIS, PASAULSLAVENAIS ALGOLOGS, UPSALAS UNIVERSITĀTES PROFESORS

Prof. Heinrihs Skuja Latvijā konstatējis ap 2100 aļģu sugu (patlaban ap 2650 sugas);
H. Skuja **Latvijā** atradis ap **515** konjugātu sugu, kas lielākoties raksturīgas purviem?!
Zviedrijā Skuja aprakstījis **29** ģintis, **450 jaunas sugas** un varietātes;
Izpētījis **Jaunzēlandes purvu** aļģu floru – **389** sugas, **64** varietātes.

Chlorophytes



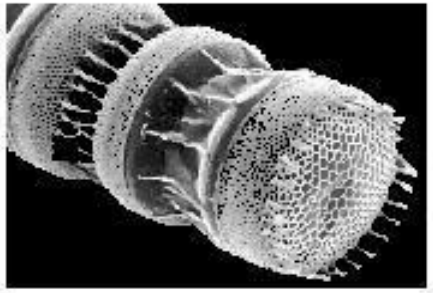
Euglenophytes

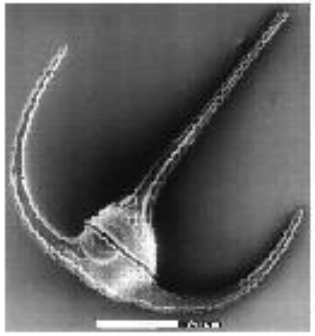
Haptophytes

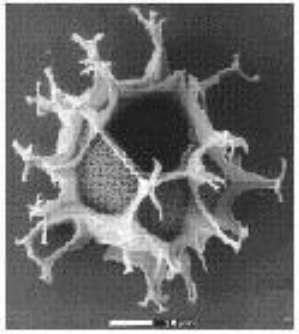
Diversity

Glaucophytes

Bacillariophytes



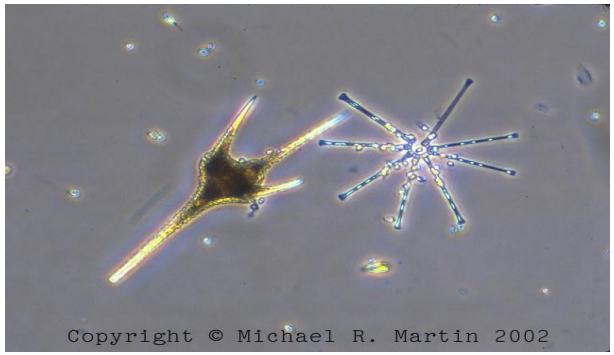


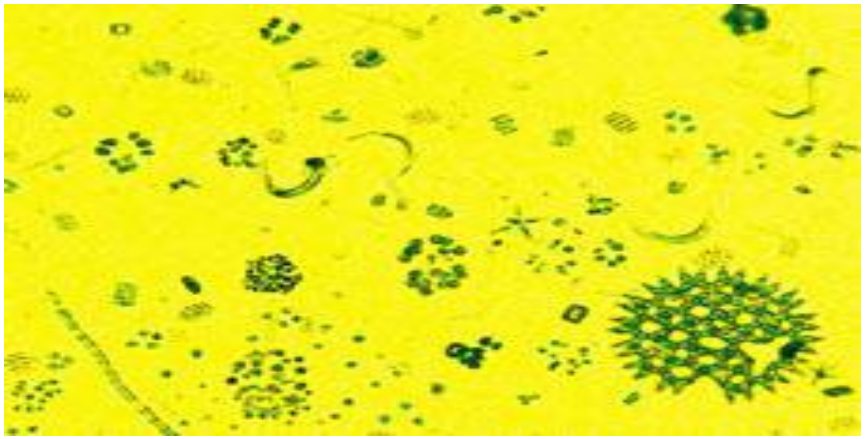


Pyrrophytes (dinoflagellates)

		vārds un tipiskā krāsa	biotops
1.	Kramaļģes – diatomejas – Diatoms - Bacillariophyta	zeltaini-brūnas	Okeāni, ezeri, upes, grīvas, piestiprinātas vai planktoniskas
2.	Zaļaļģes – Green algae- Chlorophyta	zāles-zaļas (grass-green)	ezeri, upes, grīvas, piestiprinātas vai planktoniskas
3.	Dinofītaļģes -Dinoflagellates (red-brown) Pyrrhophyta	sarkani-brūnas	Okeāni, ezeri, grīvas,
4.	Zilaļģes – Blue-greens Cyanophyta	zili-zaļas (blue-green)	Okeāni, ezeri, piestiprinātas vai planktons
5.	Zeltainās aļģes, - Chrysophytes –	dzeltenas vai brūni-zaļas	Ezeri, upes, okeāni,
6.	Kriptomonādas – Cryp tomonads-Cryptophyta	dažādās krāsās	Ezeri, planktons
7.	Eiglēnaļģes- Euglenoids- Euglenophyta	dazādas krāsas	Dīķi, ezeri, okeāns, planktons
8.	Sārtaļģes - Red algae- Rhodophyta		Okeāni, grīvas, ezeri, upes, piestiprināti
9.	Brūnaļģes – Brown algae - Pgaeophyta		Okeāni, grīvas, piestiprināti, brīvi peldošas

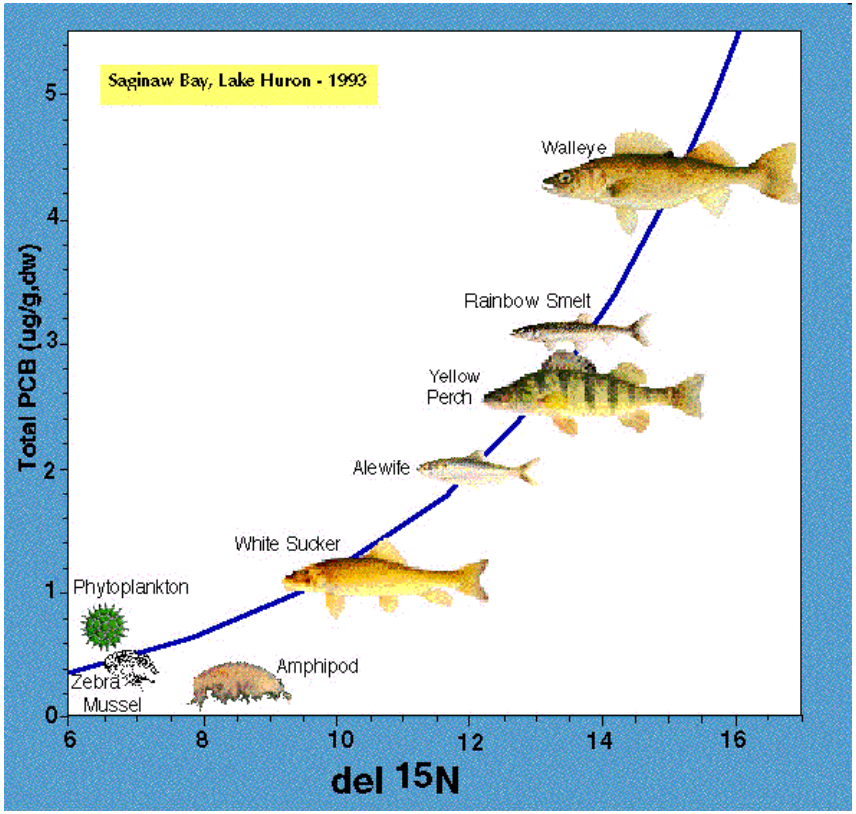
- **Planktons – *Plankton* – ūdenī brīvi dzīvojošu, pasīvi peldošu organismu kopums, ko veido bakterioplanktons, fitoplanktons un zooplanktons.**
- **Fitoplanktons – visu sīko – mikroskopisko augu kopums, kas atrodas ūdenī suspendētā stāvoklī un pasīvi pārvietojās ar ūdeni.**

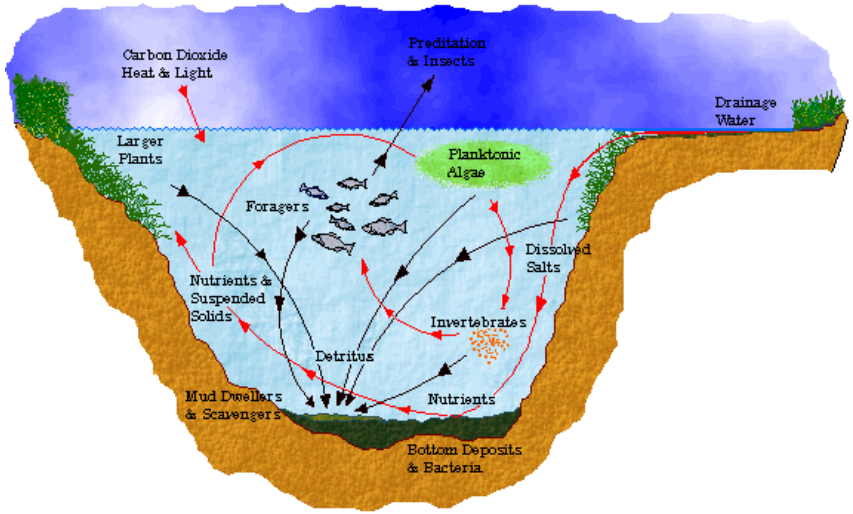




Planktona aļģēm ir mazs svars un mazi izmēri.
To noturēšanos suspendētā stāvoklī veicina dažādi šūnapvalka izaugumi, vakuolas, rezerves vielas – eļļas, gāze.

Aļģes ir autotrofie organismi, kas ir barošanās ķēdes pamatā





- Biogēnā vielu aprite sākas ar autotrofo sintēzi (to ūdeņos veic fitoplanktons)
- Tai seko heterotrofā noārdīšana (to veic baktērijas)

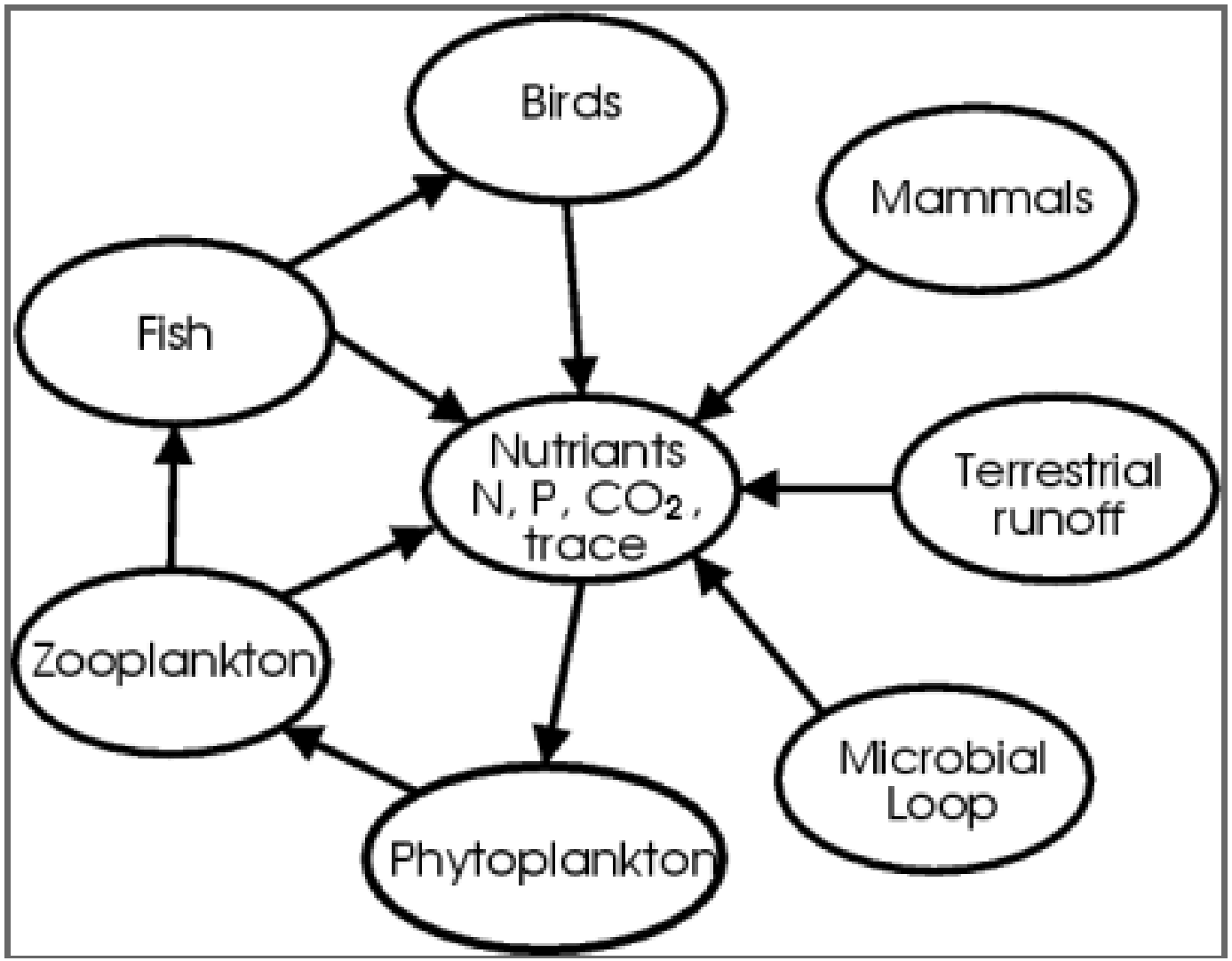
Carbon Cycle - Photosynthesis

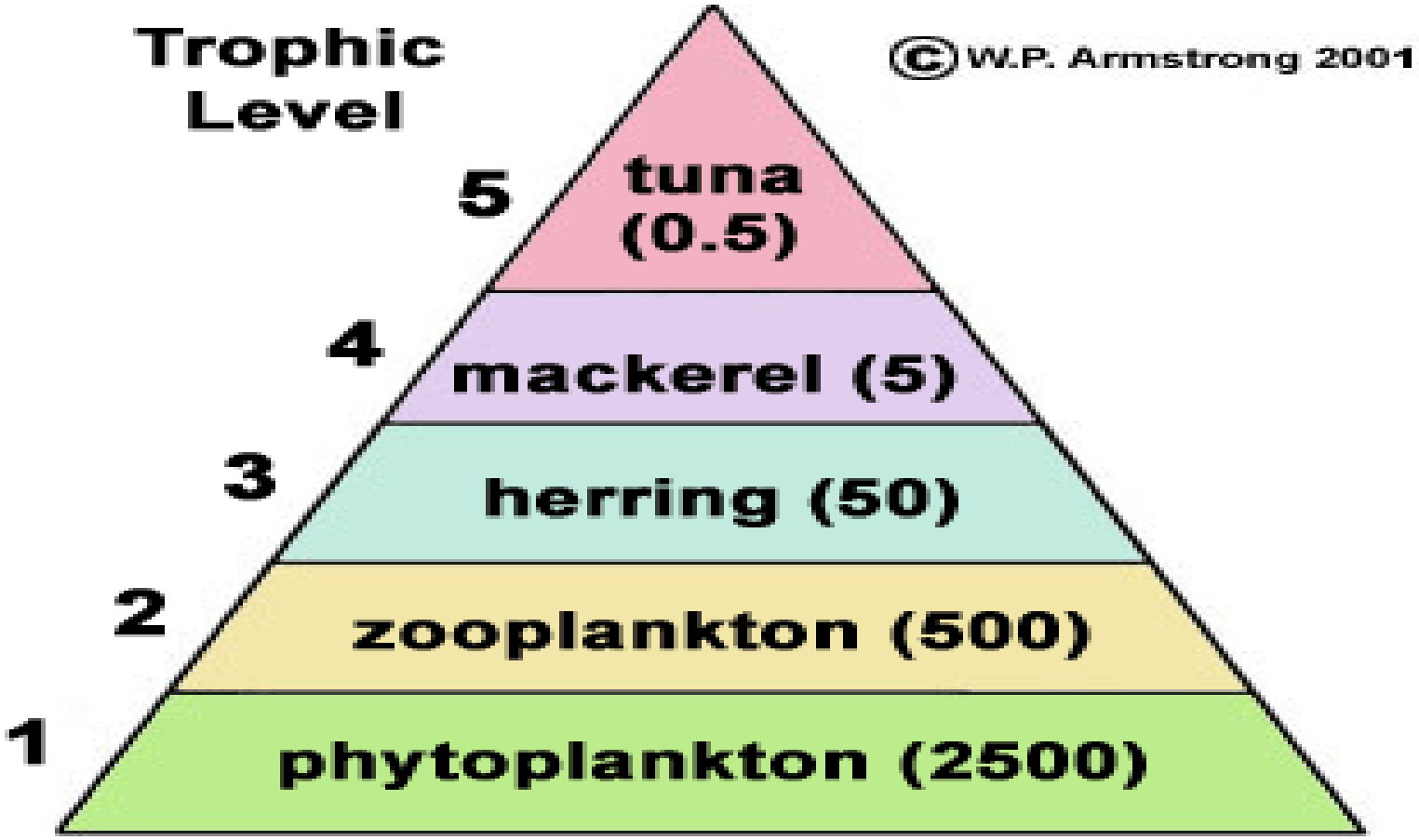
$$CO_2 + H_2O + \text{energy} \rightarrow C_6H_{12}O_6 + O_2$$

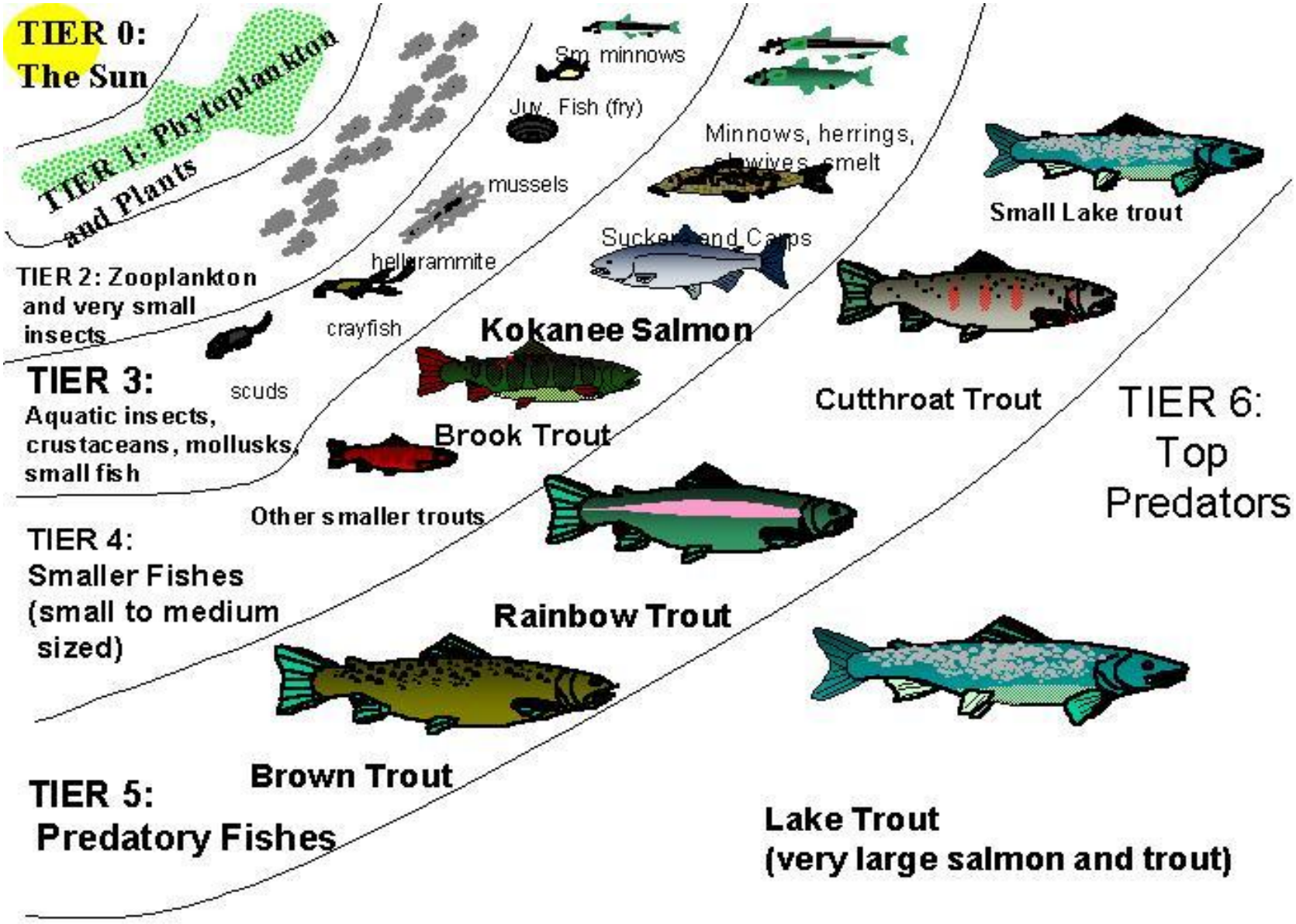
carbon dioxide — water — sun — glucose — oxygen

represents any organic matter in plants

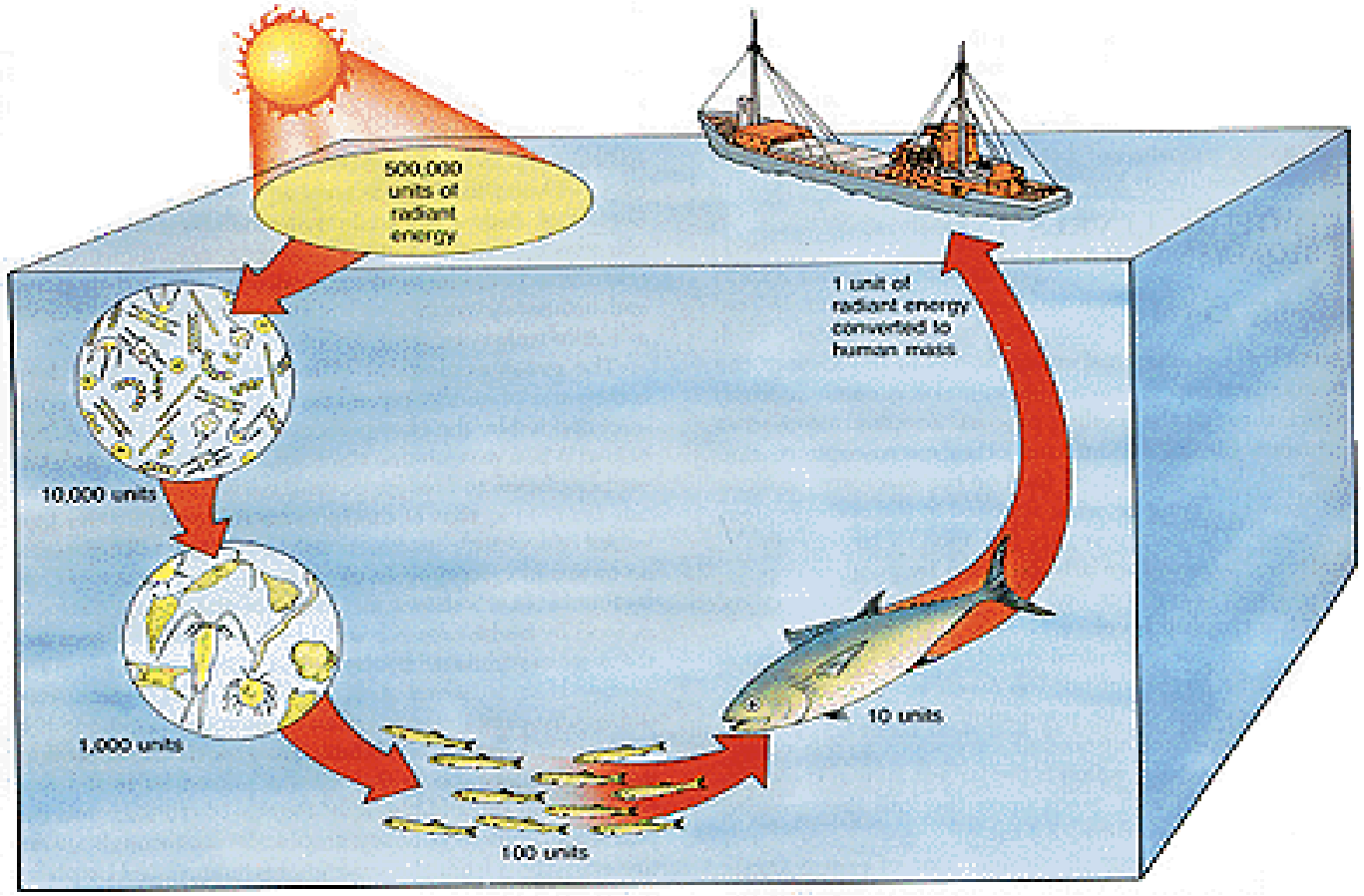
- Fitoplanktons barošanās ķēdēs



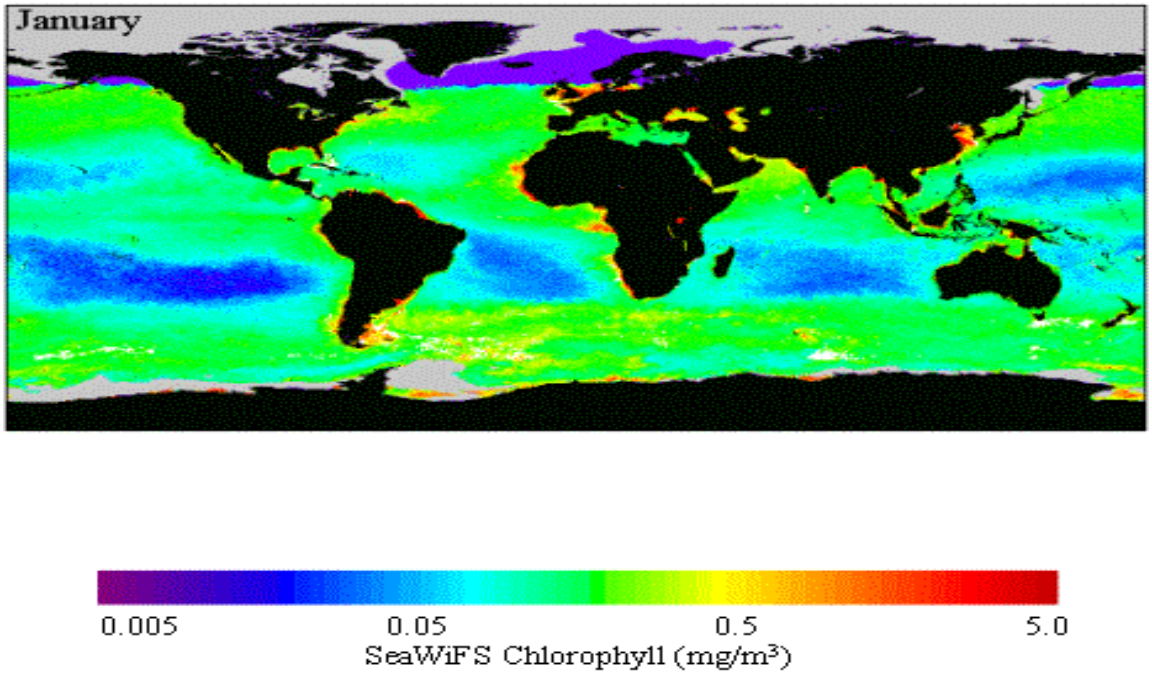

Trophic Level
© W.P. Armstrong 2001
5
tuna (0.5)
4
mackerel (5)
3
herring (50)
2
zooplankton (500)
1
phytoplankton (2500)


TIER 0:
The Sun
TIER 1: Phytoplankton and Plants
Sm. minnows
Juv. Fish (fry)
Minnows, herrings,
mussels
Small Lake trout
TIER 2: Zooplankton and very small insects
hellgrammite
crayfish
Kokanee Salmon
TIER 3:
Aquatic insects, crustaceans, mollusks, small fish
scuds
Brook Trout
Cutthroat Trout
TIER 6:
Top
Predators
Other smaller trouts
TIER 4:
Smaller Fishes
(small to medium sized)
Rainbow Trout
Brown Trout
TIER 5:
Predatory Fishes
Lake Trout
(very large salmon and trout)

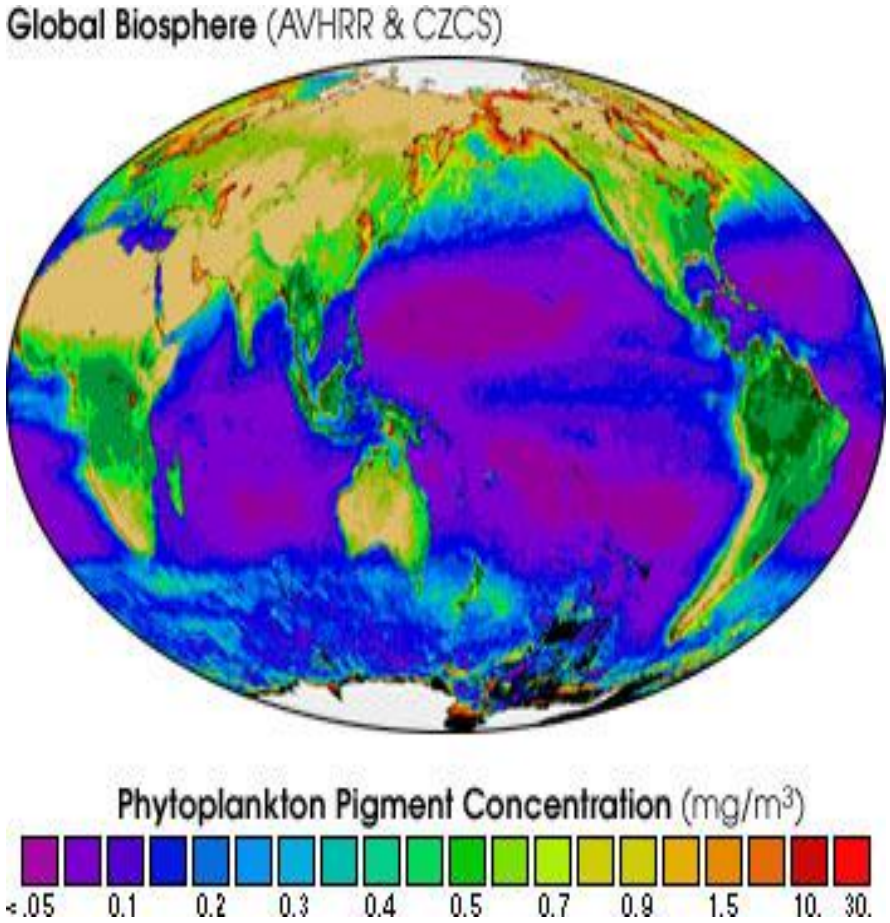
Fitoplanktona loma barības ķēdē



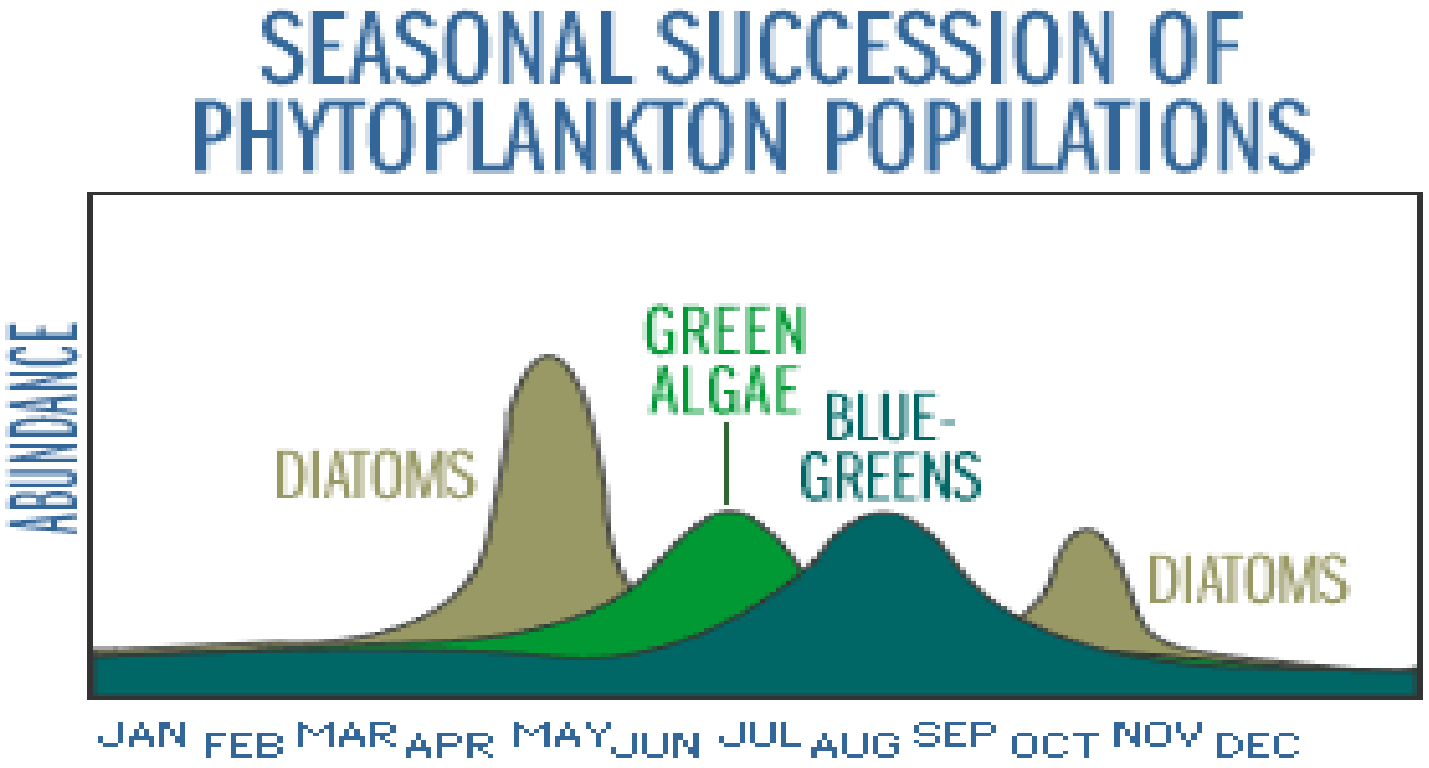
Fitoplanktona sezonālās izmaiņas (pēc hlorofila daudzuma)



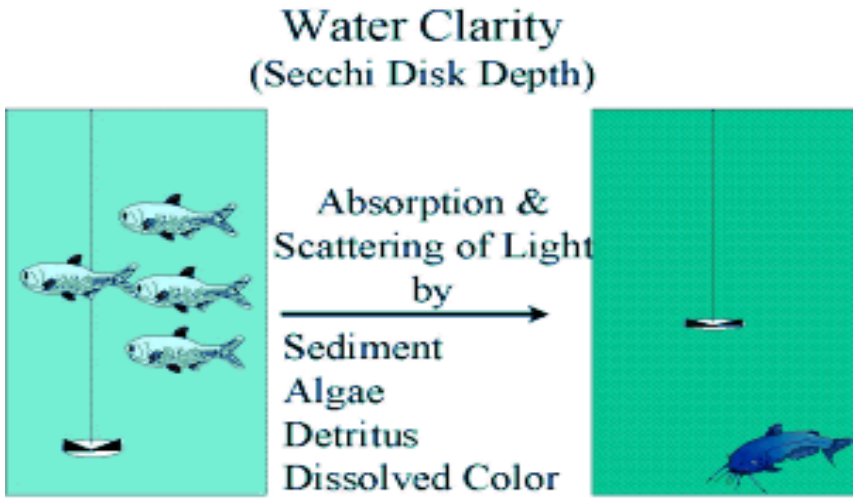
Fitoplanktona pigmentu koncentrācija pēc hlorofila daudzuma

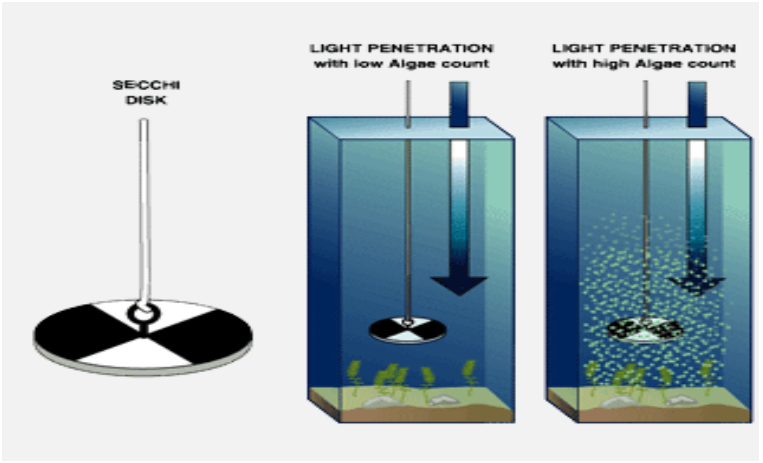


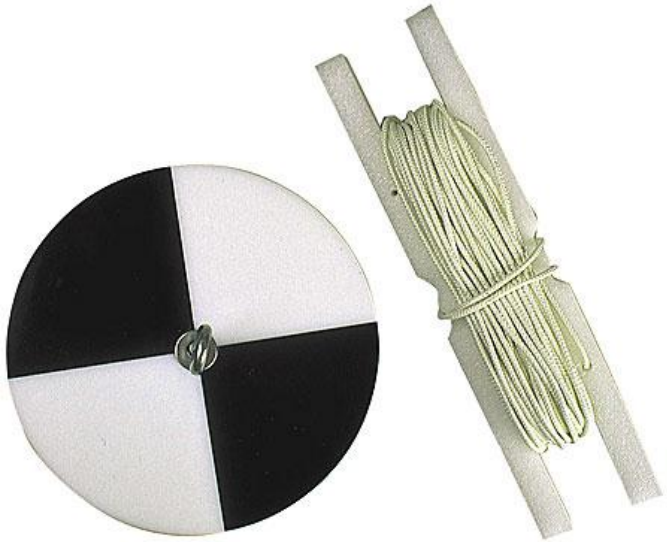
Fitoplanktona sukcesija



SEKKI (Secci, Secchi disc) **disks**







Ūdens caurredzamības mērīšana ar Seki disku

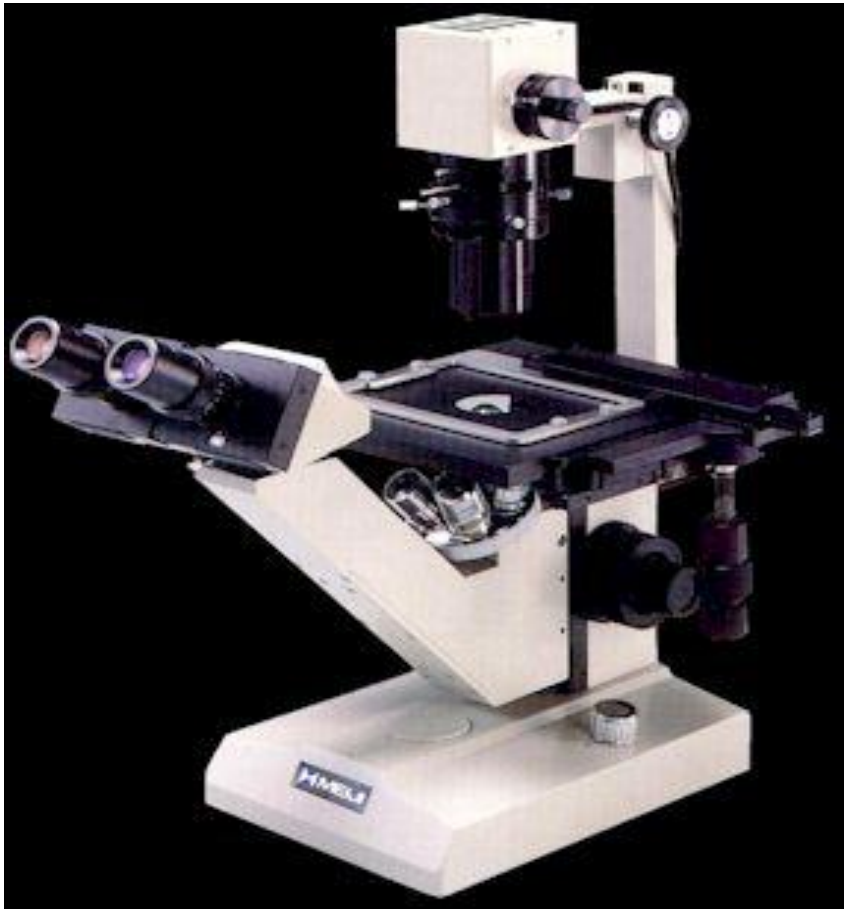
Aļģu masveida savairošanās

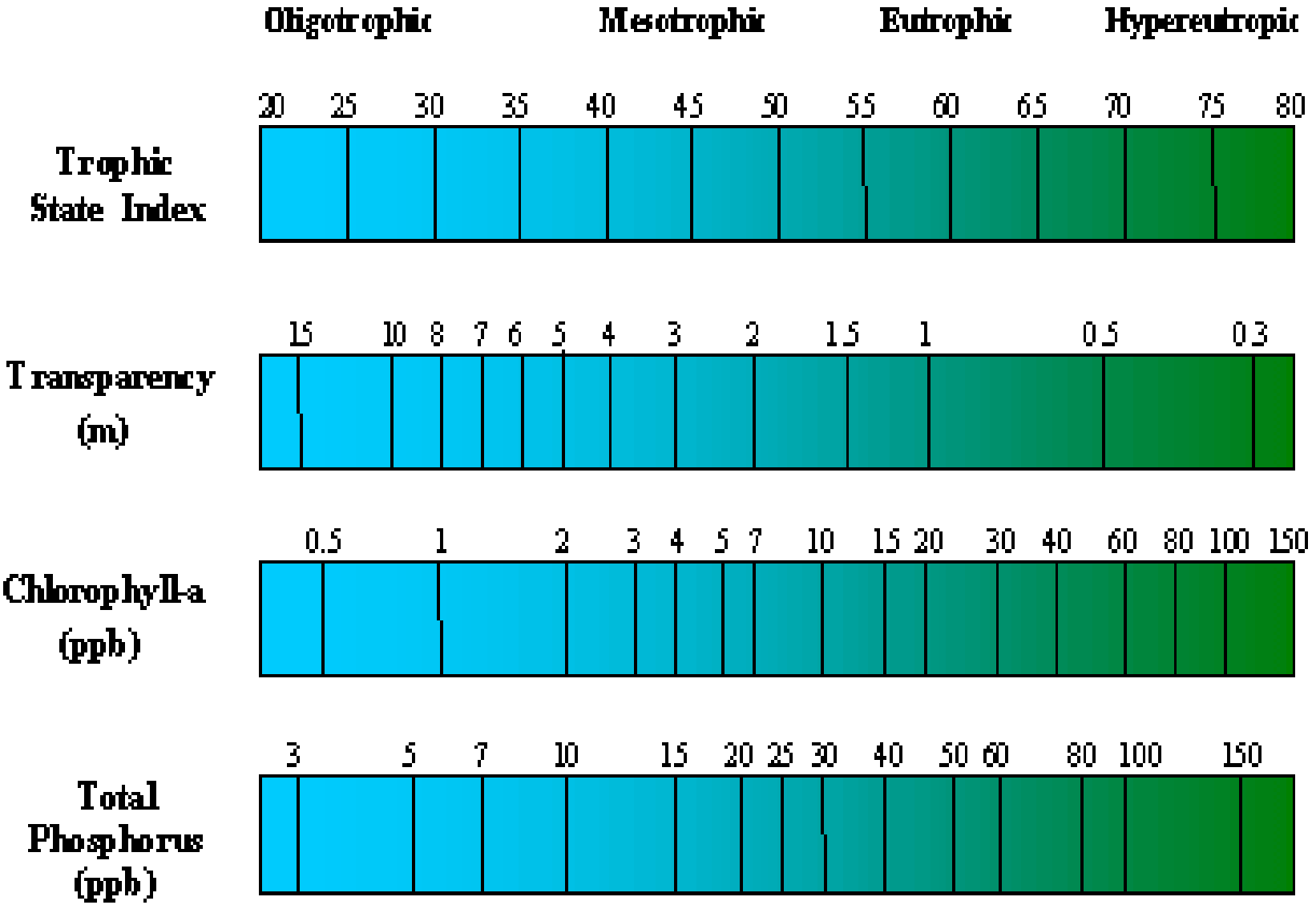
Eksperiments ezerā, kura labajā pusē iepludināti biogenie elementi –N, P

“Barības vielas nav limitējošās, ja molārā elementu attiecība C:N:P fitoplanktonā ir 106:16:1.- REDFĪLDA ATTIECĪBA”

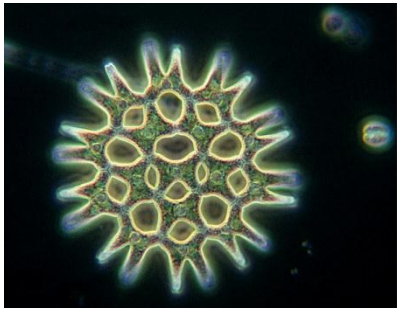
Rutnera batometrs un Apšteina tīkliņš fitoplanktona paraugu ievākšanai

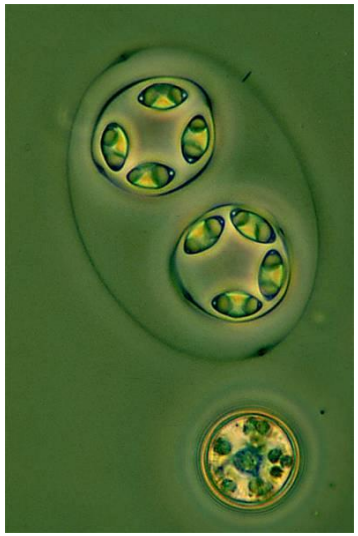
Invertais mikroskops fitoplanktona paraugu apstrādāšanai

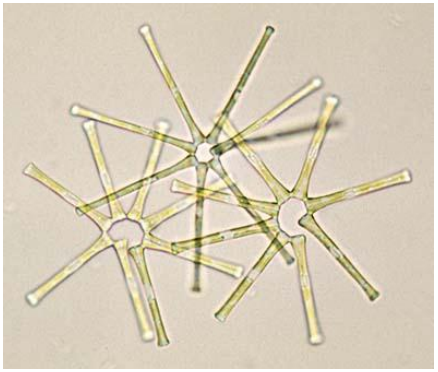


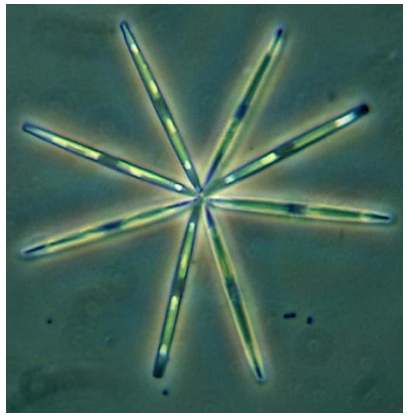

Oligotrophic
Mesotrophic
Eutrophic
Hypereutropic
20 25 30 35 40 45 50 55 60 65 70 75 80
Trophic State Index
15 10 8 7 6 5 4 3 2 1.5 1 0.5 0.3
Transparency (m)
0.5 1 2 3 4 5 7 10 15 20 30 40 60 80 100 150
Chlorophyll-a (ppb)
3 5 7 10 15 20 25 30 40 50 60 80 100 150
Total Phosphorus (ppb)

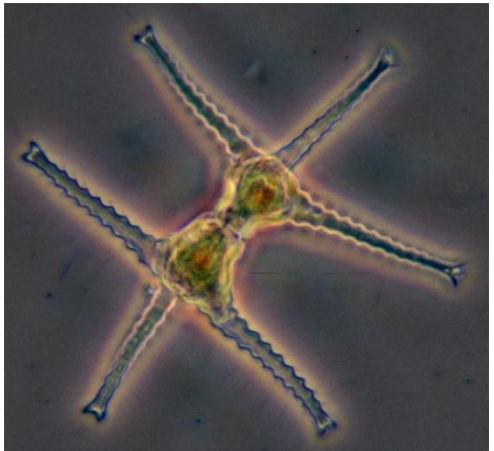
Mezotrofa ezera aļģu flora











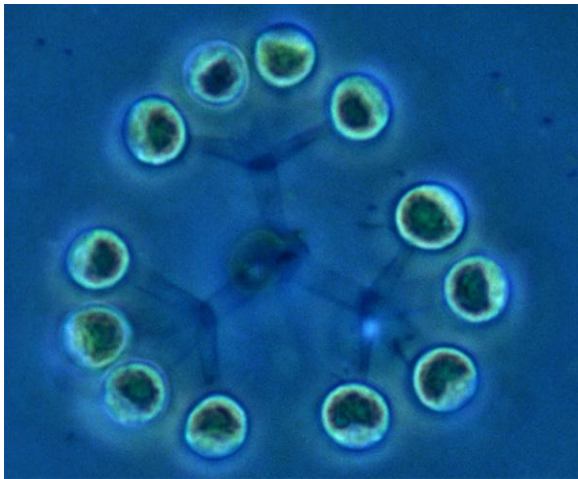










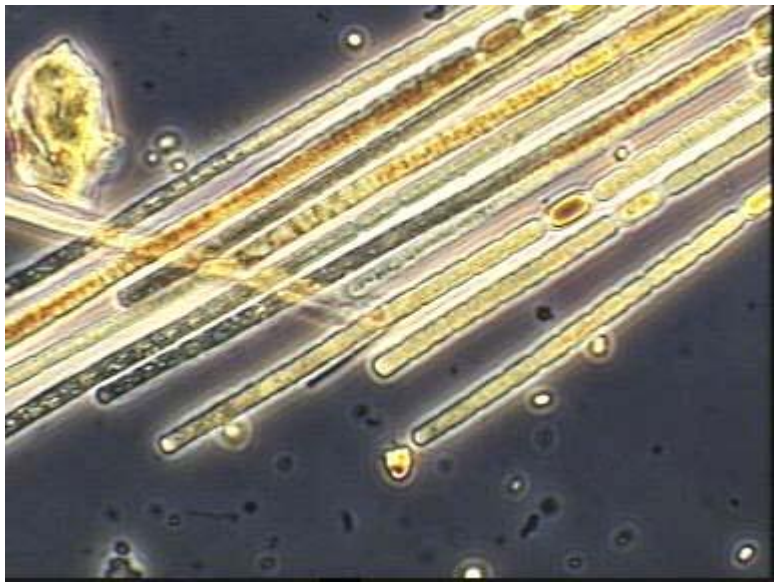


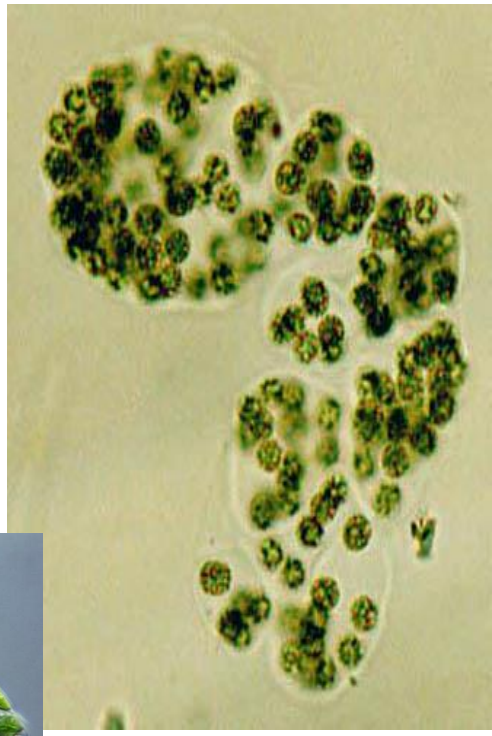


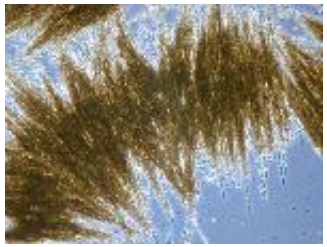


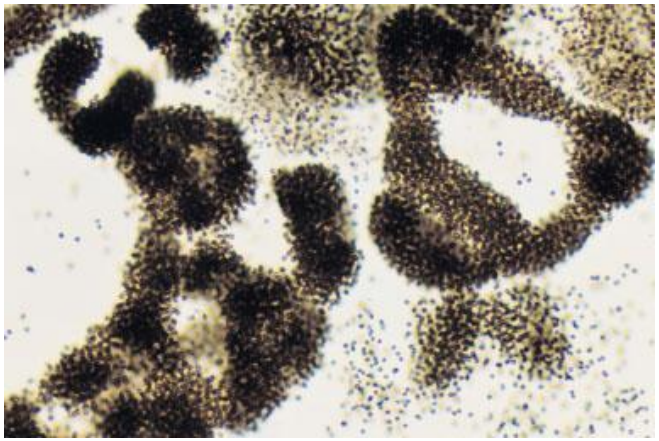
Foto: www.ezeri.lv

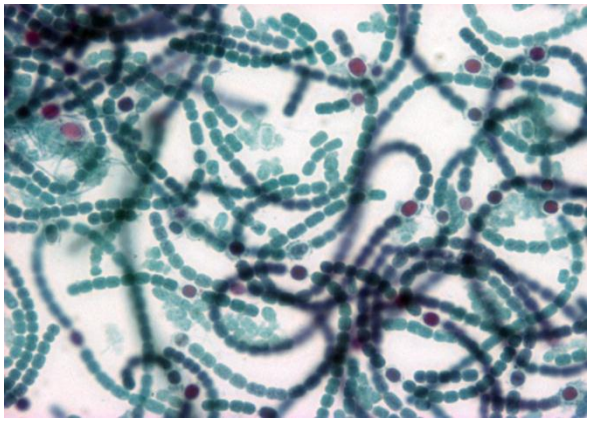
Eitrofa ezera aļģu flora





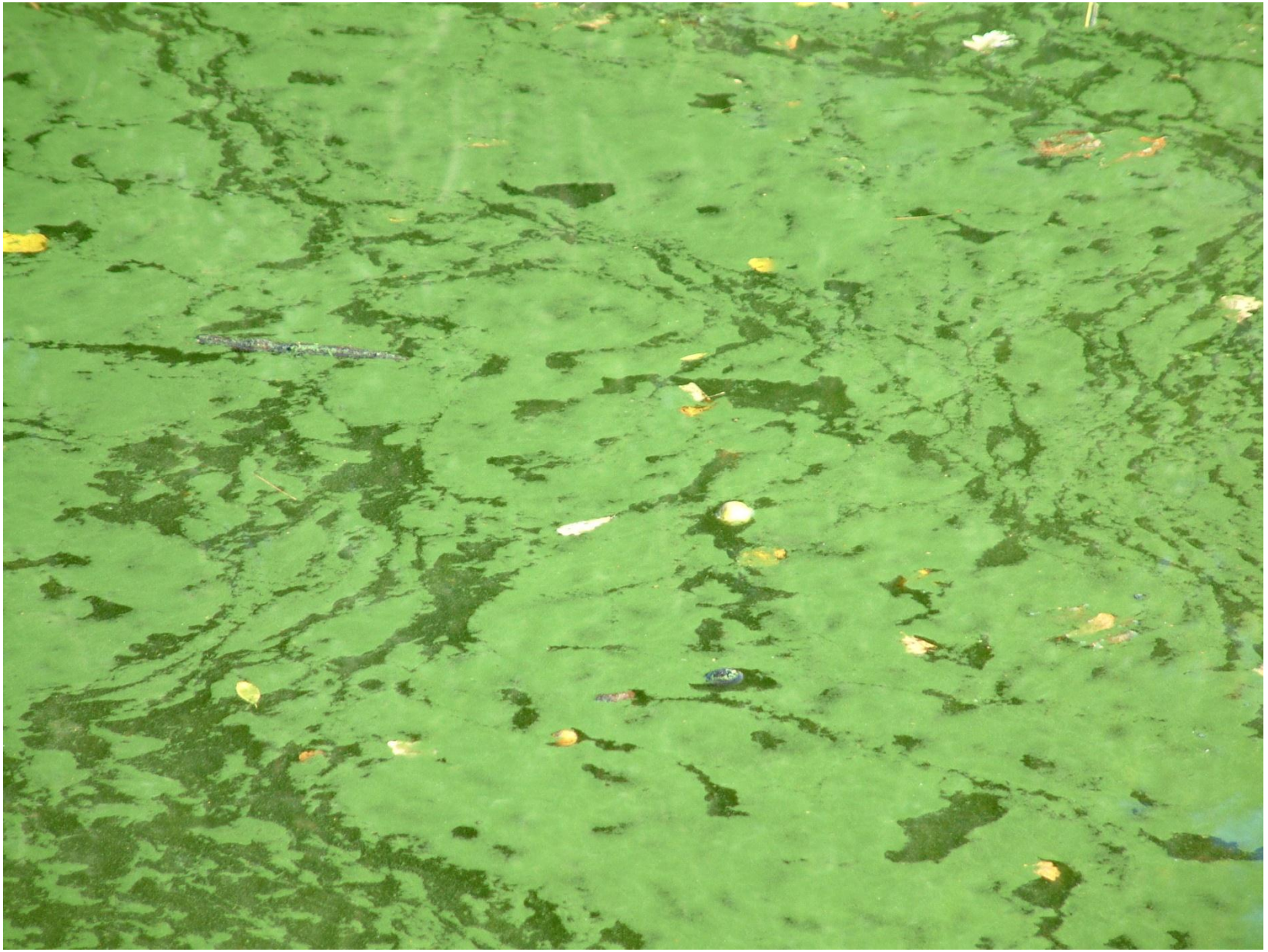








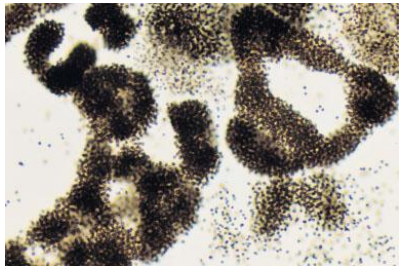

Augusts, 2003, Microcystis spp., *Anabaena* spp. Juglas ezers

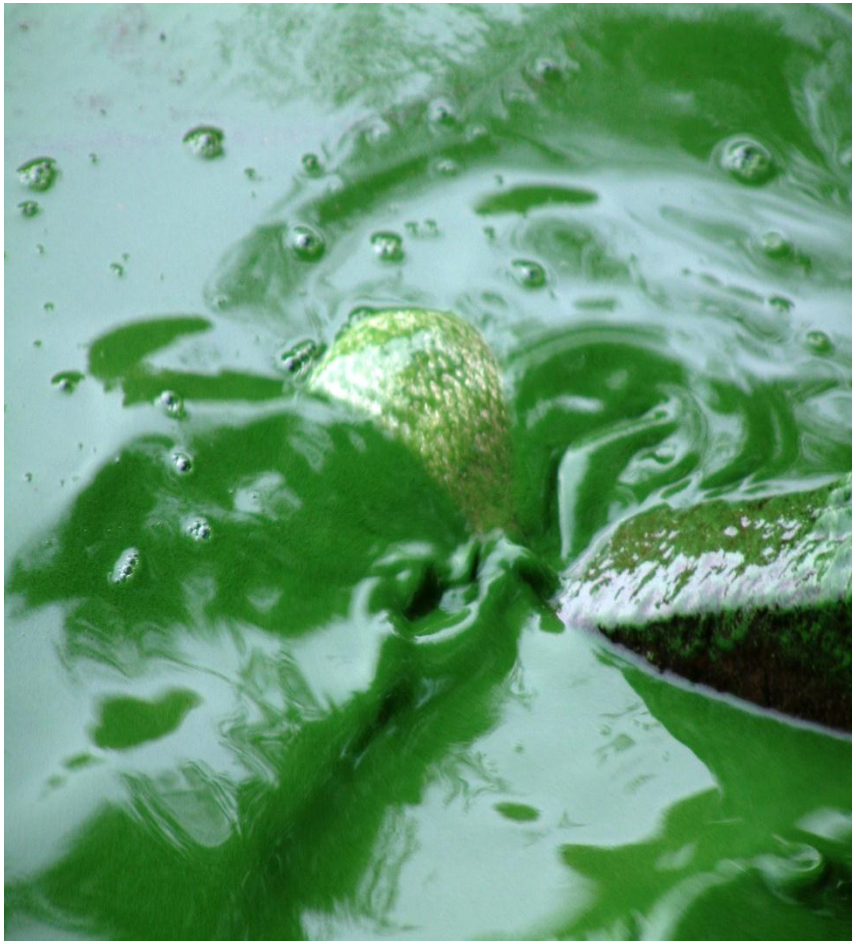


***Aphanizomenon flos-aquae* blooms in Ķīšezers**

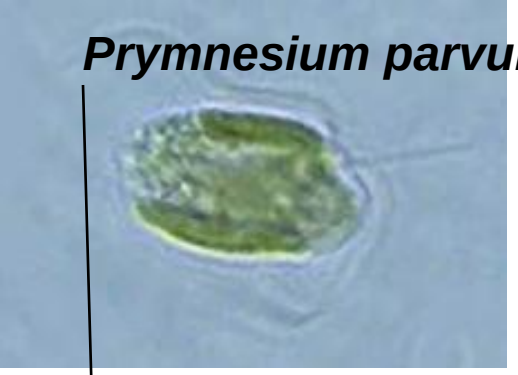
Foto Ivars Druvietis

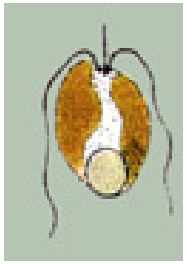
Microcystis aeruginosa “zied” Brno ūdenskrātuvē Čehijā, 2005.g. Septembrī.

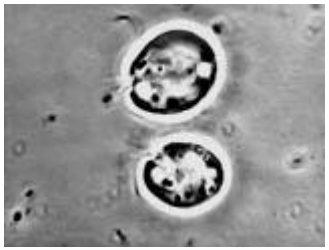


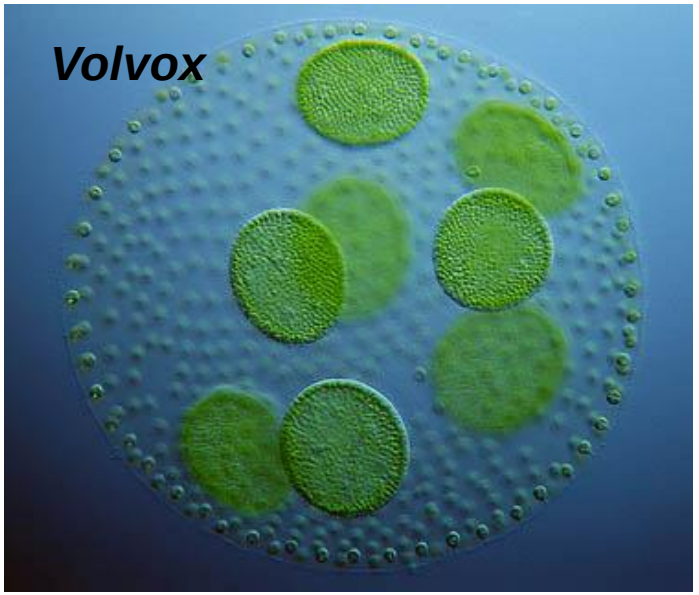


Dīķu aļģu flora

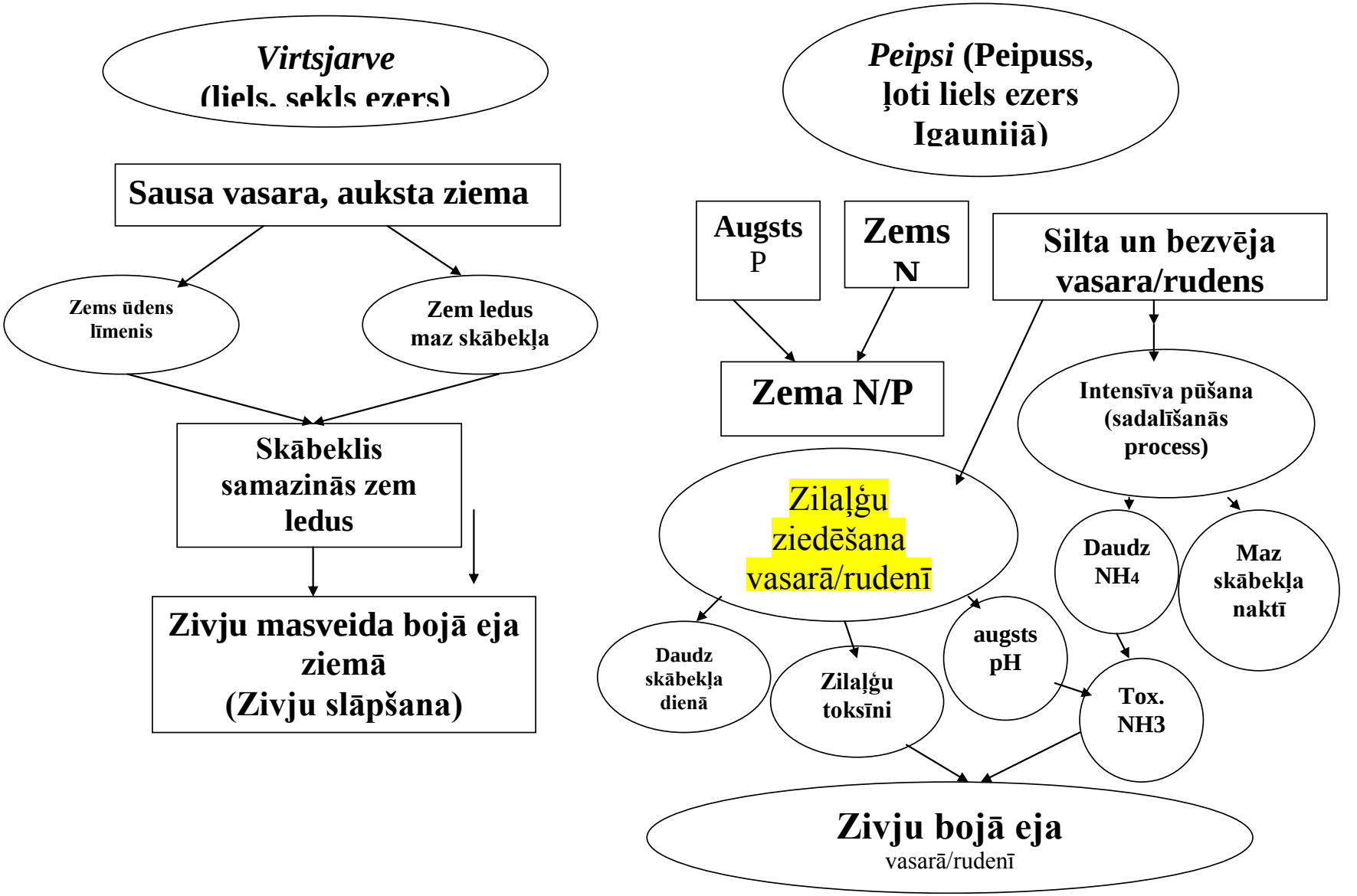








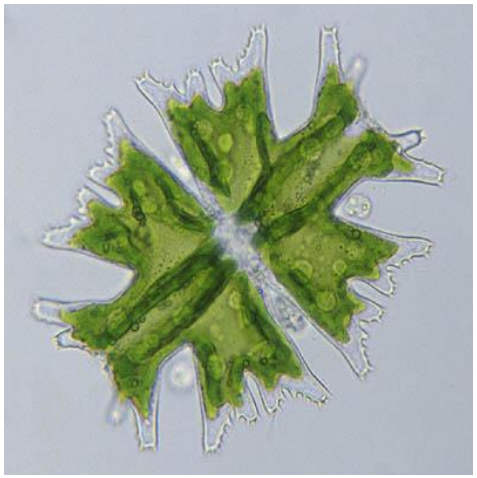
Kāpēc un kā notiek zivju bojā eja un kāda te loma aļģēm?

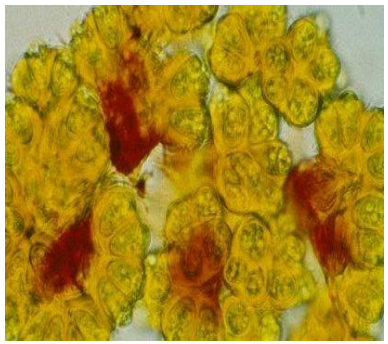


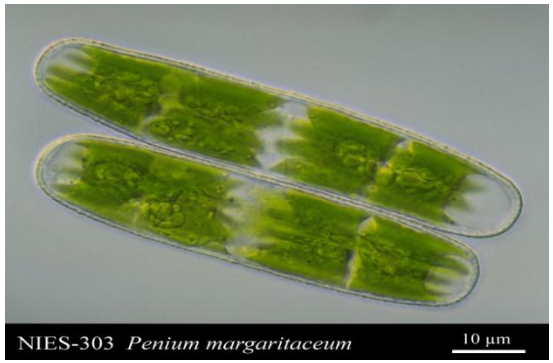
Makrofītu tipa ezeru aļģu flora

(Hāru ezeri)

DISTROFU EZERU AĻĢU FLORA

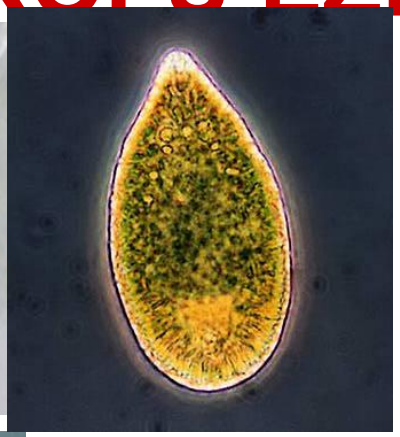
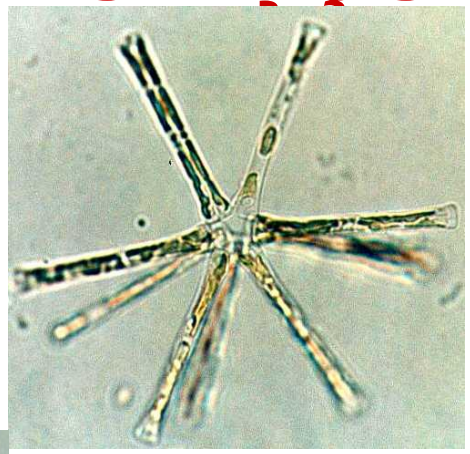
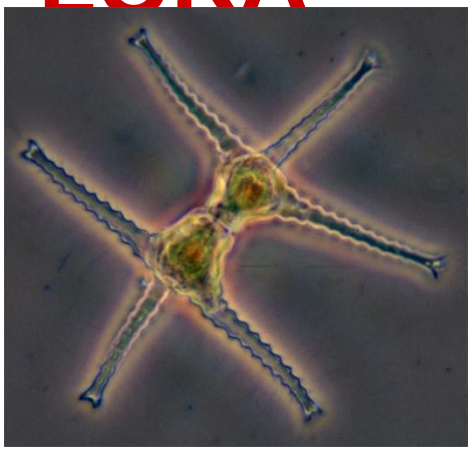


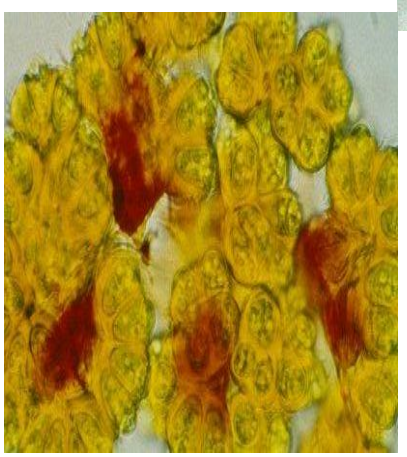
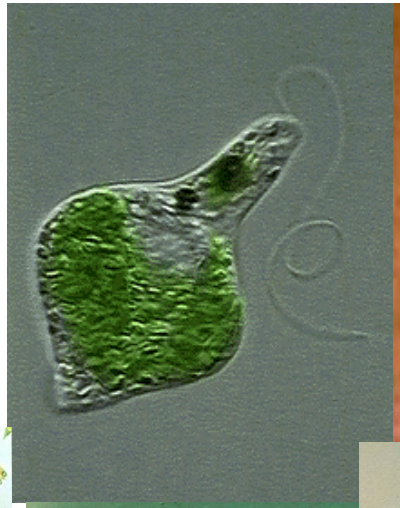


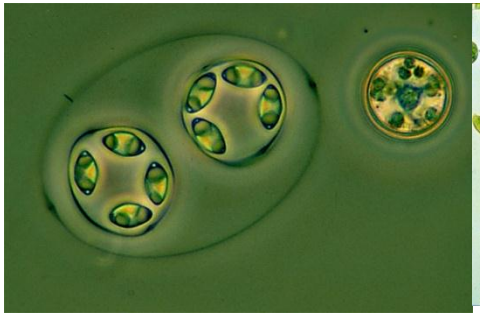


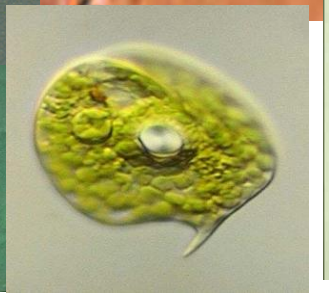
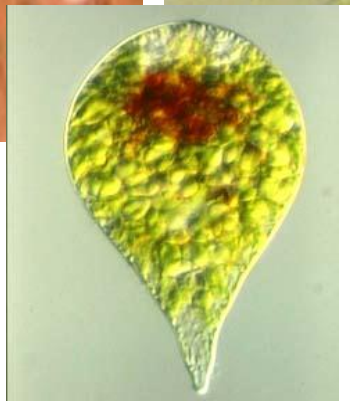
Retas sārtaļģes- *Batrachospermum* spp. – raksturīgas ļoti tīriem purvu ezeriem

DISEITROFU EZERU ALGU FLORA

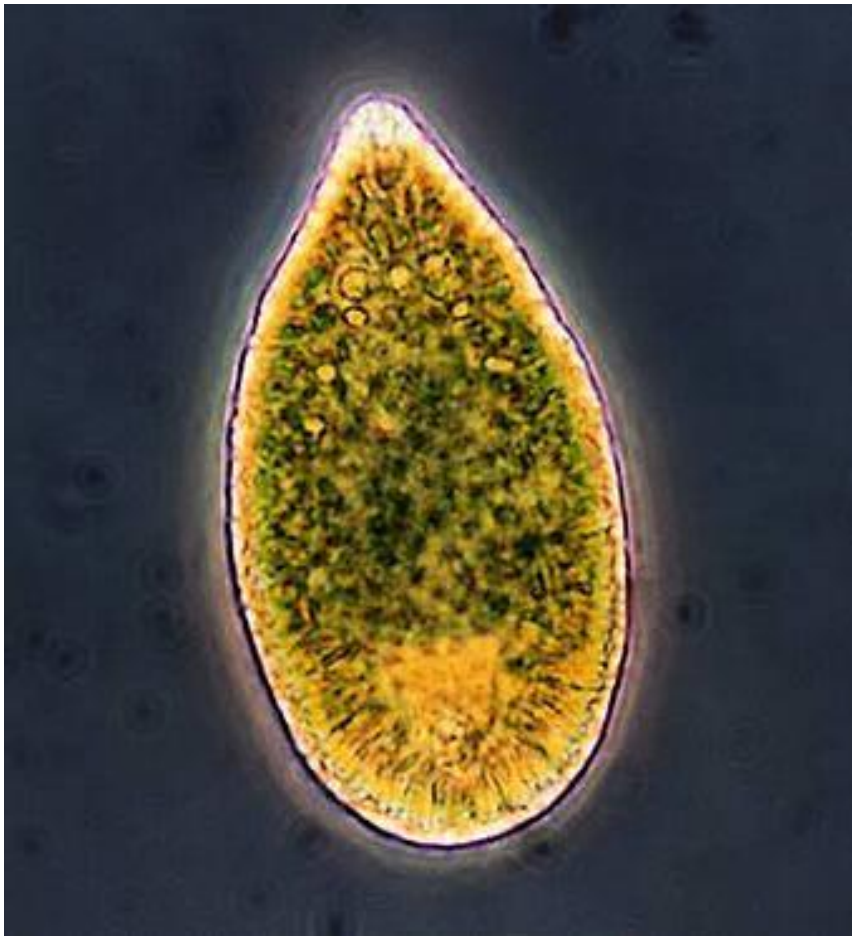





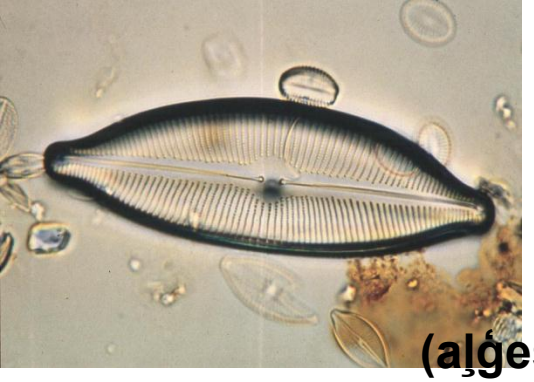



Hloromonadofītu aļģe Gonyostomum semen izraisa “aļģu ziedēšanu” (īpaši Zviedrijā kļuvusi problēmu!)

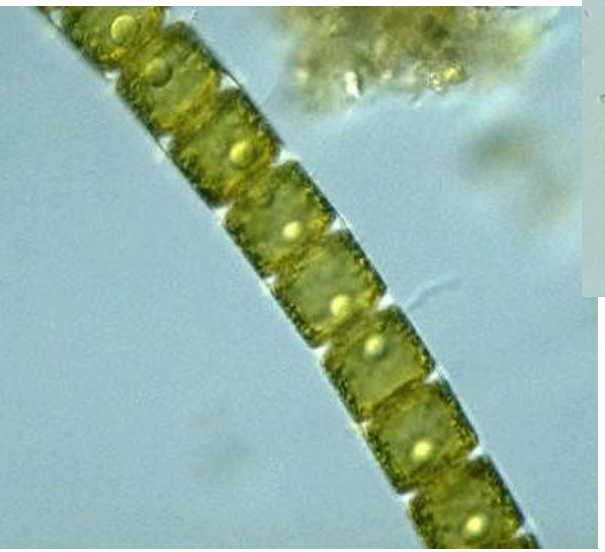


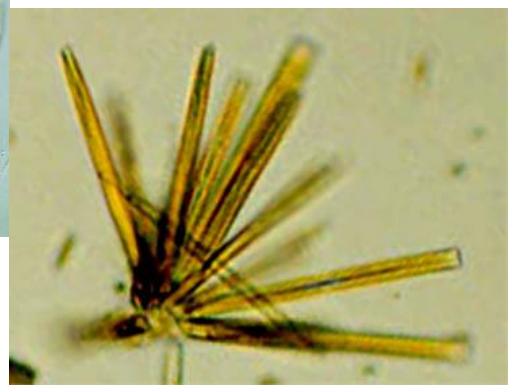
Latvijā konstatēta *Gonyostomum semen* ziedēšana pie Daugavpils un Sedas purvu u.c. ezeros

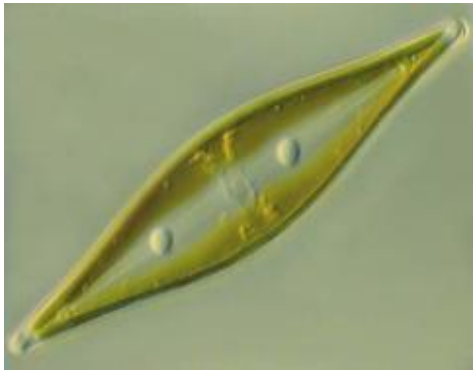


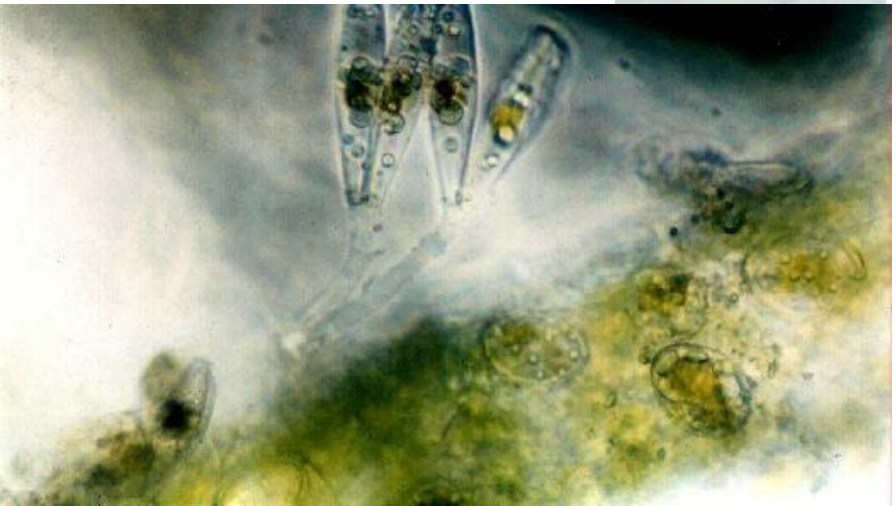
Fitobentoss

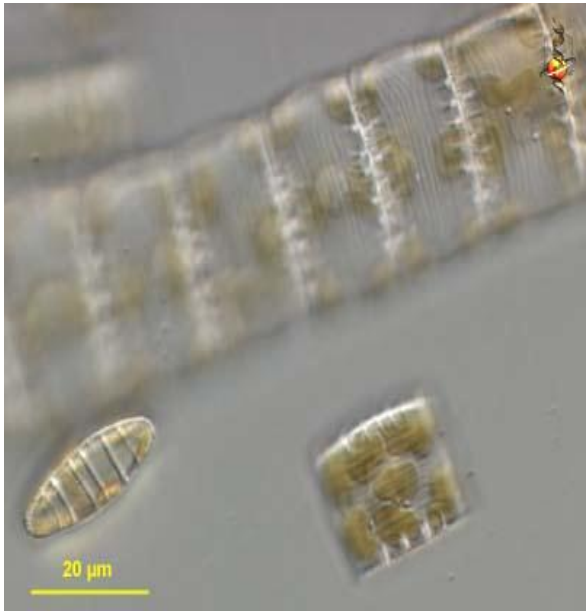
(aļģes, kas apdzīvo ūdenstilpes bentāles virsējo slānīti)



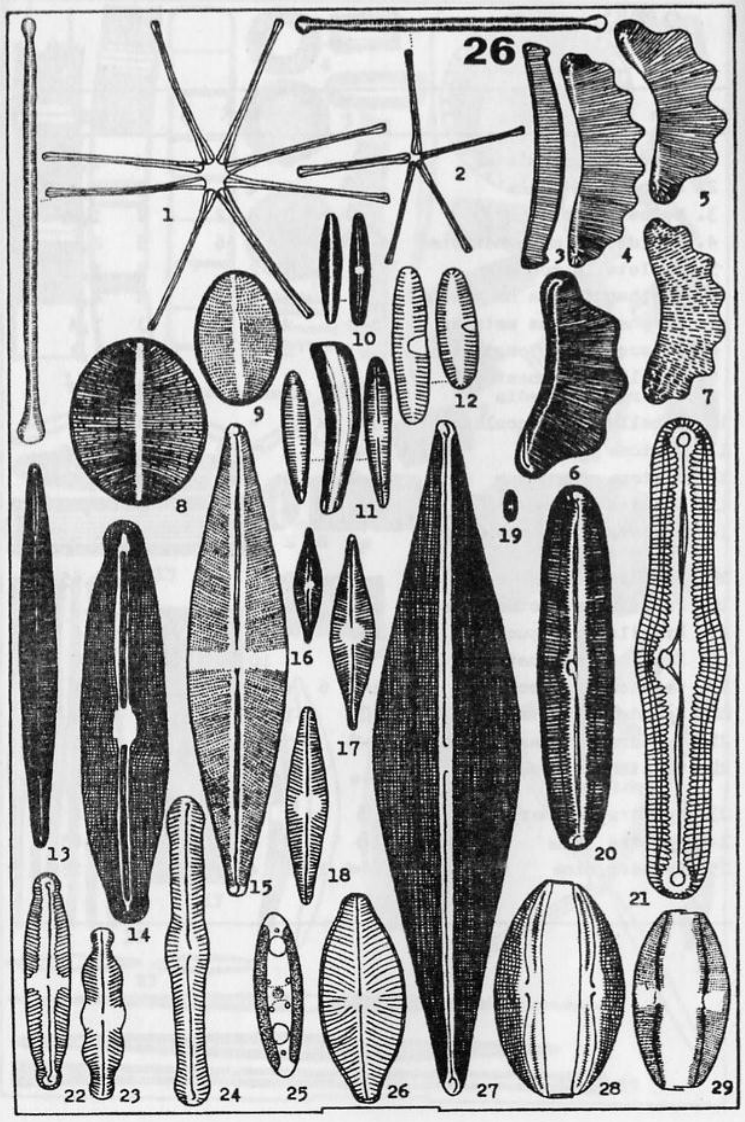








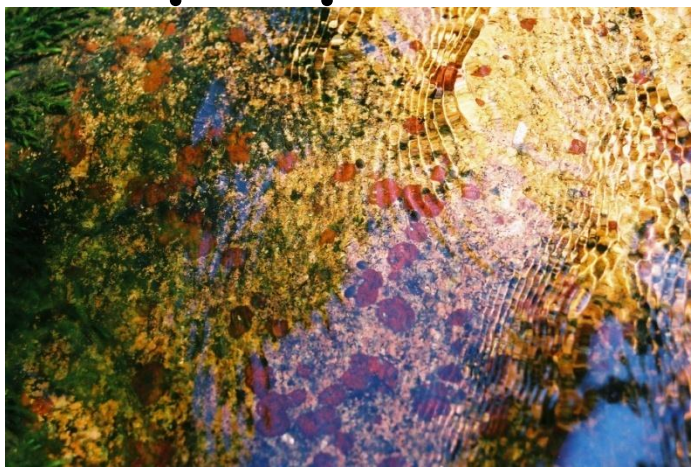
Aļģes tiek izmantotas kā bioindikātori ūdenstilpes vides kvalitātes noteikšanā



Taxon	s	x	o	β	α	p	I	S
1. Asterionella formosa	o-β		6	4			3	1,4
2. Asterionella gracillima	o		8	2			4	1,2
3. Eunotia arcus	o		8	2			4	1,2
4. Eunotia robusta	o		10				5	1,0
5. Eunotia robusta var. tetraodon	o		10				5	1,0
6. Eunotia triodon	o		10				5	1,0
7. Eunotia triodon	o		10				5	1,0
8. Cocconeis pediculus	β		3	6	1		3	1,75
9. Cocconeis placentula	x-α	2	4	3	1		1	1,35
10. Achnanthes minutissima	o-β	1	4	5	+		2	1,45
11. Rhoicosphenia curvata	β		3	5	2		2	1,85
12. Achnanthes lanceolata	x-β	5	3	2			2	0,75
13. Amphipleura pellucida	β		1	9			5	1,9
14. Frustulia vulgaris	o		8	2			4	1,2
15. Stauroneis phoenicenteron	β		3	7	+		4	1,7
16. Navicula cryptocephala	α		+	3	7		4	2,7
17. Navicula rhynchocephala	α		+	3	7		4	2,7
18. Navicula viridula	α			2	8		4	2,8
19. Navicula atomus	β			7	3		4	2,3
20. Pinnularia viridis	β			9	1		5	2,1
21. Pinnularia nobilis f. intermedia	o		8	2			4	1,2
22. Pinnularia microstauron	o	2	8	+			4	0,8
23. Pinnularia microstauron f. biundulata	o		7	3			4	1,3
24. Pinnularia gibba	x	8	2				4	0,2
25. Navicula gracilis	o-β	+	4	5	1		2	1,65
26. Navicula gastrum	β			10			5	2,0
27. Navicula cuspidata	α-β			4	6		3	2,6
28. Amphora ovalis	x-α	1	3	4	2		1	1,65
29. Amphora ovalis var. gracilis	β-o		4	6			3	1,4

Sārtaļģu Hildenbrandia rivularis (1,2); *Batrachospermum* sp. ES un LR aizsargājamie biotopi upēs

1.



2.

3.