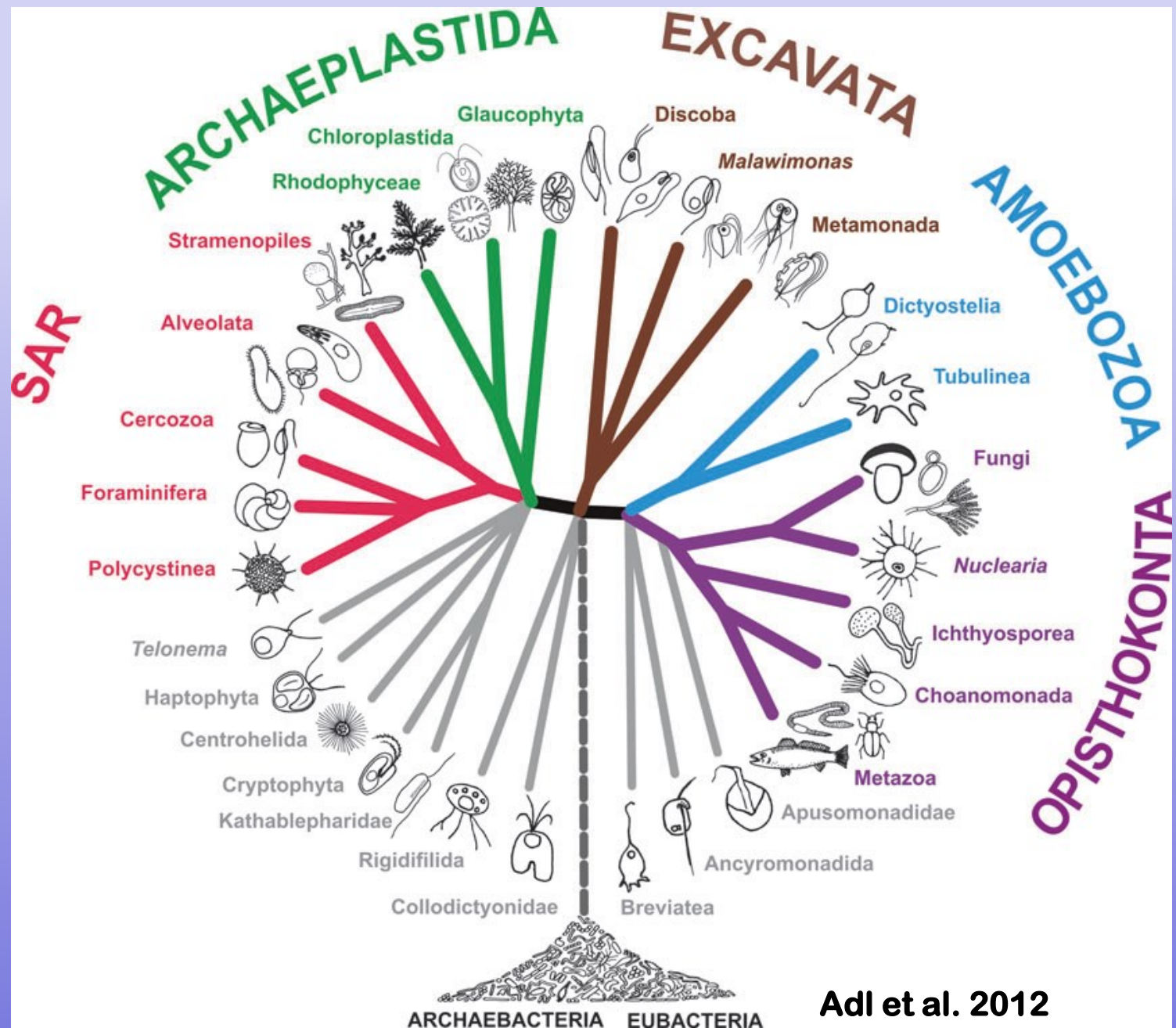
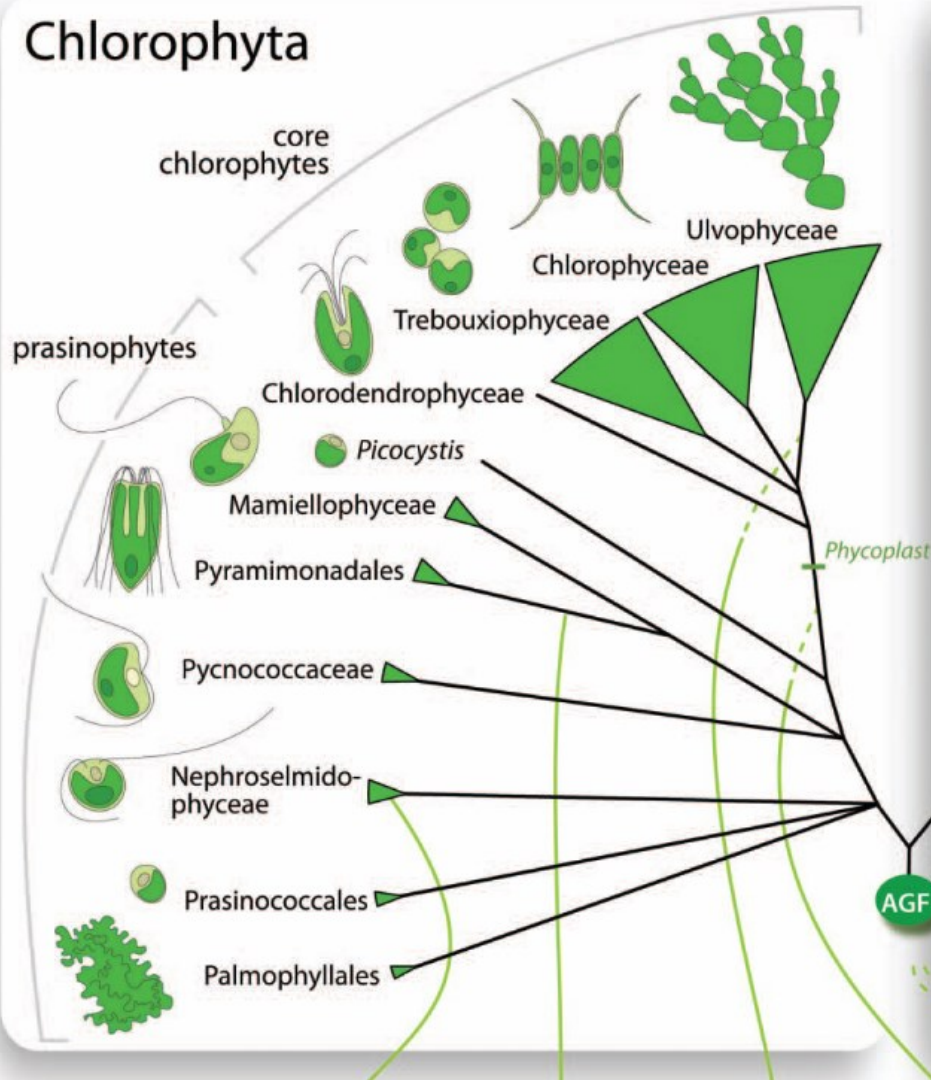


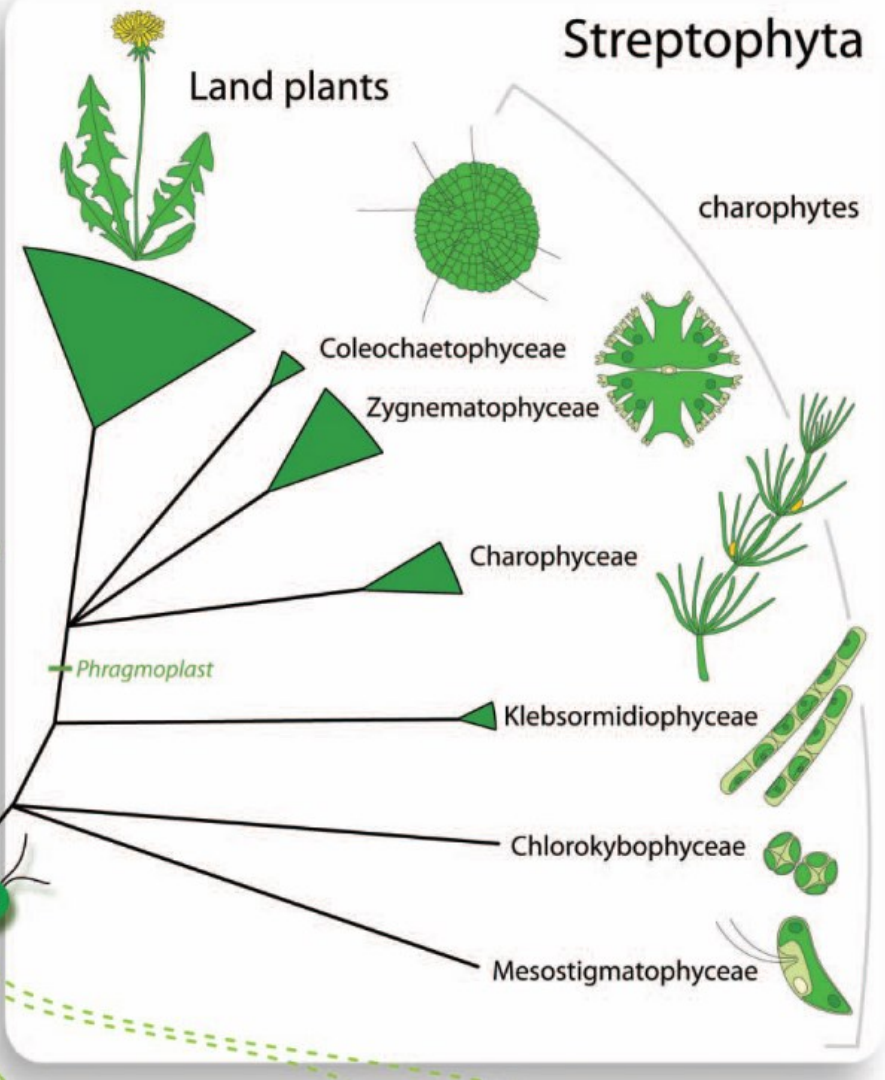


Adl et al. 2012

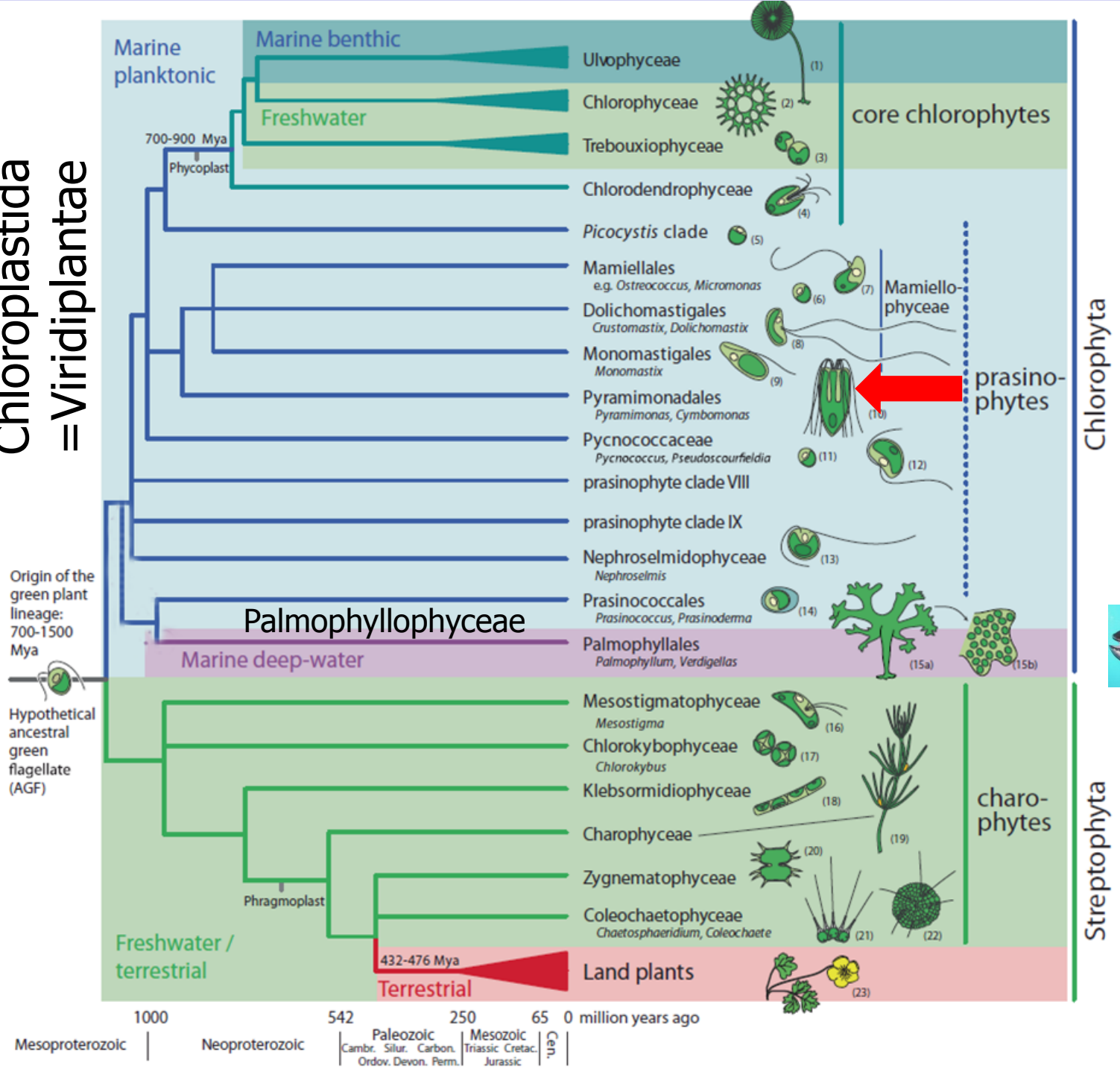
Chlorophyta



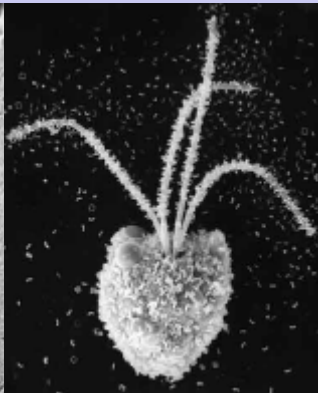
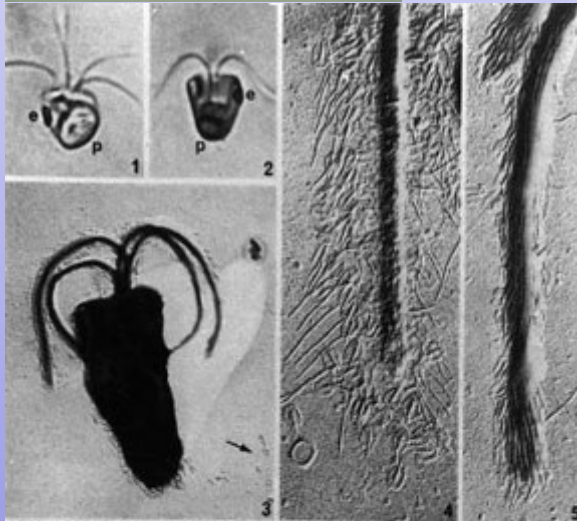
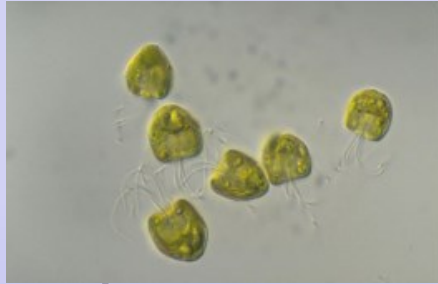
Streptophyta



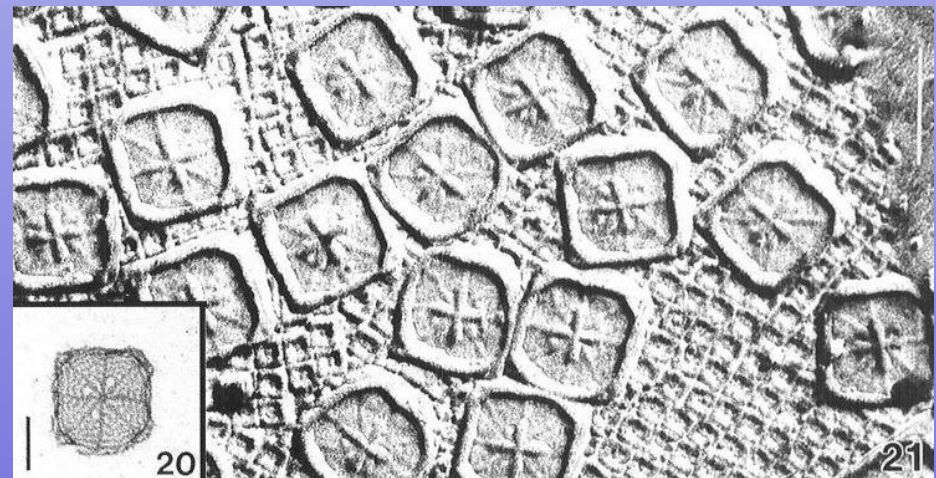
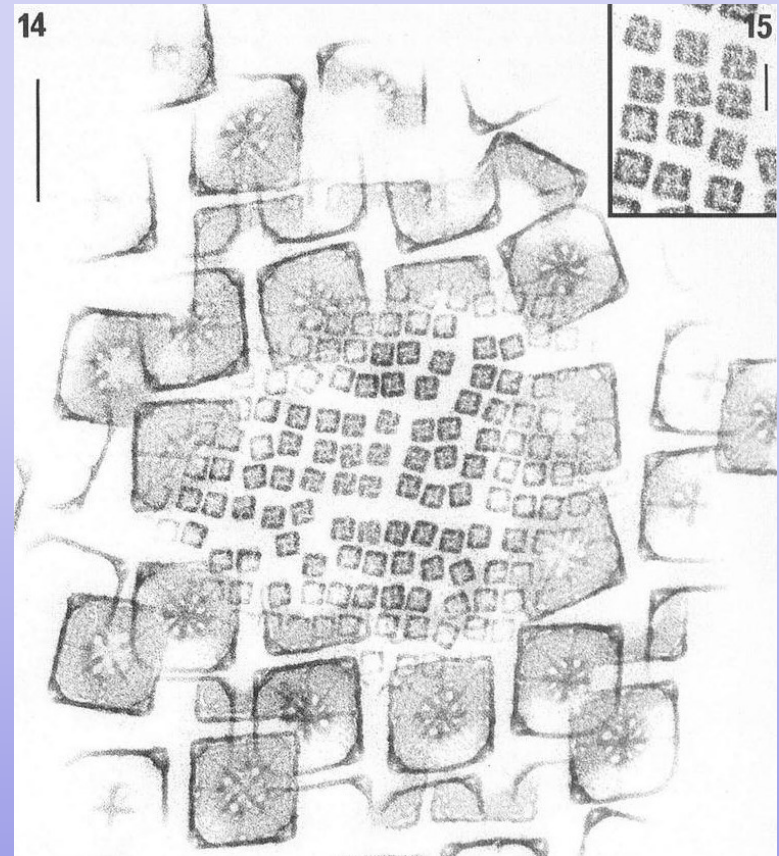
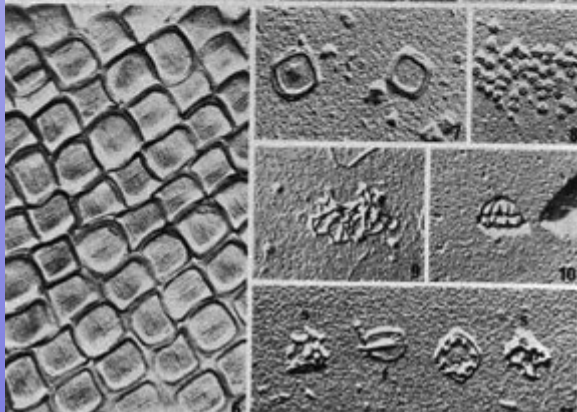
Chloroplastida = Viridiplantae

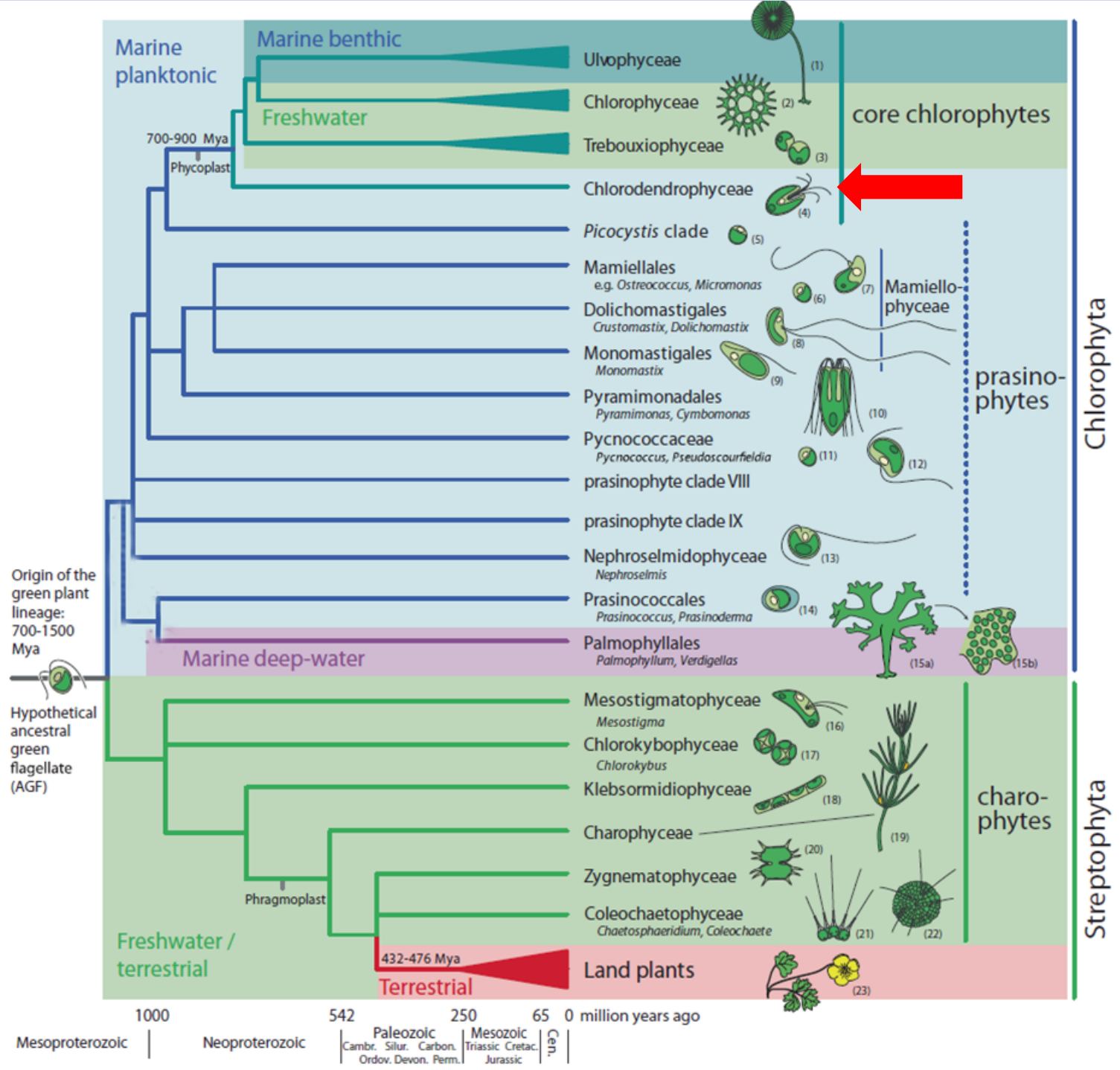


Prasinophyta – paraphyletic group



Pyramimonas





Class Chlorodendrophyceae

Tetraselmis

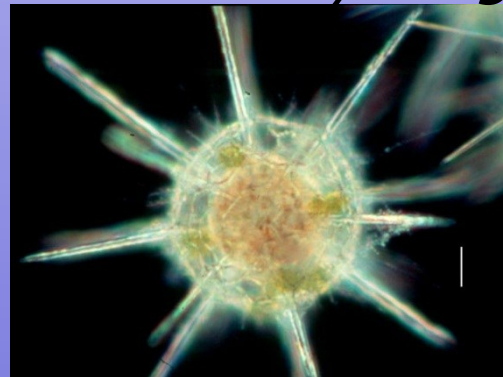
Tetraselmis marina (Cienkowski) Norris, Hori & Chihara



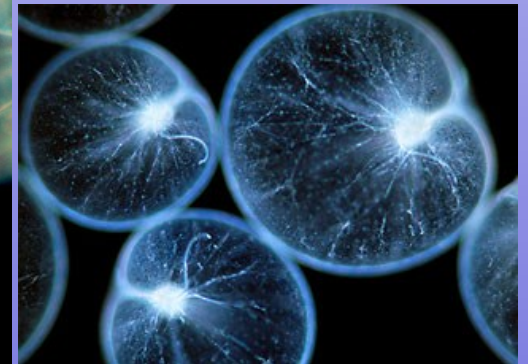
Often endosymbionts
of heterotrophs



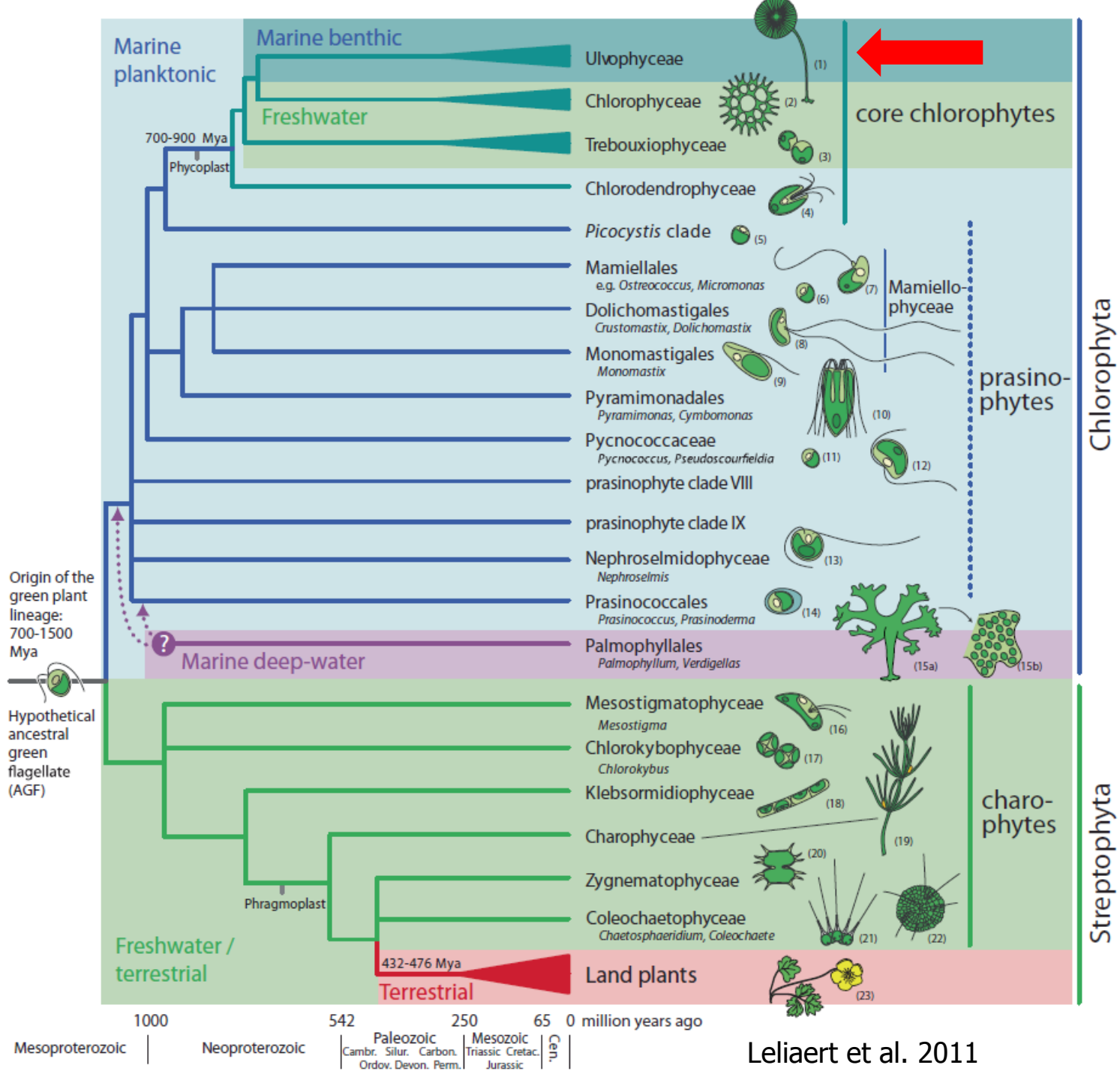
Symsagittifera roscoffensis



Radiolaria



Noctiluca



Class Ulvophyceae

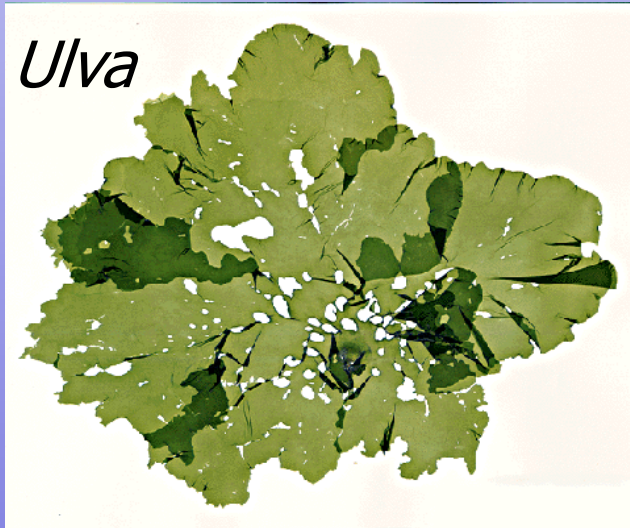
Order Ulvales



Enteromorpha



© Peter Dyrinda



Ulva



Ulva clathrata aquacultures





Ulva prolifera
(Qingdao on 18.7.2011)
South China

Going Green: Beach
Carpet



Cladophorales: *Cladophora*



Bryopsidales siphonous thallus



© D. Rostron

Bryopsis



Codium



Penicillus

Codium



Codium bursa

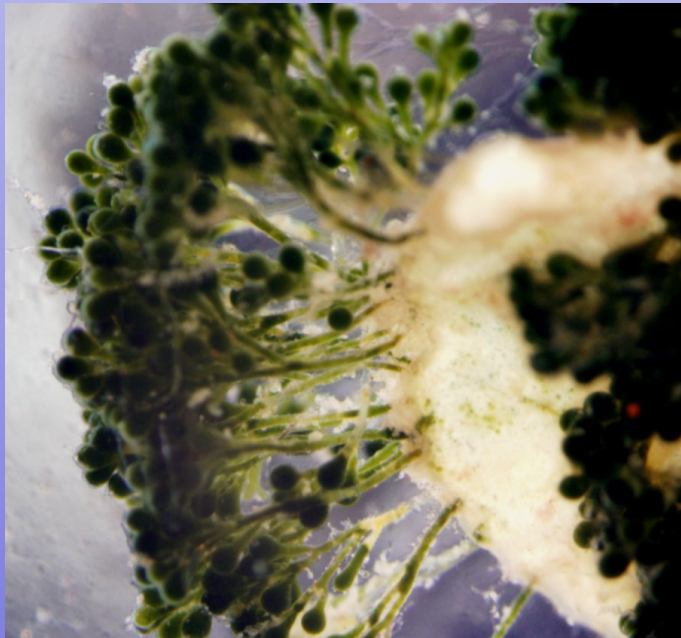
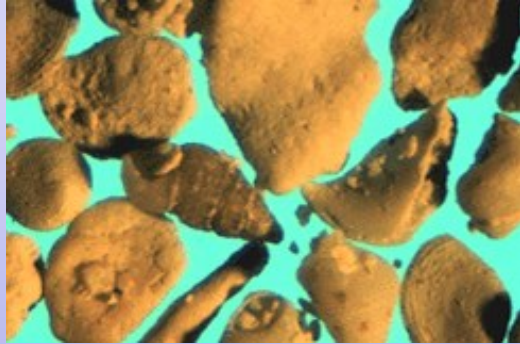
C. fragile



Dead Man's Fingers



Halimeda



Caulerpa lentilifera

Lato



Umi-budō served Okinawan style



Lato, the strange sea salad Coron, Philippines

Philippines - Tagbanua tribe

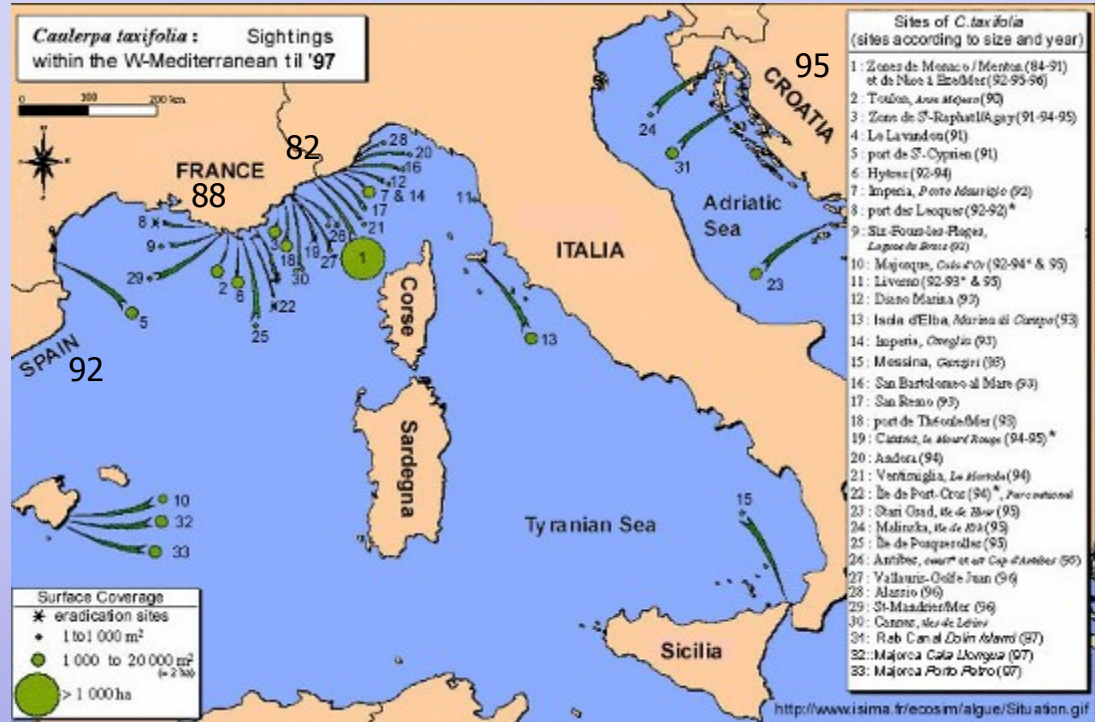


<http://www.lemanger.fr/en/index.php/lato-the-st>

Caulerpa taxifolia



Elysia subornata



© A. Meinesz



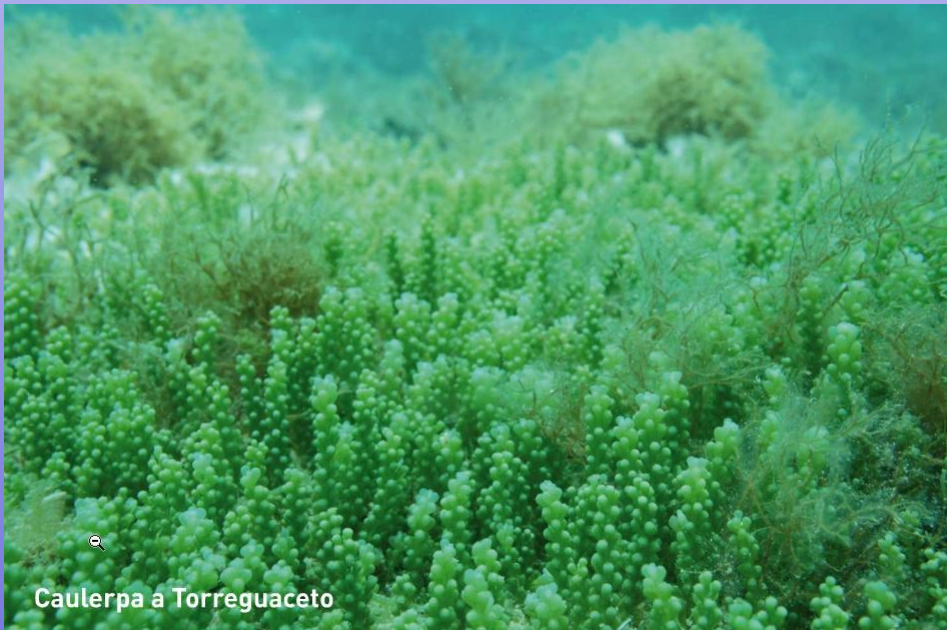
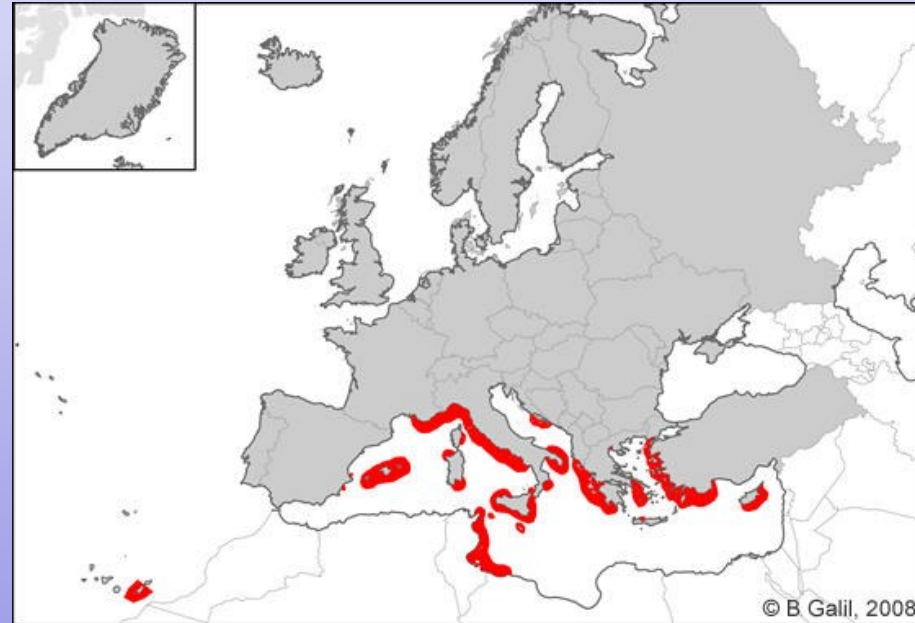
© A. Meinesz



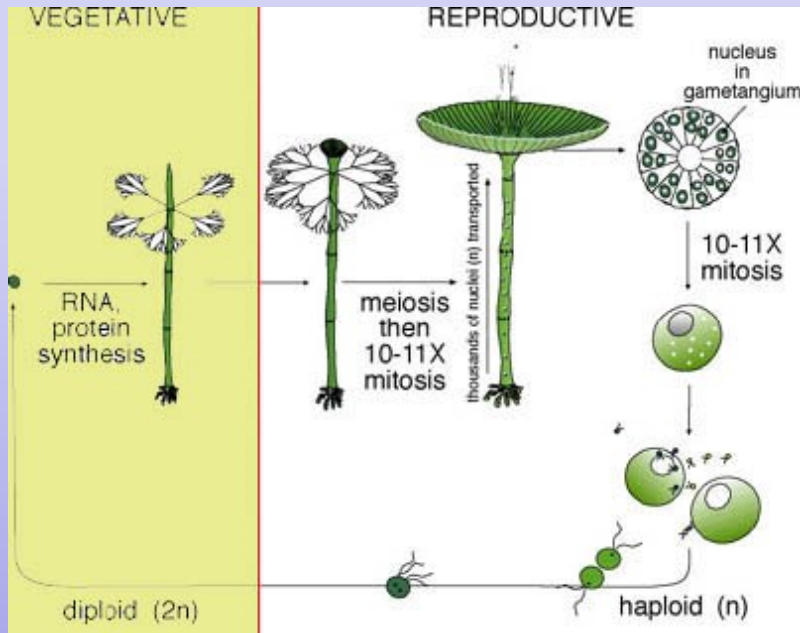
***Caulerpa* predators are being recruited to attack the invader. *Oxynoe* (left) has a partial shell to protect its reproductive organs and digestive glands, while *Elysia* (right) is shell-free. With each feeding on only 5 centimeters of frond per day, Meinesz estimates that efficient control would require more than 1,000 slugs per square meter of *Caulerpa*.**

Caulerpa cylindracea

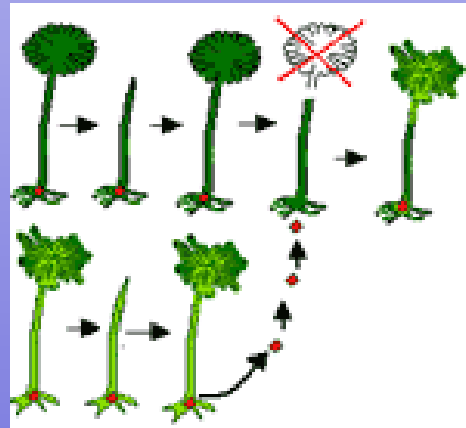
killer alga II



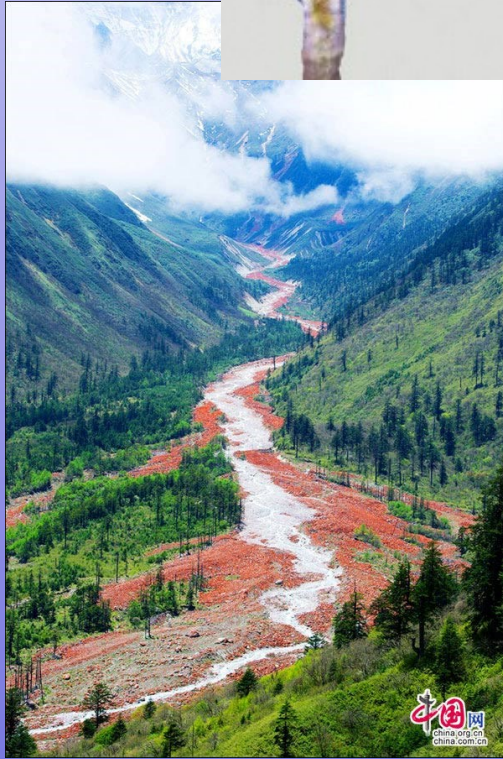
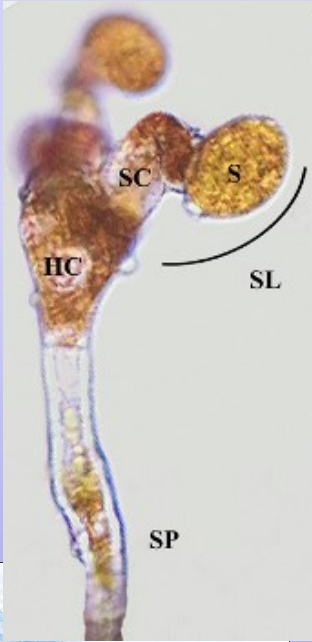
Dasycladales



Acetabularia



Trentepohliales Trentepohlia

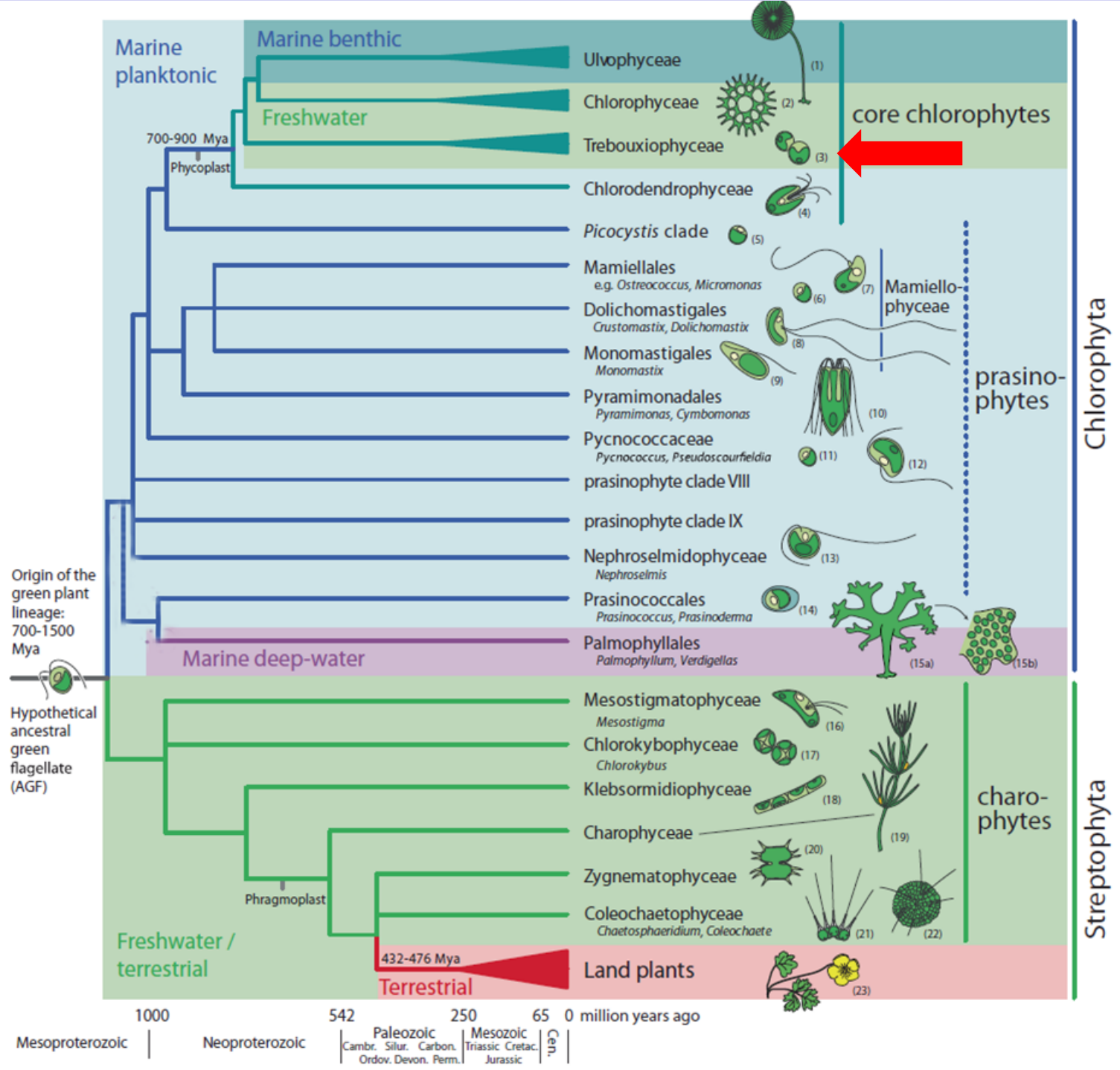


T. jolithus



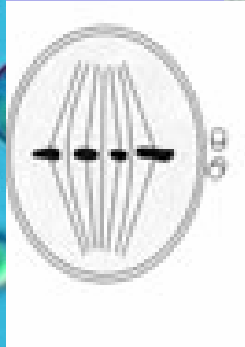
T. umbrina



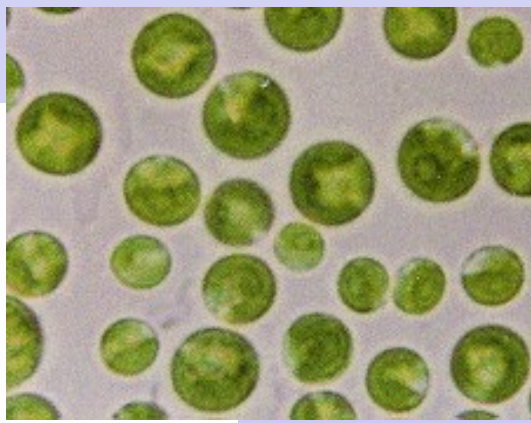


Trebouxiophyceae

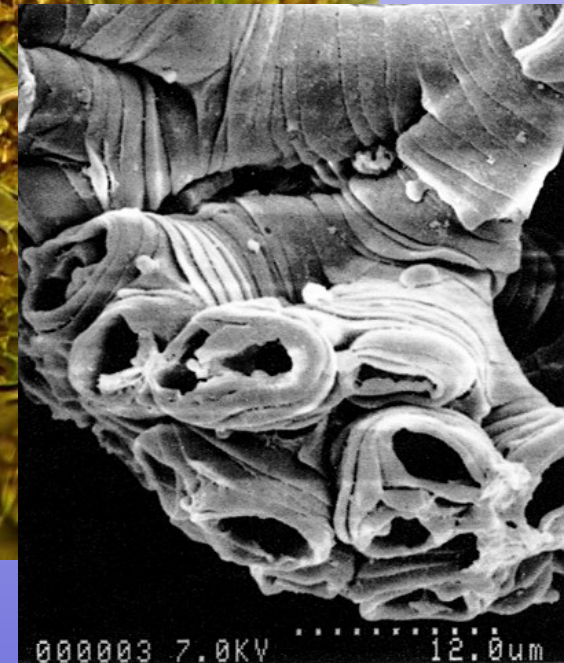
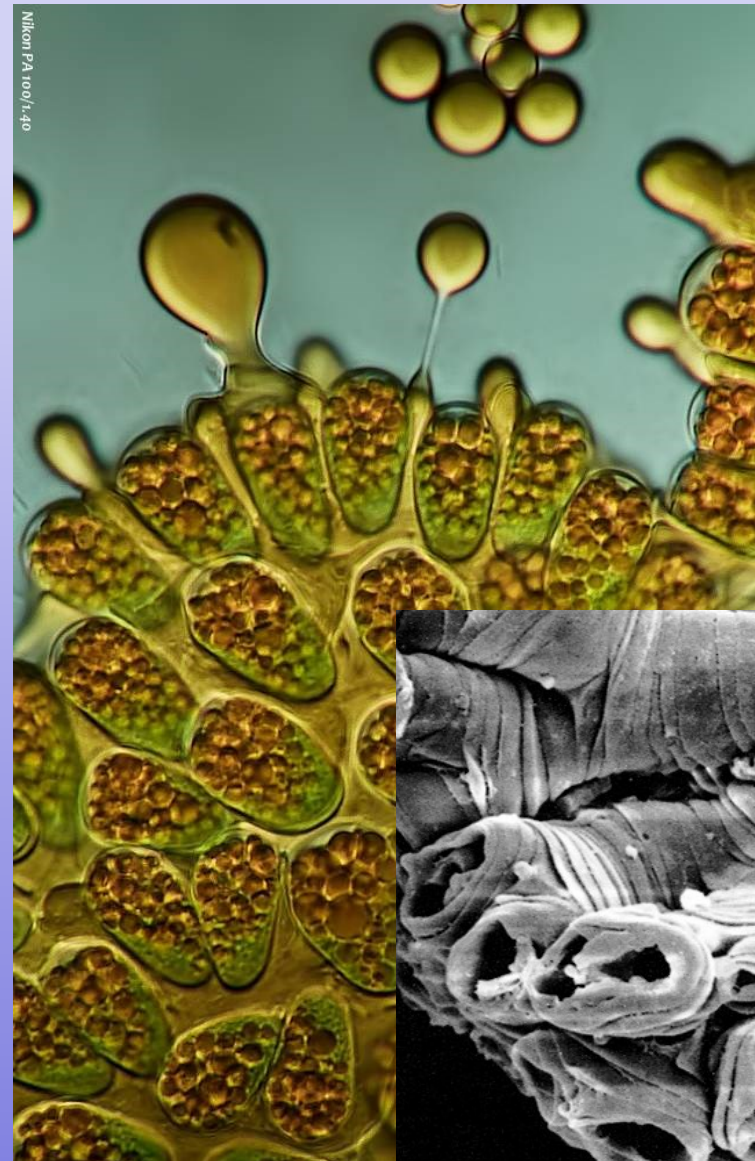
Trebouxia



Chlorella



Botryococcus



Biofuels from algae



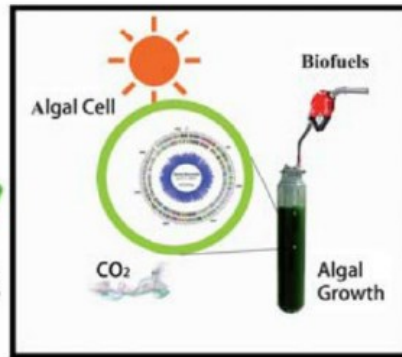
1st generation :
agricultural product
- Corn etc.



2nd generation :
cellulosic biomass
- straw etc.



3rd generation :
oil-producing microalgae



4th generation :
Producing biofuels from engineered algae

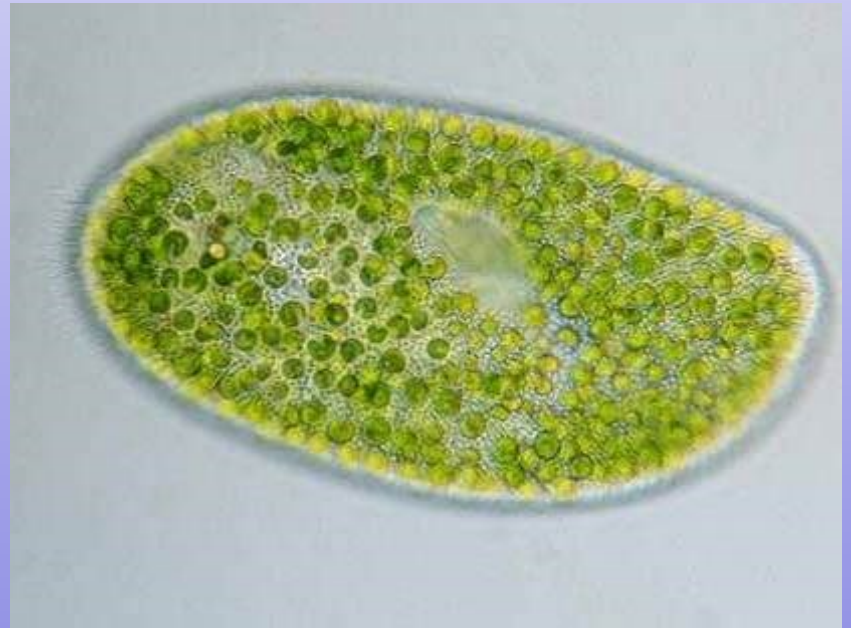
Apatococcus



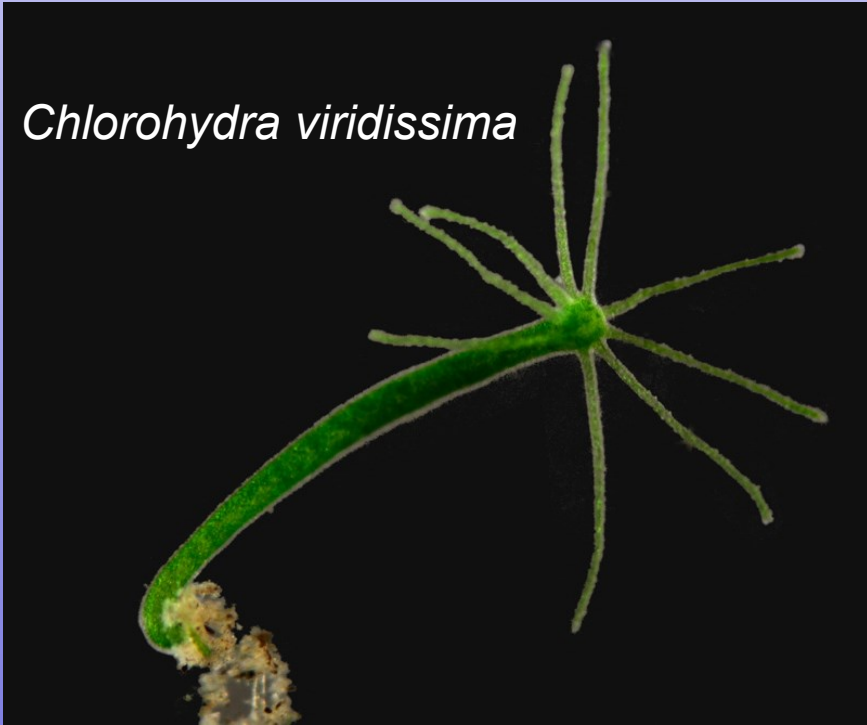
Endosymbiotic *Chlorella*

- polyps (*Chlorohydra*)
- freshwater sponges
- protista (*Paramecium*)

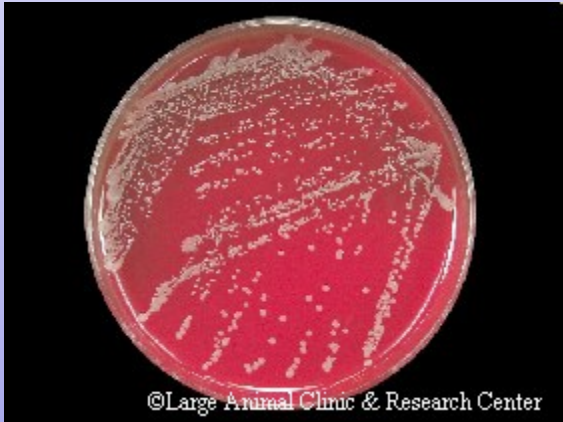
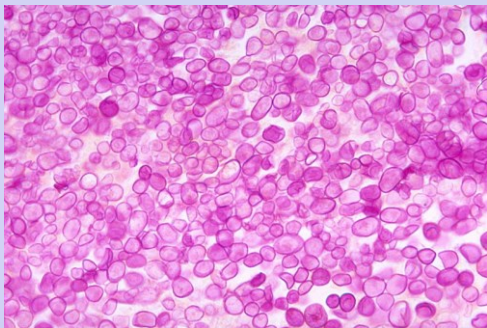
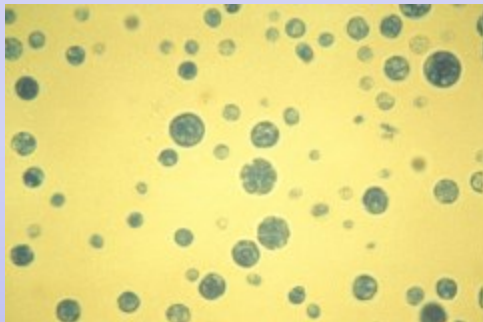
Paramecium bursaria



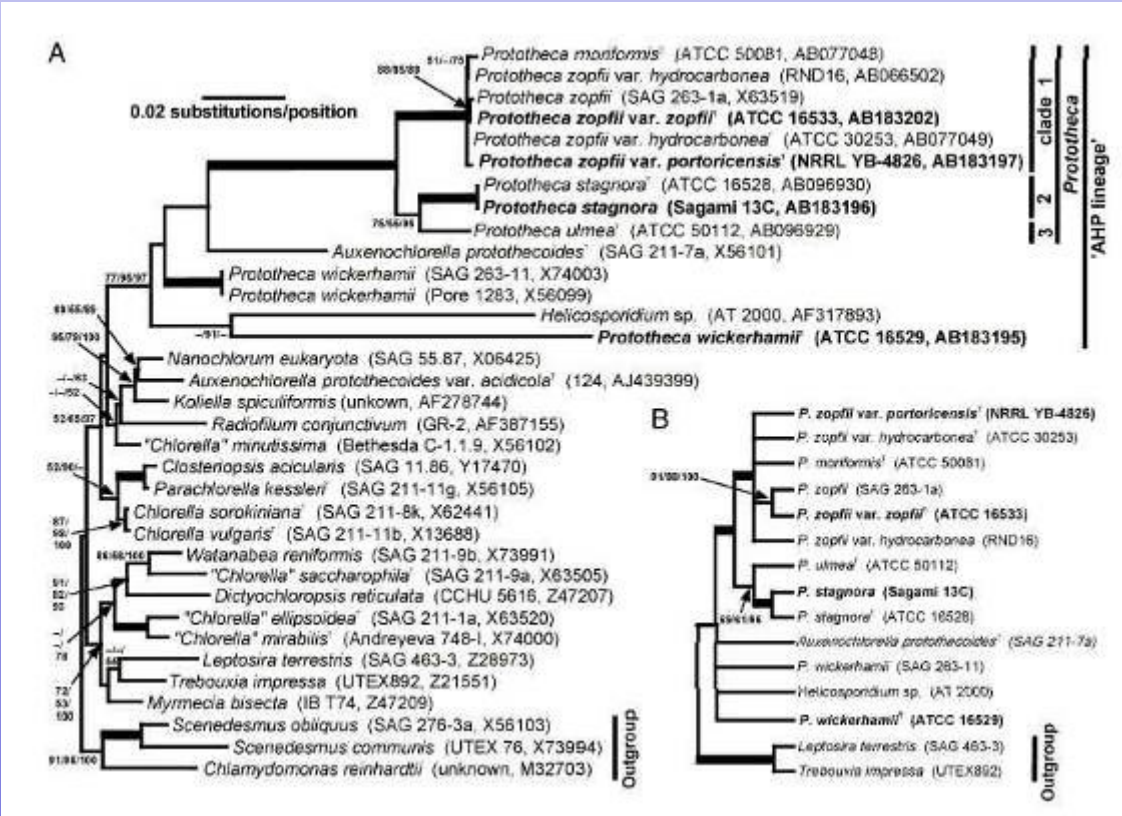
Chlorohydra viridissima

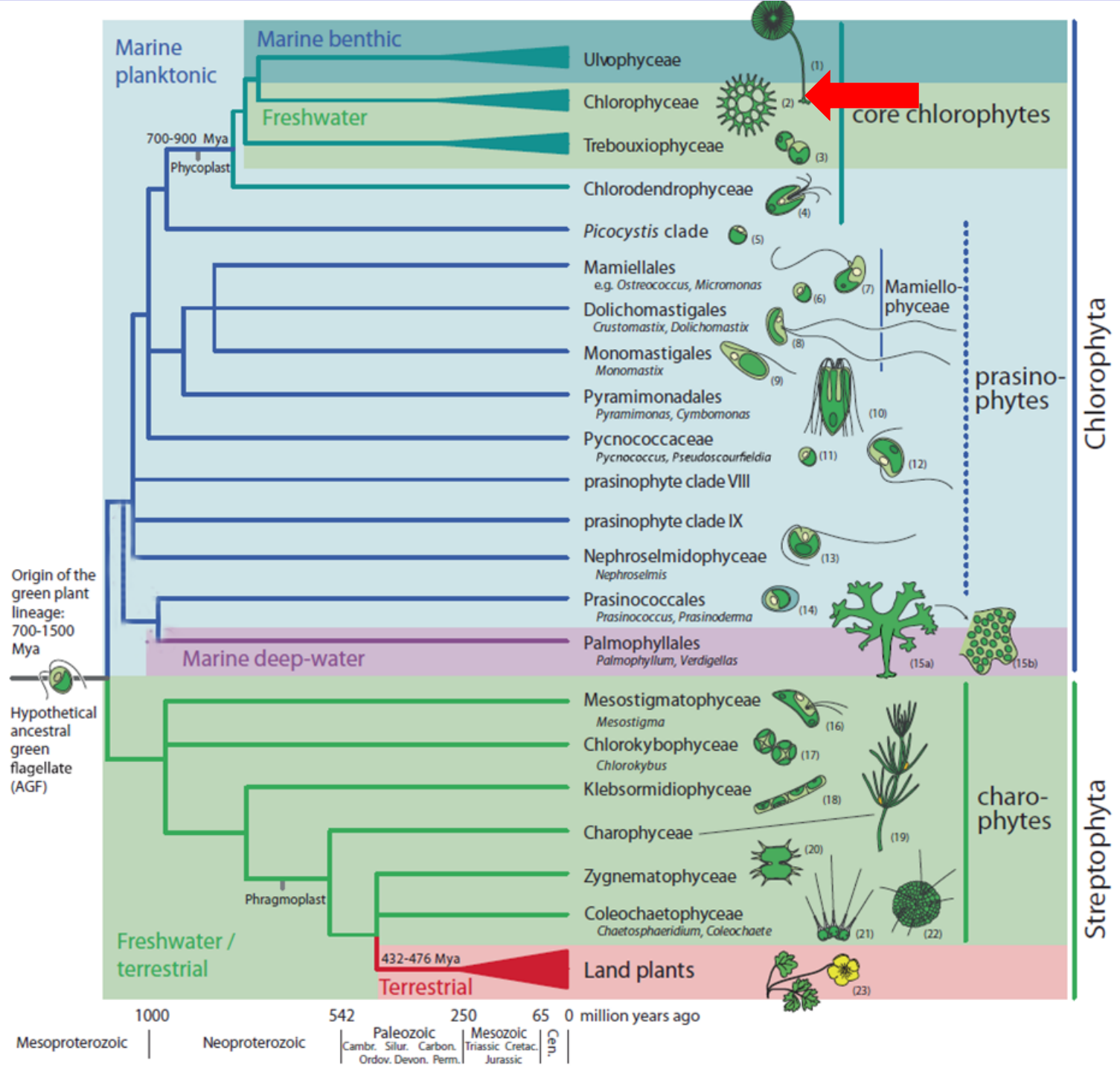


Prototheca – pathogenous

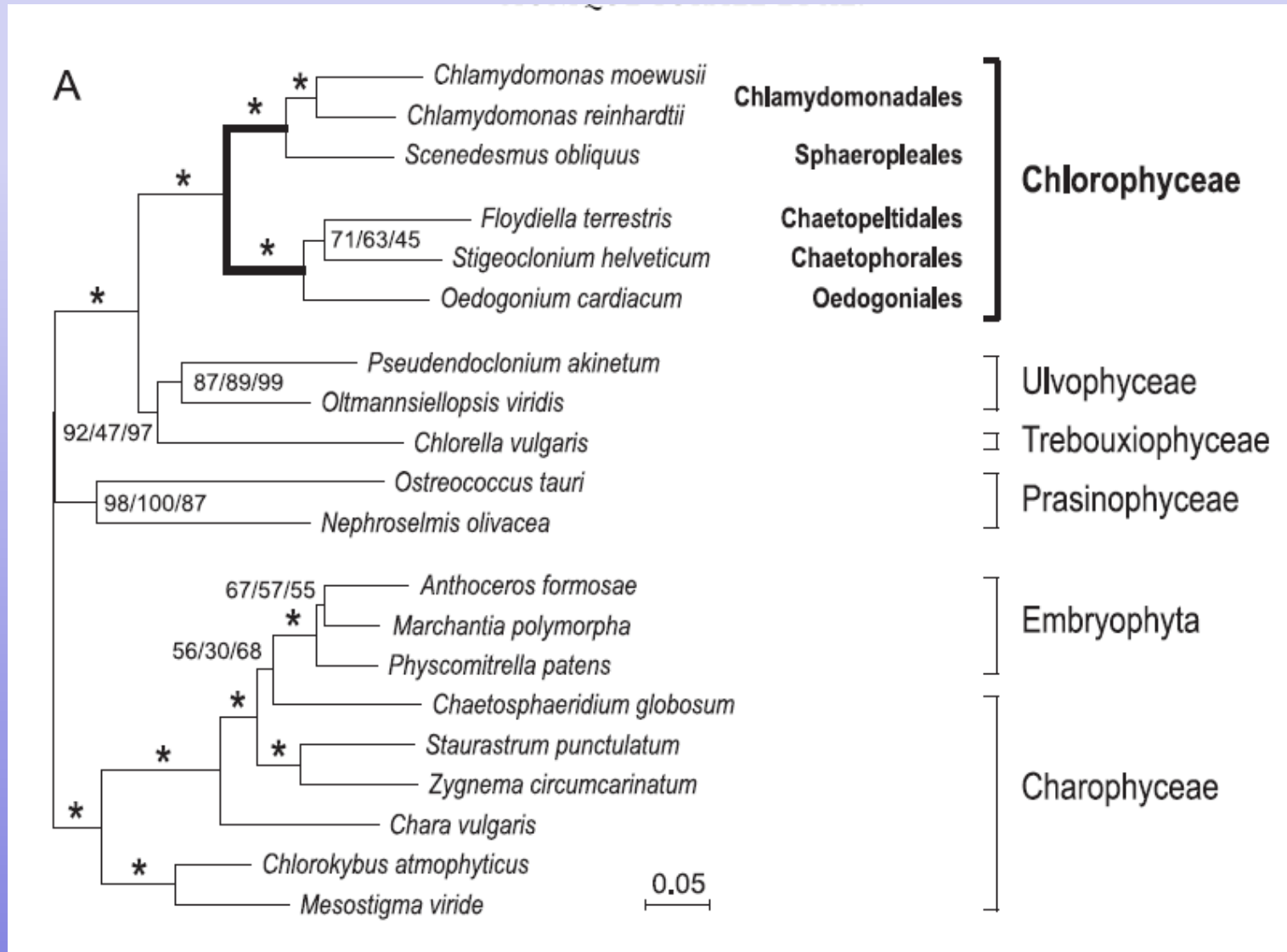


©Large Animal Clinic & Research Center



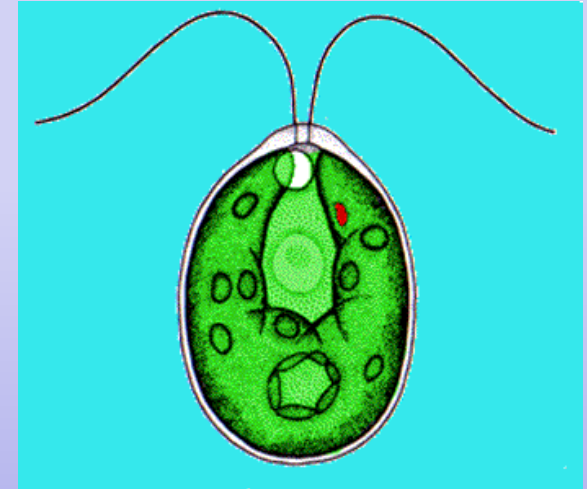
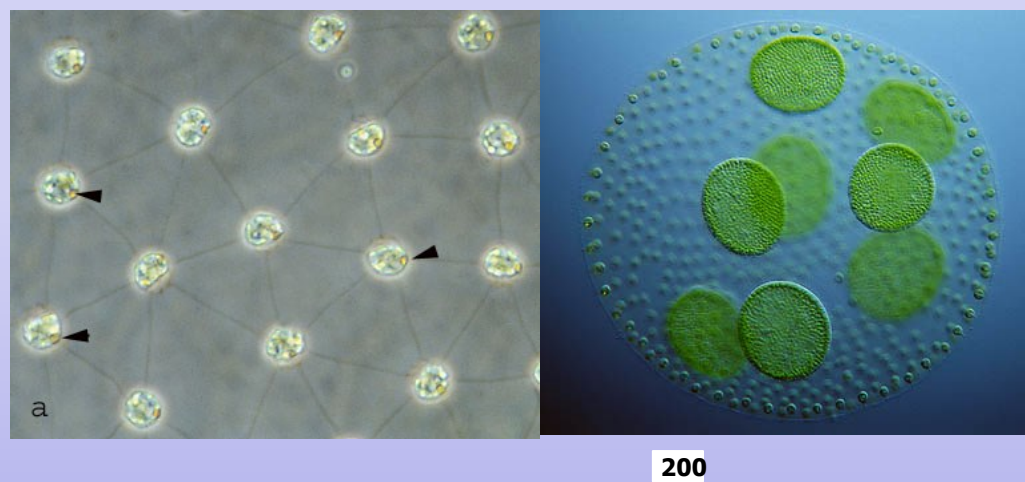


Class: Chlorophyceae

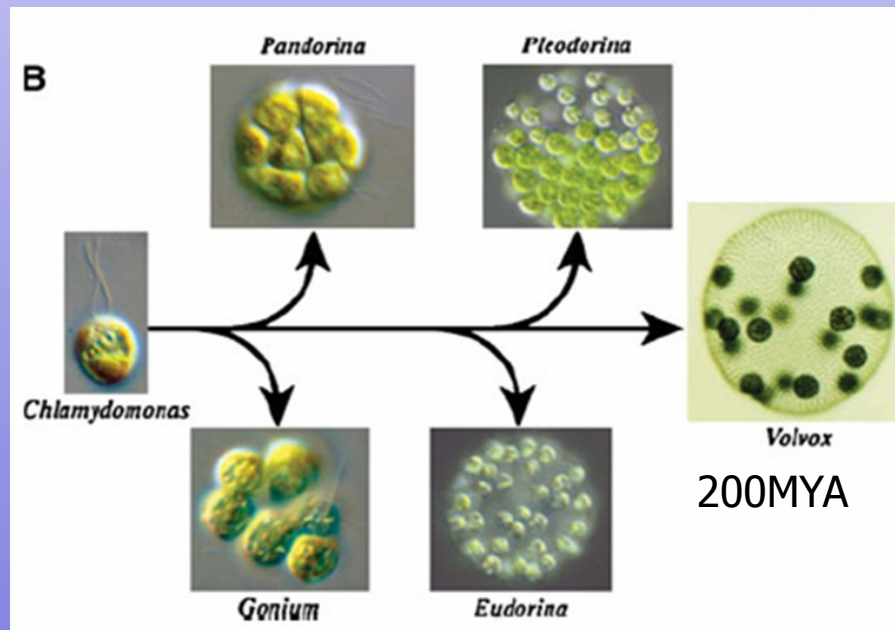


Relationships among the five monophyletic groups of the Chlorophyceae as inferred from 44 chloroplast protein-coding genes of 11 chlorophytes and nine streptophytes. (A) Best maximum-likelihood (Turmel et al. 2008)

Třída: *Chlorophyceae* - *Chlamydomonadales*



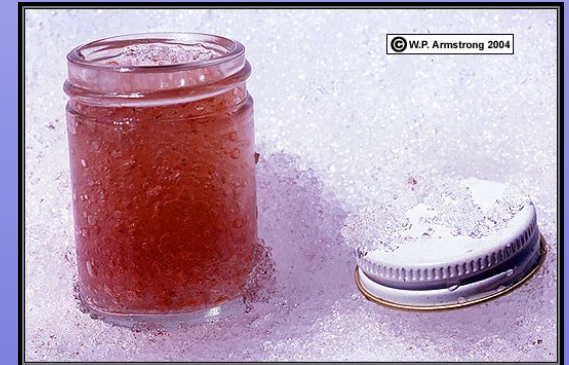
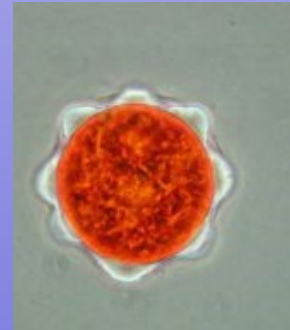
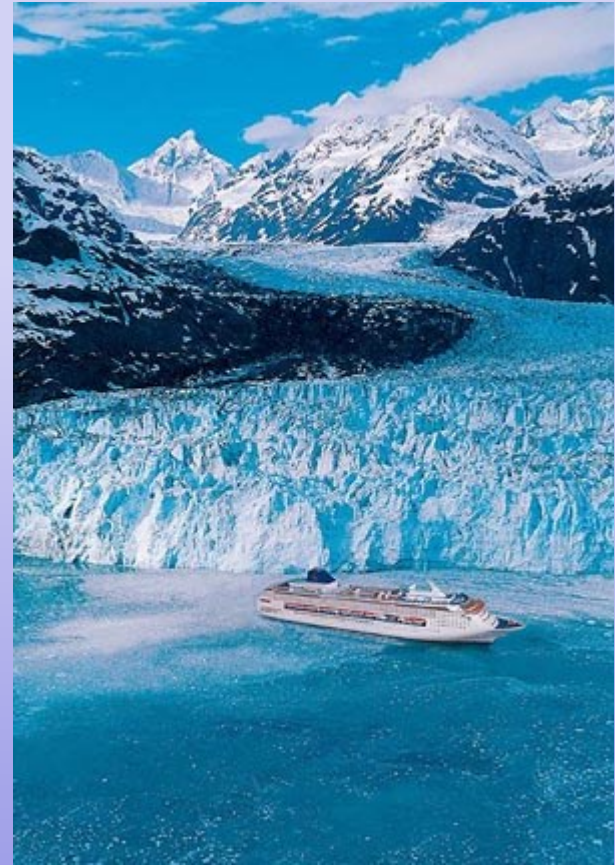
Chlamydomonas reinhardtii



Volvox globator

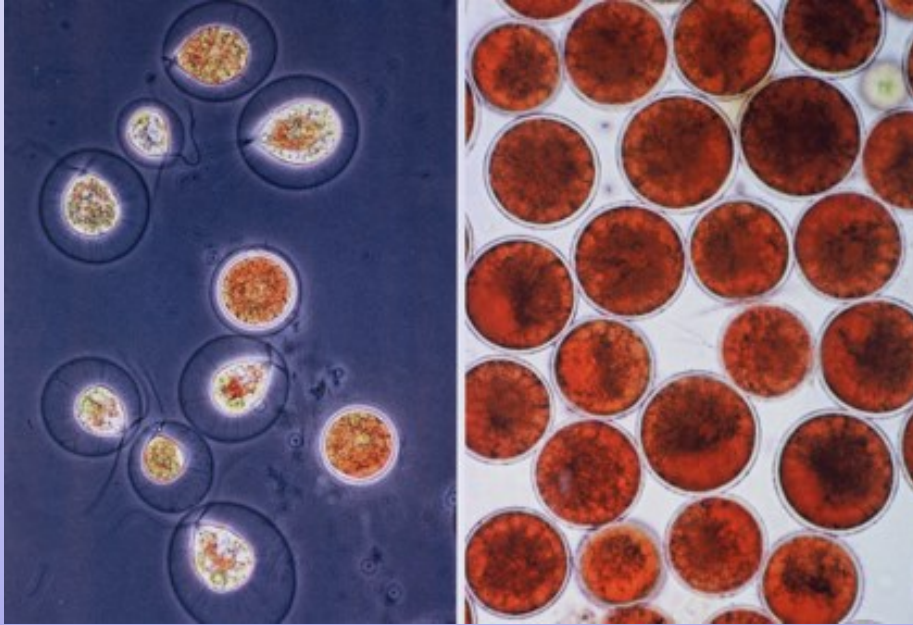
Evolution of multicellularity

Chlamydomonas nivalis

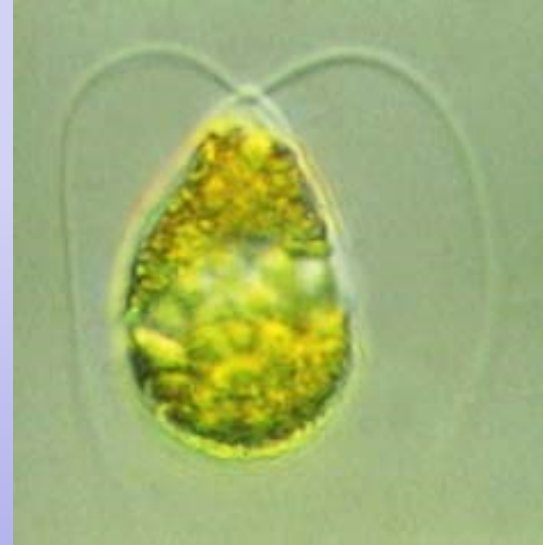


watermelon snow

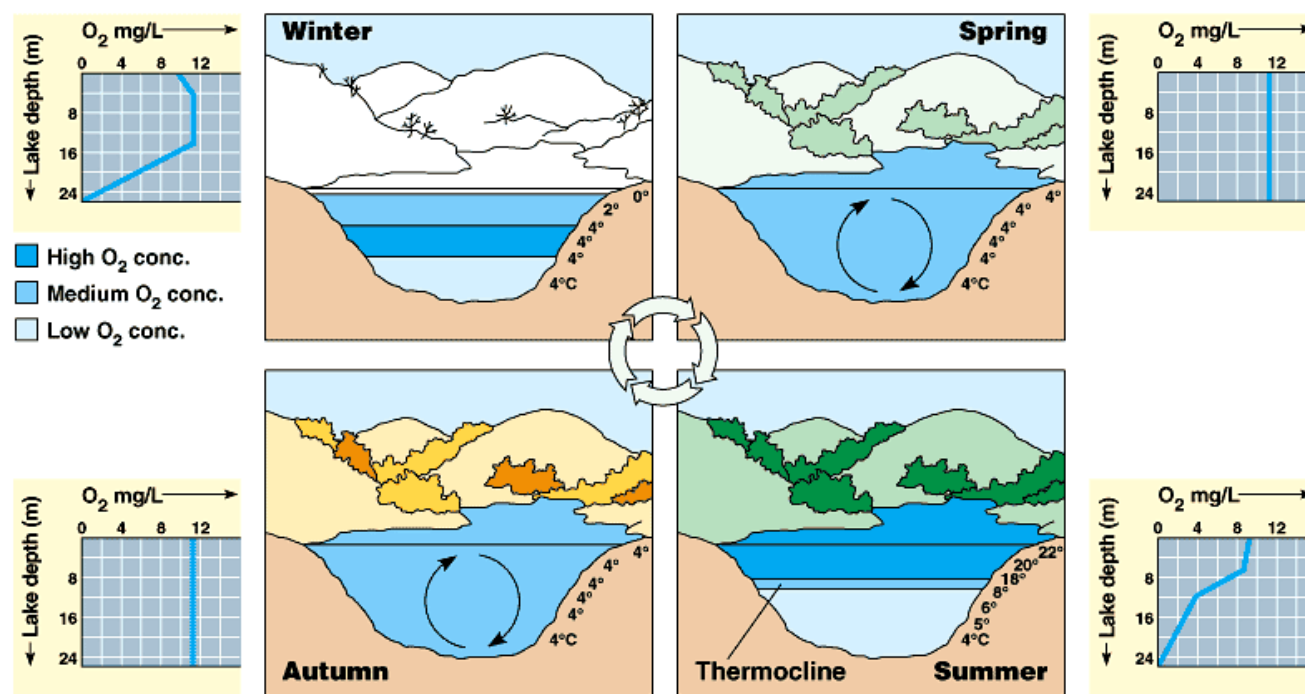
Haematococcus



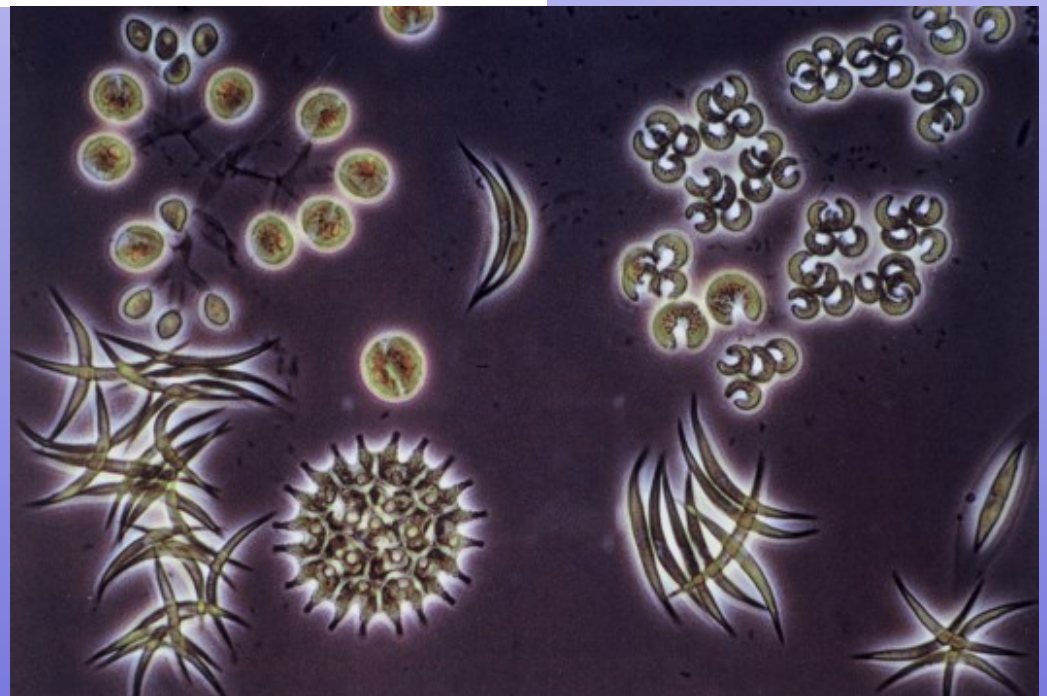
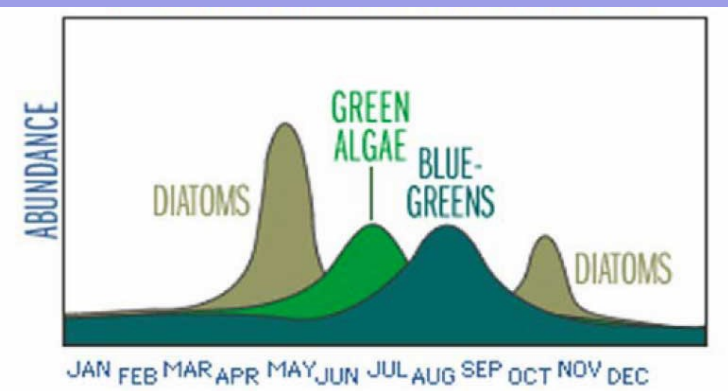
Dunaliella



Temperature stratification in temperate lakes

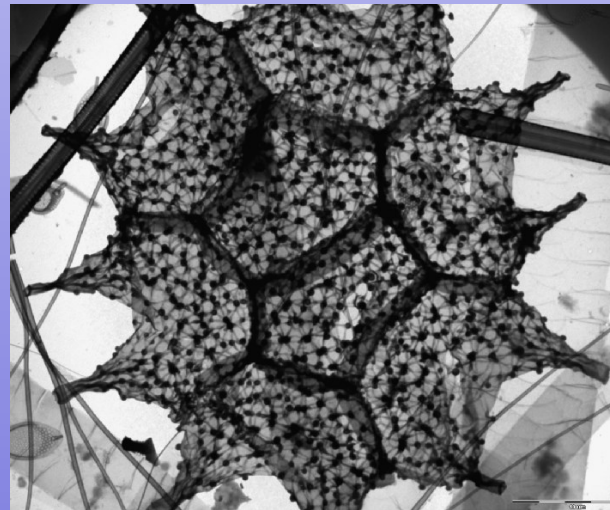
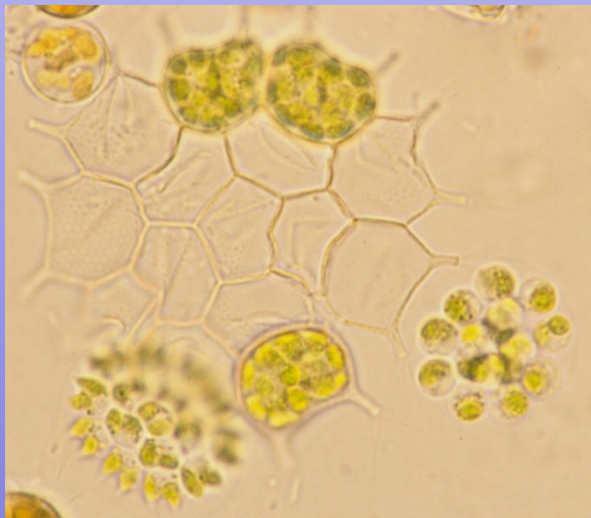
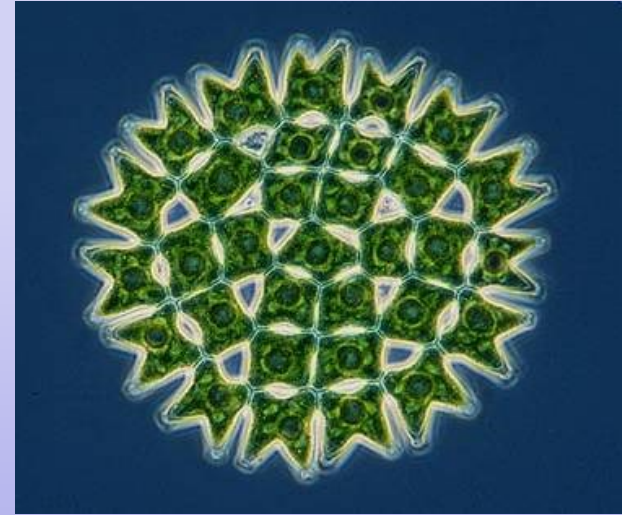
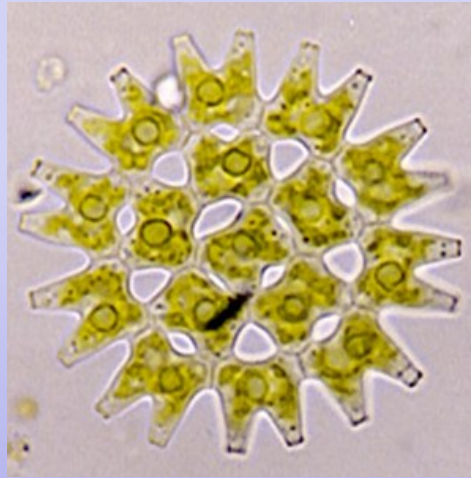


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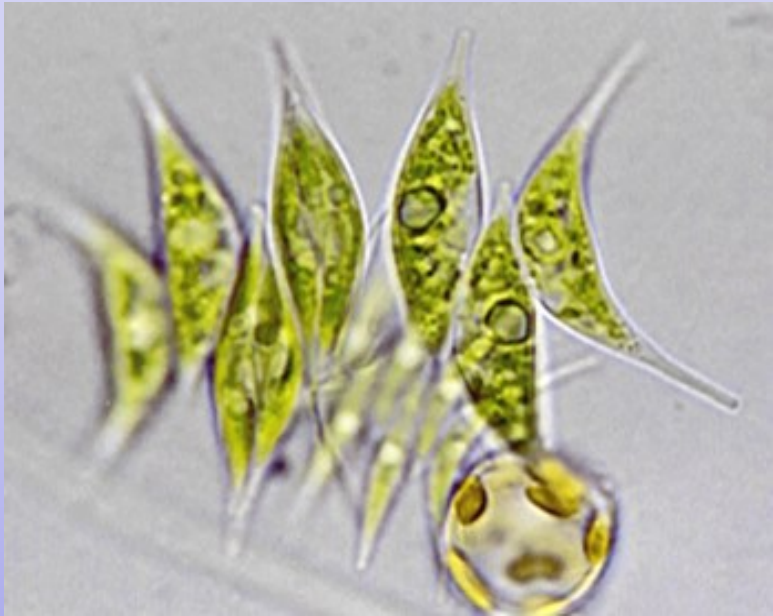
Pediastrum

coenobium

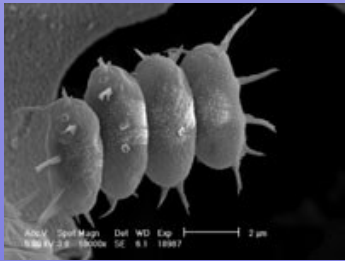
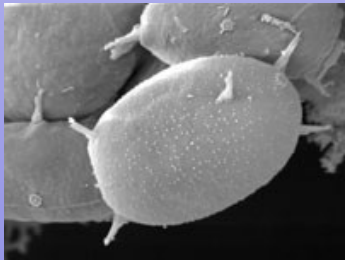
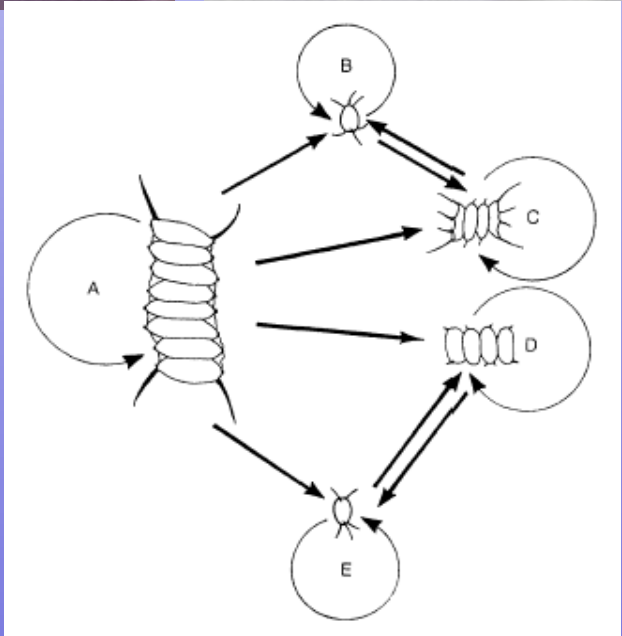


algaenan

Scenedesmus



Desmodesmus



D. subspicatus