

# Flagellate

Single-celled



<b>Size</b>	Small (15–30 $\mu\text{m}$ )
<b>Reproduction Rate</b>	Fast (< 1 day)
<b>Photosynthetic Pigments</b>	Chlorophyll, phycobilins, xanthophylls
<b>Nutrient Competition</b>	Some can eat bacteria, can store food as starch and lipids
<b>Protection</b>	Poor, are food for zooplankton
<b>Movement</b>	Yes, 2 or more flagella
<b>Problems</b>	No known problems
<b>Examples</b>	Chroomonas, Cryptomonas

Image credit: CSIRO. (2000, January 1). Microalgal cultures.  
<https://www.scienceimage.csiro.au/image/7234>

# Diatom

Single-celled



<b>Size</b>	Small (5–30 $\mu\text{m}$ )
<b>Reproduction Rate</b>	Fast (0.5–1 day)
<b>Photosynthetic Pigments</b>	Chlorophyll, beta carotene
<b>Nutrient Competition</b>	Superior, can store food as starch and lipids
<b>Protection</b>	Silica case
<b>Movement</b>	No, some can control sinking
<b>Problems</b>	Blooms, a few are toxic
<b>Examples</b>	Stephanodiscus, Cyclotella

Image credit: Canter-Lund, H. (2016). *Stephanodiscus*. Freshwater Biological Association.  
<http://www.environmentdata.org/archive/fbaia:3040>

# Diatom

Colony with many cells

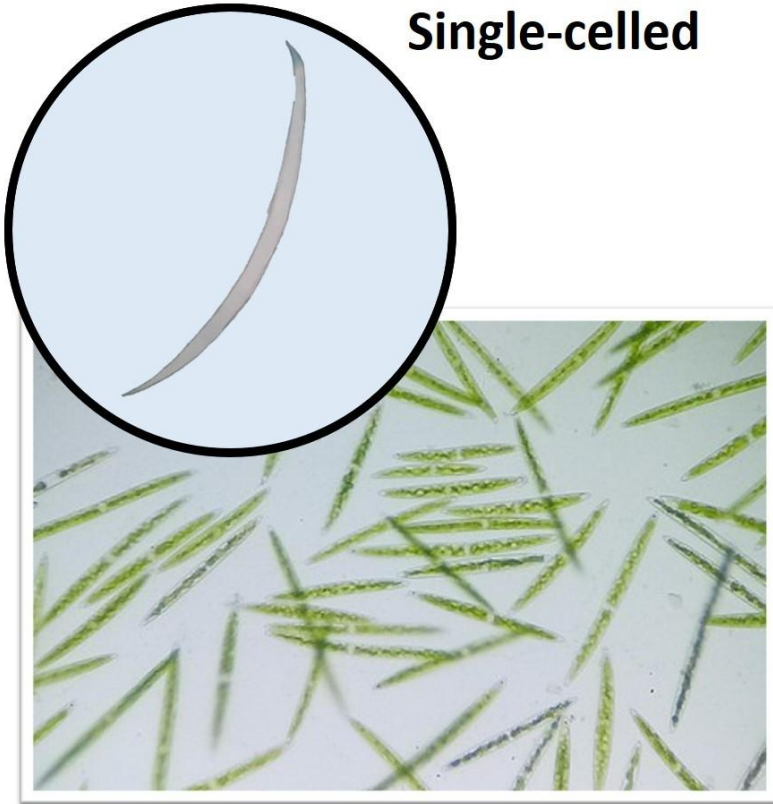


<b>Size</b>	Large (cell: 11–70 $\mu\text{m}$ , colony: 20,000–30,000 $\mu\text{m}$ )
<b>Reproduction Rate</b>	Fast (< 1 day)
<b>Photosynthetic Pigments</b>	Chlorophyll, beta carotene
<b>Nutrient Competition</b>	Superior, can store food as starch and lipids
<b>Protection</b>	Silica case, large colony
<b>Movement</b>	No, some can control sinking
<b>Problems</b>	Blooms, a few are toxic
<b>Examples</b>	Melosira, Skeletonema

Image credit: Peters, K. (2009). *Melosira varians*. Wikimedia Commons.  
[https://commons.wikimedia.org/wiki/File:Melosira\\_varians.jpeg](https://commons.wikimedia.org/wiki/File:Melosira_varians.jpeg)

# Green Algae

Single-celled

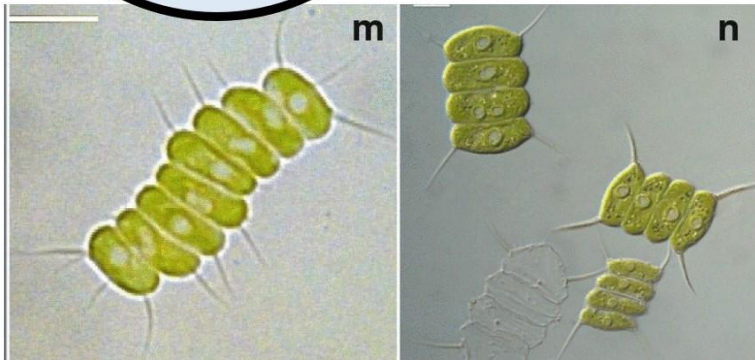
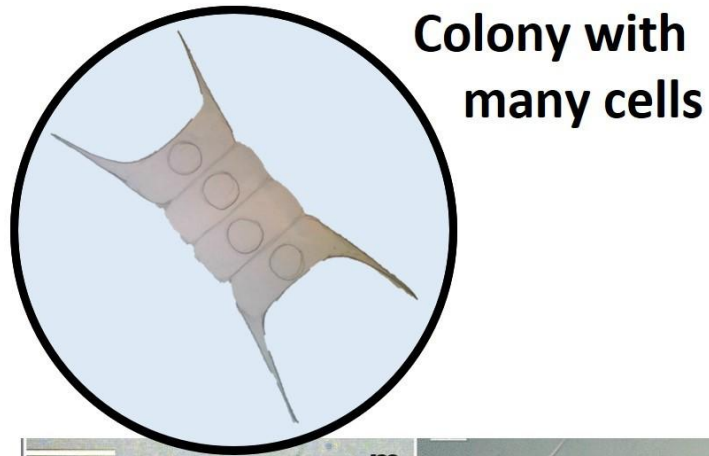


<b>Size</b>	Large (15–150 $\mu\text{m}$ )
<b>Reproduction Rate</b>	Fast (< 1 day)
<b>Photosynthetic Pigments</b>	Chlorophyll, beta carotene, xanthophylls
<b>Nutrient Competition</b>	Can store food as starch, can release chemicals that slow the growth of other algae
<b>Protection</b>	Large size
<b>Movement</b>	No
<b>Problems</b>	Blooms
<b>Examples</b>	Ankistrodesmus, Closterium

Image credit: Fritzmann2002. (2017). Closterium under a light microscope. Wikimedia Commons. [https://en.wikipedia.org/wiki/File:Closterium\\_under\\_a\\_light\\_microscope.jpg](https://en.wikipedia.org/wiki/File:Closterium_under_a_light_microscope.jpg)



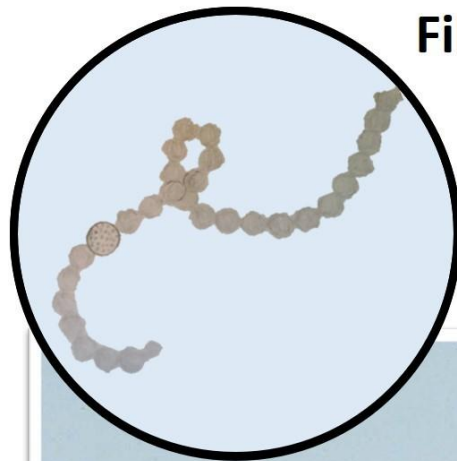
# Green Algae



<b>Size</b>	Small (cell: 15–35 $\mu\text{m}$ , colony: up to 200 $\mu\text{m}$ )
<b>Reproduction Rate</b>	Fast (0.5–1 day)
<b>Photosynthetic Pigments</b>	Chlorophyll, beta carotene, xanthophylls
<b>Nutrient Competition</b>	Can store food as starch, can release chemicals that slow the growth of other algae
<b>Protection</b>	Large colony, shape, spines
<b>Movement</b>	No
<b>Problems</b>	Blooms
<b>Examples</b>	Scenedesmus, Pediastrum

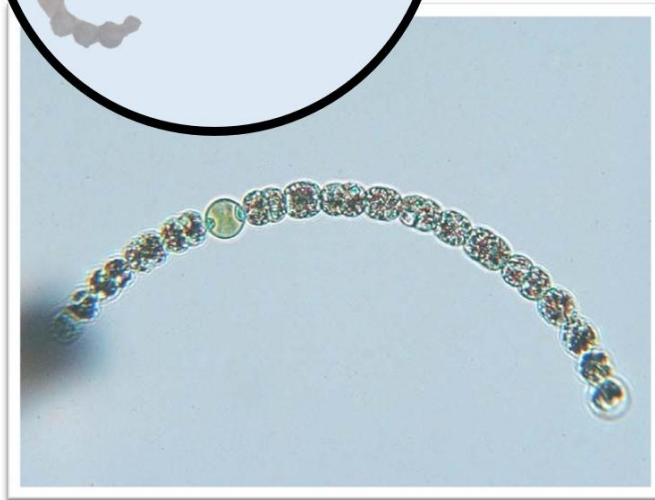
Image credit: Lortou, U., & Gkelis, S. (2019). Polyphasic taxonomy of green algae strains isolated from Mediterranean freshwaters. *Journal of Biological Research-Thessaloniki*, 26, 11. <https://doi.org/10.1186/s40709-019-0105-y>

# Blue-Green Algae



**Filament with many cells**

**Note:** Also called cyanobacteria, these algae are bacteria, not plants.



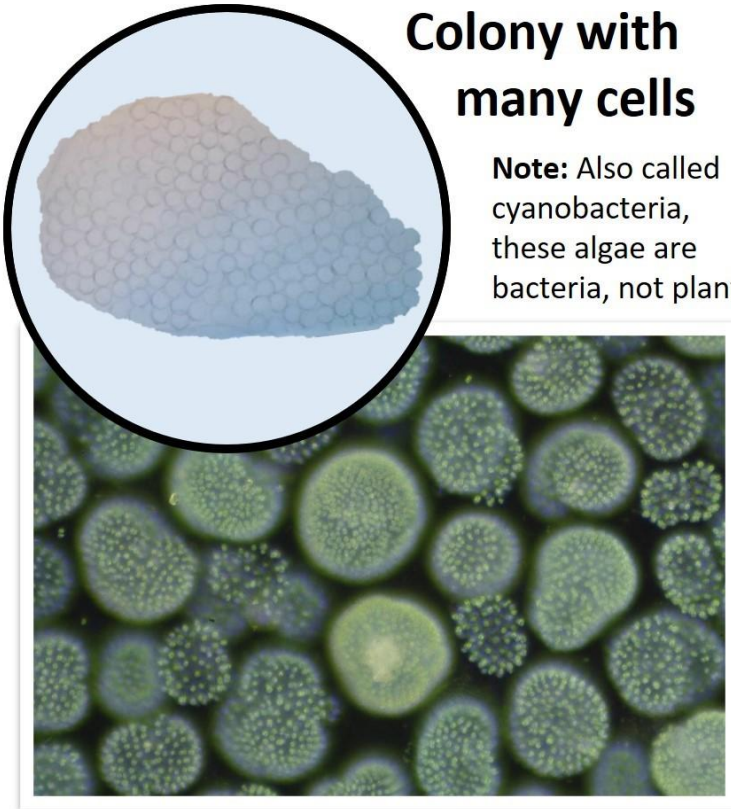
<b>Size</b>	Large (140–2,010 $\mu\text{m}$ )
<b>Reproduction Rate</b>	Slow (1–1.5 days)
<b>Photosynthetic Pigments</b>	Chlorophyll, beta carotene, phycobilins
<b>Nutrient Competition</b>	Fixes nitrogen that other algae can't use
<b>Protection</b>	Large size, can produce toxins
<b>Movement</b>	No, can control sinking
<b>Problems</b>	Blooms, toxins, bad smell/taste, irritates skin
<b>Examples</b>	Anabaena, Oscillatoria

Image credit: Bdcarl. (2012, April 13). *Anabaena circinalis*. Wikimedia Commons.  
[https://commons.wikimedia.org/wiki/File:Anabaena\\_circinalis.jpg](https://commons.wikimedia.org/wiki/File:Anabaena_circinalis.jpg)

# Blue-Green Algae

Colony with  
many cells

**Note:** Also called cyanobacteria, these algae are bacteria, not plants.



<b>Size</b>	Large (2–200 $\mu\text{m}$ )
<b>Reproduction Rate</b>	Slow (1–2 days)
<b>Photosynthetic Pigments</b>	Chlorophyll, beta carotene, phycobilins
<b>Nutrient Competition</b>	Fixes nitrogen other algae can't use, makes chemicals that slow the growth of other algae
<b>Protection</b>	Large colony, can produce toxins
<b>Movement</b>	No, can control sinking
<b>Problems</b>	Blooms, toxins, bad smell/taste
<b>Examples</b>	Microcystis, Merismopedia

Image credit: Specious Reasons. (2010, June 22). Serious bacterial bloom. Flickr.  
<https://www.flickr.com/photos/28594931@N03/4726267363/>