Key to the Common Summer Net Phytoplankton of Lakes of the PA-NY Lake Erie Region

Original edition August 2017

Key composed by J.M. Campbell, with photography by J.O. Campbell, A. Belfiore & T. Surgener

1a Eukaryotic cell type, with distinct cell walls and chloroplasts evident

1b Prokaryotic cell type, cells usually very small and lacking distinct internal structures, cells often arranged in filaments or globular colonies (Cyanobacteria)

2a Colonies of cells having transparent cell walls of precisely symmetrical form (roughly rectangular or cylindrical) and in bands, filaments, or star-shaped arrangement (diatoms)

2b Colonies of cells with other characteristics or large cells not precisely symmetrical

3a Cells elongated cylinders arranged end-to-end in straight or curved filaments - *Aulacoseira* (Figure 1a)

3b Cells elongated and arranged side-by-side in bands of varying length - *Fragilaria* (Figure 1b)

3c Cells elongated and arranged in a star-like configuration - *Asterionella* (Figure 1c)

4a Large single cell with conspicuous spines projecting, yellow-brown color; in live samples, cell may be observed moving with aid of large flagella - dinoflagellate - *Ceratium hirundinella* (Figure 2)

4b Cells in pairs or colonies, chloroplasts yellowish-green or brighter grass-green

5a Cells with usually grass-green chloroplasts in colonies of 2-to-many cells (green algae)

5b Cells yellowish green, sometimes with visible flagella, usually in colonies (chrysophyceans)
6a Colony in the form of a basically circular flat plate, cells irregular with short spines (*Pediastrum*)………7
6b Pair of cells fused in the middle, each cell with 3 antler-like processes............... *Staurastrum* (Figure 3a)
6c Spherical cells arranged irregularly in a mucilaginous sheath; cells may vary in size and number (up to 16 or more), and may include one or more 2 or 4-celled daughter colonies...................... *Gloeocystis* (Figure 3b)

Figure 3. Green algae *Staurastrum* (a) and *Gloeocystis* (b)

7a Each cell in the outer ring of colony with a single elongated spine........*Pediastrum simplex* (Figure 4a)
7b Each cell in the outer ring of colony with two projecting spines...............*Pediastrum duplex* (Figure 4b)

Figure 4. Green algae *Pediastrum simplex* (a) and *Pediastrum duplex* (b).

8a Spherical colony of elliptical flagellated cells radiating from a central point.......... *Synura* (Figure 5a)
8b Branched colony of vase-like transparent structures, each containing a cell......*Dinobryon* (Figure 5b)

Figure 5. Chrysophyceans *Synura* (a) and *Dinobryon* (b)

9a Colonies are elongated or broken filaments, with cells bead-like, short cylinders, or flat and tightly stacked like coins (filamentous cyanobacteria)..................................................................................................................................................10
9b Colonies with approximately spherical shape or irregular or in patchy globular forms, often enclosed in a transparent sheath, with many small spherical or elliptical-shaped cells..........................................................13
10a Cells in filaments distinctly bead-like, and with some slightly larger and somewhat transparent cells within trichome or occasionally found at ends (Anabaena species)........................................................................11

10b Cells in filaments not bead-like.........................................................................................................................................................................................12

11a Filament a distinct spiral or broken in short curled lengths............... Anabaena sprioides (Figure 6a)

11b Filament straight or slightly bent............... Anabaena straight trichome c.f. wisconsinence (Figure 6b)

11c Filaments curled in a jumbled mass, often with protozoans attached.... Anabaena flos-aquae (Figure 6c)

12a Short cylindrical cells in narrow filaments containing occasional slightly wider and much elongated transparent cells; in live samples, filaments occur in large bundles ................. Aphanizomenon (Figure 7)

12b Filaments with flat disc-like cells tightly packed like stacked coins and a transparent sheath often visible extending beyond end of filament...................................................... Lyngbya (Figure 8)
12c Filaments long and tapering, radiating from the center of a macroscopic ball... *Gloeotrichia* (Figure 9)

![Image](image1.png)  
*Figure 9. Cyanobacterium *Gloeotrichia echinulata*.  

13a Cells densely filling and neatly and aligned around periphery of a compact elliptical-spherical colony that often is enclosed in a transparent sheath................................. *Woronichinia* (Figure 10a)

13b Cells compact or loosely dispersed in colonies of varying shapes and sizes....... *Microcystis* (Figure 10b-d)

![Image](image2.png)  
*Figure 10a. Cyanobacterium *Woronichinia naegeliana*.  

![Image](image3.png)  
*Figure 10 b-d. Cyanobacterium *Microcystis* showing colony variations.*