Green Algae - 2017

David Overholt

Much of our activity is orientated to monitoring blue green algae (cyanophytae) and rightly so as they can produce toxins harmful to human health, we still should bear in mind that any algae in large quantities can also become a nuisance. Like most of Ontario lakes, White Lake has a rich microcosm of green algae comprising hundreds of species. Here are some examples that were observed in 2017.

Colonial Green Algae

These microscopic colonial green algae occur in large numbers when food and temperature just is right. Their abundance is not always apparent at the surface. Both Synura (spherical colonies) and *Dinobryon* (tree branches) tumble about using their paired flagella on each individual cell. Synura and Dinobryon can produce a distinct odour to water when present in large numbers. For this reason, they are of interest to water managers. Green algae do better in cooler waters which blue green algae do not prefer. Thus, they can be dominant in the spring and fall and out-compete blue greens for available resources.



2017 07 07 DINOBRYON & SYNURA Pickerel Bay depth 4.9m

Predation on Green Algae

Green algae are a source of food for zooplankton and other small crustaceans. One group of animals unique to fresh waters are the rotifers; microscopic animals with voracious appetites. At right is a photo of *Asplanchna*. At first glance it looks to be as complex as a cellophane bag! This is one of the largest rotifers. At upper right is an opening to its gut around which cilia swirl to drive food into its digestive system.

The photos below show *Asplanshn*a which has dined exclusively on the green alga *Dinobryon*! On the right you can see the empty tubes (loricas) that once held the living cells of the green alga.







A Scaly Green Algae

Green algae take a wide variety of shapes and sizes. Some are very mobile. Mallamonas are scaled single-celled organisms. Some have long bristles and body scales that are made of silica. Mallomonas move about by using a long single whip-like flagellum, which can just be seen at the cell's apex in the photo at right. The flagellum appears as a thin coiling white line at bottom of the photo. There is a saw-toothed fringe that surrounds the cell. This is actually overlapping transparent silica scales that become visible when seen edge-on. They cover the entire cell.

Mallomonas are sensitive indicators of the pH and conductivity of natural waters and because their species-specific scales are frequently preserved in lake sediments they are useful in reconstructing the historic conditions of a lake. *M. caudate* frequents a range of alkaline waters.



Filamentous Green Algae

In 2017, we observed clouds of pale yellowish green algae in White Lake. This green alga is called *Sirogonium* and forms clear hollow sheaths that hold chloroplasts. In the photo below, these appear as plates or rods depending on the angle viewed. When two filaments

are nearby they form a protuberance towards one another. This process (conjugation) will result in the formation of a new strand (see composite photo below at right).





Another green alga is *Spirogyra*, which can be seen attached to rocks or wharves. It forms dark green filaments made up of sheaths containing helical chloroplast structures.





Colonial Green Algae

A variety of colonial green algae arranges itself in paired cells increasing in multiples that can lead to cubic structures contained within a transparent sphere of mucilage.





The photo to the left below shows cells undergoing cell division. The photo to the right clearly shows the mucus sphere encasing the cells.





A non-motile green algae colony of *Pediastrum* is shown below. Its remains can persist in sediments for eons eventually forming siltstones.



18 Sept, 2017; Pickerel Bay 100x

Blue Green Algae – Missing in Action!

David Overholt

The filamentous blue- green algae *Lyngbya* is a normal component of the phytoplankton in White Lake. It should be found in abundance during the months of June to September. Its presence could be described as the dominant phytoplankton of surface waters during the warm water months. This was certainly the case in prior years where we found the species in almost every water sample we studied.

The photos below show the relative abundance of the filamentous *Lyngbya* in two typical water samples we studied in 2015 and 2016:



yngbya 31 08 2015 Three Mile Bay



In 2017, it was remarkable that *Lyngbya* did not appear in the surface waters of Three Mile Bay or elsewhere in the lake as is shown in the photomicrograph at right. The algae in the photo which also appears to be needle like in nature is in fact a green-algae and not *Lyngbya*.

We do not know why this has occurred but will be monitoring its presence or absence in future years.

