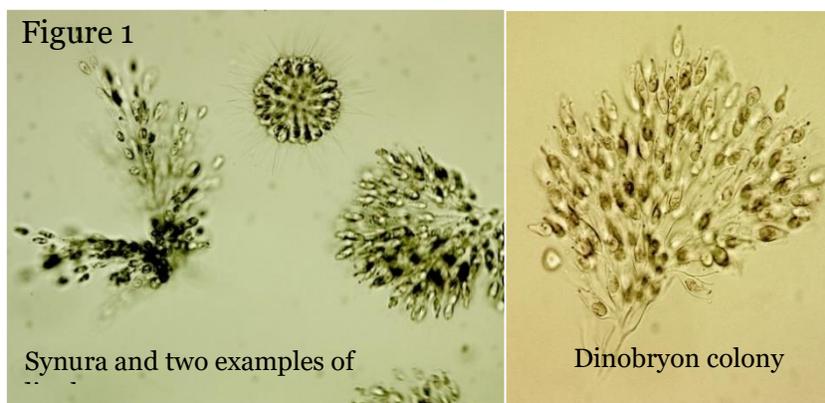


The Chrysophytes: Golden Brown Algae of White Lake - 2018

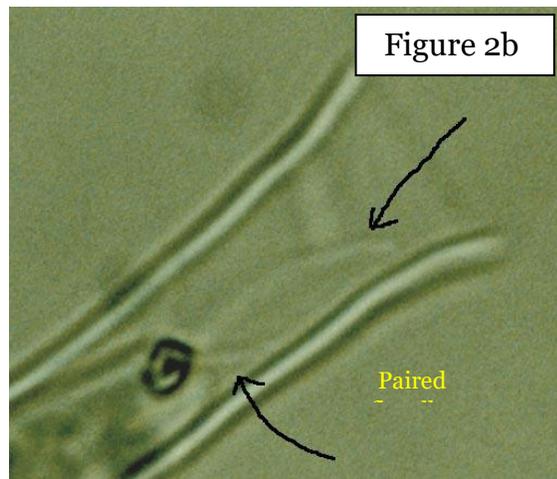
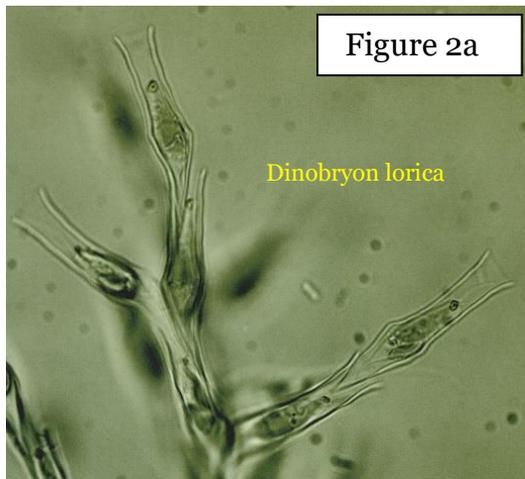
Dave Overholt

Much attention is directed to the green and blue-green algae in White Lake. But White Lake is characterized by more than these two phytoplankton groups. In fact, during the summer months and into the fall of 2018, White Lake could be described as a 'Chrysophyte' lake; a lake composed of 'Golden Brown' Algae. Chrysophytes have the ability to exploit nutrient resources in ways not available to other algae. Their chloroplasts support nutrient production through photosynthesis as would be expected for an alga but they also ingest other organisms such as bacteria. This capability allows them to use both autotrophic and heterotrophic processes¹, shifting their dependence according to the situation most favoured. For this reason they are described as 'mixotrophic' specialists. Two common members of the Chrysophyte group are Synura and Dinobryon (Figure 1). Both of these types form organized colonies made up of individual cells. Both use flagella to propel themselves through the water column.

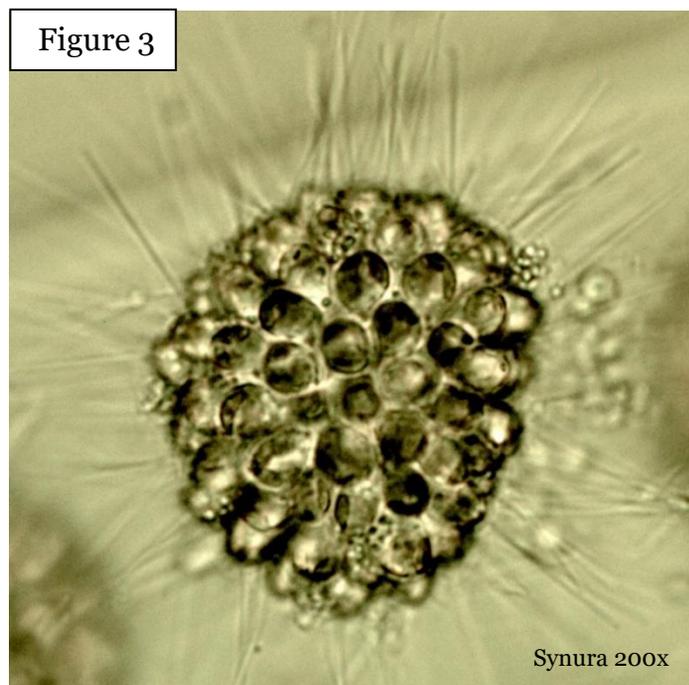


The individual cells of Dinobryon (Figure 2) form clear vase-shaped structures called lorica that are composed of cellulose. Their progeny grow from the interior wall of each parent lorica. The succession of lorici result in a branching tree-like structure. Figure 2b below indicates the barely visible paired flagella of dinobryon. These contribute to the rapid tumbling motion of the entire colony. It is thought that bacteria are absorbed when they become trapped between these flagella.

¹ Technically, the definition is that **autotrophs** obtain carbon from inorganic sources like carbon dioxide (CO₂) while **heterotrophs** get their reduced carbon from other organisms. **Autotrophs** are usually plants; they are also called "self feeders" or "primary producers".



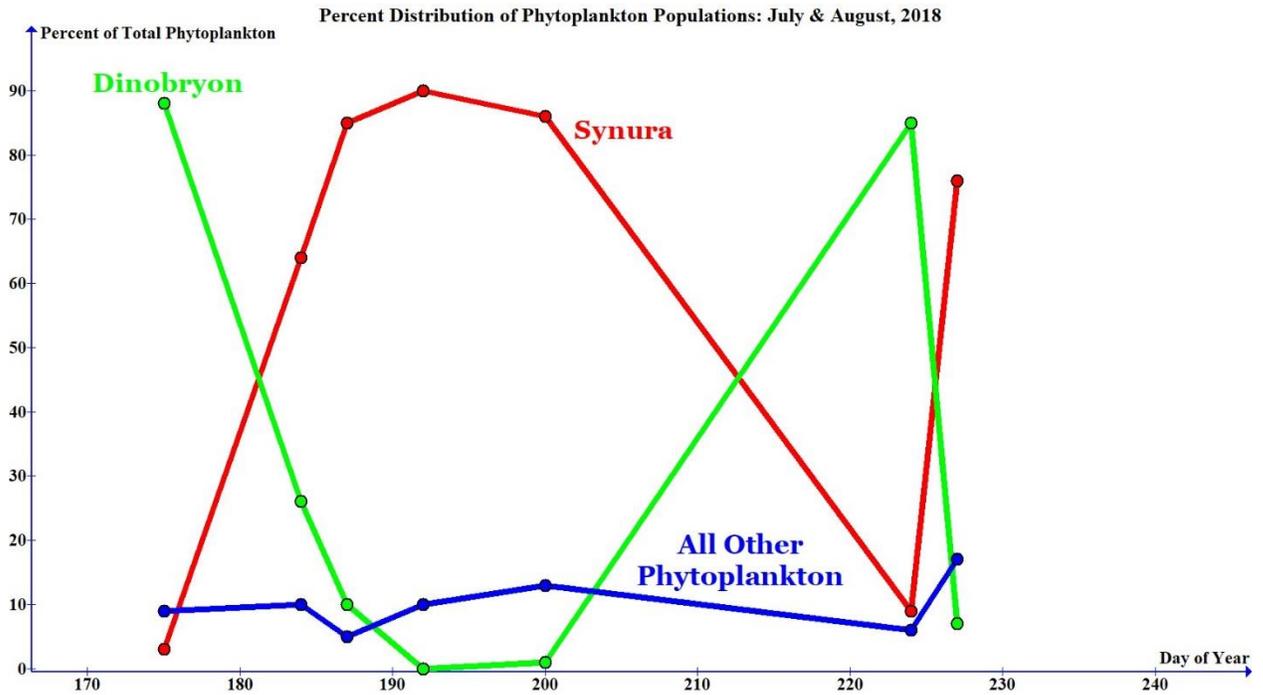
Synura (Figure 3) is another free swimming chrysophyte colony. Each individual cell possesses a pair of flagella of unequal length.



The relative occurrence of phytoplankton can be assessed from microscope 'field of view' counts for recognized classes of phytoplankton. The following graph (Figure 4) shows the percent population distribution for Dinobryon and Sinura colonies for samples taken at the Three Mile Bay sampling site. Samples were taken during a two month period from June 24 to August 15, 2018. In Figure 4, the term 'other phytoplankton' refers to the sum

of all other phytoplankton not identified as Dinobryon or Synura. This category of phytoplankton accounted for only a very small percentage of the total number of phytoplankton in the water column when compared to the chrysophytes.

Figure 4



These data supports the observation that White Lake was, at least during two summer months, a chrysophyte lake. Extending observations like these into 2019 and future years could show us how the plankton community fluctuates over time during the ice-free months.