

Elodea Leaves

Introduction:

Elodea canadensis (Canadian, oxygen weed) is a common aquatic plant introduced from North America. It is a bottom-rooted, submerged plant found in flowing water wherever light levels are adequate. Stems are up to 3 m long and 2.5 mm in diameter and easily broken. Leaves are 5-10 mm long in whorls of 3, and bright green (darkening with age and shading). Flowers occur rarely, are white, 5 mm across and produced on long thin stems.

Elodea leaves have no waxy cuticle. There is no need to conserve water in an aquatic environment. Likewise there are no stomata (no need to prevent excess water loss) and no spongy mesophyll (which would provide a large internal surface area for gas exchange). Gas exchange occurs over the entire leaf surface. Because leaves are small and thin the Surface Area : Volume ratio is high.

Method

The usual method is to cut the tips of the very small leaves near the apical bud (arrowed). The easiest method is to cut across the tip and cut a number of leaf tips at once. Do not attempt to put whole leaves on the microscope slide as their natural curvature does not allow the cover slip to sit flat. Just use the leaf tips



Mount in water, preferably a drop of the water the *Elodea* was growing in to avoid any osmotic effects.

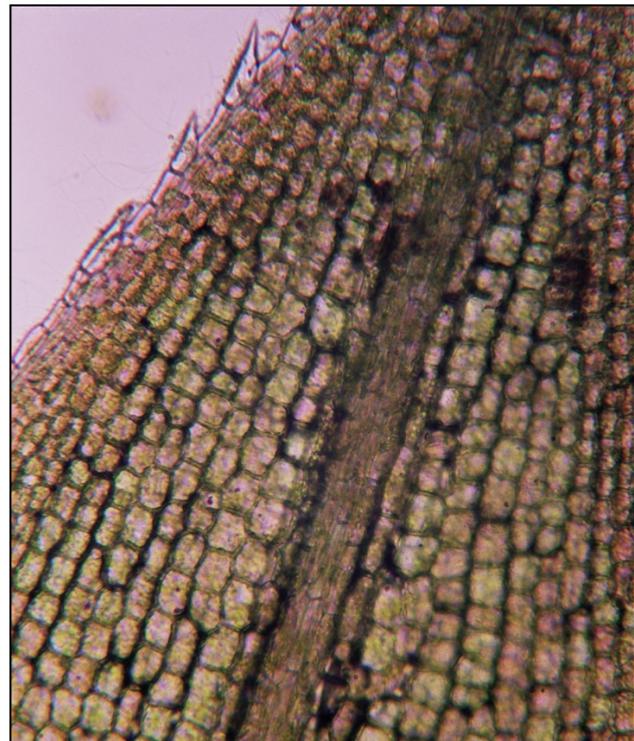
Elodea leaves are useful for:

- Observing chloroplasts (see images below)
- Observing plasmolysis as explained in another chapter.

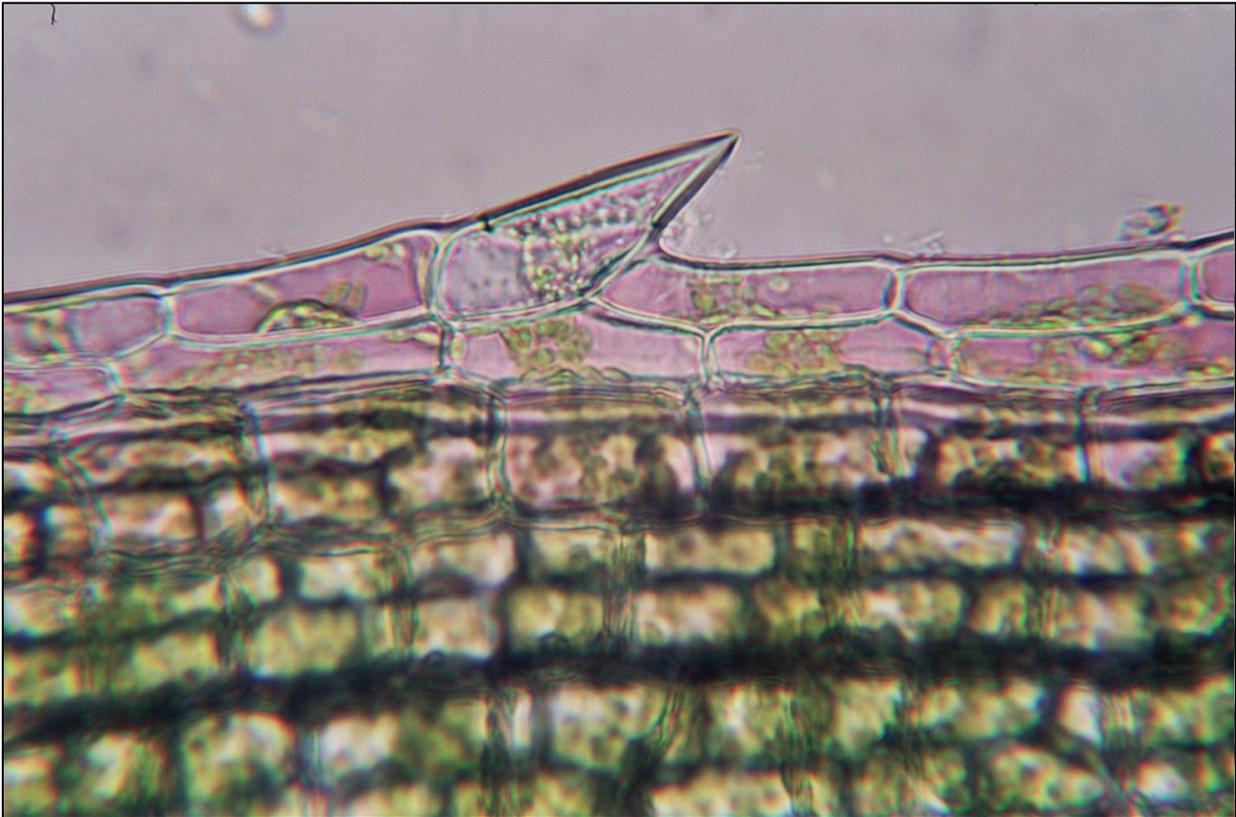
Images

Because the leaf is more than one cell thick (except along the leaf margin) the best view is obtained by focussing up and down as you observe. However, this is impossible to portray in a photograph.

View of leaf tip (left) Low Power (x40) and leaf margin (right) Medium Power (x100).



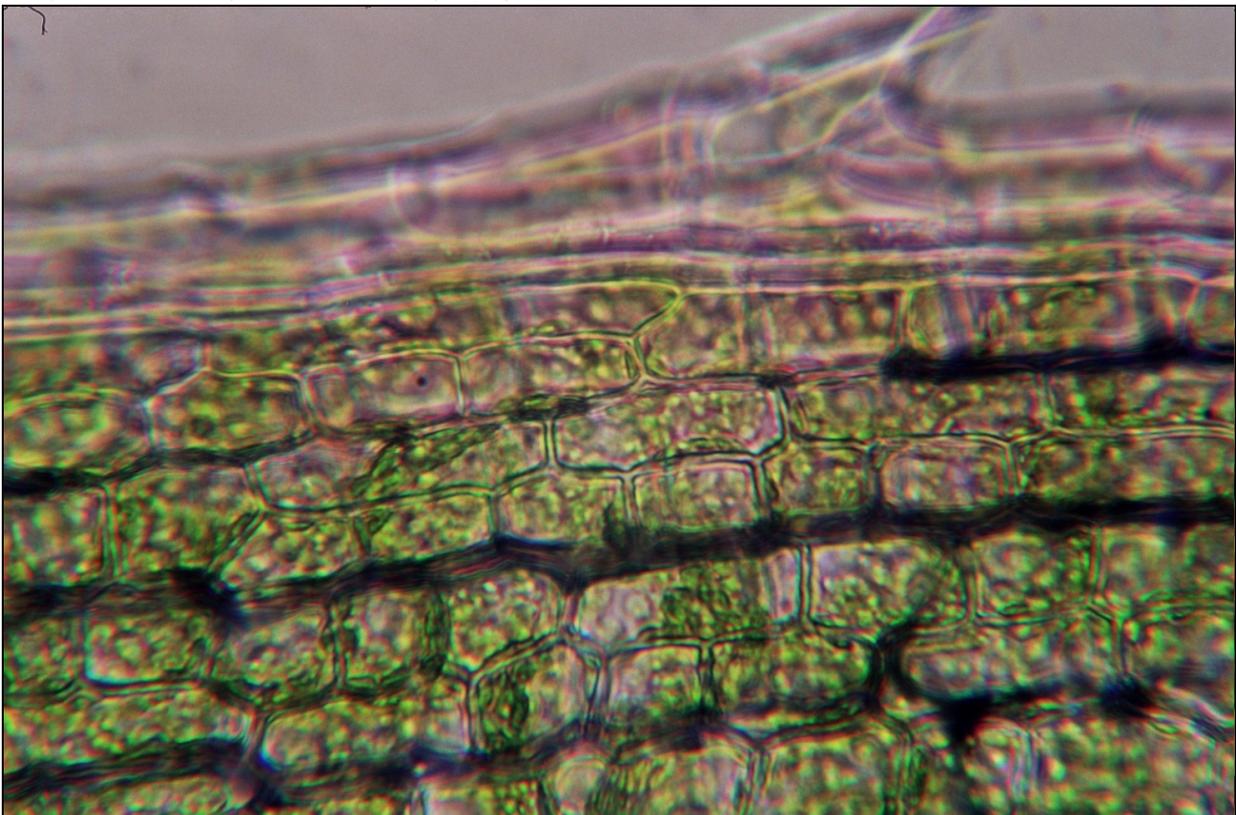
The effect of changing focus height as you observe can be seen in these 2 images. Both are of the same portion of leaf margin but the focal height has been changed so that different layers of cells have been brought into focus.



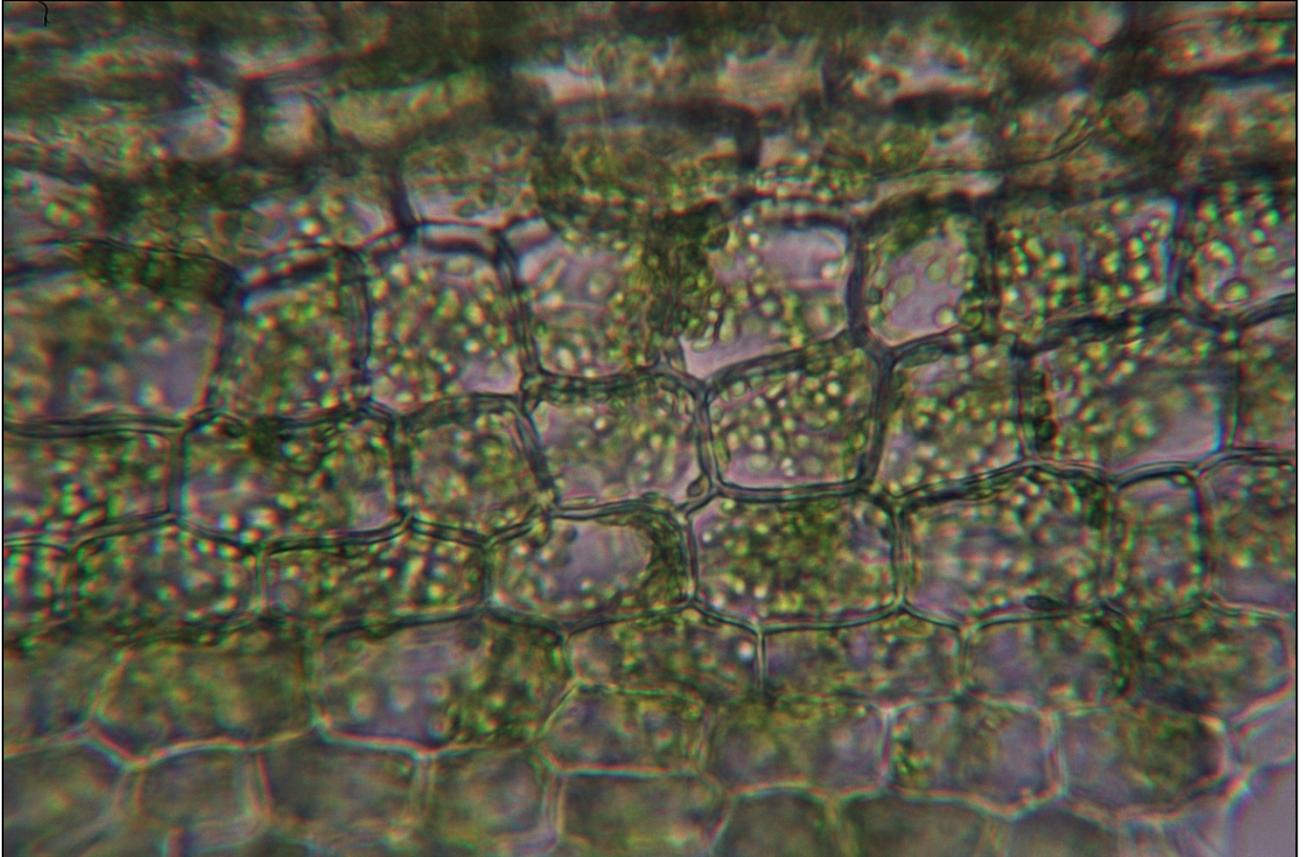
Photographs above and below:

***Elodea* leaf edge:** High Power (x400)

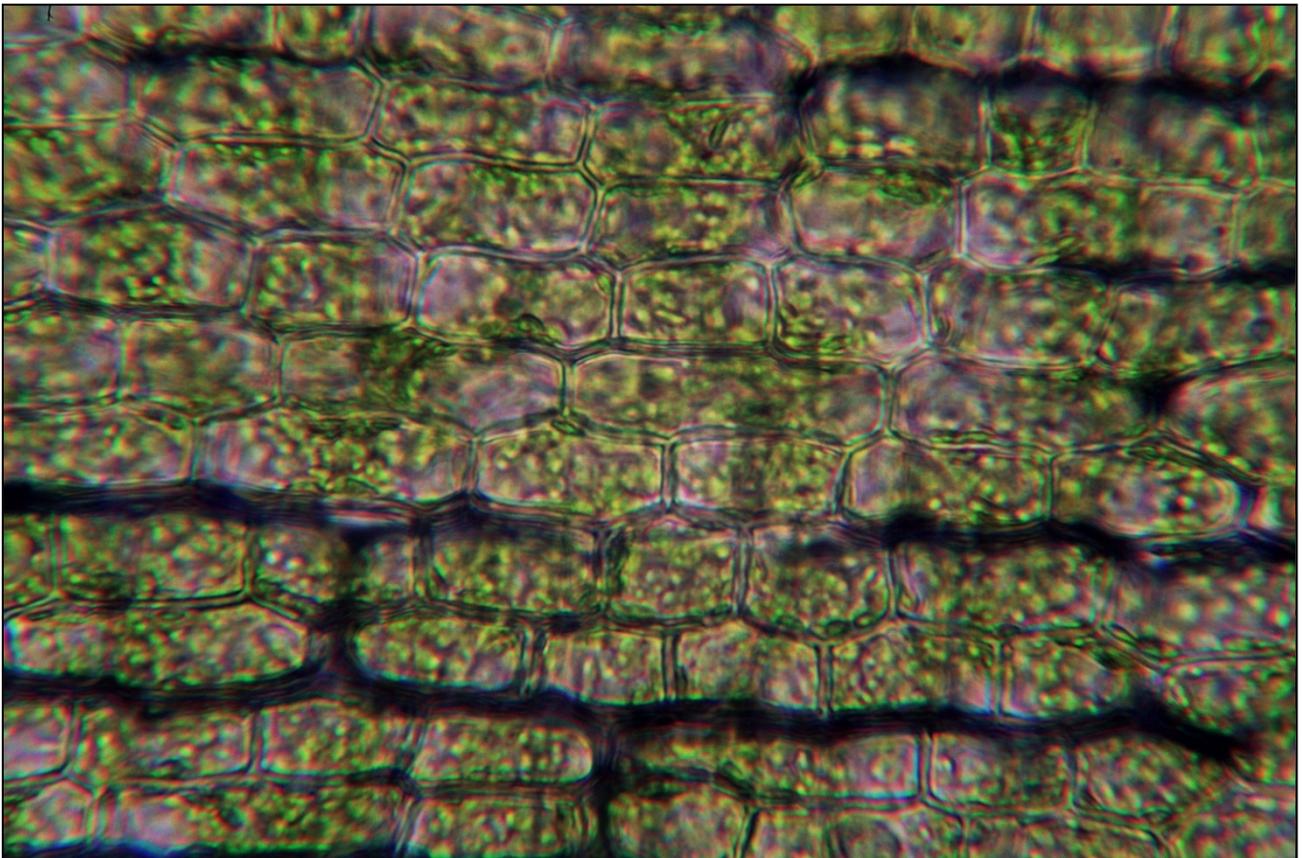
The dark areas within the leaf are air spaces. The leaf accumulates gases to make them more buoyant in water (see later photograph).



One of the more interesting aspects of observing *Elodea* leaves is the presence of chloroplasts. They are obvious in these two photographs.



***Elodea* leaves showing chloroplasts**
Both photographs High Power (x400)





This photograph (Medium Power x100) shows the air bubbles exuded from the gas sinuses present in the leaves of *Elodea* (and many other aquatic plants). Gases produced by photosynthesis are collected in these sinuses and provide some buoyancy for the plant holding it up off the bottom and into the water column where there is more light. These sinuses extend from the leaves into the stems.