Michigan Nature Association
Protecting Michigan's Natural Heritage Since 1952
www.michigannature.org 517-655-5655

Leaf Changes

Written By: Joan Chadde

What gives leaves color?

Leaves contain pigments that give them color: Chlorophyll, Carotenoids and Anthoncyanis.

Chlorophyll

- Chlorophyll carries a green pigmentation
- Captures sunlight for photosynthesis in order to produce simple sugars needed for the growth and development.
- This particular pigment is constantly being used up and replaced in the photosynthesis process.
- As it absorbs light, chlorophyll supplies energy used by plants to transform carbon dioxide and water into oxygen and carbohydrates.
- Low temperatures destroy chlorophyll and promote formation of anthoncyanins.

Anthoncyanins

- Anthoncyanina carry red and purple pigments.
- They develop primarily during late summer months.
- We often see examples of anthoncyanins at work in fruits such as cranberries, plums and strawberries.

Carotenoids

- Carotenoids carry yellow, orange and brown pigments.
- They are apparent in carrots, bananas and egg yolk.
- This pigment is often found in chloroplast and aids in the process of photosynthesis.

Why do the Leaves Change Colors?

- As the seasons progress, various species of trees endure significant chemical changes in order to insure survival.

-During the summer months, excessive chlorophyll production masks all other pigments in the leaves.

-As various species of trees prepare for the fall season, a gradual change in pigmentation is noticeable. As the days become shorter, chlorophyll production slows and ultimately stops.

- In addition, the sugar breakdown process changes when many chemicals and nutrients move out of the leaf and into the stem.

Leaf Pigments

- Species displaying bright reds and purples, or anthoncyanins, depend heavily on bright sunlight. The sunlight yields an increase in food production and sugar trapped in leaves, thus, causing the leaf to release a large amount anthoncyanins.

- Red/purple displays are prevalent in tree species such as the Nannyberry, Pin Cherry and Staghorn Sumac.

- The cool, sunny climate lends well in producing the most spectacular displays.

- Carotenoids are always present in leaves, therefore yellow and gold colors are fairly constant from year to year.

Seasonal Changes

- In order to survive the harsh winter months, known all to well in Michigan, trees drop their leaves. Tender leaf tissue would inevitably freeze under such conditions, thus, trees must either protect or shed their leaves.

- Buds, stems and twigs are much more equipped to survive the extreme cold.

- Evergreens, however, are equipped to protect by creating a heavy wax coating and a fluid containing freeze-resistant substances inside the trees' cells.

-During winter, most green plants and deciduous trees are unable to make food via photosynthesis due to the significant reduction of sunlight and moisture.