Nature Week at Heritage Village - June 7th

Trout lily by Lorie Axtell

Partnerships - Biologists call it mutualism

Our trees are finally leafed-out, more than a month and a half after snow melt. Cold, early-spring soil keeps the tree's metabolism sluggish, making water and nutrient transport up to the leaves a slow process. While the tress are gathering momentum, the spring ephemeral flowers burst forth, live their short life, set seed, and die back. They capitalize on pre-leaf short window of brightness, when 80% of the sunlight falling on the woods reaches the forest floor, before leaf-out drops that penetration to only 5%.

Spring ephemerals, like our beautify trout lily and trillium, reproduce both vegetatively, from rhizomes, and sexually, through seed production. Fields of leaves sprout from a web of rhizomes, a method that is important for plants that may bloom before it is warm enough for pollinators.

Plant to plant partnership

In early spring, trout lilies, growing mainly under maple trees, use the resources stored in their rhizomes to quickly send out leaves and activate their roots. The roots capture the nitrogen released by decaying leaves on the forest floor before the heavy spring rains flush it out of reach deep in the ground. Once the maple trees leaf-out the trout lily's above ground activity for the year is over.

Trout lily seed carried by an ant

In mid-June the trout lily is busy developing below ground. Amazing research has found that trout lilies are almost always connected to the nearby maple trees with underground threads of a fungus. The fungus transports nutrients back and forth between the tree and the trout lily, of course extracting nutrients for itself in the process. In the spring, the lily's extra nutrients are transported to the maple tree to help get it launched. Reciprocally, in late summer and fall the maple trees will push extra nutrients back to the trout lily. These two unlikely partners are sharing resources! This is called mutualism and scientists are discovering that it is very common. (You have probably heard how important your gut bacteria are to your health – another form of mutualism.)

Other ant dispersed seeds:
trillium
hepatica
bloodroot
wild ginger
some violets
bleeding heart
twinleaf

Plant to ant partnership

If that is not surprising enough, pollinated lilies and trillium produce a seed with a fat-body attached to one end called an elaiosome. This fat body, rich in proteins, attracts ants. (The ant diet tends to be carbohydrate heavy so this is a special resource.) The ants pick up the seed, carry it to their nest, feed the elaiosome to the larvae, then cart off the seed portion to their underground trash heap. Here, among the nutrient-rich detritus of ant life, the seed finds an ideal germination site. This mutualism is called myrmecochory - ant dispersal of seeds.

Trillium seed being carried by an ant

Both trillium and trout lily need these partnerships to survive. Our woods is a complex community: disturb one part and many unsuspected species suffer.

Moral: Partners make life rich !

MACKINAW NATURE CENTER

by Sandy Planisek 2015

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