

**Field Notes – Third Week of November**  
**Carrie Crompton**

**NOVEMBER LIGHT**

We're a month away from the winter solstice, with 30 minutes yet to lose before we reach minimum daylength for this year. When the sky is clear, the woods are bright, with the fallen leaves reflecting light off the forest floor. Tree trunks show their different textures and colors, with every ridge, furrow, fissure, lenticel, and peel illuminated.

The yellow birches are glowing: their silvery outer bark peels into narrow, curly strips, exposing the coppery underbark to the sunlight:



**Yellow Birch (*Betula allegheniensis*), November 9, Utley Hill Preserve**



Black birch bark has a luster like pewter.



**Black Birch (*Betula lenta*), November 15, Atkinson Dirlam Preserve, Gales Ferry**



Ironwood is soaking up the rays of the sun into its muscular trunk:



**Ironwood (*Carpinus caroliniana*), November 9, Hop River**



Red oaks are showing off their brick-red furrow linings.



**Northern Red Oak (*Quercus rubra*), November 18, Townsend Road**



In the autumn light, it's easier to see trees as individuals. Deciduous trees don't grow straight out of the ground like telephone poles: they have distinctive root flares, leans, spirals, and branching patterns.



**Red oak (*Quercus rubra*), November 9, Utley Hill Preserve**

Tango, anyone?



Lately I've been noticing pairs of different genera of trees joined at the base of the trunks. Paired trees are called "gemels," from the same Latin word as *gemi* (twins). When they are truly grafted together, as the pair below appear to be, they share a section of vascular tissue between them. It happens more often than I would have thought, and it turns out that the pairing has a name: inosculation. I love this word, too – from the Latin *osculari*, to kiss.



**Inosculated Shagbark Hickory (left) and Black Birch (right), Utley Hill Preserve**

These two trees are members of the same order, the Fagales, or Beeches.





**Inosculated, entwined Shagbark Hickory and Red Maple), Hop River**

These two are in different orders – the Shagbark Hickory in the Fagales, and the Red Maple in the Sapindales. Still close enough to be kissing cousins.





**Gemel of Black Birch (order Fagales, family Betulaceae) and White Pine (order Pinales, family Pinaceae)  
Atkinson Dirlam Preserve, November 14. Left: root flares; right: trunks**

Black birch and white pine – these two differ at the level of Gymnosperm versus Angiosperm, hardwood versus softwood! They have different sorts of vascular tissue. I don't think it's possible that they are grafted together, but they are so close, there is no daylight between their root flares. I suppose we could call this an arbuscular hug. Their roots must be extensively intertwined. I assume that the mycorrhizal fungi in their root zone are also highly compatible. (I find that "hyphae of genetically different, but typically closely-related fungi, can fuse (anastomose)."<sup>1</sup>) So it's a rich extended gemel family, above and below the forest floor. The woods are full of wonders.

---

<sup>1</sup> R. Ford Denison and E. Toby Kiers, "Life Histories of Symbiotic Rhizobia and Mycorrhizal Fungi," 2011. *Current Biology* 21 (18): R775-R787. <https://www.sciencedirect.com/science/article/pii/S0960982211006634>



## NOVEMBER GREENERY



(top left) Blue Ground Cedar (*Diphasiastrum tristachyum*), power line, Columbia  
(top right) Stag's-horn Clubmoss (*Lycopodium clavatum*), power line, Columbia  
(bottom left) Shining Firmoss (*Huperzia lucidula*), Utley Hill Preserve  
(bottom right): Southern Ground Cedar (*Diphasiastrum digitatum*), Utley Hill Preserve



Clubmosses (lycopodiums) are evergreen, but they're not attention-getting until the sun strikes them. Shining firmoss really does shine in the November sunlight! Clubmosses were the first class of plants to develop vascular systems for the transport of water. Before them, all the plants on Earth were mosses, liverworts, hornworts, or algae. By the time of the dinosaurs (the Carboniferous), the clubmosses were dominant tree forms, with diameters up to six feet. Here's an artist's conception of what a lycopodium forest might have looked like:



**Artist's conception of plant life 350 million years ago, Melbourne Museum<sup>2</sup>**

What happened to wipe out the clubmoss forests? Ancient climate change.

These tiny species we see now – never over six inches high – are the survivors of that climate disruption. They were small then, and they're small now. They grow very, very slowly via aboveground stolons or underground rhizomes. To develop from a spore to a mature plant that can produce spores itself can take 20 years.<sup>3</sup> I have read that it can take 100 years for a patch to grow to 100 square feet.<sup>4</sup> They have their specialties when it comes to habitat: the Blue Clubmoss prefers dry, sandy soils, such as I found on the power line in Columbia. The Princess Pine and the Ground Cedar prefer damp forest floor, and often grow together.

---

<sup>2</sup> <https://museumsvictoria.com.au/website/melbournemuseum/discoverycentre/600-million-years/timeline/carboniferous/index.html>

<sup>3</sup> The Natural History Log, February 13, 2014. <https://mfburchick.wordpress.com/2014/02/13/flat-branched-tree-clubmoss/>. This 20-year figure is repeated in many sources dating back to the 1960s.

<sup>4</sup> William Cullina, *Native Ferns, Moss, and Grasses*, 2008, p. 63.





**Princess Pine (*Dendrolycopodium obscurum*) and Ground Cedar growing together**

My grandmother called Princess Pine Creeping Jenny, and Ground Cedar, she called Creeping Charlie. In her generation, a lot of people collected ropes of lycopodiums to make Christmas wreaths, and the forest floors of New England became almost bare of these slow creepers. In the past fifty years, collecting has been discouraged, and the lycopodiums seem to be recovering ground, at least in protected woodlands.

As for the ferns, most have died down by now, but there are at least three evergreen species in the woods: Intermediate Wood Fern, Christmas Fern, and Common Polypody.



**(Left) Intermediate Wood Fern (*Dryopteris intermedia*), Utley Hill Preserve, November 9  
(Right) Christmas Fern (*Polystichum acrostichoides*), same place**





**An Evergreen Scene: Common Polypody (*Polypodium virginianum*) ferns, with at least four species of moss and a variety of lichens, Gay City**

I'm in awe of ever-greenness. The clubmosses and true mosses and lichens all mastered the trick eons ago. It's the opposite of what the deciduous plants do: in the fall, while the trees and shrubs and perennial wildflowers are drawing down their supplies of photosynthate – sugars –for storage in non-green tissues, the evergreens continue to photosynthesize, storing more and more sugars in their leaves. From this concentration of sugars, they manufacture nonstructural carbohydrates and alcohols that allow them to dry out and rehydrate easily and “antifreeze proteins” (AFPs) that prevent water crystals from developing and rupturing the cells. (The biochemistry is complicated. A number of journal articles can be found by googling “antifreeze proteins in mosses” and “non-structural carbohydrates in mosses.”) When snow covers them, they'll stop photosynthesizing and just wait for thaw and



sunlight, which usually come long before the warmth of spring. Such adaptability! No wonder they're still around after many climate change events. Keep your eyes open in the November woods, and enjoy the greenery!

Oh, I almost forgot – on November 9, I saw a mature bald eagle flying west along the Hop River. It was flying between me and the sun, so a photo was impossible. But what a grand sight it was! If you're walking near the River, keep an eye out for eagles, too.