Chapter 11

THE SILVER MAPLE

StandingNation-Human Alliance Bulletin

Let It Rain!

- **TREES help human communities by preventing erosion** as they hold the soil surrounding each of them in place with their roots.
- **TREES help human communities conserve water** by retaining water in the soil, where their roots break up the soil, allowing for the water table to be recharged.
- **TREES help human communities by improving water quality** by filtering water, which results in water less in need of city filtering.
- **TREES help human communities by providing flood control**:

> Their leafy canopy catches precipitation before it reaches the ground, allowing some of it to gently drip and the rest to evaporate . . . reducing the amount of runoff into sewers, streams, and rivers. . . . "One hundred mature trees can intercept about 100,000 gallons of rainfall per year."[1]

- **TREES actually perform the role of "rainmakers,"** when their leaves act in this way, as rain interceptors. The rain they catch then evaporates, which causes rain to fall elsewhere.

[1] "How Trees Make a Difference," *National Wildlife Federation* at https://www.nwf.org/Trees-for-Wildlife/About/Trees-Make-a-Difference (accessed 2/16/21).

Diplomatic Relationships

- The abundant seeds of silver maples are eaten by many birds, including evening grosbeaks, finches, wild turkeys, ducks and other game birds, and small mammals, especially squirrels and chipmunks.
- Silver maple buds provide a vital link in the food chain of squirrel populations (33) as they swell and burst during the critical winter-spring period when stored food supplies of squirrels are exhausted.[2]
- Silver maple ranks high as a food source for beavers.
- Local studies conducted on floodplains in the province of New Brunswick show that the silver maples rank far above other dominant trees on wet, mesic sites as nesting trees for wood ducks and goldeneye ducks.[3]
- Maple syrup was a food staple of native people. While generally sugar maples or black maples were tapped for their sweet sap, the Anishinabeg also used the more dilute sap of the silver maple.[4] In Ontario, tests of five maple species indicated that the quality of syrup from silver maple sap is satisfactory. However, sugar content of silver maple sap ranked lowest of the five species tested.
- While silver maples, with their quickly expanding shade that came with their rapid growth, were a “staple planting” for the European settlers who came to the country, they are now banned as a street tree in some communities because the

[2] William J. Gabriel, “Silver Maple,” U.S. Forest Service Southern Research Station referencing: Reichard, T. A. 1976. “Spring food habits and feeding behavior of fox squirrels and red squirrels,” *American Midland Naturalist* 96:443A50 (accessed 12/28/20).
[3] Harold H. Prince, “Nest Sites Used by Wood Ducks and Common Goldeneyes in New Brunswick,” *The Journal of Wildlife Management,* Vol. 32, No. 3 (Jul., 1968), pp. 489-500, https://doi.org/10.2307/3798927 (accessed 2/28/21).
[4] Donald I. Dickman and Larry A. Leefers, *The Forests of Michigan* (Ann Arbor, MI: University of Michigan Press, 2016), 83.

roots cause issues with concrete sidewalks, driveways, and foundation and their branches break under high winds and ice.

A Tourist's Testimonial

> *Silver maples impart to every stream and bank where they grow, to every big red Hoosier barn and little white farmhouse, to all the village streets and the long straight roads where they have been planted, an air at once of dignity and lively grace, a combination rare in a tree as in a human.*[5]
>
> —Donald Culross Peattie (1898 – 1964)

Tree-Tripping

- If you live where silver maple trees grow, check a tree guide or online for as to when silver maples in your area bloom. Then look for them to bud, to flower, to leaf. Can you find a flower to examine after it falls off the tree? Be sure to check it out under a magnifying glass.
- If you don't have silver maples in your immediate vicinity, where you can walk past one regularly, identify and locate another flowering tree that you can keep watch over, from budding, to flowering, to leafing, to seeding.
- You'll know something big is going on, somewhere above you, when your car or part of your yard is covered in gold or green "dust"; that's pollen. The trees that depend on the wind for pollination are the ones that may cause more human sneezes; such trees must produce more pollen as the wind is less reliable than a

[5] Peattie, D.C. *A Natural History of Trees of Eastern and Central North America*, 2nd ed. (New York: Bonanza Books, 1966), p. 463-465.

pollinator from the animal kingdom. Can you determine from what tree the pollen is drifting down?

- Can you catch sight of a bee, a hummingbird, or another pollinator at its work on a tree?

Tree Dreams

- Do you ever stop to think about all of the tree lives going on around you?
- Trees are so silent—except for the rustling of leaves in the wind (AKA psithurism, pronounced: SITH-ur-iz-m)—and slow-growing it is easy to forget, to not notice that, every year, they are moving through the cycle of budding, flowering, leafing out, seeding. Have you noticed any part of this cycle of specific trees?
- Do you ever wonder what a tree outside your window is experiencing, doing, feeling, thinking?
- Pick one tree nearby where you live. Notice what's going on with it as often as you can. Enlist binoculars (trees are much easier to watch than birds). Keep a magnifying glass handy for what comes down from your companion tree.
- Consider keeping a "nature journal" on this individual tree, or on its species, or on what you notice when on other trees. My Ferndale neighbor, Barb Stoy, whose house was in the same oak grove as ours, noted on her calendar every year the first time she came across a fallen acorn.

Tree's Big Idea: **FLOWERS**

Almost all temperate deciduous trees—with *Ginkgo biloba* being the sole exception—are angiosperms, i.e., flowering plants. Angiosperms have appeared on earth relatively recently, between 150 and 80 million years ago, almost 150 million years later than the conifers (gymnosperms).[6]

While, gymnosperms that have male and female cones in place of flowers, are all wind pollinated, angiosperms can be pollinated in two ways: by wind dispersal of their pollen or by attracting the aid of an animal pollinator. Angiosperms have evolved means of attracting the help of a number of animal pollinators: beetles, flies, bees, butterflies, moths, wasps, birds (from hummingbirds to parrots), bats (night pollinators) and other small mammals like lemurs, and even reptiles like the Noronha skink and wall lizards.[7]

What attracts a pollinator to a flower, be it a flowering plant in your garden or a flower high up in a tree, is the flower's sweet nectar, a source of food high in energy. The flower's pollen itself provides protein and other nutrients.

So how does pollination work? Flowers have female parts and male parts. The primary female part is the pistil, which is made up of four parts: 1) the style which connects 2) the ovary at the base of the pistil, which holds 3) the ovules, the egg cells of the flower to 4) the stigma which contains secretes a sticky substance which traps pollen.

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[6] Kathy Willis, *Botanicum* (Somerville, MA: BIG PICTURE PRESS, an imprint of Candlewick Press, 2016), 28.
[7] Michelle Douglass, "Animals You Might Not Know Pollinate Flowers," *BBC Earth,* May 14, 2015 http://www.bbc.com/earth/story/20150514-extraordinary-pollinators (accessed 12/30/20).

The main male part is the stamen, which has two basic parts: 1) the long and slender filament, which attaches to 2) the anther, the part that produces the pollen in pollen sacs, to the flower.

Somewhere on the flower, most usually located at the base of the stamen, are small glands called nectaries, which provide the reward for pollinators.

Of course, flowers have other parts: The petals, which may signal the reward of nectar to potential pollinators and the green sepals at the base of the flower which formerly protected the flower when it was a bud.

And, then there is the pollen itself.

> "Pollen grains are designed to protect the [tree's] genetic material as it is transferred from one flower to another. In order to [ensure] that the genetic material is not scrambled in transit, or destroyed completely, the DNA is locked inside several secure layers.
>
> At the very core of the pollen grain, the genetic package floats in a pool of cytoplasm, which is protected by a layer of cellulose called the intine. The intine is protected by another layer called the exine.[2] The exine is very tough, resistant to things like UV radiation, moisture, dryness, pressure, and changes in pH. . . the exine is not easily breached.
>
> Finally, the exine is wrapped in a super-sticky and colorful layer called pollenkitt.[3] Pollenkit keeps the pollen from blowing away from the flower, but it also allows the honeybee to clump pollen together into . . . hard pellets packed on her back legs.[8]

The act leading to tree reproduction is pretty straightforward when it involves a pollinator from the animal kingdom. A pollinator is attracted to the flower, which may signal its treat of nectar by the bright color of its petals or its scent. The pollinator, say a

[8] Rusty Burlew, "How Bees Transfer Pollen Between Flowers," *The HoneyBeeSuite: A Better Way to Bee,* Blog, https://www.honeybeesuite.com/how-bees-transfer-pollen-between-flowers/ (Accessed 12/31/20) First published in *American Bee Journal, Vol. 158. No. 4, April 2018, pp. 449-452.*

honeybee, helps herself to the nectar and pollen, which she collects as food for the entire colony. In the process of collection, parts of the bee's body brush against the male parts of a flower, grains of pollen. At the next tree's flower, the pollinator, probing for another sip of nectar and more pollen, brushes against the flower's "lady parts" (i.e., the pistil). As a body part of the bee deposits the pollen from a flower on the last tree she visited on the stigma, she is inadvertently pollinating the flower—consummating the union of two trees—from which will come a protected, enclosed seed, one within fruit, unlike the naked seeds of gymnosperms.

One other important tree flower bit of information: trees can have just one sex of flowers (i.e., are "unisexual") on them—meaning that one tree has flowers that produce the male pollen, and a different tree produces the female seed. These species are called dioecious. Or trees may be bisexual and produce both male and female flowers. Individual trees produce either all male (staminate) flowers or all female (pistillate) flowers. These trees are monoecious. In some dioecious species, like the silver maple, trees can change sex from year to year. In addition, some species bear hermaphroditic flowers, flowers which possess both pistils and stamens. How do trees prevent self-fertilization?

> In species in which staminate and pistillate flowers are found on the same individual (monoecious plants) and in those with hermaphroditic flowers (flowers possessing both stamens and pistils), a common way of preventing self-fertilization is to have the pollen shed either before or after the period during which the stigmas on the same plant are receptive, a situation known as dichogamy.[9]

[9] Bastiaan J.D. Meeuse, "Mechanisms that prevent self-pollination" in "Pollination," *Britannica*, https://www.britannica.com/science/pollination/Mechanisms-that-prevent-self-pollination (accessed 12/31/20).

This type of pollination by animal pollinators is especially important for fruiting varieties of fruit trees, but many deciduous temperate angiosperms rely on wind dispersal. Here are the location of reproductive organs and the method of pollination for the trees covered in this book:

Tree Species	Location of Reproductive Organs	Method of Pollination
Maple (Norway)	Monoecious/Dioecious	**Bees:** honey bees, bumble bees & Andrenid bees
Northern White-Cedar*	Monoecious	Wind
White Oak	Monoecious	Wind
Eastern Cottonwood	Dioecious	Wind
American Sweetgum	Monoecious	**Bees**
American Beech	Monoecious	Wind
English Oak	Monoecious	Wind
Eastern White Pine*	Monoecious	Wind
Ginkgo*	Dioecious	Wind
Sycamore	Monoecious	Wind
Juniper*	Dioecious, rarely monoeciou	Wind
Silver Maple	Monoecious, occasionally dioecious	**Bees** *or* wind
Ash	Dioecious	Wind-pollinated, no nectar, but bees do collect pollen
American Chestnut	Monoecious	Wind
American Elm	Monoecious	Wind, primarily
Eastern Redbud	Monoecious	**Bees**, many types
Colorado Pinyon*	Monoecious, occasionally dioecious	Wind
Crepe Myrtle	Monoecious	**Bees**
Flowering Dogwood	Monoecious	**Insects**, most importantly bees

* Denotes a gymnosperm; the remainder of the tree species are angiosperms (flower-bearing)

Coda: The masked pair of walkers on the sidewalk in front of my house must wonder what I'm looking at with binoculars out of my window. I want to check out my neighbor's silver maple, the one at the apex of her curved driveway that helped me to identify the silver maple in the park.

Last year I saw that silver maple blooming on March 17th, 10 weeks from now. And I wonder how many more people in the U.S. will have been infected, will have died, and will have been vaccinated, all in response to COVID before the silver maple's flowers bloom again.

As I train my binoculars upward on my neighbor's silver maple, I notice it has a lot of moss growing on the north side of one of its main branches . . . And then, there, an abundance of buds, beads on the rosaries of silver maple branches.

Regardless of how our human prayers and actions will influence the second March of this pandemic, the silver maple is already preparing to bloom again.