Field Notes – 1st Week of July
Carrie Crompton

HIGH SUMMER

"How rapidly new flowers unfold! as if Nature would get through her work too soon. One has as much as he can do to observe how flowers successively unfold. It is a flowery revolution, to which but few attend." – Thoreau, journal entry June 15, 1852.

July Meadow, Mansfield Hollow State Park

LONG-DAY PLANTS

Many flowering plants keep track of the hours and minutes of sunlight in a day—or rather, the number of hours of dark in the night—by manufacturing photoreceptor proteins that shape-shift (vast oversimplification of complicated chemistry here), in response to the balance of light in the red–far red part of the spectrum, between two forms: a

daytime form and a nighttime form. Daylength-sensitive species initiate flowering when the "nighttime" form of the photoreceptor is at an optimal concentration—low or high—for the activation of genes that initiate flowering.

By the Solstice, every "long-day" plant in the Northern hemisphere had gotten the memo: the nights are not going to get any shorter. When a long-day plant has gotten the go-ahead from the photoreceptors *and* amassed enough energy through photosynthesis to support the energy-intensive production of flowers, two of the necessary preconditions for flowering have been met. But there are other conditions that determine the actual initiation time, and the time from initiation to flower development is faster in some species than in others.

The rest of July and August are an unfolding of the flowering and fruiting of these long-day plants. It has always fascinated me that this unfolding is no less predictable than the pre-Solstice unfolding of spring bloomers. Because many of the long-day species bloom for weeks on end, the landscape may begin to look a little static, but the succession of the *first-opening dates* of the summer flowers is replicated year after year.

For me, Common St. Johnswort = Summer Solstice. My records for Andover show it opening for the first time June 21–26. Its common name, which came with it from the British Isles, associates it the Feast of St. John, June 24, but as the British Isles are to the north of us, and reach the critical daylength earlier, that might refer to the time of *peak* bloom in England, rather than *first* bloom. Our peak bloom is in July.

Common St. Johnswort (*Hypericum perforatum*) opening, Hebron Center Trail, June 22

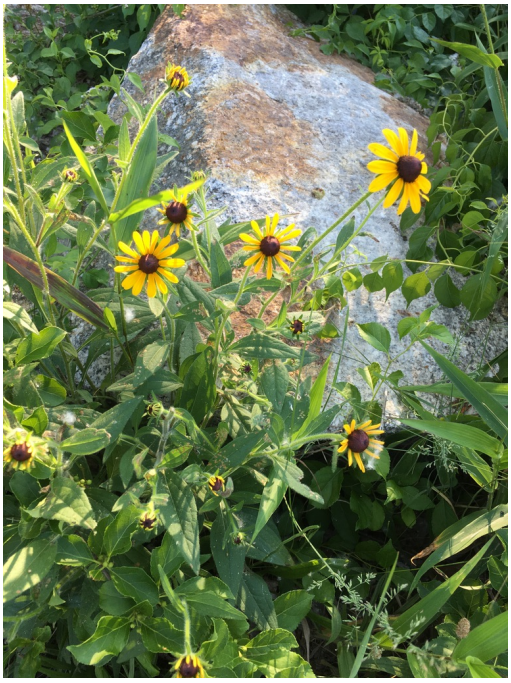
Thoreau mentioned this flower in his journal of 1852: July 10, "St. Johnswort is perhaps the prevailing flower now. Many fields are very yellow with it." Close up, the light reflected off the petals can be almost blinding, like the sun.

The other predictable post-Solstice roadside bloomers were right on time this year:

Queen Anne's Lace (*Daucus carota*), Chamberlain Pond, June 30

Since the 1970s, I've always seen the first open Queen Anne's Lace flowers in the last few days of June or July 1. Although global warming is definitely affecting the phenology of some plants that are being studied, I'd say QAL is still predictable.

This non-native biennial is so thoroughly naturalized in New England, it's actually become a functional member of the wild community; I find many species of insects, including small native bees, on the umbels.



Black-eyed Susan (*Rudbeckia hirta*), near Andover Soccer Field, June 20

I have many years of first bloom dates for Black-eyed Susan, too: the first is June 21, 1974. The last three years: June 18, June 21, and June 20. Another stalwart.

I grew up thinking that Queen Anne's Lace and Black-eyed Susan were as natural to the New England landscape as sugar maples and white pines. But Queen Anne's Lace is actually from Europe, and Black-eyed Susan from the prairies of the American West, successfully introduced to the East in the early 1850s. Now I realize that most of the flowers we see on the roadsides and on power lines in June, July, and August are in fact naturalized from Europe. This list includes—in addition to Common St. Johnswort, Queen Anne's Lace, and Black-eyed Susan— Rabbit's-foot Clover, Spotted Knapweed, yellow and white Sweet Clover, Birdfoot Trefoil, Butter-and-Eggs, Chicory, Bouncing Bet, Crown Vetch, and Canada Thistle, and others. They all thrive in full sun and disturbed soil and keep throwing up fresh flowering stems for weeks. They brighten my trips to Willimantic on Route 6 on errands.

All except the Black-eyed Susan coevolved with their original compatriots, the European honeybee, and according to a bee-keeping website I found, all are important nectar plants for these bees in the Eastern United States. Bumblebees like many of them, too. They are apt to be bad weeds in pasture—several are toxic to livestock—but good weeds in a pollinator pathway.

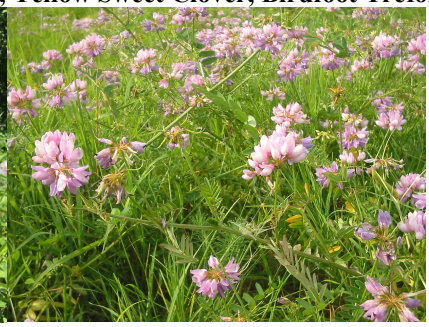
Non-native Roadside Flowers



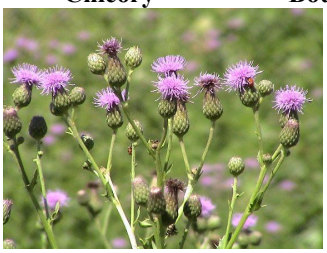


Rabbit's-foot Clover, Spotted Knapweed, Yellow Sweet Clover, Birdfoot Trefoil, Butter-and-Eggs





Chicory Bouncing Bet Crown Vetch



Canada Thistle

So if the plants we see by the side of the road in July are mostly non-native, where are our native flowers blooming? Good question! I've figured out that there are two kinds of habitat that support the long-day natives.

The first is early-stage succession fields and power lines, which, like roadsides, are "artificial" habitats in the sense that they exist only because of human intervention in the constant drive toward climax vegetation—i.e., hardwood

forest. But of course, even in a forest, there are always openings due to windfalls and lightning strikes and insect infestations and what have you, so there have always been temporarily open areas and early-stage succession plants to fill them, such as Common Milkweed, Pokeweed, various Raspberry species, Thistles, Pasture Roses, native Fox Grapes, Evening Primrose, and Fleabane. These are all prolific seed producers with effective means of seed dispersal, so they're always ready to "move on" to the next opening in the landscape. I find these plants in first bloom at predictable dates in our local, infrequently mowed power lines, intermixed with the naturalized plants mentioned above (and others).

Common Milkweed **Pokeweed** **Pasture Rose** **Evening Primrose**

The second midsummer-flower habitat is wet and watery places—swamps, wet thickets, marshes, ditches, and shores. After the Solstice, I start hunting for the perennial species with "swamp" in their names—Swamp Rose, Swamp Candles, Swamp Milkweed . . . These I find in the same places, year after year, starting to bloom at their characteristic times, along with the their wet-soil-loving neighbors.

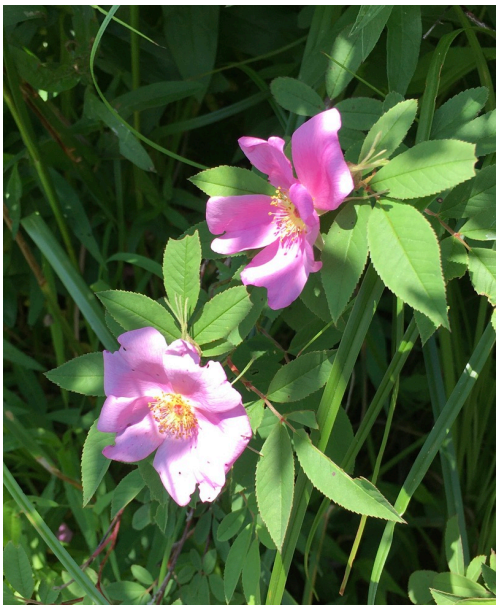
Tall Meadow Rue (*Thalictrum pubescens*), June 23

Pickerelweed (*Pontederia cordata*), June 25, Bishop Swamp, July

Swamp Milkweed (*Asclepias incarnata*), July 1, gas line crossing Hebron Road

Canada Lily (Lilium canadense), gas line ditch off Hebron Road, July 2
(photo by John D. Cameron, http://nhwildflowers.org/lily-canada.php)

I have always associated the Canada Lily with the Fourth of July, because whenever I returned to my hometown of Chesterfield, MA, for the holiday, this flower would be in bloom in the wet meadows as I drove into town.



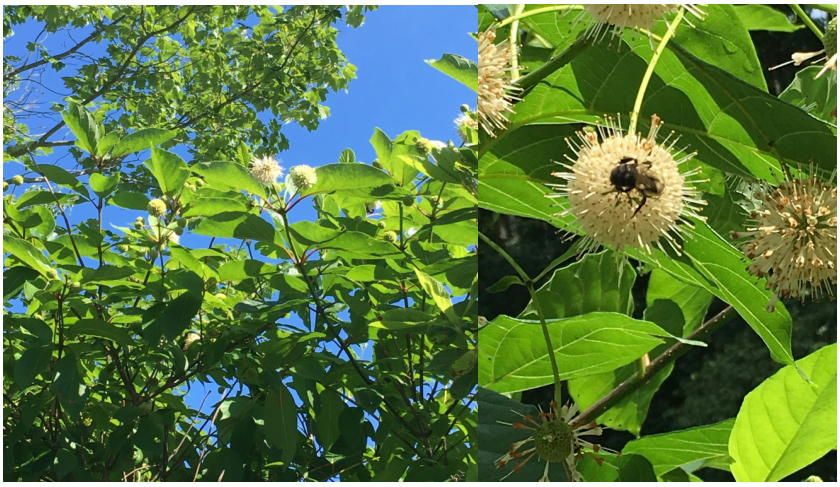
Swamp Rose (*Rosa palustris*), shores of Bishop Swamp, July 4

And then there are the wet-soil-loving shrubs! I have to admit that for much of my life as a wildflower enthusiast, I have not paid enough attention to these flowering plants. I trained my gaze downward to see the spots of color below waist height that are named and described in wildflower manuals, and ignored these gorgeous displays of white at eye level and above. Almost all of these shrubs have white flowers, so I think of them collectively as "the white shrubs." Now that I've learned to see them, I watch for their buds to appear (mostly in early June) and keep an eye on them until the flowers burst open a few weeks later. These shrubs usually produce their flowers in large clusters known as cymes, panicles, and umbels, that yield huge amounts of pollen. I am learning, by observing, that they serve as really big native grocery stores for pollinators, both apian and lepidopterous.

Elderberry (*Sambucus canadensis*), Cone Road power line, June 26

Silky Dogwood (*Cornus racemosa*), Andover Lake Island, June 28 – and my first Monarch of the season!

Maleberry (*Lyonia ligustrina*), Andover Lake Island, July 8.



Buttonbush (Cephalanthus occidentalis), Bishop Swamp, July 8

Winterberry (*Ilex verticillata*), staminate flowers, our yard, June 26

Look at that rich yellow pollen falling off the flowers onto the leaves of the male Winterberry shrub! This plant is covered with small bees, wasps, and flies for over two weeks.

LONG-DAY BEE BEHAVIOR

Now I realize that there must be a correspondence between the pollen stores provided by our native plants and the numbers of pollinators at any given point in the season. Early in the spring, there were not a lot of plants requiring pollination, and not a lot of pollinators. Remember when I reported at the beginning of June that I could count only 35 bumblebees in our entire yard? After that, the white clover in the lawn started to bloom, and the bumblebee numbers increased rapidly. Now I can count 35 bumblebees on a single spiraea bush, and a dozen in every 5 square feet of clover.

The question pops to the front of my brain: What if bees, like the plants they associate with, are photoperiodic? I google the question (no need to spend years studying this before I get an answer, right?) and find that it has indeed been studied, and that all the phases of bumble bee colony behavior are indeed influenced by photoperiod (Edgar Javier Hernandez, "The effect of photoperiod on regulation of key components of the life cycle in the bumble bee *Bombus impatiens* L., dissertation, University of Missouri, St. Louis, 2012). There's a lot to learn here, but my take-away for today is that the bumblebee colony starts small, increases exponentially, and reaches its maximum size around the Summer Solstice, when the daylength is at its maximum.

In the natural gardens away from our yard, the pre-Solstice increase was happening steadily, thanks to the pre-Solstice-blooming native "white shrubs": the Maple-leafed Viburnum, Mountain Laurels, Nannyberry and Arrowwood Viburnum, the Dogbanes, and others. I found it hard to monitor the pollinators on these shrubs at the same time that I was monitoring the activity on my garden plants, but I saw some, and trust that the populations were growing while I wasn't looking. At this point, the insect populations on the post-Solstice "white shrubs" are simply uncountable. The annual crescendo of the native insect population matches the annual crescendo of pollen production by native plants.

The fortissimo of this midsummer crescendo is the blooming of the American Basswood, *Tilia Americana* (AKA American Linden). A mature tree can be huge, 60–100 feet high, often with multiple trunks and a broad crown. It has large leaves, and casts a deep shade. When it flowers, every twig bears a cyme of miniature cream-colored bells. Here's Thoreau's description of its flowering in his journal of 1852:

July 16.
The bass on Conantum is a very rich sight now . . . . Its twigs are drooping, weighed down with pendulous flowers, so that when you stand directly under it and look up, you see one mass of flowers, a flowery canopy. Its conspicuous leaf-like bracts too have the effect of flowers. The tree resounds with the hum of bees—bumblebees and honeybees. Rose bugs and butterflies are also here, a perfect sursurrus, a sound . . . unlike any other in nature.

And here is Donald Culross Peattie's description in *A Natural History of Trees* (1966):

When the shade begins to be heavy and the midges fill the woods . . . an odor steals upon the moist and heavy air, unbelievably sweet and penetrating.

It is an odor that comes from no bed of stocks, no honeysuckle. More piercing, yet less drugging, than orange blossoms, it is wafted, sometimes as much as a mile, from the flowers of the Linden. . . . The odor of the Lindens in bloom brings back to many of us the soaring wail of the treetoads, the first fireflies in the dusk, the banging of June beetles on the window screens, the limpness of the flags at Fourth of July, and all that is a boy's-eye view of those languorous first days of vacation from school.

Gary L. Hightshoe, in his *Native Trees, Shrubs, and Vines* (1988) describes the flower as having "a sweet, arresting scent."

With recommendations like this, I have been watching two mature Basswoods in Andover this midsummer, one on Andover Lake and one near the Hop River, waiting eagerly for the scent of nectar and the sursurrus of bees. I look

up at the trees and try to imagine what is to come. I figure the reason for the buzzing sound must be that the flowers face downward, providing no platform for the bees to stand on, so they must harvest the nectar and pollen on the fly. (Most other bee-attracting flower clusters face upward, so the bees can do their work quietly and efficiently by crawling from floweret to floweret.)

First I watched the buds, which looked the same, day after day, for about two weeks:

Basswood (*Tilia americana*) flower buds. Each cyme (flower cluster) is attached to a light green papery bract (modified leaf). Andover Lake, July 1

Then, the first flower opened on June 2– yay!

Basswood, first flowers opening, July 2

By June 6, both trees are more than half in flower:

Basswood flowers opening, July 6

But I smell no magical fragrance, and hear no magical sursurrus. I see a few bees moving among the blossoms, but they are countable on my hands. I wonder: Has the nectar flow begun yet? Will the fragrance intensify? Will more bees come? I check again the next day.

Basswood flowers almost all open, July 7

This looks more promising. The anthers are darkening. There is a detectable fragrance, but I have to pick a cyme and bring it to my nose before I detect it. It's sweet, with a dark, mysterious undertone I can't describe. If the undertone were a color, it would be maroon. There are a few bees flying over my head, but not a lot, and I can't hear any buzzing. Maybe the nectar isn't really flowing yet? Where is it produced? I put a single blossom under the stereoscope and see that there are numerous fine branched trichomes at the base of the pure white pistil. I suspect that these trichomes are associated with nectar production, but I see no liquid . . . How will I know when there is "flow"? The suspense is killing me.

The next day, the canopy is in full-on bloom. The anthers have developed a brownish-orange color, rusty-looking on the flowers . . .

Mature Basswood Flowers, July 8

. . . but the pollen in the corbiculae of the bees is bright orange.

Bumblebees collecting pollen on mature Basswood flowers, July 8

There are honeybees, too, and Japanese beetles and skipper butterflies. I am sure that Thoreau and Peattie would be underwhelmed with the turnout: the buzz is not loud. In fact, it's very soft. And the fragrance, though sweet, is not detectable from any distance. The show is modest, but—nonetheless—magical. It's always good to see bees on perennials and shrubs, but it's worth a few trips to see them from "floor to ceiling" on a large tree. In Andover, check out the tree between the Hop River and the soccer field parking lot. It should continue blooming for another week or so.

There is nothing quite like this time of high summer, with so much going on! Heat, humidity, thunderstorms, cricket song, and the "flowery revolution"!