CONNECTICUT BOTANICAL SOCIETY
newsletter

Fall 2020 Volume 47, Number 2

Lilies of the Pond: Field Notes Afloat in the 4th Week of June

BY CARRIE CROMPTON

Slow simmering sounds fill the air
in the sultry, sexy days of summer.
Roll me over gently, please—
Ovens of nature cookin' me well-done...
—John Krumm

AFTER THE SUMMER SOLSTICE, the woods are dark, the fields are scorching in the sun, and the most refreshing place to be is on (or in) the water. One of my favorite places to kayak is Bishop Swamp—not for exercise, but to see a world that is otherwise inaccessible to me, lively with birds, aquatic plants, insects, amphibians, and fish.

Bishop Swamp (aka Jurovaty Pond) is the centerpiece of the 719-acre Bishop Swamp Wildlife Management Area, in Andover. The pond itself is only 53 acres, and it's very shallow, which is great for pond lilies. Most of these plants are anchored by their rhizomes in the muck, and their stems extend only two or three feet to the surface. Fortunately, my kayak draws only a few inches!

I took my first ride on the Swamp this year on June 23, and within the first minute on the water, I saw some of the very first fragrant water-lilies (*Nymphaea odorata*) of the season opening up for the day. This is always a thrill for me!

The blossom of the fragrant water-lily is absolutely unmistakable, but I have to relearn its associated floating leaves every year, because they are so similar to those of the bullhead pond-lilies (*Nuphar variegata*), which grow among them. Both species have large leaves, about the same size, but the fragrant water-lily pads are the round, glossy ones. The bullhead lily pads are elliptical, and less reflective.

Once I've established that distinction yet again, I can enjoy looking at—and smelling—the flowers of the fragrant water-lily a little more closely. What an exquisite contrast

TOP LEFT: Bishop Swamp, June 23, 2020. All photos: C. Crompton
TOP RIGHT: Fragrant water-lily (*Nymphaea odorata*) opening. Bullhead pond-lily (*Nuphar variegata*) is at upper left.
BOTTOM LEFT: Fragrant water-lily close up.
BOTTOM RIGHT: Sweat bee collecting pollen on a fragrant water-lily.

between the smooth, poised petals and the vibrant, kinetic-looking stamens! The flowers are indeed sweet-smelling thanks to a pool of nectar at the base of the bowl, which attracts a lot of small insects—bees, flies, and beetles. I understand from my reading that halictid bees (sweat bees) are

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The Connecticut Botanical Society, Inc., founded in 1903, is a non-profit 501(c)(3) corporation chartered in the State of Connecticut. Contact the president about tax-deductible contributions.

Visit the CBS web site: www.ct-botanical-society.org

The CBS web site, created by Janet Novak, is visited by more than 1,000 people each day. The site provides an introduction to CBS and its activities, including field trips and meetings. The site also contains photo galleries, a guide to landscaping with native plants, and *Newsletter* articles.

We thank Janet Novak, Eleanor Saulys, Arieh Tal, and others for the excellent photos on the web site. CBS members are encouraged to submit web materials to: chris.wyse@cox.net

Newsletter design: Susan Lindberg

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Paul Stetson In Memorium

ON MAY 28, 2020, we lost our friend and longtime CBS member, Paul W. Stetson. He was 79. Many CBS members may remember Paul as the gentleman who collected book sale money from us at CBS meetings. He served as CBS Treasurer for 20 years and was a member for many more. Longtime CBS member Gary Lemmon wrote: "Digging through a box of old CBS yearbooks I found some dating to the early 1960s. Paul's name first appears as a member in the 1963 yearbook. That's 57 years as a member." Of his service as CBS Treasurer Vice President Lauren Brown wrote: "An unsung but critical job, which he did with competence and without fuss."

Paul Stetson touring the gardens of Claude Monet's home in Giverny, France in 2018. Photo: S. Stetson

Paul had an M.A. in biology from Southern Connecticut State University and an M.B.A. from the University of New Haven and spent most of his career working with small businesses as a financial professional. As noted in the *New Haven Register* obituary, "he also served 26 years active and reserve in the U.S. Marine Corps and the U.S. Air Force. . . During working years and into retirement, Paul was always involved with volunteer work in numerous organizations both as a participant and as a Board member; of particular note was his service to the Institute of Management Accountants where he served at local, regional and national levels and [became] a National Vice President. . . Along with great love of nature and the outdoors, he was an avid reader. Never ending was his joy of travel especially with [his wife] Sandra."

In keeping with our policy of donating to a conservation organization in memory of board members or committee chairs serving for at least 10 years, CBS contributed $1,000 to the Peter's Rock Association of North Haven. Peter's Rock was Paul and Sandy's favorite nearby nature preserve.

Although he participated in many organizations, Paul chose CBS as the one donations in his memory should go to. If you would like to make a donation in any amount to CBS in his honor, please write "Stetson" on your check and send it to: the Connecticut Botanical Society, P.O. Box 9004, New Haven, CT 06532.

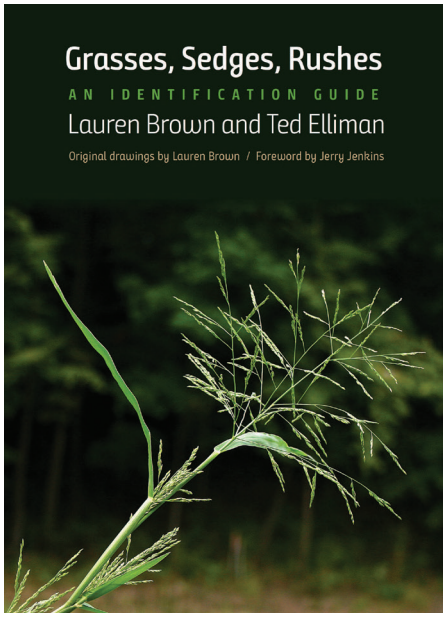
Notes and Notices

- The Berlin Land Trust (BLT) was able to acquire a 47-acre parcel on Lamentation Mountain thanks in part to the botanizing efforts of CBS members and the CBS Conservation & Ecology Committee, which submitted information in support of the BLT's grant application to the State of Connecticut for matching funds. "Your participation in our endeavor ... is deeply appreciated," wrote Dennis Kern of the BLT.

- On behalf of the Avalonia Land Conservancy Chuck Toal wrote to CBS members, saying: "We cannot thank you enough for your recent donation of your time and services to complete the 2019 Botany Survey of TriTown Forest Preserve... Your active commitment to the environment is both essential to our mission and encouraging to us and we hope that your generosity will serve as an inspiration and example to others as well."

- After nearly a year of meetings, discussions with a variety of experts, the ROW subcommittee of the CBS Conservation & Ecology Committee recently completed its *Recommendations for Electrical Utility Right-of-Way Vegetation Management*. If you or your local land trust owns land traversed by powerline rights-of-way (ROWs) you may have noticed big changes in how these ROWs are being managed. Powerline ROWs have long provided habitat for unique plant communities, often hosting some of the rarest species in CT. Recent changes are damaging these important areas, but you can have a say in what happens. The Connecticut Botanical Society, in consultation with academics, professional and amateur botanists, and ecologists, has developed ROW vegetation management recommendations that we believe better conserves ecological communities while still allowing for the safe and reliable delivery of electrical power. The CBS recommendations and other important documents are available in section 4 of this page: http://www.ctconservation.org/information-powerline-right-way-vegetation-management

- We recently unearthed a trove of *A Passion for Plants: The First Century of the Connecticut Botanical Society*. Published in 2003 for the centennial of the Society's founding, this lively and profusely illustrated history of the Society is once again available. If you would like to order a copy, please send CBS a check for $12 (postage is included). Write "Passion for Plants" on your check, and mail it to: Connecticut Botanical Society, P.O. Box 9004, New Haven, CT 06532.



Announcing a New Field Guide

Grasses, Sedges, Rushes: An Identification Guide, by Lauren Brown and Ted Elliman.

THIS ELEGANT, portable, and easy-to-use guide is an updated and amended revision of Lauren Brown's seminal *Grasses: An Identification Guide,* first published in 1979. It features more than one hundred grasses, sedges, and rushes, presented with line drawings, color photographs, concise descriptions, and details on the uses of various plants throughout history. The authors highlight the differences between similar species and offer notes on plant survival strategies, invasiveness, and how different plants fit within the ecological landscape.

"No one will be able to claim that the identification of grasses, sedges, and rushes, which are of fundamental importance, both environmentally and economically, is simply 'too difficult' after they have learned to use this excellent guide." — Peter Raven, President Emeritus, Missouri Botanical Garden

Lilies of the Pond

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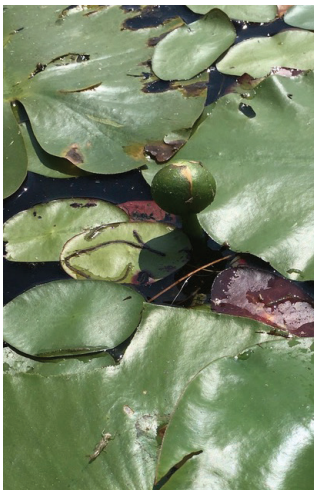
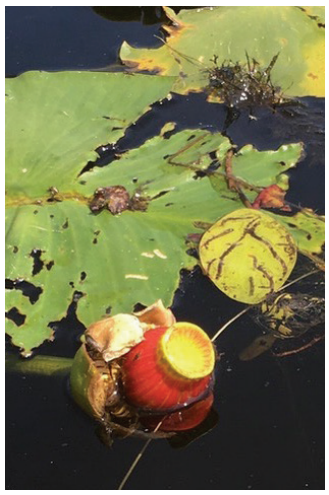
frequent pollinators. And indeed, I find one in a lily. Her thorax is a metallic green, and her abdomen is striped—a bicolored striped sweat bee (*Agapostemon virescens*). She is a ground nester, but here she is, out on the water. She doesn't have to fly very far; the fragrant water-lilies are all rather close to shore.

I read that the sweat bees do their work by getting covered with pollen on their way to the nectar pool at the center of the flower, falling into the nectar pool and depositing pollen on the stigma at the base of the pool. This would seem to suggest that the lily flower self-pollinates, but that's not what happens. There's a good plan to ensure outcrossing. On a given plant, the stigma is receptive on Day 1, when the nectar is most intensely fragrant. (This appears to be a Day 1 plant.) The flower closes up for the night, and on Days 2 and 3, the stamens release their pollen. The insects visiting the stamens of this day, collecting pollen, will fall into the nectar pool of *another* flower nearby that's opening for its first day. (I gather that the insects manage to crawl out of the nectar pool unharmed.)

TOP LEFT: Fragrant water-lily being visited by flies.
TOP RIGHT: Day 1 fragrant water-lily with its bowl filled with nectar, which obscures the pistil at the center.
BOTTOM LEFT: Day 2 fragrant water-lily with stamens shedding, no nectar pool, pistil visible.
BOTTOM RIGHT: Day 3 fragrant water-lily, with its center turning dark.






FROM LEFT TO RIGHT: Bullhead pond-lily (*Nuphar variegata*) bud; bullhead pond-lily opening; ripe bullhead fruit; close-up of bullhead pond-lily flower with pollinators.

Further from shore, I see no bees, but lots of little flies!

I took a photo of a Day 1 lily – untouched yet, with its nectar pool open. I reached down to see how deep the nectar pool was, and sure enough, it sloshed! About a quarter-inch deep, I'd say.

After the flower has been fertilized, it will close up and the stem will corkscrew it down into the water, where the seeds will develop.

Water lilies are appetizers, main course, salad, and dessert for many species in the swamp—painted turtles, ducks, beavers, and muskrats, among others.

It is mind-bending to think that these plants have been blooming in shallow waters since the time of the dinosaurs. According to a 2017 article in *Nature*, the earliest fragrant water-lily fossil found so far dates to the early Cretaceous period, ca. 125–115 million years ago (https://www.nature.com/articles/hortres201751).

Paddling on, I see that the bullhead pond-lilies (*Nuphar variegata*) are also opening up after being closed overnight. The bullheads have been blooming since mid-May, when first I noticed them from the shore, and they will continue to bloom all summer. At this point, it's possible to see them in all stages—bud, freshly opened flower, developing fruit, ripe fruit—within a single patch of lily pads.

The bullhead pond-lily flower has no distinctive smell (for me), but what an interesting form it has! What appear to be yellow petals are really yellow sepals, and what appear to be stamens surrounding the huge central stigma are a mix of stamens and linear petals. Is the lure for pollinators purely in the brilliant yellow of the flower? It does shine like the sun!

I got some beetles here—likely the ones known as water-lily beetles (*Galerucella nymphaeae*), that spend their entire lives on bullhead pond-lily plants, moving from the stems (where they overwinter as larvae) to flowers and leaves in the spring. They eat pollen as well as leaf tissue. Are they the reason bullhead leaves always look so ratty?

As I make my way slowly through the submerged stems of the bullheads I come upon a broad carpet of (mostly) notch-free lily pads. These are easier to paddle through than the large lily pads; the stems are very slim and flexible. There are two species in the foreground of this photo—watershield (*Brasenia schreberi*) and pondweed (*Potamogeton sp.*). Like the fragrant water-lily and the bullhead pond-lily, they grow together, and can be hard to distinguish at first glance. But the eye soon notices the differences: watershield leaves have veins radiating from the center, where they attach to the stem, while pondweed leaves have parallel veins running from the stem attachment to the other end of the ellipse. Can you see the four pondweed leaves in the right foreground?

This early in the season, some watershield pads are still entire, but as you can see, the leaf miners are at work! Unlike the water-lily beetles that destroy the margins of the bullhead leaves, these miners do their work within the leaf margins, so the effect is never "ratty"—in fact, I find it artistic, calligraphic. By the end of the season, virtually all of the leaves will be inscribed with poems in the leaf-miner language, but their outlines will mostly be intact.

Today, the watershields are in bloom. I notice (for the first time, though I've been paddling through these weeds for years) that the flowers are of two types. "Oh," I think, "they are dioecious—male and female on separate plants. The one on the left has a circle of yellow stigmas, the one on the right has stamens with purplish pollen. The bright red bits on the female flowers must be there to attract pollinators." But I'm wrong. When I look up the species later on, at home, I learn that the watershield, like the fragrant water-lily, produces both stigmas and stamens on the same flower, but on consecutive days. The photo on the left represents a Day 1 flower and the one on the right is a Day 2 flower. On any given day, there are enough Day 1 and Day 2 flowers blooming to ensure

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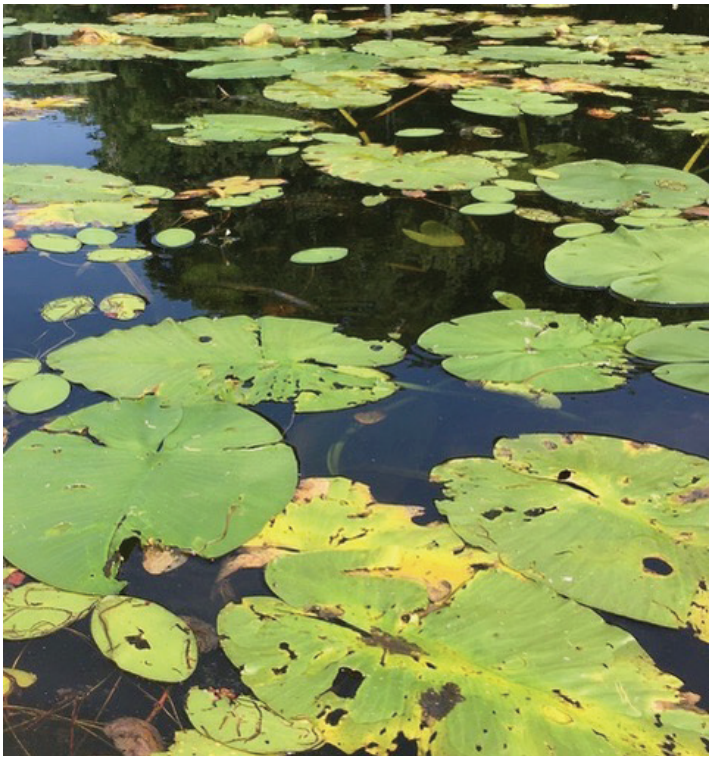

Lilies of the Pond

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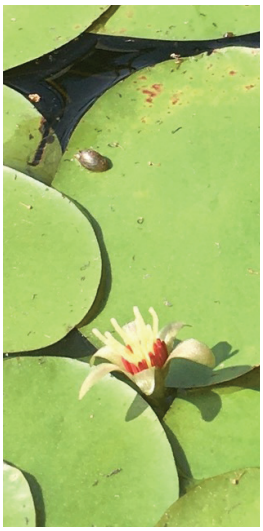
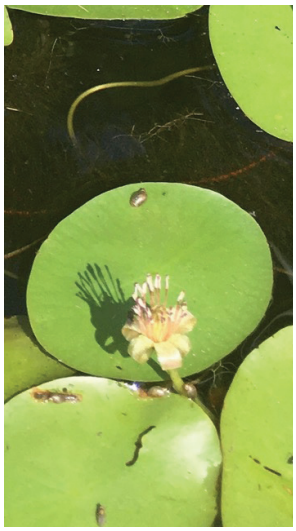
cross-pollination. Notice how exposed both stigmas and stamens are— they have no surrounding corollas to impede the light breeze that ruffles the swamp and carries *Brasenia* pollen to receptive stigmas. The bright red circle on the Day 1 flower is the circle of immature stamens. I think it's attractive, but suspect that the anthocyanins are there to protect the delicate stamen tissues, not to catch anyone's eye.

As for those pondweeds, there are some 26 species of *Potamogeton* in Connecticut along with several more hybrids, but we seem to have only one on the surface of the swamp this week. This is the floating pondweed, *P. natans*, with its characteristic light green "joint" just below the leaf. It's another breeze-pollinated plant, with an undistinguished-looking green spike of both male and female flowers.

The swamp water looks as dark in real life as it does in photographs, but it's possible to see things in the first 10–12 inches below the surface. Tangled in the pondweed is a plant whose flowers I am looking for, but which is not yet blooming on June 23: bladderwort, or *Utricularia*.





TOP FROM LEFT TO RIGHT: Bullhead pond-lily leaves, looking well-chewed; watershield (*Brasenia schreberi*) pads (predominantly). BOTTOM FROM LEFT TO RIGHT: Watershield flower (Day 1); watershield (flower (Day 2); pondweed (*Potamogeton natans*) leaves and flower spike, on my kayak.

This is lovely stuff, no? It consists solely of stems and leaves—it has no anchoring rhizomes or roots. Its little hollow bladders keep it floating close to the surface, where the leaves get plenty of sunlight for photosynthesis. It also captures protozoans and mosquito larvae in its bladders, and digests them with enzymes, to compensate for having no access to nutrients in the soil. What a life. I find these floating pearls in the deeper parts of the swamp, where the lilies are thin.

The next day, June 24, floating bladderwort (*Utricularia radiata*) has produced its very first floats and flowers. The "float" is formed by a whorl of leaves with swollen stalks. This is the first of three species that I look for in Bishop Swamp; the next will be greater bladderwort (*Utricularia vulgaris*), another yellow bladderwort that blooms a couple of days later and has no "floats." (Next I'll be watching for the purple

TOP FROM LEFT TO RIGHT: Floating bladderwort (*Utricularia radiata*); greater bladderwort (*Utricularia vulgaris*). BOTTOM FROM LEFT TO RIGHT: Submerged leaves and flowers of fanwort (*Cabomba caroliniana*); fanwort flowers on the surface.

bladderwort, *U. purpurea*, which is much less common, but very pretty.)

Once I'm out of the lily pads, I look under the surface and see more and more submerged plant life. Unfortunately, much of this is non-native, invasive stuff, like fanwort, which creates enormous colonies that are invisible until you're right over them.

Carolina fanwort (*Cabomba caroliniana*) is native to the southeastern United States. It was brought north by the aquarium trade in the mid-twentieth century, and is now widespread in the Northeast. Its foliage is so dense it shades out native plants as they emerge from the swamp floor, and it is difficult for fish to move through. It spreads not only through seed production, but also by fragmentation, so a little piece of the plant that sticks on a boat can be the start of a new population the next time the boat puts into a new pond. It's the ultimate invasive pest, and I'm afraid it's here to stay in Bishop Swamp. The flowers begin blooming underwater, and make their way up to the surface; I am seeing the very first emersed flowers this week. My camera superimposes the deep green reflections of trees over the submersed leaves of the fanwort, highlighting the little white flowers on the surface of the water.

I love moving along the surface of the water in my kayak, shifting my attention from the big sky overhead to the dark green shrubs and trees at the edges of the pond to the lilies on the surface of the water to the plants and animals I can see in that first foot beneath the surface. The world I experience here is full of dragonflies, damselflies, frogs, turtles, the tops of plants. Phoebes, orioles, and warbling vireos sing from the shore. Redwing blackbirds, eastern kingbirds, and tree swallows swoop over the water. Bullfrogs chugarump from the margins, and crickets keep up a steady chirp all day from the shore. Most of this life doesn't show up in my photos. The fishermen on the swamp see and hear the same things I do, but their attention is probably more on the fish, which I perceive only as bubbles or "jumps." The fish see smaller fish, and larvae; the larvae feast on tasty leaves and submerged portions of plants. Every viewer has their own a unique perspective. Under and over every surface lies another world.

Carrie Crompton fell in love with the New England wildflowers in the 1970s as an undergraduate in the Plant Science Department at UMass, noting the first date of every wildflower she could identify using Peterson's Field Guide to Wildflowers. Every year since, she has made a sport of looking for "the firsts" of the season. She started photographing pollinators while enrolled in the Master Naturalist program at Goodwin State Forest in 2017. Since the spring of 2020, she has written biweekly field notes on the plants and pollinator communities around Andover, CT, for the Andover Conservation Commission website (https://www.andoverconnecticut.org/conservation-commission).

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"Water Lilies, Evening Effect," Claude Monet, 1897.