NYFA New York Flora Association

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Editor's Note: This issue is full of interesting articles, among them an informative article by Scott Ward on his NYFA funded bittersweet project, which includes some handy hints on distinguishing our two species. I found this particularly useful, as up here in the north we do not have as much alien bittersweet for comparison, and I always worry that I may have identified a vine incorrectly. If you have wondered about all those pesky plant name changes, or about what is going on with the ash trees and the emerald ash borer, see the articles by Steven Daniel and Molly Marquand. And that is not all, see the table of contents!

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Those Maddening Name Changes

by Steven Daniel

Anyone who has looked at plants for a while has undoubtedly noticed, and perhaps been frustrated by, the flurry of name changes. Some of us resist it, and stick to the old, familiar names, while others feel that we need to go with the times and try to learn the new ones. But what sometimes gets lost is any explanation as to why the names are changing. It is more than simply "lumpers vs splitters" - there really is a lot of logic behind most of the changes.

Name changes arise from two distinct disciplines - taxonomy (relationships among species that produce a classification) and nomenclature (how we name species). You may be familiar with those tree diagrams that show phylogeny, often through recent DNA work. As our understanding of taxonomy is refined, botanists often need to change names to reflect this knowledge. Assigning names to plants must also be in accordance with the International Code of Nomenclature for Algae, Fungi, and Plants (ICN), which provides very specific rules for how this should be done in order to stabilize names. I provide a few examples that may be familiar.

1) Through a variety of research methods, botanists may determine that a species belongs in a different genus than the one in which it currently resides. A good example is the sharp-lobed hepatica, a spring wildflower familiar to many plant enthusiasts. Many of us learned this plant as *Hepatica acutiloba*. But a paper published in *Systematic Botany* (Hoot, et al., 1994) used molecular methods and determined that *Hepatica* really falls within the larger genus *Anemone*. Many subsequent workers have followed this determination, including *Flora of North America* (Dutton et al., 1997), Flora Novae Angliae, (Haines, 2011), and the NYFA Atlas (Weldy et al., 2016). Since this species name had been published in 1884, the Code requires that the proper name revert to that determination, *Anemone acutiloba (DC.) Lawson*.

Hepatica (Anemone?) acutiloba

So should you call all of our beloved hepaticas *Anemone acutiloba*? Well…maybe. Most workers do, but not all. In *Michigan Flora* (Voss and Reznicek, 2012), Tony Reznicek, one of the authors of the original 1994 *Systematic Botany* paper that showed that it falls within the genus *Anemone,* still uses *Hepatica*! He writes, "*Hepatica* has been clearly shown to be nested within *Anemone,* but we hope to be forgiven for recognizing such a familiar genus in the hopes that with a world-wide study, the variable genus *Anemone* may be split along natural lines into smaller genera, as is sometimes done in Europe, and rarely in North America, which would allow recognition of *Hepatica*…." So the short answer is…it is up to the judgment of the botanist. There is no governing organization that issues a final decree - rather names tend to be accepted by consensus amongst botanists, and botanists don't always agree!

2) The twayblades offer another related example. You may have seen one or more of these tiny orchids in bogs or cedar swamps in New York. Many of us learned the twayblades as the genus *Listera* - *Listera cordata* (heart-leaved twayblade), *Listera australis* (southern twayblade), and others. But alas, there is a non-photosynthetic European orchid named *Neottia nidus-avis* (birds-nest orchid) that, although it doesn't look a whole lot to my eyes like twayblades, has been shown, in a 2005 monograph of that orchid subfamily, to be in the same group as *Listera* (Pridgeon, et al., 2005). Since *Neottia* was described in 1753 by Linnaeus in his Species Plantarum (before *Listera* which was described in 1813), the name *Neottia* has *priority* according to the rules of the Code. So all our twayblades are now *Neottia* and are no longer in the genus *Listera.* Heart-leaved twayblade is now *Neottia cordata*.

Does that mean that southern twayblade (formerly *Listera australis*) is now *Neottia australis*? Unfortunately it's not so simple. The name *Neottia australis* is already 'taken' - an Australian orchid goes by that name. So, according to the Code, our southern twayblade needed a new specific epithet as well as a new genus. It is now known as *Neottia bifolia.* Yes…it can be maddening!

Neottia bifolia, the twayblade formerly known as *Listera australis*.

3) Sometimes name changes occur when a name turns out to be a misidentification of a morphologically similar species - in this case the name was 'misapplied'. The NYFA Atlas (Weldy et al., 2016) has numerous examples of misapplied names. For example, many older herbarium specimens of *Phragmites* are

called *Phragmites australis* - the Eurasian species that has invaded numerous wetland habitats of all kinds. However there was an undescribed taxon that was hiding in plain sight in many of our calcareous wetlands and had been lumped in with *Phragmites australis* until recently. It has now been recognized as a valid taxon (as either *P. australis* ssp. *americanus* or simply *P. americanus*) and the original usage of *P. australis* for it is considered to be misapplied. When encountered in the field, workers should certainly be clear whether or not the *Phragmites* they are seeing is the native taxon.

4) What about *Aster* and *Lycopodium*? The splitting of the genus *Aster* for most of our North American "asters" has caused many plant enthusiasts to wring their hands. It has been known for nearly a couple of decades that we have no native, true (e.g. Eurasian) asters in New York. Many of the field guides have not kept up with this change, but the segregate genera actually make a lot of sense. For example, many of the former asters are now in the genus *Symphyotrichum,* which was shown to be quite far from the genus *Aster* in a DNA phylogeny. The other genera (*Eurybia*, *Doellingeria*, *Ionactis*, and *Oclemena)* appear quite distinctive from each other as well. Recognizing these genera has helped me learn many of the former asters which had previously given me lots of trouble. Arthur Haines (2001) wrote an excellent paper on the subject, available online.

5) Likewise many people have a tough time getting used to the splitting of *Lycopodium* into many smaller genera. Some have argued that it is an arbitrary split, and that they all could be left in *Lycopodium* as part of a larger generic concept, although there is some DNA evidence that partly contradicts this idea. I have found, however, that learning these smaller genera (*Dendrolycopodium*, *Diphasiastrum*, *Spinulum*, *Lycopodiella*, and a much smaller *Lycopodium)* actually makes it easier to learn the lycopods, as the commonalities are often evident within each smaller genus. The *Peterson Field Guide to Ferns* (Cobb et al., 2005) has excellent explanations of these splits. Give it a try - you may find those pesky clubmosses really aren't so confounding!

Consider this essay to be an introductory overview on name changes; I haven't touched on all the key issues around naming. So…don't let those new names stop you. Strive to learn them - in many ways your understanding of plants and their relationships will improve.

This piece was inspired by an excellent overview of name changes in "California Mushrooms" (Desjardin, Wood, and Stevens, 2015), and by further discussions with David Werier.

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How New York Saved its Ash

by Molly Marquand

The genus *Fraxinus*—better known as ash trees— are under threat from an invasive beetle called emerald ash borer (EAB); here in New York ash are dying all around us. Accidentally imported from China, the beetle's larvae feed upon the plant's nutrient transport tissues, effectively girdling the tree in as little as 3-5 years. Infestations of EAB are hard to detect. Seeing the bleach blonde underside of ash bark is often the first tell-tale sign EAB is at work. Woodpeckers create this 'blonding' as they strip the trees' trunks, hunting for larvae. Unfortunately, it takes a couple of years to get to this stage, at which point the tree is generally too far gone to save. As of 2016, hundreds of millions of trees have been killed by EAB, as far away as Texas, and as close to home as Rochester, West Point, Albany, and Binghamton. An important timber species, ash is also a popular street tree, making this an issue that reaches far beyond ecology, deep into the pockets of our economy, and out of the woods into our cities, our suburbs and our homes.

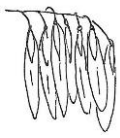
Over the last five years I have been lucky enough to get to know the ash trees of New York rather intimately. As Ash Collections Manager at the Mid Atlantic Regional Seed Bank (MARSB), this genus has been my bailiwick for two years. After receiving a grant from the US Forest Service to collect seed in order to stave off the genetic sinkhole the genus is about to enter, my work took me to every corner of the state. I met ash at 2,500 feet in the Catskills, ash knee deep in river mud in the Hudson, ash on the sandy flats of the Great Lakes and lots and lots (and lots) of ash along country lane after country lane in every county I visited. And it's this fact— the genus's sheer abundance— that will make its loss so devastating. Sure, the oaks support more invertebrates, the sweet gum has better fall foliage, but ash make up a staggering 7% of New York's canopy, and along the shores of our Great Lakes, that figure is closer to 30%. Imagine all those trees fallen, clattered like matchsticks in a ruin. Actually, you don't have to imagine it at all. Just visit Michigan where EAB has been doing its dirty work a decade longer than here. The insect has laid waste to hundreds of miles of forest in less than twenty years.

MARSB's mission is, loosely, to preserve the native flora of the Mid Atlantic via seed collection. The current focus is on making coastal collections to revegetate the vast swaths of sand demolished by Hurricane Sandy a few years ago, but they've made collections of rare and threatened species too, plus what they deem 'workhorse' species (more common plants) for use in restoration projects. The plan for ash is to collect as much seed as possible over as much New York territory as possible. All seed collected is shipped to the Forest Service's seed bank in Georgia where it can be stored for up to fifty years. Some of it, however, will go to researchers seeking an immediate solution to the EAB problem, perhaps in the form of a resistant ash tree. Some ash have demonstrated resistance to the beetle's onslaught, lingering on for many years after the major wave of EAB has passed (see the Forest Service's 'Lingering Ash' project for more information). It's the MARSB team's fervent hope that one day this ash seed might be used for restoration purposes too— restoring Adirondack ash to the Adirondacks, and Lake Erie ash to those sandy shores I mentioned earlier. After all, no two plants are alike— even if they are the same species.

The MARSB program demonstrates nicely how anyone can get involved in botany these days. In 2015, when ash across the eastern seaboard masted, over 70 volunteers participated in our ash program, scouting green, black, and white ash, reporting their locations and collecting their seed for banking. October was a busy month: volunteers packed lunches and got into the woods with pole pruners to snip off heavy bunches of samaras; they stood on the hoods of cars to reach that last big cluster of seeds to ship to Georgia; they learned how to distinguish the sessile leaflets of black ash from the longer, more narrow leaflets of green. People of all ages were involved and truly demonstrated their care for our New York flora. Thanks to all the help we amassed close to 250 collections of ash, all of which are now cooling in the Forest Service's seed

bank, waiting to be examined and have its genetic secrets unlocked.

This year, ash seed production was scarce and spotty. Instead of sitting idle, we set out to collect some of the species common to ash dominant forests. Presumably, once EAB decimates our ash forests here in New York, we can expect understory species to suffer too, particularly in areas swarming with other invasives like Japanese barberry and stiltgrass. We taught identification of 10 different native plants to our volunteer collectors and took in seeds from *Mimulus ringens*, *Schizachyrium scoparium*, *Rhus copallinum*, and others. These collections will live in Colorado at the National Seeds of Success seed bank. This program is part of a larger plan to develop a network of seed collectors: people who care about our native plants and want to do their part to help conserve them. We will provide all the training and information necessary to take part, so if you're interested, please reach out! Just as our flora provides the backbone of the landscapes and ecosystems we enjoy here in New York state, so we hope our volunteers will do the same for our programs, and provide the strength in numbers and resourcefulness we need to really make a difference. For more information contact mmarquand@marsb.org



Botanizing in New York: Bittersweet Findings

by Scott Ward, SUNY Brockport

Hello to fellow botanists and NYFA members! I've written a quick summary of my research interests and how NYFA's research award has helped me through my endeavor. In addition, I have added the observations and pictures I've collected so far in the hope that they may help some of you who struggle from time to time with distinguishing American bittersweet from Oriental bittersweet (especially without the tell-all fruit).

For my first field season, I primarily used the research award provided to me by NYFA for traveling to my various research sites; from Akron and Basom in Genesee County to the Finger Lakes National Forest and additional Ithaca-based sites in Schuyler and Tompkins County. So far, I have analyzed four communities that support American bittersweet populations, and hope to document plant communities at four more sites next summer. With this information, I am hoping to determine a disturbance threshold for the species, and compare it with sites inundated with Oriental bittersweet.

American bittersweet (*Celastrus scandens*) has a NYS CoC (Coefficient of Conservatism) rating of 6 (see Rich Ring's article in the Spring 2016 newsletter for an explanation on CoC values). This means the species generally has a narrow range of ecological tolerances and persists in stable communities. In part of my analyses so far: some of the sites register a 4 or less when accounting for all other species present. This provides interesting initial findings, showing that this state-rare species can actually withstand a moderate level of disturbance (if we associate low rated species and exotics with a level of disturbance). This may not be surprising to some that have encountered the species across numerous sites, given its seeming predilection for mildly disturbed hedgerows and thickets. Hopefully next year's data will help to shed more light on this year's findings.

Another aspect of my research deals with the closely related Oriental bittersweet (*Celastrus orbiculatus*). NYFA research funds aided my purchase of the tree coring equipment that will help me to answer questions regarding the tree-girdling nature of *Celastrus orbiculatus*. I hope to collect cores from trees across known restoration sites in which the invasive vines have been cut or removed in past years. From these cores, I want to determine if tree growth rebounds after the girdling pressure of *C. orbiculatus* has been released. Additionally, I have taken transpiration and photosynthesis measurements on saplings infested with *C. orbiculatus* this year and will use my leftover funds to collect leaf samples from canopy-dominant trees next summer. This will include either ascending the

trees with harness equipment, or clipping samples using pole pruners and ladders. Although from casual observations many botanists can see that trees have been pulled down and in some cases killed by Oriental bittersweet, it is still important to quantitatively measure specific parameters of tree health in order to understand the specific mechanisms of this species' invasion. Furthermore, data from this year may show if the combination of drought conditions and girdling by vines has caused synergistic stresses to infested forest trees.

Both aspects of my research this summer have involved the close and careful consideration of morphological characteristics that help to separate the two bittersweet species in the field, as many of my sites had them co-occurring. Below are descriptions that have helped me to distinguish the congeners from each other, as well as corresponding pictures I've gathered this research season.

Flowers/Fruit:

This is perhaps the easiest method to tell the species apart. *Celastrus scandens* has white-colored flowers borne in terminal panicles whereas *Celastrus orbiculatus* has green flowers borne in axillary cymes. If you are trying to determine if the species you are looking at is native or not, always look closely throughout all vine individuals for the presence of terminal fruit clusters (or stalks, if fruit are no longer persisting on the stem).

Pictures 1 and 2. Dull green flowers of *C. orbiculatus* (left); close up of white-colored flowers of *C. scandens* (right). Both species are primarily dioecious.

Pictures 3-6: Flowers (top left) and fruit (bottom left) of *Celastrus scandens*, note the terminal clusters of fruit. The pictures on the right show the contrasting fruit arrangement between *C. scandens* (top right) and *C. orbiculatus* (bottom right). Fruits on *C. scandens* consist of darker orange capsules surrounding fleshy red arils with 1 seed per aril. *C. orbiculatus* has more than one seed per aril.

Leaves:

When fruit are not present on vines, leaves become the most useful way to distinguish between congeners (see Pictures 7-10). Be certain to look for mature or hardened leaves, as newly produced leaves of both can often look quite similar. Mature leaves on *C. scandens* typically have slightly involute, more elliptic leaves with mildly serrate to crenulate margins. *C. orbiculatus* has sub-orbiculate to orbiculate-shaped leaves with more distinctly crenulate or even crenate margins. Leaf coloration can be slightly diagnostic as well, as *C. scandens* generally has a more blue-green to dark-green color while *C. orbiculatus* seems often to have bright-green leaves, especially in moderate to full sun. Also, the leaves on our native bittersweet tend to feel a bit thicker. When looking at mature leaves, look for acuminate points on *C. scandens*, as these leaf tips can often be significantly longer than *C. orbiculatus* (see Leicht-Young et al., 2007) for measurement information and a more formal key). Something else I have observed is that the terminal shoots of *C. scandens* often seem to grow in a circular form or "tangle" - growing in on itself (Fig. 11). While care must be taken to distinguish these species when only vegetative characteristics are present, it seems that if clearly acuminate tips and more elliptic leaves are present, then you may be looking at *C. scandens*. Both species produce bright yellow foliage prior to complete senescence, so be on the lookout during the fall season.

Pictures 7-10: Mature leaves of *C. scandens* (top left), note slightly involute curvature and long acuminate point; smaller leaf of *C. orbiculatus* (top right), note that even on immature leaf the apex is a bit shorter and margins are more crenulate; immature leaves and shoot of *C. scandens* (bottom left), often the acuminate point is more apparent than in *C. orbiculatus*; immature leaves of *C. orbiculatus* (bottom right), note similar appearance to immature *C. scandens*, hence why mature leaves are more definitive in telling the two apart.

Picture 11. Don't get "tangled up" trying to tell your bittersweets apart. Terminal shoots of *C. scandens* can often be seen twining in on themselves (also note long, slender leaf-apex).

Stems/bark:

Generally speaking, the younger stems of *C. scandens* have a light grey (nearly glaucous) and sometimes reddish-brown coloration. The stems of young woody seedlings from *C. orbiculatus* tend to have a more brownish-orange coloration and often have multiple stems arising laterally from the main stem. Also, fresh stems on *C. orbiculatus* usually appear bright green. Both species can have prickly buds later in the growing season. As for bark on *larger* vines, *C. orbiculatus* usually has a pale grey, "flaky" nature, growing tight to its host and girdling close to the ground while *C. scandens* tends to keep the reddish-brown coloration (Pictures 12-13) and smooth texture it had when smaller, and it often grows more free from its host. Note: larger, greyer vines are likely to be *C. orbiculatus*; however, *C. scandens* can also reach substantial stem widths and appear slightly grey.

Pictures 12-13: Bark from one of the larger individuals of *C. scandens* seen at Finger Lakes National Forest. It is not uncommon to see smooth bark on larger individuals.

Growth form and girdling:

While both species, by nature, are stem-girdling vines, *C. orbiculatus* almost always causes more damage to its tree hosts through its aggressive strangulation on the lower stems and trunks. I have witnessed moderate damage on tree hosts caused by small to medium sized stems of *C. scandens*, but they are not nearly as detrimental as its oriental congener. Looking up into the canopy of a tree infested with *C.*

scandens- the native vine seems to appear more "clumpy" in nature, often finding a particular portion of the canopy to grow and spread in. This contrasts with, in some ways, *C. orbiculatus*, which generally shows a more uniform twining and smothering nature once in canopies. I have yet to see any native bittersweet reach such a substantial size as one I saw at Mendon Ponds County Park in Honeoye Falls, NY. This stem from *C. orbiculatus* was approximately 13 cm in diameter (see Picture 14; note the quarter in the picture for size comparison). Many lateral brownish-orange stems can often be seen protruding from the main stem of *C. orbiculatus*, much like those on poison ivy. Lastly, I have never personally witnessed older, wider stems of *C. scandens* girdling its host close to the ground, while *C. orbiculatus* seems to almost always begin to girdle its host starting at a lower height. This can happen even when stems are quite small (note Pictures 15-16). While there are exceptions to how these infestations twine from the ground, it is something I noticed throughout the summer, and felt it was appropriate to note.

Picture 14. Woody cross section of *C. orbiculatus* taken from Mendon Ponds County Park. Note the quarter for size comparison. This vine had a diameter of 13 cm, individuals with a diameter of 18 cm have been recorded.

Pictures 15-16: (Left): a cut and treated vine of *C. orbiculatus* on *Acer saccharum* about 10-18 cm diameter depending on where you measure. Will this tree ever fully recover now that the vine has been cut? (Right): A smaller vine of *C. orbiculatus* on a *Prunus serotina* sapling (note the much lighter grey coloration of the vine compared to the typical reddish-brown color of *C. scandens*).

Separating these species using morphological characteristics can be tricky unless I use all available parts of the plant. The hierarchy of identification for me goes: fruit/flower arrangement, mature leaf width and apex length, stem size and coloration, and infestation size and form on host. I know this article was in some ways excessive, but isn't it fascinating how congeneric plant species can appear so vastly similar in certain situations, yet have the potential to cause such vastly different ecological consequences?

I hope these descriptions and pictures have helped some of you, and maybe further solidified many of the characteristics that more experienced botanists were always aware of but never put down into layman's terms. Collection of *C. scandens* vouchers should be limited considering the species' continued rarity in our state; however, I encourage botanists to collect and catalogue vouchers of *C. orbiculatus* so that we can create a solid foundation in understanding where this species is and isn't growing (especially for Biota of North America Program (BONAP) records). Looking ahead, these vouchers may help us to further understand the fundamentals of both species invasions, and congeneric co-occurrence amidst our state's diverse floral assemblages.

If you have any locations or sightings of *C. scandens* in the Western and Finger Lakes portion of New York, please contact me at sward5@u.brockport.edu. I would like to thank NYFA for their research award; botanists James Battaglia, David Werier, and Marybeth Deller for their assistance in helping me find various populations of *C. scandens* throughout the state, and Anne Johnson for her assistance in plant identification. And lastly, I would like to thank my advisor, Dr. Kathryn Amatangelo here at SUNY Brockport, for guiding me through the process of ecological research.

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NYFA Trip: Mill Brook First Growth Forest and Mill Brook Fen, 7/9/16

by Dan Spada

A weather forecast for scattered showers and thunderstorms did not deter an intrepid group of 16 from trekking a short distance in from Mill Brook Road south of Arkville, NY. Dr. Michael Kudish led the trip and provided an interesting narration on the forest history of the site. This small area on the northerly slope of Balsam Lake Mtn. was acquired by NYS in the early 1900's and is part of the Forest Preserve. Indications are that this site was never logged and would be considered "first growth" forest, that is, forest that has never had human disturbance such as logging, burning, barking, etc. This piece of land happens to be located just beyond the limit to which tanbark mills hauled bark. In addition, the area was colonized in the mid- to late 1800's and so had less chance of human disturbance from logging or pasture clearing before state acquisition. There were three distinct vegetational communities that we explored. Immediately upslope of and adjacent to the Mill Brook Road is an old growth eastern hemlock community mainly occupying the nearly-flat top of a moraine; only a small portion of the grove descends down the short, relatively steep slope to the road. On the far side of the slope is a depressional wetland that is perhaps two acres in size. Beyond the wetland the slope rises again and continues steeply all the way to the summit of Balsam Lake Mtn. This slope contains a first growth northern hardwood forest. We noted many large yellow birch (*Betula alleghaniensis*) (43" dbh), sugar maple (*Acer saccharum*) (36" dbh), red maple (*A. rubrum*) (27" dbh), black cherry (*Prunus serotina*) (36" dbh), white ash (*Fraxinus americana*) (30" dbh), and eastern hemlock (*Tsuga canadensis*) (45" dbh) as well as typical ground cover species found under

northern hardwoods. In the past Mike had made actual counts of growth rings of either broken off boles or large branches to get approximate ages of some of the trees. In the hemlock grove he noted ages of 243, 213 and 135 years. One sugar maple was 150 and an American beech was 115. We began to explore the wetland that occupies a depressional area at the toe of the slope below the northern hardwood forest, but were cut short by a thunderstorm. It was obvious that the group wanted to continue botanizing in the peatland, but it was thought prudent to head back to the cars. We kept a species list which is included below, joined by species previously identified from the site by Mike Kudish.

Trees and Small Trees
Acer pensylvanicum
Acer rubrum
Acer saccharum
Acer spicatum
Amelanchier canadensis
Betula alleghaniensis
Fagus grandifolia
Fraxinus americana
Fraxinus nigra
Prunus serotina
Tsuga canadensis

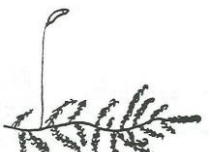
Shrubs
Hamamelis virginiana
Lonicera canadensis
Rhododendron prinophyllum
Ribes lacustre
Sambucus racemosa
Viburnum lantanoides

Herbs
Aralia nudicaulis
Arisaema triphyllum
Cardamine pensylvanica
Caulophyllum thalictroides
Chelone glabra
Chrysosplenium americanum
Circaea alpina
Clintonia borealis
Coptis trifolia
Galium trifidum
Geum sp.
Heracleum maximum
Impatiens capensis
Laportea canadensis
Lysimachia borealis
Maianthemum canadensis
Medeola virginiana
Mitchella repens
Oclemena acuminata
Oxalis montana
Polygonatum pubescens
Prenanthes altissima
Pyrola elliptica
Rubus pubescens
Scutellaria lateriflora
Saxifraga pensylvanica
Streptopus roseus
Thalictrum pubescens
Tiarella cordifolia
Trillium erectum
Trillium undulatum
Tussilago farfara
Uvularia sessilifolia
Viola cucullata

Graminoids
Carex trisperma
Cinna latifolia
Glyceria striata

Ferns and Friends
Dryopteris cristata
Dryopteris intermedia
Gymnocarpium dryopteris
Huperzia lucidula
Onoclea sensibilis
Osmundastrum cinnamomeum
Polypodium virginianum
Polystichum acrostichoides
Thelypteris noveboracensis

Bryophytes
Anomodon attenuatus
Bazzania trilobata
Hylocomium splendens
Hypnum imponens
Plagiomnium ciliare
Pleurozium schreberi
Polytrichastrum pallidisetum
Sphagnum squarrosum
Rhizomnium magnifolium
Rhizomnium punctatum
Thuidium delicatulum
Trichocolea tomentella
Ulota coarctata



New Endangered and Threatened Plant Records for New York State 2016

Compiled by Steve Young, Chief Botanist, NY Natural Heritage Program

The following are endangered or threatened plant discoveries that are new to their sites and either found by New York Natural Heritage Program staff or reported to staff from outside the program. The plants are listed by scientific name, common name, and protected status. Each record includes the person who found the occurrence, the county where it was found, and any additional significance about the find. Thank you all for your excellent plant work this past year and I look forward to many more discoveries in the future. If there are any new finds that are not included here, let me know and I will include them in an addendum in the next issue of this newsletter.

Aplectrum hyemale, puttyroot orchid (state endangered) – An environmental consultant, Sullivan County, only the third known existing site in the state and a new county record.

Arethusa bulbosa, dragon's-mouth orchid (state threatened) – Steven Daniel, St. Lawrence County, a new county record.

Asclepias viridiflora, green milkweed (state threatened) – Jim Stevenson, Nassau County, the largest known population in the state. Also, Jane Jackson reported another new and small population from a preserve in Nassau County.

Alisma gramineum, water plantain (state threatened) – Steve Young and Rich Ring, Clinton County, very large populations along the shore of Lake Champlain.

Botrychium rugulosum, St. Lawrence grapefern (state endangered) – Anne Johnson, St. Lawrence County. Just when we thought we couldn't find this fern again in the state, Anne found a new one.

Bouteloua curtipendula, side-oats grama (state threatened) – Mike Adamovic, Rockland County, confirmed by Rich Ring and a new county record.

Carex cumulata, clustered sedge (state threatened) – Rich Ring, Orange County.

Cardamine douglassii, purple cress (state threatened) – Kathy McCormick, Erie County, Jim Battaglia helped confirm and document the plants. Also, Julie Lundgren, Seneca County, a new county record.

Carex formosa, handsome sedge (state threatened) – Aaron Iverson and A.J. Evans, Cayuga County, the first collection in that county since William J. Beal collected it at Union Springs in 1868.

Carex haydenii, cloud sedge (state endangered) – Steve Daniel, St. Lawrence County, a new county record.

Carex sartwellii, Sartwell's sedge (state endangered) – Anne Johnson, St. Lawrence County.

Carex schweinitzii, Schweinitz's sedge (state threatened) – David MacDougall, Dutchess County, the first time this has been found in the county since 1915.

Carex typhina, cat-tail sedge (state endangered) – Joe Bridges, Ulster County, one of the largest occurrences in the state, several thousand clumps in a wetland and a new county record.

Carya laciniosa, big shellbark hickory (state threatened) - Tim DePriest and Michael Wilkinson, Erie County, small trees in a wetland that were confirmed by Steve Young. Also, Julie Lundgren confirmed a population in Seneca County.

Cuscuta obtusiflora ssp. *glandulosa*, southern dodder (state endangered) – Eric Lamont and Steve Young, Suffolk County, along a coastal plain pond shore.

Cyperus retrorsus, retrorse flatsedge (state endangered) – Ray Matarazzo and Steve Young, Richmond County, the first find on Staten Island since Britton collected it in 1878.

Cypripedium arietinum, ram's-head ladyslipper (state threatened) – Lee Ellsworth, Jefferson County, discovered in the alvars.

Eleocharis ovata, ovate spikerush (state endangered) – Steven Daniel and Anne Johnson, St. Lawrence County, two separate occurrences and the first occurrences in the county since 1933.

Equisetum palustre, marsh horsetail (state threatened) – Rich Ring, Clinton County, along the shore of Lake Champlain.

Diphasiastrum complanatum, northern running-pine (state endangered) – Mike Hough, Cortland County, in the vicinity of a 1946 record by Clausen.

Draba reptans, Carolina Whitlow-grass (state threatened) – Chris Mangels and Steve Young, Dutchess County, thousands of plants along a railroad embankment.

Fraxinus profunda, pumpkin ash (not yet protected) – Daniel Atha, New York and Bronx Counties, the first records for New York State.

Hottonia inflata, featherfoil (state threatened) – Carol Weiss, Rockland County, this is only the second existing occurrence in Rockland County.

Linum medium var. *texanum*, Southern yellow flax (state threatened) – Polly Weigand, Suffolk County.

Orontium aquaticum, golden club (state threatened) – Mick Adamovic, Ulster County, in a tidal marsh along the Hudson and the only existing occurrence in Ulster County.

Oxalis violacea, violet wood-sorrel (state threatened) – Taro Ietaka, Westchester County, the first occurrence of this species in Westchester County since O.R. Willis published his Flora of Westchester County in 1881.

Podostemum ceratophyllum, riverweed (state threatened) – Donna Vogler, Otsego and Delaware Counties, in the Susquehanna River and a new county record for Otsego County.

Ptelea trifoliata, wafer ash (state threatened) – Meg Janis, Erie County.

Schoenoplectus heterochaetus, slender bulrush (state endangered) – Rich Ring and Steve Young, Clinton County, this is much more common than we thought along the shore of Lake Champlain.

Senecio suaveolens, sweet-scented Indian-plantain (state endangered) – John W. Greaves IV, Chenango County, near Norwich where an old record with no date had been collected by W.H. Fitch.

Sericocarpus linifolius, flax-leaf whitetop (state threatened) – Polly Weigand, Suffolk County.

Silene caroliniana ssp. *pensylvanica*, wild pink (state threatened) - William S. Hoffman and Christopher Camacho, Columbia County, the first occurrence reported in the county since 1935.

Sparganium natans, small bur-reed (state threatened) - Anne Johnson and Steven Daniel, St. Lawrence County.

Spiranthes magnicamporum, Great Plains ladies-tresses (not yet ranked) – Don Leopold, Jefferson County, the second site in the alvars.

Stenanthium leimanthoides, pinebarren death camas (state endangered) – Dave Taft, Suffolk County, the first find of this plant in NY since 1929. We thought it had become extirpated in the state.

Tripsacum dactyloides, northern gamma grass (state threatened) – Ray Matarazzo and Steve Young, Richmond County, for the second existing site on Staten Island.

Ulmus thomasii, cork elm (state threatened) – Mike Hough, Cortland County, a new county record.

Utricularia striata, fibrous bladderwort (state threatened) – Matt Kaelin, Suffolk County, another population from a coastal plain pond.

Veronicastrum virginicum, Culver's-root (state threatened) – Norbert Quenzer, Ulster County, the first record since Paul Huth had seen it near New Paltz in 1980.

Viola primulifolia, primrose-leaf violet (state threatened) – Jackie Donnelly, Warren County, a new county record and the only existing occurrence north of Long Island.

Sugarloaf Mountain Field Trip

by Rich Ring

On a perfect, sunny June 4th morning, nine plant enthusiasts from the joint NYFA/NEBC meeting met for a hike up Sugarloaf Mountain. Sugarloaf is within Hudson Highlands State Park and accessible via a Metro-North rail from New York City. This explains the crowds of people just arrived from NYC passing our group at the trailhead. Nearby Breakneck Ridge receives more than a thousand visitors a day on some summer weekends. Luckily, the crowds haven't discovered Sugarloaf yet (don't tell), and we had the trail largely to ourselves.

Our main objective was to explore the rocky summit grassland habitat at the top of Sugarloaf. We mostly ignored the lower slopes of weedy tulip tree forest, working our way up through a mix of oak and maple. On the way up some of the New Englanders were interested in the common dittany (*Cunila origanoides)* we ran across in the oak woods. This southern species is locally common in such habitats in southeastern NY, but doesn't quite make it east into New England. As in much of the Hudson Highlands, the geology at this site seems complicated, and there are acidic oak-heath communities transitioning quickly into more calcareous juniper-hickory woodlands.

Upon reaching the summit, our group was rewarded with views of the Hudson River, Bannerman's Castle, and Storm King Mountain in the background, and a steep slope filled with *Carex bicknellii* in the foreground. The upper slope and summit area burned in the 1990's, resulting in the current open, meadow-like habitat dominated by grasses, sedges, and a wide diversity of forbs. The steep slope, shallow soils, and exposure to drying winds from the west seem to have helped slow down succession to shrubland or forest. A few goat's-rue (*Tephrosia virginica*) were starting to open their showy blooms, and we got down on hands and knees to see some smaller native notables such as Carolina geranium (*Geranium carolinianum*), Virginia dwarf-dandelion (*Krigia*

virginica), and orange-grass (*Hypericum gentianoides*).

Somehow everyone survived our bushwhack down the steep slope back to the trail without incident. On our hike out Tom Phillips showed several of us a rocky seep with a nice diversity of mosses. It was generally agreed, over post-hike ice cream, that NYFA and NEBC ought to meet up together more often. A plant list is included below.

Common Dittany (*Cunila origanoides*). Photo by Rich Ring

Photo by Doug McGrady

Vascular Plants observed on Sugarloaf Mountain Hike, 6/4/2016. List compiled by Lisa Standley and Doug McGrady.

Acer rubrum	red maple	Apocynum cannabinum	hemp dogbane
Acer saccharum	sugar maple	Aquilegia canadensis	red columbine
Ailanthus altissima	tree-of-heaven	Arabidopsis lyrata	lyre-leaved rock-cress
Alliaria petiolata	garlic-mustard	Aralia nudicaulis	wild sarsaparilla
Ambrosia artemisiifolia	common ragweed	Arisaema triphyllum	Jack-in-the-pulpit
Ambrosia trifida	giant ragweed	Artemisia vulgaris	common wormwood
Amphicarpaea bracteata	American hog-peanut	Asclepias quadrifolia	four-leaved milkweed
Antennaria plantaginifolia	plantain-leaved pussytoes	Asplenium platyneuron	ebony spleenwort
Apocynum androsaemifolium	spreading dogbane	Aureolaria flava	smooth false foxglove

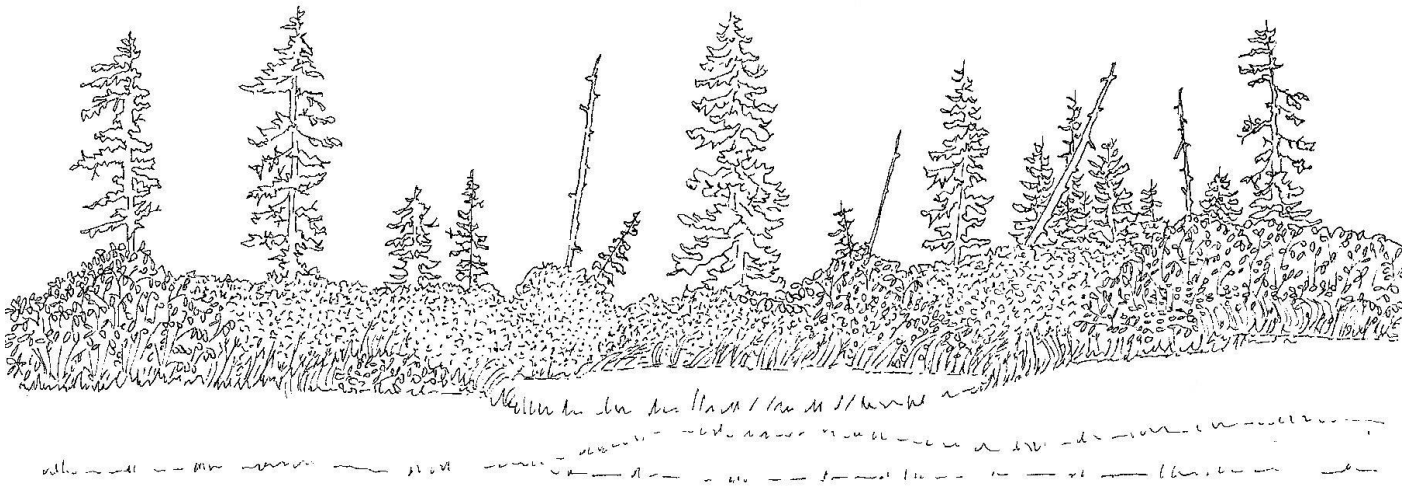
Aureolaria virginica	downy false foxglove
Baptisia tinctoria	yellow wild indigo
Berberis thunbergii	Japanese barberry
Betula lenta	cherry birch
Boechera laevigata	smooth rockcress
Bromus pubescens	hairy wood brome
Campanula rotundifolia	Scotch bellflower
Capnoides sempervirens	pink-corydalis
Cardamine impatiens	narrow-leaved bitter-cress
Carex albicans	white-tinged sedge
Carex appalachica	Appalachian sedge
Carex bicknellii	Bicknell's sedge
Carex blanda	eastern woodland sedge
Carex cephalophora	oval-headed sedge
Carex communis	fibrous-rooted sedge
Carex digitalis	slender woodland sedge
Carex grisea	inflated narrow-leaved sedge
Carex hirsutella	hirsute sedge
Carex laxiflora	broad loose-flowered sedge
Carex pensylvanica	Pennsylvania sedge
Carex platyphylla	broad-leaved sedge
Carex rosea	rosy sedge
Carex sp.	sedge
Carex swanii	Swan's sedge
Carex umbellata	parasol sedge
Carex virescens	ribbed sedge
Carya glabra	pignut hickory
Carya ovata	shagbark hickory
Castanea dentata	American chestnut
Ceanothus americanus	New Jersey redroot
Celastrus orbiculatus	Asian bittersweet
Celtis occidentalis	common hackberry
Cerastium strictum?	American field chickweed
Chimaphila maculata	spotted prince's-pine
Circaea alpina	small enchanter's-nightshade
Collinsonia canadensis?	horse-balm
Comandra umbellata	bastard-toadflax
Cornus (Benthamidia) florida	flowering dogwood
Cryptotaenia canadensis	Canada honewort
Cunila origanoides	common dittany
Cystopteris tenuis	Mackay's fragile fern
Danthonia spicata	poverty oatgrass
Dennstaedtia punctilobula	eastern hay-scented fern
Deschampsia flexuosa	wavy hair grass
Desmodium paniculatum?	panicled tick-trefoil
Desmodium rotundifolium	round-leaved tick-trefoil
Dichanthelium boscii	Bosc's rosette-panicgrass
Dichanthelium depauperatum	starved rosette-panicgrass
Dichanthelium dichotomum	forked rosette-panicgrass
Dichanthelium polyanthes?	many-flowered rosette grass
Dryopteris marginalis	marginal wood fern
Eupatorium sessilifolium	upland thoroughwort
Eurybia divaricata	white wood-aster
Eurybia sp.	aster
Fagus grandifolia	American beech
Fallopia scandens?	climbing false buckwheat
Festuca sp.	fescue
Fraxinus americana	white ash
Galium circaezans	forest licorice bedstraw
Gaylussacia baccata	black huckleberry
Geranium carolinianum	Carolina crane's-bill
Geranium maculatum	spotted crane's-bill
Hamamelis virginiana	American witch-hazel
Helianthus divaricatus	woodland sunflower
Heuchera americana	common alum-root
Hieracium paniculatum	panicled hawkweed
Hieracium venosum	rattlesnake hawkweed
Hylodesmum glutinosum	pointed-leaved tick-trefoil
Hylodesmum nudiflorum	naked tick-trefoil
Hypericum gentianoides	orange-grass St. John's-wort
Hypericum perforatum	common St. John's-wort
Hypoxis hirsuta	common star-grass
Juglans nigra	black walnut
Juncus tenuis	path rush
Kalmia latifolia	mountain American-laurel
Krigia virginica	Virginia dwarf-dandelion
Laportea canadensis	Canada wood-nettle
Lespedeza capitata	round-headed bush-clover
Lespedeza hirta	hairy bush-clover
Lespedeza sp.	bush-clover
Lindera benzoin	northern spicebush
Liriodendron tulipifera	tulip tree
Lonicera japonica	Japanese honeysuckle
Luzula multiflora	common wood rush
Lysimachia quadrifolia	whorled yellow-loosestrife
Maianthemum stellatum	star-like false Solomon's-seal
Micranthes virginiensis	small-flowered-saxifrage
Microstegium vimineum	Japanese stiltgrass
Monotropa uniflora	one-flowered Indian-pipe
Nabalus serpentarius?	lion’s foot rattlesnake-root
Nabalus trifoliolatus	three-leaved rattlesnake-root
Onoclea sensibilis	sensitive fern
Osmorhiza claytonii	bland sweet-cicely
Osmunda claytoniana	interrupted fern
Ostrya virginiana	hop-hornbeam
Parathelypteris noveboracensis	New York fern
Paronychia canadensis	smooth forked whitlow-wort
Parthenocissus quinquefolia	Virginia-creeper
Pedicularis canadensis	forest lousewort
Pinus resinosa	Red Pine
Poa spp.	blue-grass
Polygonatum biflorum	King Solomon's-seal
Polypodium appalachianum	Appalachian polypody
Polystichum acrostichoides	Christmas fern
Populus deltoides	eastern cottonwood
Populus grandidentata	Bigtooth Aspen
Populus tremuloides	Quaking Aspen
Potentilla simplex	common cinquefoil
Prunus serotina	black cherry
Prunus virginiana	choke cherry

Pteridium aquilinum	bracken fern
Pycnanthemum incanum	hoary mountain-mint
Pyrola americana	American shinleaf
Pyrola sp.	shinleaf
Quercus alba	Eastern White Oak
Quercus ilicifolia	scrub oak
Quercus montana	mountain chestnut oak
Quercus rubra	northern red oak
Quercus velutina	Black Oak
Ranunculus abortivus	kidney-leaved crowfoot
Ranunculus micranthus	small-flowered crowfoot
Rhus copallinum	winged sumac
Rhus hirta	staghorn sumac
Robinia pseudoacacia	black locust
Rosa carolina	Carolina rose
Rosa multiflora	rambler rose
Rubus flagellaris	northern dewberry
Rubus phoenicolasius	wine raspberry
Rubus sp.	bramble
Rumex acetosella	sheep dock
Sambucus nigra	black elderberry
Saponaria officinalis	common soapwort
Sassafras albidum	sassafras
Schizachyrium scoparium	little bluestem
Scrophularia lanceolata	lance-leaved figwort
Silene latifolia	white campion
Sisyrinchium angustifolium	narrow-leaved blue-eyed-grass
Smilax herbacea	carrion-flower
Smilax rotundifolia	roundleaf greenbrier
Sorghastrum nutans	Indian grass
Tephrosia virginiana	wild goat's-rue
Thalictrum dioicum	early meadow-rue
Tilia americana	American linden
Toxicodendron radicans	poison-ivy
Trichophorum planifolium	bashful clubsedge
Triodanis perfoliata	Venus' looking-glass
Ulmus americana	American elm
Ulmus rubra	slippery elm
Uvularia perfoliata	perfoliate bellwort
Uvularia sessilifolia	sessile-leaved bellwort
Vaccinium pallidum	hillside blueberry
Vaccinium stamineum	deerberry
Veronica arvensis	corn speedwell
Viburnum acerifolium	maple-leaved viburnum
Viburnum prunifolium	smooth blackhaw
Viburnum rafinesquianum	downy arrowwood
Viola spp.	violet
Vitis vinifera?	wine grape

Partial list of bryophytes seen on Sugarloaf Mountain hike, 6/4/2016. Compiled by Tom Phillips.

From Xeric upper trail areas:
Dicranum scoparium
Diphyscium foliosum
Frullania (Liverwort)
Leucobryum glaucum
Orthodicranum fulvum
Pohlia nutans
Thelia asprella
Weissia controversa

From Waterfall that some of us visited near the lower part of the trail
Brachythecium rivulare
Hygroamblystegium tenax
Philonotis fontana
Rhizomnium punctatum
Thamnobryum alleghaniense
Thiudium delicatulum
Torrentaria (Eurhynchium) riparioides



An Engaging Late Fall Activity for Everyone

by Anne Johnson (with help from Steven Daniel)

Feeling at loose ends because the botanizing season is over? Try *Botrychium* hunting! It is a perfect sport for the late fall when all else has senesced and the woods are full of hunters. Why? Because you can find them in cemeteries!

St. Lawrence County botanist Nancy Eldblom had discovered a number of years ago that certain cemeteries were good spots to look for (and find) grapeferns. I was re-locating some of her finds this past fall (she kept notes such as "near the Wilcox's stone in the NW" or "near the stone that is on the very edge of the shadow of the tallest white pine" or "near the Mary statue"). I did succeed in re-locating grapeferns at some of the old known sites, which inspired me to try to find E.P. St. John's collecting sites from the 1940's. St. John had found a number of grapeferns, at least one of which had turned out to be *B. rugulosum* (a state-listed rare grapefern with an S1 ranking). His label information was generally somewhat vague – for instance, " 2 miles W of Parishville", or "pasture 3 miles SW of Parishville". So, I drove out to Parishville then went 2 miles W, and lo and behold found a cemetery. And in that cemetery were grapeferns! Steven Daniel came back with me the next day, and we searched a number of other cemeteries, some of which had grapeferns and some of which did not, and this started us on a flurry of cemetery activity. He found a list of cemeteries by town on the internet and using this resource as well as Nancy's old notes and drive-by sightings, we embarked on a highly amusing late fall activity.

In one cemetery we found over 100 individuals, many just emerging at the end of October. Here are a couple of tiny ones next to a dime for scale. We wondered: do the numbers vary a lot from year to year? Steven thought they behaved a bit like fungi, just popping up like this, and wondered if there is a mycorrhizal connection.

We were mostly seeing *B. dissectum* and some *B. multifidum* in these places but some we were just totally unsure of. The next three photos show two that were growing next to each other. They seemed somewhat veiny and didn't seem like *B. multifidum* or *B. dissectum*, so we were wondering if they might be the state-rare *B. rugulosum*? The first two pictures below are the same individual; the last one is a different plant but growing very close.

And here's a tiny *B. dissectum* with a sporophore. Sometimes we found tiny ones that are fertile and large ones that are not; so it must not simply be a question of age and vigor. (And yes, we find golf balls in cemeteries also).

We found lots of nipped sporophores like these. Rabbit? Deer? Something likes them!

We found that the grassier and more well-kept a cemetery was, the less likely we would find grapeferns. They seemed to prefer a poor, sandy soil, the sort you find in the older cemeteries. But not only cemeteries; Steven Daniel spotted one on the side of NY 37 while driving – what caught his eye was the rather hefty fruiting stalk of a *B. multifidum*. We got out to look and began finding grapeferns all over on the sandy roadside bank. So why all the grapeferns, and why so late in the year? We just don't know. Could it be because it was such a terribly hot and dry summer, and then in late October it finally rained and they all took that opportunity to come up and try to send out spores before the ground froze?

We'd like to extend a big thanks to Art Gilman, who led a NYFA workshop on *Botrychium* back in 2011, and who was good enough to graciously put up with a barrage of *Botrychium* photos from us this fall; because when you start seeing them everywhere, you think they either 1) all look alike, or 2) all look different, depending on your frame of mind that day.

And lastly, here is a gravestone that made us laugh:

2016 Additions to the St. Lawrence County Flora

by Anne Johnson

St. Lawrence County is a big county and there always seems to be more to find. We've added another 13 species to the county this year. The county total now stands at 1432 plant species (including subspecies and varieties). Added this year were the following (an asterisk (*) denotes a non-native species):

***Allium tuberosum** (Chinese Chives).** This apparently weedy garden escape was found growing in two places along the Old Market Road in Stockholm, where it has persisted for a number of years.

***Amaranthus albus** (Tumbleweed Amaranth).** This amaranth was found growing with the above Chinese Chives on a weedy, disturbed pile of soil. It is similar to *Amaranthus blitum*, which we added to our county flora a few years ago, but it is upright rather than prostrate.

***Bromus commutatus** (Hairy Brome).**
***Bromus hordeaceus* ssp. *hordeaceus** (Soft Brome).**
***Bromus hordeaceus* ssp. *pseudothominei** (Lesser Soft Brome).** All three of these Brome grasses were found within a few hundred meters of each other. Two were in a weedy portion of an old strawberry bed, and one in an aging hayfield. All three were in places I had travelled quite a bit in the past, and I assume I would have noticed them if they had been here previously; therefore I suspect they are relatively new introductions.

Scan and close-up of *Bromus commutatus*

***Carex haydenii* (Hayden's Sedge).** A state-listed (S1) rare sedge found by Steven Daniel in the town of Edwards. It was lining a waterway through a former beaver meadow.

Scan and close-up of *Carex haydenii*

***Corallorhiza maculata* (Late Spotted Coralroot).** Historically known from the county (early 1900's) but not found again until this year. A single plant was found growing in some very ordinary hemlock woods in the town of Stockholm. Nearby (though not new to the county) was another treat, a few stems of *Botrychium matricariifolium*.

Corallorhiza maculata, photo by Steven Daniel

***Eleocharis ovata* (Ovate Spikerush).** Another exciting find by Steven Daniel. This late season, drawdown spikerush was encountered on muddy shores in two locations (towns of Fine and Clare). It also is a state-listed rare plant (S1S2).

***Fagopyrum esculentum** (Buckwheat).** Buckwheat is not native and not naturalized according to the NYFA atlas, but it is repeatedly introduced. It occurs up here as a weed when and where people use buckwheat as a cover crop.

***Platanthera dilatata* var. *dilatata* (Bog-candle).** Another nice find by Steven Daniel; it was growing in a small fen with *Trichophorum alpinum* and *Spiranthes romanzoffiana* in the town of Colton.

***Symphyotrichum novi-belgii* var. *elodes* (Narrow-leaved New York Aster).** Another historic record, this one was found by Steven Daniel and interestingly, in the same vicinity as the 1933 Homer House record and an older Peck record in the southern, Adirondack portion of the county.

***Toxicodendron rydbergii* (Rydberg's Poison Ivy).** Most of the poison-ivy up here does not have hold-fasts and does not climb trees, but it is distinctly *T. radicans* (ssp. *negundo*). This one though jumped out at me as it was growing on a sandy shore and was noticeably different in that it was very upright and the terminal leaflet was noticeably large and orbicular.

***Vernonia noveboracensis* (New York Ironweed).** I strongly suspect this plant is not originally native to St. Lawrence County, or to the North Country in general, but it has been widely planted as a component of wetland mitigation seed mixes and it seems to persist in at least a few places. This particular plant was growing near a big box store in Potsdam, in what had likely once been a mitigation area. The plant, with its deep purple flowers on a tall stem is quite attractive.

We're excited to announce the first NYFA Workshop for 2017!

Our first ever **Winter Botany** offering will be held on January 21, in Syracuse, NY. For beginners and experts alike, this workshop will focus on the off-season characters of buds and bark, seed pods and spores, basal rosettes and dried stalks. Joe McMullen will lead this one-day workshop at the Onondaga Lake Visitors Center. For more information and to sign-up visit the NYFA webpage:

http://www.nyflora.org/field-trips-and-workshops/#WinterBotany2017

Membership Renewal for 2017

As 2016 draws to a close, we thank NYFA members and friends for their continued support. It's been an exciting year of workshops and field trips, and the first ever NEBC/NYFA joint retreat. Articles in the NYFA newsletter recount those events for those unable to attend, and enrich our knowledge of the state's flora and of those engaged in its study. The New York Flora Atlas continues to be the premier reference for botanists in NY and the northeast. Your membership dues and donations help make it all possible. We hope you'll renew today!

http://www.nyflora.org/membership/

Best Wishes for 2017

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And check out what's on our Website and Blog
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Annual Membership dues:
_____ New $20 Make checks payable to the **New York Flora Association**
_____ Renewal $20 per year
_____ Renewal with paper option $30 per year (**only** for those already receiving printed newsletters)
_____ New Student Members (Free the First Year) School: _____
_____ Student Members (continuing) $10 School: _____
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We are only accepting credit card payments through PayPal at this time. If you would like to use a credit card, please use the link on our website: http://www.nyflora.org/join-make-a-donation/

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Thank you for supporting NYFA and the flora of New York State

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