Sempervirens

Winter 2023 The Quarterly of the Virginia Native Plant Society

Virginia Natives Initiative grounded in collaboration

The Plant Virginia Natives Initiative has been helping grow public demand for 14 years. In 2008, prior to funding and launching Plant Eastern Shore Natives—the first of six coastal campaigns—the Virginia Coastal Zone Management (CZM) Program heard natives still described as scraggly and weedy. Today, with regional native plant marketing campaigns state-wide, that perception is fading away garden by garden.

The initiative leverages existing as well as new resources, ensures consistent messaging, and provides a rallying point for over 150 partner organizations. What makes the initiative's regional native plant marketing model effective is that it was designed with a Community-Based Social Marketing (CBSM) approach to go beyond awareness to change individual behavior and to make planting natives the social norm rather than the exception.

The model strategy was informed by research first conducted on the Eastern Shore and then validated through research in other regions. By listening to gardeners, Virginia CZM and partners, notably the Natural Heritage Program at the Virginia Department of Conservation and Recreation, identified the barriers that are inhibiting gardeners from planting natives, including a lack of public and provider knowledge of what plants are native to their region, and inconsistencies or a lack of point-of-sale information at local garden centers that do stock natives. We also identified the benefits gardeners would receive by increasing their use of natives, and the outlets through which they receive information.

The model strategy has three main components: 1) captivating communications and multi-media; 2) securing a public commitment (collecting pledges); and 3) point-of-sale materials to prompt gardeners.

Effectively Using Captivating Communications

What was not known when the Plant ES Natives campaign published the first regional native plant guide, *Native Plants for Accomack and Northampton*, was how immensely popular these guides would become.

A *Virginian-Pilot* article announcing release of Native Plants for Southeastern Virginia resulted in over 1,000 email requests for a copy in one week. The guide also received a very favorable review in the Botanical Society of America's *Plant Science Bulletin.*

Well over 100,000 copies of six coastal regional guides have been distributed, another is available for Northern Piedmont, and three are in production for Southwest Virginia, Southern Piedmont, and the Ridge and Valley, all with expected releases this year.

A Plant RVA Natives provider partner in Richmond, Sneed's Nursery & Garden Center, tweeted to say "So excited to support this initiative! We've got complimentary guides to give to customers. Just ask an associate for one!" resulted in replies such as "What a perfect partnership! Yay! Loving this guide too! It's invaluable for designing my little pollinating backyard!" and "Oh wow this is great!!! I saw (the Plant RVA Natives exhibit) at the Maymont plant sale the other weekend and was able to get one of their guides. Everyone needs one of these. It's priceless."

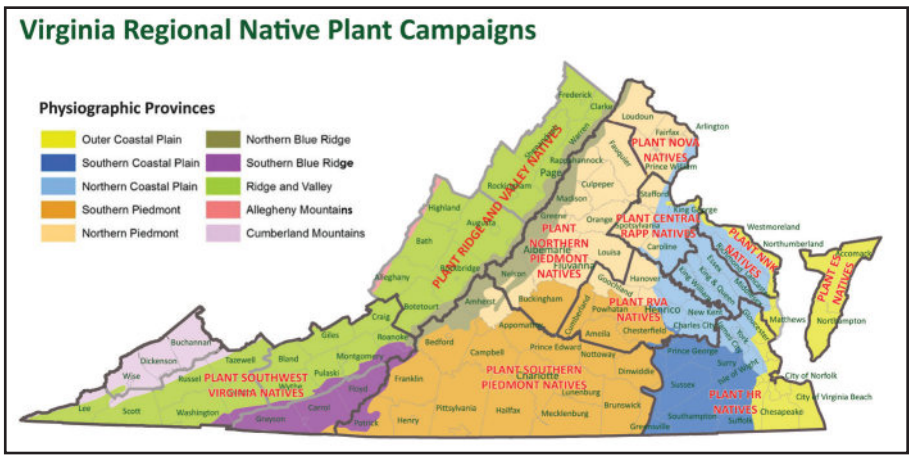
Providers on the Northern Neck share that many customers arrive with a *Native Plants of the Northern Neck* guide in hand. One manager trains and gives a copy to all staff, and another relayed that the campaign and guide has encouraged them to stock more native plants. "Dug In Farms started out as a vegetable stand, began offering native plants about three years ago at the urging of the campaign," says Betsy Washington,

(See Plant Virginia Natives, page 2)

Insert inside!

2023 VNPS WOY brochure

Hollow Joe-pye-weed *Eutrochium fistulosum*



Plant Virginia Natives

(Continued from page 1)

coordinator of the Plant NNK Natives, and president of the Northern Neck chapter of VNPS. "Despite having a diverse market with many specialty items, native plant sales have earned the most profit."

Washington also writes a monthly "Plant of the Month" column published in local newspapers on the Northern Neck as well as in Williamsburg and Gloucester. "I believe we have greatly expanded our influence and outreach to a new, enthusiastic audience."

All regional guides are downloadable from PlantVirginiaNatives.org, which hosts regional campaign pages and was designed to provide a gateway to information about Virginia native plants and the resources that our many partners have to offer. It is a work in progress, but comments like this one are heartening: "I spent some time looking at your very well-designed and lovely website and the current version of Plant NoVA Natives publication. Kudos to you and your team for a job VERY well done!" shared staff at the Lady Bird Johnson Wildflower Center in Texas.

Collecting Pledges and Providing a Reminder

The campaigns collect commitments or pledges to plant natives, such as signatures during public events. By pledging, and then displaying a decal, in a publicly visible way, those who pledge also help spread the campaigns' message. Regional partners are well-known and respected in their communities, which also has an inordinate impact upon receipt and spread of the Plant Virginia Natives message.

During its first year, the Plant RVA Natives campaign collected over 2,000 in-person signature pledges. The Plant NoVA Natives campaign has shared photos of exhibit visitors holding pledge signs on social media, and also collects on-line pledges. Pledges to "Plant Natives for Pollinators" are collected through the Plant Virginia Natives website and a decal mailed to the pledgee. The on-line pledges will facilitate reaching back out with a survey to assess a change in behavior towards planting natives.

Seeing is believing. To help make the norm for Virginia natives more visible, another facet of the model strategy is highlighting places that people can go to see native plants used in a garden and landscape setting—where cues for care, companion plants, plant density, and year-round interest and blooming—are exemplified.

The native plant demonstration landscape in Cedell Brooks, Jr. Park in King George County will be the headquarters for the Fredericksburg-King George Tour during the 2023 Garden Club of Virginia Historic Garden Week. It features five gardens, including over 70 species and over 650 plants. Installation of these demo gardens by the Plant Central Rapp Natives campaign was funded by Virginia CZM, and the value of the volunteer time involved in installation and maintenance is beyond a monetary estimation. To enhance their educational experience, visitors also find interpretive signs and plant identification markers that include a description and engraved drawing of the plant.

Just to the south is a demo garden trail mapped out by the Plant NNK Natives campaign. "We have found that most of our very best sites for finding the greatest number and species diversity of butterflies is in many of the gardens on our Northern Neck Native Plant Trail, including species not previously recorded in our area," describes Washington, who is also a sector lead on four regional butterfly counts, part of the citizen science efforts of the North American Butterfly Association.

Prompting Consumers with Noticeable Point-of-Sale Materials

In addition to publishing guides and other multi-media to educate gardeners, campaigns are partnering with local and regional providers to promote native plants, such as signage and plant tags to make it easier for customers to identify plants as native to the region. This encourages both the demand and ultimately the supply of native plants.

Twenty-five garden centers in Northern Virginia welcome 50 campaign volunteers, who have already applied thousands of "Northern Virginia Native" stickers to existing plant signage and tags to trees. "This program has proven so popular that the garden centers have noticeably increased the numbers of native species that they offer for sale," states Margaret Fisher, outreach coordinator of the Plant NoVA Natives campaign.

The Vice President of Marketing for Meadows Farms, a chain of centers in Virginia, Maryland, West Virginia and D.C., reached out to Fisher last fall to share, "We are proud, very proud to be associated with you and Plant NoVA Natives…It's a win, win, win. Win for us, win for you guys, win for the

environment," stated Bobby Lewis. "Thank you as a businessman who really appreciates you doing it in not only a very effective way, but a way that allows us all to support it. You work with businesses, not against them, which is the best way to move things forward in my opinion."

Plant NoVA Natives also is reaching out to professional property and community managers, including a webinar for the Community Association Institute, and a continuing education course for those who need a realtor's license. In addition to its annual conference in English for landscape professionals, the campaign teamed up with the Virginia Turfgrass Council Environmental Institute to provide a workshop for Spanish-speaking professionals. The campaign also offers a brochure in seven other languages.

The Plant Northern Piedmont Natives campaign prioritized its work with local retailers to increase the availability and demand for native plants. Piedmont Master Gardeners took the lead on a garden center liaison program that trains volunteers to provide outreach to providers in Albemarle County and Charlottesville, including labeling regional native plants.

"The program works with retailers to highlight native plants and provide them with the regional guide, posters, and banners," describes Beth Mizell, executive director of Blue Ridge PRSIM and coordinator of the regional campaign. "We are thrilled that local retailers are fully engaged, and to see campaign banners at nurseries in Albemarle County and Charlottesville, and we hope to replicate this program throughout the Northern Piedmont region." Mizell stressed that the program would not be possible without partner collaboration, including master gardener volunteers, the Jefferson Chapter of VNPS, and Blue Ridge PRISM.

In addition to surveying garden centers in the Roanoke Valley to compile a list of native plants offered, the Plant Southwest Virginia Natives campaign is propagating its own plants. Through a generous grant from the Virginia Outdoors Foundation to the New River Regional Commission, the campaign is setting up a native plant propagation space at the Hale Community Garden. "These plants will be given to residents and distributed to localities and community groups across the New River Valley," describes campaign coordinator, Nicole Hersh, a regional planner and community designer with the commission.

A Plant Virginia natives survey of all providers state-wide has been drafted and will be distributed soon.

Cross-regional Collaboration for Statewide Impact

Cross-regional collaboration is a major part of the big picture. To facilitate this, Virginia CZM hosts virtual meetings with campaign coordinators to share successes, challenges, new programs and products. With so many people to reach, an important focus of the Plant Virginia Natives Initiative is on behavior change-inspired tools and techniques that are transferrable and effective across the Commonwealth. We are now looking at adoption by other regions of the Plant NoVA Trees 5-year drive to encourage preservation of native trees and an increase in the region's tree canopy, including a week-long Celebrate Native Trees event.

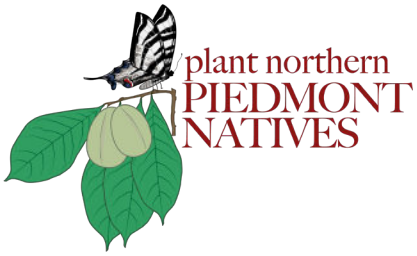
"The Plant Southern Piedmont Natives campaign plans to leverage ideas shared in these meetings," states Kathy Fell, coordinator for the Plant South Piedmont Natives campaign and a master naturalist. "The Southwest Virginia Natives campaign propagation center concept may be an answer to our biggest challenge: the lack of supply of native plants in our region. Our second biggest challenge is managing invasive species. We would like to adopt the Plant NoVA Natives project to educate landowners to rescue trees from non-native vines." Fell shares that the support and education from Blue Ridge PRISM is helping the campaign deal with invasive plant species in their demonstration garden in the woods. "I look forward to more great ideas for encouraging effective stewardship of our native plants," states Fell.

In 2021, the Plant Virginia Natives Initiative offered a 12-part webinar series, which attracted over 3,000 registrants. The series, coordinated by Virginia CZM, engaged all the regional campaigns and many organizations, but special thanks go to the Lewis Ginter Botanical Garden and Blue Ridge PRISM for their assistance in registration and taking on the role of Zoom hosts.

The series began with a presentation by Dr. Doug Tallamy, renowned entomologist and author, most recently of *Nature's Best Hope* and *The Nature of Oaks*. Although the webinars were planned with native plant novices in mind, the thousands of questions asked and post webinar comments received confirmed that the series had a lot to offer all gardeners, as well as professionals. One participant shared, "I was clueless until I heard these first two webinars and now I'm hooked." Another commented, "I already have native plant gardens, but I am ever-learning. This talk strengthened my resolve and inspired me to do more." Landscape designer Meg French reached out to say, "Thank you for all your hard work putting together these great VA native talks via zoom. If you ever need a speaker or if there's any way I can help, let me know. I love your lineup so far!!"

An unplanned benefit of the series was raising funds to produce state-wide suitable marketing material. Virginia CZM had funds available to design and print the "Plant Natives for Pollinators" pledge decals, as well as "Please Carry Cards" for gardeners to leave with retailers to thank them for carrying natives or to encourage them to sell the species they want to buy. This contribution

(See Collaboration, page 4)



Collaboration key to Plant Virginia Natives Initiative

(Continued from page 3)

enables the Initiative to use the webinar proceeds to produce what we hope will be the first in a Plant Virginia Natives video series this year, with the expertise of the Department of Wildlife Resources (DWR), Department of Environmental Quality, and other partners. The video will focus on the many benefits of native trees.

Expanding the regional native plant marketing model statewide is one of the strategies in an Action Plan, or roadmap, drafted by the Plant Virginia Native Marketing Partnership—a forum for regional, non-profit, state and business partners—brought to the table by the Virginia Coastal Zone Management Act (CZMA) in 2011 to encourage coordination and collaboration to increase state-wide use and availability of Virginia natives. The Habitat Program at DWR played an important role in facilitating this expansion. We have a long way to go, but we are certain that yard-sized victories will lead to landscape-sized victories, and that we will accomplish the big picture intent of this plan.

VNPS has been a key partner in regional campaign work and in the state-wide partnership. "Reinstatement of the Shenandoah Chapter of the VNPS in September of 2022 will help ensure the longevity of the Plant Ridge and Valley Natives campaign," shares Anna Maria Johnson, president of the chapter and coordinator of the campaign. The chapter will serve as the fiscal agent for the regional guide that will be available at the chapter's table on Earth Day, following the lead of the Potowmack and Northern Neck chapters.

In a fundraising letter to VNPS members and supporters, which raised $34,000 to help produce and reprint regional guides, VNPS President, Nancy Vehrs, summed it up thusly:

"The interest in planting natives is growing. We are at a pivotal moment to keep public sentiment moving in the right direction. Imagine what an impact we can have for plants and wildlife, including the birds and pollinators we love, by helping influence whole communities to Plant Virginia Natives."

—Virginia Witmer is coordinating the Plant Virginia Natives Initiative as the outreach coordinator for the Virginia CZM Program, a network of state agencies and coastal localities, which receives all its funding from National Oceanic and Atmospheric Administration through the federal CZMA. Witmer also serves as the VNPS Publications chair.

Plant Ridge and Valley Natives Guide coming soon

The newly-reorganized Shenandoah Chapter is partnering with VNPS chapters as well as Virginia Master Naturalists, Virginia Master Gardeners, and other non-profit organizations to launch the Plant Ridge and Valley Natives campaign and to publish a regional guide. The region is either Ridge and Valley or Mountain region on maps. The guide includes native plants found in the 11 campaign counties: Frederick, Clarke, Shenandoah, Warren, Page, Rockingham, Highland, Augusta, Bath, Rockbridge, and Alleghany.

Over 150 plants will be highlighted with photographs, growth information, natural habitat, wildlife associations, and ideas about how to integrate the native plants into a home garden. Special thanks to Anne Elise Lintelman who designed the logo for the new campaign as part of the Plant Virginia Natives initiative..

The guide will be available at the Shenandoah Chapter's table on Earth Day (April 22) in Staunton. To pre-order the book, visit the VNPS website (vnps.org) or go directly to https://vnps.org/virginia-native-plant-guides/#ridge-valley. The cost of $15 includes tax and shipping.

Organizations may pre-order a box for the special wholesale price of $11/copy with a minimum of 40 copies (plus delivery fees). The guide will also be downloadable from PlantVirginiaNatives.org. You can follow the chapter on its Shenandoah Chapter Facebook page as well as the Plant Ridge and Valley Native Plants Facebook page.

Society seeing many happy successes

Great News! As our 2022 fundraiser for Shenandoah Mountain concluded at the end of January, we met our goal. You contributed $50,287! We thank all of our generous members who gave to this worthy cause of extinguishing the underlying mineral rights on certain tracts of land within the proposed Shenandoah Mountain National Scenic Area. Take time to read the article on page 12 to understand why this annual appeal was particularly important this year. As Virginia Wilderness Committee's Executive Director Mark Miller said, we helped defuse a "ticking time bomb."

As I write this, we just experienced one of the warmest Januarys on record. Our long winter nap is not so long any longer and spring is upon us. We used to call our annual workshop a winter workshop because it was held the first week of March, but now we associate the whole month of March with spring in accordance with the meteorological calendar. This year's workshop, coordinated by Education Chair Joey Thompson, remained virtual because that has allowed us to reach a wider audience across our Commonwealth. This year's topic was "A Field of Continued Growth: Recent Botanical Exploration and Discoveries in the Eastern U.S." As we have done in the past couple of years, the workshop was divided into two parts and was held on the evenings of March 7 and 14.

From the President, Nancy Vehrs

The General Assembly will have wound down or nearly so by the time you receive this newsletter, but the news has been overwhelmingly positive down in Richmond with favorable reactions to some modest legislation on the subject of invasive plants. Both Delegate David Bulova (HB2096) and Delegate Paul Krizek (HB1998) presented bills that passed both houses (House 99-0 and Senate 39-0) and now await the Governor's signature. Hooray! HB2096, will tweak the administration of the Noxious Weeds law, prohibit the planting and sale of invasive plants by state agencies, direct the Department of Conservation and Recreation to update its invasive species list by 2024 and update it every four years, and require landscapers to notify their clients if the landscape plan includes invasive plants. HB1998 directs the coordination of strategic actions for state agencies to take to prioritize the use of native plant species on state properties. We commend Delegates Bulova and Krizek for bringing forward these bills and securing their passage.

We thank our VNPS legislative team of Conservation Chair Barbara Ryan, Invasive Plant Educator Jim Hurley, and volunteer lobbyist Tom Smith (retired Deputy Director for Operations for the Department of Conservation and Recreation) for their efforts. Budget amendments for conservation efforts were also offered, and our team tracked those as well.

The great outdoors is calling, and we must go. ❖

Remains of an old coal mine can still be seen within the proposed Shenandoah Mountain National Scenic Area. This scar upon the land is found along the appropriately named stream called Coal Run. With the help of the annual fundraiser, mineral extraction such as this will no longer be a threat to the lands within the scenic area. (Mark Miller)

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E-mail items to Nancy Sorrells at lotswife@comcast.net.

Next submission deadline: April 1, 2023

Friends of the Cedars makes a difference

From Your Natural Heritage Program

By Laura Young
Southwest Regional Steward

One of the first things I remember after starting with the Virginia Natural Heritage Program in November of 2019, as the Southwest Regional Steward, is participating in a Christmas Bird Count with the volunteer stewardship group for The Cedars Natural Area Preserve (TCNAP). We started at 7 a.m., in the dark, on a Sunday, in the cold of December. I still remember standing in Jonesville, which has a population of less than 1,000 people, thinking there was no way more than three people would show up this early, in a place this rural. How wrong I was! To my surprise, we had about twelve folks show up in the darkness; enough to split into three teams to search the preserve for birds and represent this under-surveyed area for Audubon's 120th annual survey. From that day on, I have felt so lucky to be surrounded by this wonderful group of people that have remained steadfast in their passion to support The Cedars Natural Area Preserve.

Friends of The Cedars (FOTC) is a volunteer stewardship committee that supports TCNAP through service projects, guided field trips, business meetings, public outreach events, and conversations with their neighbors as well as elected officials about the value of the resources that the Natural Heritage Program protects. The group offers monthly events on the preserve to learn about rare species and natural communities, including the globally rare Running Glade Clover (*Trifolium calcaricum*) and the federally listed Lee County Cave Isopod (*Lirceus usdagalun*). They also aim to improve the preserve through service projects and provide other citizens with opportunities to realize how special Lee County, Virginia is.

Upwards of 16 people regularly show up for different types of events and projects. Some might say that's pretty low numbers of volunteers in this area—because it's rural, not because people don't want to volunteer. However, what this small group has accomplished in a short time is quite astonishing.

Over the last three years, FOTC has managed to clean up over 50 historic dump sites, many of which were in sinkholes that lead directly to the water table. This equates to dozens of truck and trailer loads of debris that have been hand-carried off the preserve. Due to shallow soils in these areas, little water filtration occurs and pollutants can swiftly move into groundwater via karst features such as caves, sinkholes and other hydrological features. Cleaning up expansive dump sites also creates new spaces for native plant populations and communities to flourish. Volunteers have mechanically cleared several power line right-of-ways to preclude the need for chemical spraying that would threaten rare plants like Yarrow-leaved Ragwort (*Packera millefolium*). Student groups have volunteered with the stewardship committee to remove over 750 defunct tree tubes from riverside restoration tracts, so those tubes would not became watershed eco-trash. Students also

FOTC volunteers with a truck and trailer full of trash collected during a clean-up, including piles of metal and tires ready for recycling.

removed many acres of invasive Autumn Olive (*Elaeagnus umbellata*) shrubs, which are notorious for spreading beyond control, outcompeting native vegetation and significantly changing native habitats. Church groups have also volunteered with the stewardship committee to remove a dozen historic dumpsites and small debris left over from a large scale sawmill cleanup.

FOTC also spearheads restoration projects in TCNAP. One of the most notable is our relatively new effort to restore River Cane populations (*Arundinaria gigantea*) along bare riverside levees across the preserve. Canebrakes currently occupy less than two percent of their native range due to grazing, fire suppression, land clearing, and other human activities. Restoring these communities provides habitat for migratory songbirds, increases host plant numbers for cane feeding moths like *Leucania calidior*, and reduces erosion into the Powell River by stabilizing stream banks. *Arundinaria gigantea* is difficult to propagate and expensive to purchase. Volunteers have hand dug rhizomes from a healthy canebrake, propagated the rhizomes in sandwich bags on their porches, and transplanted the young cane plants to establish two new canebrakes on TCNAP over the last two years. The success of our first two years has inspired the group to continue this as an annual effort to increase canebrake areas throughout TCNAP.

Young River Cane plants (*Arundinaria gigantea*) started from rhizomes collected by volunteers who then planted them in sandwich bags. These are ready for out-planting to start a new canebrake along a barren stretch of river frontage.

FOTC volunteers on a birding hike, one of the several types of field trips the group offers at The Cedars Natural Area Preserve.

FOTC also works to educate the public about the importance of natural heritage resource conservation through field trips, social media, and other events. Over the past three years, we've grown our social media outreach by over 100 people by consistently offering and participating in events. We have a diverse collection of backgrounds in this group: math teachers, doctors, farmers, college professors, pilots, and natural resource professionals, just to name a few. With this rich diversity comes different interests and different expertise, expanding the reach of even such a small group. We've been able to offer geology trips, entomology hikes, bird counts, night sky programs, mussel workshops, mushroom wanders, spring flower walks, herpetology hikes, and river float trips on a monthly basis. These field trips are some of the most engaging ways to learn about the value of the preserves and the rare species and unique natural communities conserved within them. These experiences give southwest Virginians a way to learn about the natural history that makes this region so special, while also giving our stewardship committee opportunities to continue learning and give back to their community. All of this continues to grow local support for this preserve and the work of Virginia's Natural Heritage Program on Southwest Virginia preserves.

While I have only been a part of this for a few years, I believe that this community is becoming more connected through the work of the Friends of The Cedars volunteer stewardship committee. In addition to getting important work done, there are emotional and sense-of-place benefits that I hope will continue to expand from this small passionate group. The natural heritage resources we protect in rural southwest Virginia are magnificent, making each of our small wins all the more rewarding. Each accomplishment inspires us to see past the litter, invasive species, and consequences of past land use. This is the best fuel to move us forward, one step at a time, to improve the landscape for rare species, and amazing natural communities. ❖

2023 WOY
Yes, Virginia, Joe-pye Weed is in the Daisy Family!

Article and photographs by W. John Hayden, Botany Chair

Figure 1. *Eutrochium fistulosum*, Hollow Joe-pye-weed; super-inflorescence composed of numerous, small, discoid heads.

Figure 2. *Helenium autumnale*, Common Sneezeweed; one daisy-like radiate head with a single row of elongate ray florets and numerous small disk florets most of which are unopened buds, but those near ray florets are open.

The 2023 Virginia Native Plant Society Wildflower of the Year is *Eutrochium fistulosum*, Hollow Joe-pye-weed (Figure 1). Several closely related species are also called Joe-pye Weed, and they are all classified in the genus *Eutrochium*, a member of Asteraceae, the Daisy family. If, after glancing at Figure 1, your response to that last sentence is something along the lines of, "What? The Daisy family? Joe-pye Weeds don't look anything at all like daisies!" this article, an overview of the morphological characteristics of Asteraceae in general and the Joe-pye Weeds in particular, is for you.

The Daisy family is H U G E: it encompasses something like 32,000 species classified in more than 1,900 genera. Among flowering plants, only Orchidaceae (Orchid family) is larger. As seems always to be the case, large families are most intensively studied by specialists and, over time, specialists develop specialized terms to describe and distinguish between myriad organisms they study. Said simply, understanding large plant families requires the assimilation of specialized jargon. To understand the rudiments of the Daisy family, there is no escaping the necessity to grapple with special structures and their associated terminology. Special terms applied to Asteraceae (some of which may be applied to other families as well) will here be rendered in bold font.

For starters, let's consider any daisy-like member of Asteraceae (there are thousands of them!); Common Sneezeweed, (*Helenium autumnale*, Figures 2, 3) provides a convenient example. A "daisy" is not a single flower, rather, it is an inflorescence, a tight cluster of many, small, individual flowers. In other words, the daisy is a composite entity composed of many **florets** (floret = jargon for small flower) and this is the reason that the family Asteraceae was once known as the "Compositae." In botanical terminology, an inflorescence consisting of tightly clustered florets can be termed a **head** or **capitulum** (capitulum = Latin for little head). A somewhat less frequently encountered term for the basic Asteraceae inflorescence is **synanthium** (syn- indicates joining together, anth- is Greek for flower). Further, because daisies and other asteraceous heads are often mistaken for single flowers, the term **pseudanthium** (literally, a false flower) can also be used to characterize asteraceous heads. Believe it or not, the tiny florets of Joe-pye Weed are clustered into heads that are small, but otherwise fully consistent with the general form of florets found in Asteraceae.

Let's next address organization of the head/capitulum inflorescence of Asteraceae. Botanists organize formal descriptions of plant structure starting at the bottom and progressing successively upward—we will follow the same pattern. At the base of an asteraceous head/capitulum there is always a series of bracts, modified leaves, that enclose the florets (Figure 4). Asteraceae specialists refer to these bracts individually as **phyllaries**, and

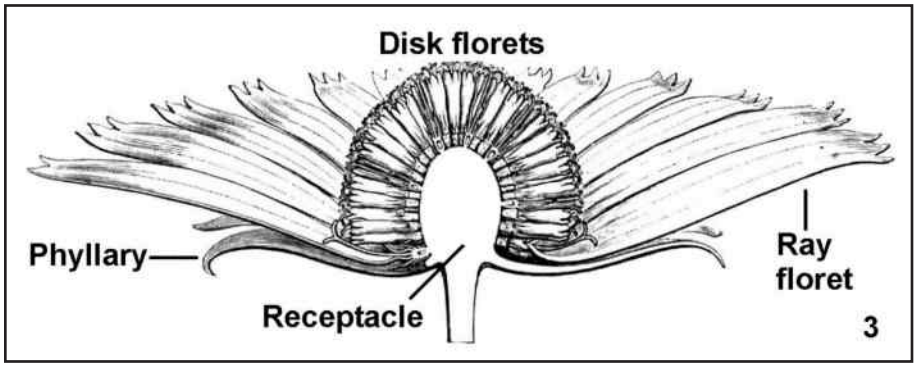

Figure 3. *Helenium autumnale*, Common Sneezeweed, diagrammatic longitudinal section of a daisy-like head; phyllaries are at the base, there is a single row of ray florets and numerous disk florets are attached to a convex receptacle. (Baillon (1886) *Histoire des Plantes*, vol. 8, Librairie Hachette, Paris.)

Figure 4. *Bidens bipinnata*, Spanish Needles; side view of a head with multiple separate phyllaries of the involucre; note presence of just two ray florets and many central disk florets.

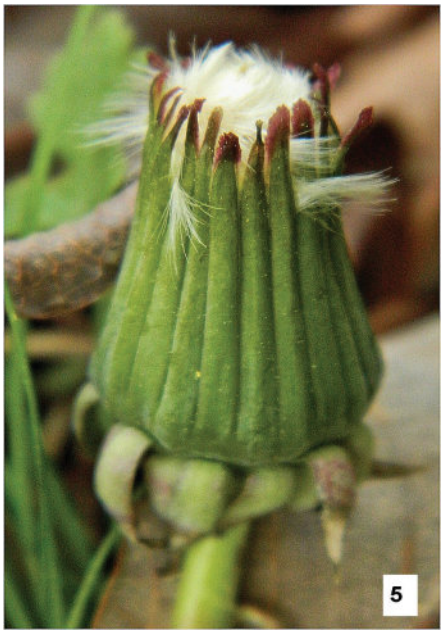

Figure 5. *Taraxacum officinale*, Common Dandelion; side view of a post-flowering head with inner phyllaries united side-by-side, forming a tubular involucre; tips of white parachute-like pappus bristles are visible.

Figure 6. *Eutrochium fistulosum*, Hollow Joe-pye-weed; close-up of several small heads showing multiple separate phyllaries with styles and stigmas emerging from the florets, all of which are of the disk form.

collectively all the phyllaries constitute an involucre (envelope or enclosing structure). Phyllaries and involucres of the Daisy family exhibit considerable morphological diversity: number, size, color, and shape of phyllaries vary across the diversity of the family; sometimes all phyllaries are similar, in other daisy family members, phyllary characters vary from the outermost to innermost elements. In non-native dandelions (*Taraxacum* spp., Figure 5) and native Ragworts (*Packera* spp.), there is a row of phyllaries that are fused laterally, forming a tube- or sheath-like **involucre** surrounding the florets. In thistles (*Carduus* and *Cirsium* spp.), phyllaries are sharp-pointed. Close examination of Figure 6 will reveal the pattern typical of Joe-pye phyllaries: lowermost phyllaries are small and dark-pigmented, upper phyllaries are progressively longer, and the uppermost ones, those closest to the florets, are longest with pigmentation similar to that of the florets. Though not exactly the same as a common daisy, phyllaries enclosing the heads/capitula of Joe-pye fall easily within the range of diversity found in the Aster family.

Because phyllaries (bracts) are, in essence, leaves, it follows that they are attached near the apex of the stem that bears the head/capitulum. In most Asteraceae, that stem terminates in a broad, more or less flat region termed the **receptacle**. And here we encounter a common problem with the jargon employed by specialists—sometimes common structure-based terms acquire unique, somewhat divergent, application in large, technically difficult groups of plants. For flowering plants in general, a receptacle is the stem apex of a single flower to which the individual floral organs (sepals, petals, stamens, and pistils) are attached. In Asteraceae, however, **receptacle** refers to the stem apex of the inflorescence, which is the structure to which multiple individual florets are attached. Here is one way to look at the situation: we can acknowledge that descriptive terms can have different meanings depending on context, or we can argue for the creation of yet another specialized term. Apparently, long ago, Asteraceae specialists preferred to broaden the contextual application of "receptacle" rather than generate a new term for what is, arguably, a contextually *similar* structure. While receptacles of most Asteraceae are more or less flat (Figure 7), in Common Sneezeweeds (Figure 3), various coneflowers (*Echinacea* and *Ratibida* spp.), and a number of other genera, receptacles are elongate structures. In Sunflowers (*Helianthus* spp.), there are bracts (more small, modified leaves) on the surface of the receptacle, and each of these bracts is associated with one floret. Capitula of Joe-pyes are small and, consequently, their relatively flat and bractless receptacles are not easily seen without tearing apart the head.

On to the tiny flowers (florets), themselves. Florets of Asteraceae occur in two distinct forms. Once again, it is convenient to refer to any generic daisy to explain overall floret morphology; for the purpose of this article, refer to the dissected heads of Common Sneezeweed (*Helenium autumnale*) (Figure 3) and Jerusalem Artichoke (*Helianthus tuberosus*) (Figure 7). Florets at the center of a typical daisy-like head are called **disk florets**. Disk florets will be described in more detail on the next page; for now, suffice it to say that disk florets are characterized by five small,

(See Daisy Family, page 10)

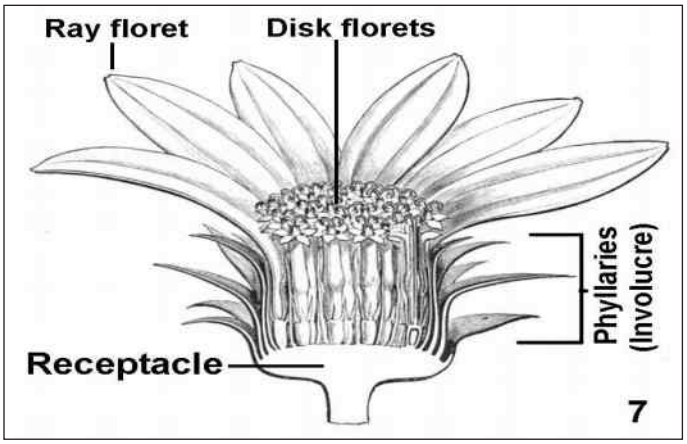

Figure 7. *Helianthus tuberosus*, Jerusalem artichoke; diagram of a single head in longitudinal section showing the flat receptacle, multiple divergent phyllaries, a row of ray florets, and many central disk florets. (Baillon (1886) *Histoire des Plantes*, vol. 8, Librairie Hachette, Paris.)

Figure 8. *Taraxacum officinale*, Common Dandelion; two ligulate heads (disk florets are completely absent).

Daisy Family large and full of diversity

(Continued from page 9)

fused petals of uniform size, arrayed in a symmetrical pattern like that of a five-pointed star. In contrast, the margin of a daisy-like head consists of a single row of **ray florets**. Just like the disk florets, petals of ray florets are fused at the base, but for most of their much longer length they take on a flat, strap-like form that diverges radially from the capitulum (Figures 2, 3, 7). It is, by the way, ray florets that one plucks, one at a time, while reciting, "He/she loves me, he/she loves me not."

Daisy-like Asteraceous heads, i.e., those with both disk and ray florets, are described as **radiate** (Figures 2, 3, 4, 7). But not all members of the daisy family have radiate heads; not all heads of Asteraceae look like daisies. In heads of some Asteraceae, all florets are of the ray floret form; such heads are described as **ligulate** (*ligula* = Latin for small tongue or strap). Dandelions (*Taraxacum* spp.) provide familiar, ubiquitous, examples of ligulate heads (Figure 8). On the other hand, there are asteraceous plants with capitula composed solely of disk florets; such heads are described as **discoid**. The small heads of Joe-pye Weeds (*Eutrochium* spp., Figure 6), and the closely related Thoroughworts (*Eupatorium* spp., Figure 9) are discoid and it is the absence of ray florets, along with their small size that make these heads seem so very different from daisies. Some other familiar Asteraceae with discoid heads include the Ironweeds (*Vernonia* spp.) and Blazing Stars (*Liatris* spp.).

Despite not looking much like daisies, plants with discoid heads have long been recognized as part of the morphological diversity within Asteraceae because the structure of their disk florets conforms well with that of the disk florets of daisy-like Asteraceae (compare Figures 10-right and 11). At the base of each floret there is an ovary, technically an **inferior ovary**, because the other floral organs are attached to its apex. First of these other floral organs are the sepals, which in Asteraceae are collectively termed the **pappus**; in this case, a special term is well-justified because the constituent sepals are highly modified. In many Asteraceae pappus takes the form of a cluster of thin bristles or plumes, sometimes highly branched, and of sufficiently large number that they form parachute-like structures that assist wind dispersal of the single-seeded fruits that form from the ovary. The parachute-like pappus (sepals) of Dandelions (*Taraxacum* spp.) should be familiar to all readers of *Sempervirens*; among the Joe-pye Weeds (*Eutrochium* spp.) and related Thoroughworts (*Eupatorium* spp.), pappus is generally similar and performs the same wind-dispersal function. The next series of floral organs atop the generic daisy family ovary are the petals, already discussed above. Five stamens arise from within the space enclosed by the petals. Stereotypically, staminal filaments are separate from each other, but the sides of pollen-bearing anthers are closely appressed; collectively, therefore, the anthers form a hollow tube at their center. In most asteraceous disk florets, filament portions of stamens are sufficiently long that anthers are easily seen above the corolla (Figure 10-right); in *Eupatorium* (Figure 11) and *Eutrochium*, filaments are short and the anthers remain hidden inside the corolla tube. Regardless of overall stamen length, styles attach to the top center of the ovary and emerge through the anther tube, ultimately opening

Figure 9. *Eupatorium serotinum*, Late Thoroughwort; multiple discoid heads structurally similar to those of Eutrochium fistulosum; disk floret corollas, styles, and stigmas are easily distinguished.

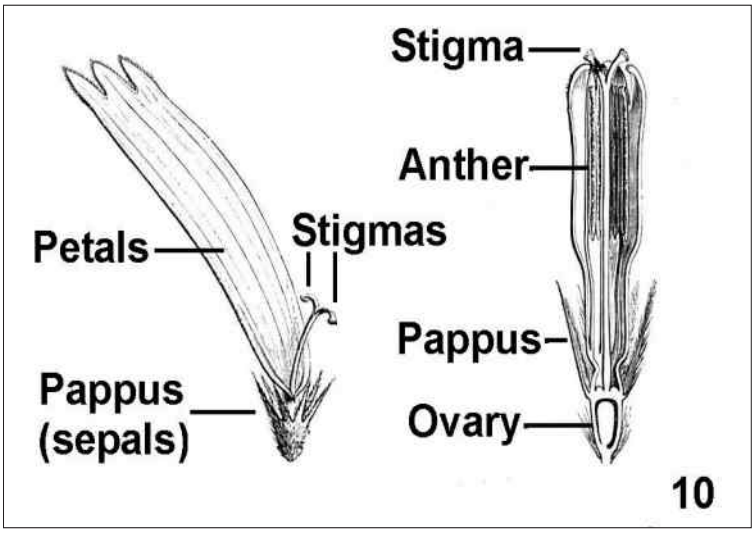

Figure 10. *Helenium autumnale*, Common Sneezeweed, an isolated ray floret (left) and disk floret (right); labelled structures are discussed in the text. (Baillon (1886) *Histoire des Plantes*, vol. 8, Librairie Hachette, Paris.)

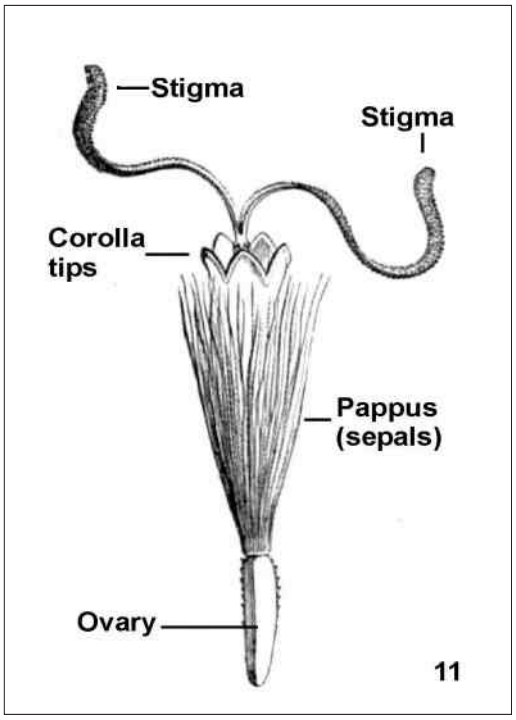

Figure 11. *Eupatorium cannabinum*, Hemp-Agrimony; disk florets of Eutrochium are structurally similar to those of this close relative from Europe. (Baillon (1886) *Histoire des Plantes*, vol. 8, Librairie Hachette, Paris.)

and revealing a pair of stigmas. In no way do the florets of *Eutrochium* spp. or the closely related Thoroughworts (*Eupatorium* spp.) (Figure 11) diverge significantly from patterns commonly encountered throughout Asteraceae.

For sake of completion, I feel compelled to note that, while Joe-pye florets conform well with disk florets of the family, there are a number of additional variations found in the family regarding sexuality of florets. The florets just described may be termed bisexual since both anthers and ovaries are present and functional. In other Asteraceae, other possibilities exist: 1) ray florets may produce no pollen but are otherwise fertile, i.e, they can produce seeds; 2) ray florets may be present, but completely sterile, functioning, presumably, to attract pollinators; or 3) all the florets may be unisexual. For Asteraceae with unisexual florets, the plants may be monoecious (staminate and pistillate heads on the same plant) or dioecious (staminate and pistillate heads on different plants. None of these variations, however, pertain to *Eutrochium*, but knowing these dimensions of diversity within the family reinforces the idea that *Eutrochium* is a reasonably typical member of Asteraceae, despite having heads that, superficially, do not resemble a typical daisy.

Lastly, let's consider the concept of **super-inflorescence**. Given that the basic inflorescence unit of Asteraceae is a head/capitulum bearing multiple florets, the concept of super-inflorescence refers to how multiple heads are borne on the plant. In the case of *Eutrochium*, its small heads can number easily in the hundreds and they are borne collectively on a highly branched super-inflorescence that develops from upper nodes of the stem. The overall effect is a cloud-like cluster of small heads (Figure 1) and this, perhaps, is another aspect of Joe-pye Weeds that contrasts most strongly with so many asteraceous plants with daisy-like heads.

Bottom line: Though they may not look *exactly* like daisies, Joe-pye Weeds are, indeed, members of the Daisy family. Did you think, upon reading the first paragraph, "Huh, daisies, how complicated could that be?" Welcome to the wonderful world of plant diversity!❖

VNPS fundraiser helps defuse Shenandoah Mt.'s 'ticking time bomb'

Many years ago, the Virginia Wilderness Committee (VWC) set a task that seemed impossible at the time. Our goal was simple—the permanent protection of the iconic Shenandoah Mountain. It took many years of discussion to forge the agreements needed to help achieve this vision. With the introduction of the Shenandoah Mountain Act last year, we are one step closer to making that vision a reality.

The 92,000-acre Shenandoah Mountain National Scenic Area is home to two salamanders found nowhere else on earth. Its 10 peaks over 4,000 feet are a refuge to many threatened and endangered plants and animals. The mountain provides a critical high elevation link in the ever-present conditions created by climate change.

Protecting Shenandoah Mountain is an important part of our work, but there is a ticking time bomb under the lands that are Shenandoah Mountain. That time bomb is privately held mineral rights. Privately held mineral rights are the minerals under the surface that were retained by the owners when they sold the lands that make up our national forests in Virginia. To be fair, not all of our national forests are threatened by privately held mineral rights, but lands under the proposed Little River Wilderness and Lynn Hollow Wilderness are subject to this threat.

This threat is real. The owners of privately held mineral rights have the absolute right to reasonable access to that land. At any time, an owner could make a claim to access those rights and the Forest Service is obligated to develop a plan for extraction—even in Wilderness.

Over 10 years ago, the VWC set itself on a second path that was considered impossible—purchasing privately held mineral rights and returning them to the Forest Service thereby ensuring they are permanently retired. Like Don Quixote, we dreamed the impossible. First, we had to create a title chain. This included a significant quantity of research in Forest Service offices and county courthouses. Against all odds, we succeeded. Then we had to find the owners. Some were easy like large corporations. Other were more difficult. Again, we succeeded.

Now VWC is working to make the deals. We have already closed on one tract and VWC holds the title. We have settled on a price for the second tract and hope to close sometime in the next few months. Once we have completed this agreement, we plan to move on to the next two and final tracts.

The price we pay per acre is not exorbitant, but there are thousands of acres involved in these tracts. Then when we factor in the attorney fees necessary to ensure a clear title and solid purchase agreement, our coffers have been stretched to the breaking point.

VWC is grateful for the generous support that the VNPS has offered us in our quest to retire these rights and pull the fuse on these ticking time bombs. Without your generous support this effort would be all but impossible.

—Mark Miller, VWS Executive Director

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