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From the Executive Director

As always, if you have questions, comments, concerns, or congratulations, please reach out to us. We value your participation and involvement in environmental education and the Arboretum’s collections. When we ask, volunteers account for the great majority of manpower for these two events and for our programs. It is possible to recruit new volunteers for special events, to help at the Visitor Center desk, and for work on the grounds in the collections. Please reach out to us and volunteer to help out in various capacities. Please feel free to contact Jillian Aldebron at jaldebron@fona.org for more information if you are interested in volunteering with FONA and the Arboretum.

Looking toward the second half of the year: By the time you read this, the final performance of our Summer Evening programs, a jazz concert by John “Sax” Williams and his quartet, will be fast approaching. Our summer series is part of the year-round programming that FONA is planning and scheduling, from concerts to workshops to offerings by our partners such as REI bike rides. There are many reasons to visit the Arboretum all year long, and FONA’s programming is one of them.

The biggest event, possibly the biggest of the whole year, is the ongoing celebration of the Arboretum’s 22nd Annual Dinner. This year marks the 90th anniversary of the National Arboretum grounds and the 10th anniversary of FONA’s programming at the Arboretum. Join us for the third free evening of Music in the Meadow as FONA presents the third free Summer Evenings concert. Pack a picnic, bring a lawn chair or blanket, and relax below the Capitol Columns.

Dear Friends of the National Arboretum:

As I write this, we have just completed the first six months of the year and our two big annual FONA events—the 26th Annual Garden Fair and the 22nd Annual Dinner Under the Stars—with great success. I would like to thank chairs Nancy Bryson and Kevin McIntosh for the Garden Fair and Chandler Goode for the Annual Dinner and their respective committees for their enormous efforts on behalf of FONA for the benefit of the National Arboretum.

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Volunteers account for the great majority of manpower for these two events and for our programs at the Washington Youth Garden. As well as our Summer Evenings events, special events throughout the year for FONA members, and the many programs and symposia the Arboretum offers. The Arboretum and FONA have joined forces to recruit new volunteers for special events, to help at the Visitor Center desk, and for work on the grounds in the collections. Please reach out to our Volunteer and Visitor Services Manager Jillian Aldebron at jaldebron@fona.org for more information if you are interested in volunteering with FONA and the Arboretum.

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Letter from the Director

Summer reflections

The summer solstice has just passed, and one tries not to think about shortening days at the official start of summer. This year, the solstice fell on the first full moon of June, and our staff guided hikers through the National Arboretum grounds by an exceptional lunar display. The sandstone Capitol Columns reflect the moon’s light and are especially radiant during these hikes.

The moonlight is also captured in the white inflorescences of one of my favorite childhood plants, the ubiquitous Queen Anne’s lace (Daucus carota). Like many members of the carrot family, the inflorescences are composed of numerous individual white florets arranged in small clusters, which collectively form a large, convex umbel. As a child wandering the grassy meadows and wet prairies of Wisconsin, I was entranced by the presence of and variation in the floral array of Queen Anne’s lace. When present, the exasperated floret varies from pink to near black, with red being rare and covered by my four-year-old self. What I did not know at the time—besides the technical aspects of floral morphology—was that the role of this central floret has been debated since Darwin, and to this day, evidence is inconclusive as to its role in pollination. Nowadays, we hear a lot about pollinators and the specialized plants that have co-evolved with our iconic bees and butterflies. Unfortunately, we often overlook plants with generalized pollination systems, like our native and non-native carrot relatives, that host a diverse array of generalist insects. Yes, Queen Anne’s lace is not native, a fact that was inconsequential to a child who was simply enjoying flowers and their insect visitors.

Another non-native is Japanese honeysuckle (Lonicera japonica), of which I have fond memories of being taught, upon our family’s move to North Carolina, how to get a delicious drop of nectar by pulling the pistil out the floral tube. Certainly a nectar-thief the plant didn’t co-evolved with, but neither are the American hawk mourning, hummingbirds, and hummingbirds that also visit the flowers.

The time came when I lost my botanical innocence and learned of the origins and impacts of these plants on our natural ecosystems. These thoughts weigh heavy over the Arboretum, an institute dedicated to promoting and distributing novel plant genetic resources to the nursery industry; and which spends tens of thousands of dollars each year combating invasive plants. We make every effort to evaluate our plant collections for potentially invasive species and remove them. Invasiveness represents a continuum, from simple persistence and naturalization to outright dominance and displacement. And there are regional and temporal issues to factor in. We do our best with this complex issue.

But each summer when the days are long and the Queen Anne’s lace and honeysuckle bloom, I steep back a few of those innocent childhood memories and reflect on a simpler time and place that set me on a career filled with great purpose, endless wonder, and sheer joy. I hope our efforts here at the National Arboretum provide similar opportunities for reflection. Enjoy a safe, and plant-filled summer.

Richard T. Olsen, Director  
The United States National Arboretum
Cayenne, habanero, serrano, and jalapeno are all names familiar to lovers of spicy food. But these are only a few of the 106 types of chile peppers grown in the Herb Garden. Chosen by the International Herb Association as the 2016 Herb of the Year™, the chile pepper is considered outstanding in all three of the categories—medicinal, culinary, and decorative—that the organization uses to make its choice.

The chile pepper (genus *Capsicum*), a New World plant native to South America, is now found on every continent except Antarctica. According to National Herb Garden curator Christine Moore, “The chile peppers are the most popular part of our collection with visitors from all over the world who recognize many of the same plants they grow and use in their own cultures.”

The chile’s presence throughout the world speaks to its many appealing qualities. It is disease-resistant, pest-resistant, and easy to grow, and its ornamental features add beauty to the garden. “And as a culinary ingredient, it is an excellent addition to the foodscape,” says assistant curator Piper Zettel.

The Black Pearl ornamental pepper, introduced about a decade ago, was featured at FONA’s Annual Dinner Under the Stars in June. It is just one of the products of plant scientists’ market-driven work to create new varieties that gardeners find attractive and that are useful additions to their plots. Some cultivars that are new to the Garden this year are ‘L’il Pumpkins’, ‘Pepper Jack’, and ‘Midnight Creeper’. There are more than 25 known species of *Capsicum*. Because...
not all of them cross-pollinate well, plant breeders are limited in the strains they can work with. One challenge they face is maintaining genetic diversity so that new cultivars will be viable and hardy.

The painstaking work of plant scientists has provided gardeners and cooks with a resilient and versatile plant resource. All that’s needed is a location with plenty of sun. Beyond that, the pepper lover’s challenge is to sort through the scores of choices to find the right combination of chiles that will provide both dramatic beauty and culinary usefulness. A good place to start is with a tour of the National Herb Garden’s chile collection.

NANCY BREWSTER WAS A FORCE OF NATURE—or, better said, a force for Nature. She devoted most of her life to gardens and gardening. An active and effective member of the FONA Board for many years, she and her husband Andre not only made substantial financial contributions to its work, but more importantly, she brought to the Board her deep knowledge of and love for trees and plants. Of equal value was her joie de vivre, her enthusiasm, and the unflappable common sense she brought to the solution of any problem—and the problems of FONA and the understaffed and underfunded National Arboretum were many.

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FONA was not enough to contain her seemingly inexhaustible energy. She presided over her own quite spectacular personal gardens at her country home in Maryland. And she devoted much time and effort to the growth and development of the Ladew Topiary Garden, of which she was also a trustee. As Vice Chairman of the Garden Club of America, she somehow found time to serve as the Photographic Editor for Plants That Merit Attention, Volume I—Trees, a book about significant trees illustrated with many of her own photographs, and she co-authored Plants That Merit Attention, Volume II—Shrubs.

Voltaire’s hapless hero Candide concludes the tale of his adventures with the rueful advice, “We must cultivate our garden.” Nancy seems to have taken that advice very much to heart, and she lived a long and fulfilled life as a cheerful gardener. Here at FONA, we were fortunate to have been in her company and will ever hold her in happy memory.

WOODY PRICE

served on the FONA Board of Directors for 17 years; Nancy served for 21 years. They both left the Board in 2010. Woody now lives on Cape Cod. He joined us at the annual Dinner Under the Stars and remains a loyal friend and supporter of FONA and the Arboretum.
Meet (and Beat) Rose Rosette

John Hammond, Ph.D. and Ramon Jordan, Ph.D.

U.S. NATIONAL ARBORETUM SCIENTISTS John Hammond and Ramon Jordan are participants in a Specialty Crops Research Initiative grant to tackle the problem of rose rosette disease (RRD). RRD threatens the $400 million rose industry, rose collections, and roses in private gardens across the US. Drs. Hammond and Jordan are tasked with developing reliable and fast serological (antibody-based) tests for detecting and identifying the rose rosette virus that causes RRD. They collaborate with other plant pathologists, entomologists, rose breeders, and extension personnel at five universities as well as the US Department of Agriculture Electron and Confocal Microscopy Unit in Beltsville in a multidisciplinary approach to understanding and combating RRD, including selection and breeding of RRD-resistant roses.

RRD has emerged as a significant threat to the health and ultimate survival of many types of roses; infected plants may die within one or two years. RRD is caused by infection with the recently discovered rose rosette virus, although RRD has been known since the 1940s as a disease of wild multiflora roses. RRD was long thought to be confined to multiflora roses, a noxious weed in many states, and was considered a potential biocontrol for multiflora roses. But more recently, RRD has been found to affect cultivated roses, starting with landscape roses and then many other rose types, meaning that use of RRD for biocontrol may endanger cultivated roses.

Rose rosette virus is transmitted by eriophyid mites (Phyllocoptes fructiphilus), which are spread by wind currents. The mites require magnification to be visible—an adult is about 0.02 millimeters long (Figure 1). The best approaches to control RRD in cultivated roses are to start with healthy plants, to root out RRD-affected rose shoots, and to remove RRD-affected plants as soon as possible, and to minimize mite populations to avoid transmission.

To remove infected plants, it is first necessary to recognize the symptoms of RRD, which may differ between rose species and cultivars (some symptoms mimic herbicide damage), making visual diagnosis difficult. Characteristic symptoms include increased growth of vegetative shoots, followed by proliferation of small branches with densely-packed, often distorted, small leaves (a witches’ broom appearance; Figures 2 and 3). Leaves and stems may have abnormal pigmentation, and stems may also be swollen and produce an excessive number of thorns which may be either green or red. Flowers may be abnormal in appearance and color; some petals may be replaced by leaf-like structures. Removal of symptomatic canes by pruning may delay the spread of the virus but is unlikely to save the plant, which may serve as a source for mite transmission to other plants.

Removal of affected plants at first identification is recommended, preferably by bagging the plant (to prevent mites from migrating) and cutting it at ground level; the root system should be dug out, and both roots and shoots should be burned or bagged for disposal. The mites can overwinter under bark, in dormant vegetative buds, and in spent flower buds remaining on the plant. Hard winter pruning (cutting back by about two thirds) followed by removal of all prunings and treatment with horticultural oil, should remove most of the mites from healthy plants or kill them. Application of horticultural oil, insecticidal soap, or miticides to control eriophyid mites during active growing may also help, but may also benefit insects that prey on eriophyid mites.

Currently, definitive diagnosis of rose rosette virus is by nucleic acid-based laboratory tests such as polymerase chain reaction assays, which require specialized equipment and are not available to most rose producers or growers. Arboretum scientists are working to develop serological tests that can be implemented by rose producers or even home gardeners, with the end goal of developing a dipstick test similar to a home pregnancy test. To date, new antibodies for detection of rose rosette virus have been developed and are being evaluated for sensitivity and specificity in various test formats. Arboretum scientists are also working with other Agricultural Research Service scientists and with rose breeders to examine interactions between the mites and different rose types to identify characteristics of roses with resistance to either rose rosette virus or the mite vectors, characteristics the breeders can use to select new varieties.

DR. JOHN HAMMOND is Research Plant Pathologist in the Arboretum’s Floral and Nursery Plants Research Unit, where he has been studying rose rosette disease for several years. DR. RAMON JORDAN is Associate Director of the Floral and Nursery Plants Research Unit.
More than 36,000 votes were cast on FONA’s Facebook page to select the names “Freedom” and “Liberty” for the Arboretum’s eaglets. Many of the Arboretum’s partners involved with the eagles were present to reveal the names, photo courtesy of Steve Ausmus, ARS.

Washington Youth Garden hosted the first Arbor Day Fest with tree planting, ecological panel sessions, and an evening party in the Herb Garden.

World Bonsai Day on May 14th coincided with the release of In Training, an art book of photographs that reveals aspects of the Museum through a creative prism. Author Stephen Voss (left), with the Museum’s 2015 First Curator’s Apprentice, Danny Coffey, photo courtesy of the National Bonsai Foundation.

Gardeners and visitors flocked to the Garden Fair in spite of the dreary April rain. This fundraiser was a great success!

The Arboretum’s 30th Lahr Symposium on native plants had presentations on using native plants in gardens and landscape designs, art by William Coulter Designs.

Celebrating the National Arboretum’s Contributions to Agriculture, the Annual Dinner Under the Stars honored Tom Vilsack, Secretary of the Department of Agriculture. It was a beautiful night in the Meadow, with perfect June weather!
Early each spring, I search the Asian Collections for a little patch of woodland primroses, the *Primula sibthorpii*, a surprisingly tough southeastern European cousin of the heat-averse common garden primrose. *P. sibthorpii* is a rarely cultivated species and is available only from specialty nurseries. Although it lacks the gaudy colors and fragrance of its showy hybrid relatives, *P. sibthorpii* is a very good alternative in hot summer climates. A new race of truly heat-tolerant garden primroses could potentially be created if *P. sibthorpii* were hybridized with a good clone of fragrant yellow *P. vulgaris* or with some of the colorful modern hybrids. Unfortunately, the small number of *P. sibthorpii* already in cultivation may well derive from a narrow genetic base, which is a disadvantage for plant breeders as well as for the plants’ long-term survival. Here at the Arboretum, however, we have fresh genetic stock from a population that has probably never played any part in the breeding of modern primroses, and it spans the range of colors found in this species: white through pale lilac to a soft mauve pink.

When Martin Scanlon and I traveled to Azerbaijan in September 2008 for a plant collecting expedition, Martin was targeting woody plants for the Woody Landscape Plant Germplasm Repository, but my own list included many herbaceous plants with potential value for the National Arboretum’s collections. On our first day of real plant hunting, we were driven well north of the subtropical Baku to a region that lies just south of Dagestan between the Caucasus Mountains and the Caspian Sea. There, much of the landscape is devoted to agriculture, and we found ourselves rummaging around a marbled landscape of disturbed, regenerating scrub forest and steppe-like areas. The fact that temperate and subtropical (and farther west, alpine) climatic zones, with similar variations in rainfall, occur within a few hours’ drive is part of the key to Azerbaijan’s biological diversity—these rapid transitions allow many different kinds of plants with unique adaptations to occur over a relatively small area. At first, I was slightly underwhelmed at the herbaceous offerings of that disturbed hillside; the most interesting things seemed to be one or two Asparagus species, some starved-looking *Stachys byzantina* (lambs’ ears), fragrant *Teucrium polium* (felty germander), tap-rooted pancakes of gray-leaved *Convolvulus* (bindweed) with tiny pink flowers.
Summer Watering Tips

Rising summer temperatures paired with less reliable rainfall mean that in order to grow a successful garden, you will need to water on a regular basis. Watering is an undemanding task. Without good technique, it’s easy to waste time, effort, and precious water resources. Follow these best watering practices to deliver water more efficiently and more effectively.

TOOLBOX
- Rain gauge
- Non-kink hose able to reach all garden areas
- Watering wand with shower-type nozzle
- Doughnut sprinkler
- Oscillator sprinkler with adjustable width
- Optional: soaker hoses and 15-gallon gator bags

BEST WATERING PRACTICES
- Gardens should receive at least 1 inch of rain per week. A rain gauge will help accurately measure rainfall in your garden. Remember to empty the gauge after each rainfall.
- Make it easy—water deeply and less frequently. Deep watering encourages deep roots which make for more drought-tolerant plants.
- Water dispensed with a car washing nozzle can harm plants and expose roots. Use a shower-type nozzle with a setting that will allow water to gently penetrate the soil surface.
- A doughnut sprinkler is good for watering individual shrubs and trees.

Use an oscillating sprinkler for large established garden areas. Match watering patterns with bed shape.
- Remember your goal is to saturate the root mass, not the foliage of the plants. Often times, roots of newly purchased plants are dense much like a ball of yarn. As you water, visualize the root ball and apply sufficient water to percolate into the core of the ball.
- After watering, use a towel to examine exactly how deeply the water has penetrated. The soil should be moist to a depth of 4 to 6 inches. Water not that deep yet? Continue to water AND start your rain dance.

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The Friends of the National Arboretum is an independent, nonprofit organization established to enhance, through public and private sector resources, support for the U.S. National Arboretum.

HAPPENINGS

SUMMER EVENINGS: MUSIC IN THE MEADOW WITH JOHN “SAX” WILLIAMS
September 1, 6:30 p.m. to 8:30 p.m.
Williams and his band will perform songs by James Taylor. Pack a picnic and escape to the cool Arboretum Meadow. Free but reservations are required. Please email Claire at cbroderick@fona.org to reserve your spot.

NATIONAL BONSAI MUSEUM’S 40TH ANNIVERSARY: JAPANESE PAVILION RE-DEDICATION & AKI MATSURI AUTUMN FESTIVAL
October 14
Re-dedication of the Japanese Pavilion and celebration of National Bonsai Museum’s 40th anniversary.

October 15, 10:00 a.m.–5:00 p.m.
Aki Matsuri Autumn Festival celebrates Japanese plants and culture at the Arboretum with tours, book signings, cultural activities, and Japanese food and drink. Admission and all daytime activities are free.

WASHINGTON YOUTH GARDEN: STROLLING SUPPER
October 6, 6:00 p.m.–9:00 p.m.
Washington Youth Garden’s Strolling Supper will celebrate its 45 years of work with the DC community, and it will feature great food from local chefs and restaurants, live music, and fresh recipes from the Youth Garden, a silent auction, and much more. Keep an eye on washingtonyouthgarden.org for more details.

Be sure to follow FONA on Facebook and to check events on the National Arboretum’s Events page at http://www.usna.usda.gov/Education/events.html

If you’re an Amazon Prime member, please consider using the AmazonSmile program to benefit Friends of the National Arboretum at smile.amazon.com