



The problem of invasive, wild Callery pear (*Pyrus calleryana*) hybrids has not faded away in the five years since the Columbia, Missouri Parks Department launched the “Stop the Spread!” campaign. The good news is that in addition to the significant increase in awareness within our community about the consequences of planting ornamental pears, the campaign has propelled policy change within our own municipal government and helped us strengthen and build both alliances and support to confront this issue.

Among the many non-profit and governmental agencies we have partnered with to spread the word, the Missouri Community Forestry Council and the Missouri Department of Conservation (MDC) have both been particularly ready to lend a hand. MDC Urban Forester Ann Koenig, for example, wrote an informative article about the Callery pear menace and Columbia’s “Stop the Spread!” campaign for the MDC’s popular magazine, *Missouri Conservationist* (see [mdc.mo.gov/conmag/2011/03/stop-spread](http://mdc.mo.gov/conmag/2011/03/stop-spread)).

Cohesion among City of Columbia departments addressing this issue has also grown since the alarming spread of Callery pear hybrids became abundantly clear. For instance, the City Water and Light Department’s “Trade-a-Tree” program no longer offers ‘Aristocrat’ pears as one of the replacement choices for electric customers. City Arborist Chad Herwald, in the Community Development Department, is working to update the landscaping ordinance by removing Callery pear species from the list. In the meantime, he has notified developers and contractors that landscape plans submitted for review that include ornamental pears will not be given the green light.

The talented folks in the City of Columbia’s Public Communication Department created a terrific video that highlights the Parks Departments efforts in working with both non-profit organizations such as Missouri River Community Network and federal agencies such as the USFWS to rid Columbia’s Forum Nature Area of hybrid Callery pear seedlings. ([http://gocolumbiamo.granicus.com/MediaPlayer.php?view\\_id=3&clip\\_id=295](http://gocolumbiamo.granicus.com/MediaPlayer.php?view_id=3&clip_id=295))

Progress continues as we develop a better understanding of exotic invasive plant species and management techniques for their control. The University of Missouri Weed Science Program shares their expertise and provides



A germination study found an average 89% germination rate for both wild and cultivated pear seed collected in Columbia, Missouri. Photo by Brett O’Brien

recommendations on products for Callery pear control. In turn, we help the Weed Science Program by allowing graduate research projects on selected areas of City of Columbia park property. These projects include examining the seed biology and control of bush honeysuckle as well as chemical application trials on both Callery pear and sericea lespedeza (*Lespedeza cuneata*).

The path forward will likely involve additional collaboration, such as engaging nurseries and landscaping firms and others in the green industry. I believe as the invasiveness of ornamental pears becomes more self-evident, both the green industry and the general public will turn to municipalities and government agencies for greater guidance and leadership on this issue. The opportunity is available now for municipal foresters and natural resource managers to serve as models of good stewardship.

Stop the Spread website: [www.gocolumbiamo.com/ParksandRec/Parks\\_and\\_Facilities/stopthespread.php](http://www.gocolumbiamo.com/ParksandRec/Parks_and_Facilities/stopthespread.php)

—Brett O’Brien, Natural Resources Supervisor, Columbia, Missouri



A *Cassytha* species showing the initial green form and the final brown form severely infesting several live oaks in Miami. Photo by Jeff Shimonski

The urban forest is constantly under pressure from development and redevelopment, poorly conceived designs, brutal maintenance regimes, and the occasional errant vehicle that finds a tree in its way. Mother Nature certainly does not help with all of the hurricanes that we have to endure here in Florida. With all of these challenges, it is tough for urban trees to survive more than a few years after being planted.

One more problem that trees in Florida face is the occasional plant parasite that somehow ends up in the tree’s canopy and begins to bleed the life out of the tree. During the past few years a species of woe vine (*Cassytha* sp.) began showing up in tree canopies in the City of Miami. *Cassytha* and dodder (*Cuscuta*) are two genera in two different plant families that almost look identical and are difficult to tell apart without close examination of the minute flowers and fruit. They can also completely envelop a tree’s canopy.

These parasites attach to and penetrate foliage and branches via haustoria (root projections) and begin to withdraw fluids from the tree. Unfortunately, neither private nor municipal property owners recognize an early infesta-

tion soon enough to control it without drastic action. I have seen mature live oaks literally topped and then the remaining dodder or woe vine infestation removed by hand. This kind of treatment will kill the patient.

A group of plants not commonly thought of as parasites are some of the bromeliads. Bromeliads are typically acknowledged as epiphytes (when they grow in trees) and not as parasites; however, there is enough empirical evidence that several species of air plants (*Tillandsia*) cause decline in mature live oak (*Quercus virginiana*) along with other tree species. Throughout Florida, tree companies are hired to control infestations of Spanish moss (*T. usneoides*) and ball moss (*T. recurvata*).

The decline in trees infested by various bromeliad species may be an indirect parasitism attributable to nutrient loss. Instead of invading the vascular system of the tree like dodder or woe vine does, the bromeliads might be intercepting nutrients in a liquid form as water precipitates from the foliage, branches, and trunk of the tree. Furthermore, it has been shown that when the lower green leaves of a palm are removed on a regular basis either for aesthetic reasons or “hurricane



Ball moss (*Tillandsia recurvata*) begins to infest a Miami tree. Photo by Jeff Shimonski

pruning,” a micronutrient deficiency develops that can eventually cause decline and even death of that palm. This may be similar to what is happening with bromeliad infestations. When bromeliads overwhelm the canopy of a tree, the leaf litter that would normally end up on the ground, returning nutrients to the tree, is disrupted. Over time this constant nutrient capture stresses the tree and speeds its demise.

Years ago, flowable copper was used to kill bromeliads. Now, spraying into the canopy of a tree to control plant parasites is almost impossible in the urban forest. The best control method at this time is early detection and hand removal before the tree is overwhelmed by the parasite and any control method becomes futile and a waste of effort.

—Jeff Shimonski, Director of Horticulture, Jungle Island, Miami, Florida; Editorial Review Committee Chair, City Trees

California is a large state with many different climates. In 2009, the California Invasive Species Council created the Invasive Species Advisory Committee (CISAC) to advise the Council and develop recommendations. The CISAC compiled its first California Invasive Species List, which was just released in 2010 ([www.iscc.ca.gov/species.html](http://www.iscc.ca.gov/species.html)).

The list has over 90 woody plants total, including 15 trees and shrubs listed with widespread impacts, and the remainder listed with more limited (at present) impacts. Some of the worst offenders I expected to find, such as tree-of-heaven (*Ailanthus altissima*); others I was a bit surprised to see on the list.

Many of those listed in the “limited spread” category were growing wild or were planted in Redwood City’s urban forest, including Chinese pistache (*Pistacia chinensis*), Monterey cypress (*Cupressus macrocarpa*), Siberian elm (*Ulmus pumila*), oleander (*Nerium oleander*), and bluegum eucalyptus (*Eucalyptus globulus*). Even what we have been calling California pepper tree is apparently a non-native Peruvian tree, *Schinus molle*, and it is listed as invasive with limited spread (this was one of the surprises to me). Fortunately, none of our native or introduced oaks were on the list.

In our attempts to increase diversity in the urban forest, we have planted evergreen trees now on the list, such as Monterey cypress. For fall color we have planted Chinese pistache, Chinese tallow (*Sapium sebiferum*), and honeylocust (*Gleditsia triacanthos*). For flowers, we have planted oleander and flowering plum (*Prunus cerasifera*).

We consider them good urban trees, and in many cases, the invasive potential has to do with regional and environment-specific factors. For instance, I have observed that the spread of some of the trees that are now being called “invasive” was probably due to overplanting or “mini-forest” plantings.

The take-home message for me is that as we strive for more diversity in our urban forests, we need to be cautious that we don’t overplant any individual species. I haven’t seen reports about species that were only 5% or less of a street tree inventory explode into invasiveness.

We should avoid planting trees with aggressive root sprouting. Another factor to consider is dispersion of seed by wildlife eating fruit. Yet, if we try to only plant male non-fruiting trees, we may increase the pollen issues ... proving again, there are no simple answers in urban forestry.

—Gordon Mann, Mann Made Resources Consulting Arborists, Auburn, California

In central Ohio, where I live, there are many very large bush honeysuckle shrubs (*Lonicera* sp.) growing in home landscapes where they were planted years ago for their attractive ornamental qualities. The fast growth of these plants and the abundant red berries are seen as positive qualities for a landscape plant, but unfortunately these are some of the same qualities that make them hypercompetitive and highly invasive.

Bush honeysuckle shrubs planted for their beauty are botanical bullies that create unsightly tangles in nearly every bit of unmanaged greenspace throughout greater Columbus, greater Cincinnati, points west in between those two cities, and undoubtedly in other urban areas throughout the state. Observant residents can see that most parks, river corridors, and rights-of-way here in Franklin County are now teeming with non-native invasive honeysuckle shrubs, especially amur honeysuckle (*Lonicera maackii*).

One thing is for certain: emerging invasive plants in urban forests will have to be able to hold their own against bush honeysuckle and other invasive plants like tree-of-heaven (*Ailanthus altissima*) that already have a strong foothold in the landscape. A few popular landscape plants are starting to become more and more noticeable (to me) in parks, along waterways, bike trails, and roadways, as well as in public and private forestland throughout Ohio. Perhaps they are reaching the end of the “lag phase” that occurs after introduction and before exponential spread and naturalization. Will they be able to stand up to competition from honeysuckle and other established invasives? Time will tell.

In my opinion, privet is the likely leader among those emerging invasive plants. Like bush honeysuckle, Japanese and European privet as well as several other *Ligustrum* species were introduced here as ornamentals. Escaped privet can grow almost anywhere that bush honeysuckle grows but it appears to do really well in moist riparian areas. It is creeping into city parks, cemeteries, and other urban green spaces. I have seen some private woodlands where privet is just as widespread and abundant as bush honeysuckle. So the potential for invasiveness is there, but will privet find an open niche in the urban forest?

Some other popular ornamental plants like Japanese barberry (*Berberis thunbergii*) and burning bush (*Euonymus alatus*) have also been observed in our region’s natural areas. For the most part, they are not yet causing the damage that honeysuckle does but they have demonstrated their ability to reproduce and colonize new habitat.

The good news is that awareness of invasive plants seems to be increasing and people are getting involved to address the issue. I have worked with a number of volunteer groups to control invasive plants in public

parks. The most ambitious volunteers are often the youngest, like Boy Scouts and high school students. Hopefully awareness of invasive plants will continue to grow as these young people mature into adults who will remain active in their communities.

Another bit of good news is that some home gardeners are beginning to recognize the beauty of many of our native plants and the benefits they provide. Being an avid native plant gardener myself, I was happy to see that one of the big box home improvement stores is now carrying a number of native perennial plants and they are marketed as such. This would seem to indicate that there is an increasing demand for native plants and an awareness of the potential perils of planting non-natives in our landscape.

—Annemarie Smith, Invasive Species Forester, Ohio DNR Division of Forestry

**F**irst, the good news: for at least two decades there has been a steadily increasing understanding of and concern for invasive exotics and their adverse impacts in New England and Long Island, New York. Professionals, conservation organizations, cooperative extension and university staff, and state and federal representatives have worked hard to educate the public on invasive species.

This has led to research, regulations, on-the-ground management, and accompanying ecological restoration. It has also led to passage of state and county bans on the sale, transport, distribution, and propagation of specified invasive plants—starting with a ban enacted by the State of Connecticut in 2004. The Commonwealth of Massachusetts followed in 2006 with a statute negotiated with some forward-thinking nursery owners in the lead. Now, an increasing number of conservation commissions here on Cape Cod and elsewhere in the Commonwealth require some measure of invasive species management and replacement with native plants as part of a permitted property improvement. In 2007 both Nassau and Suffolk Counties on Long Island passed a similar ban on selected invasive species; you can see a comprehensive “Do Not Sell” list of banned plants within their excellent publication: <http://ccesuffolk.org/assets/galleries/Agriculture/Commercial-Nursery-and-Landscape-Management/Website-FAQ-on-Invasives-Brochure-2012.pdf>

The history of invasive species in the Northeast starts with arrival of European colonists in the 17th century. The New England Wildflower Society estimates that about 60% of the invasive exotics we struggle with were originally brought here as ornamental plants. This includes our “kudzu of the North,” oriental bittersweet (*Celastrus orbiculatus*), as well as Japanese honeysuckle

(*Lonicera japonica*) and porcelainberry (*Ampelopsis brevipedunculata*). And look out: some very foolish people have actually planted kudzu in southern New England.

The kings of the invasive shrubs are the various species of shrub honeysuckle; here on the coastal plain we struggle primarily with *Lonicera morrowii* and *L. tartarica*. Other “ornamental” plants that have invaded minimally managed habitats include Japanese and European barberry (*Berberis thunbergii* and *B. vulgaris*), winged euonymus (*Euonymus alatus*), privet—especially border privet (*Ligustrum obtusifolium*), and European and glossy buckthorn (*Rhamnus cathartica* and *Frangula alnus*). There is also an extensive list of invasive herbaceous and aquatic plants; see the Invasive Plant Atlas of New England at <http://nbii-nin.ciesin.columbia.edu/ipane>.

Government agencies, such as Departments of Agriculture and the former Soil Conservation Service

introduced about 30% of our invasive plants. Some of the worst invasives include multiflora rose (*Rosa multiflora*) and autumn olive (*Elaeagnus umbellata*). Invasive trees include both Norway and sycamore maples (*Acer platanoides* and *A. pseudoplatanus*) and black locust (*Robinia pseudoacacia*), which, while native in other parts of the United States, is decidedly invasive here.

We will never eradicate all of them. The good news, however, is the growing efforts at research, education, regulation, and management of invasive species—and a growing interest in and use of native plants in urban and suburban landscapes and in conservation restoration of our degraded greenspaces.

—Michael Talbot, Massachusetts Certified Horticulturist, Landscape Designer, Consulting Arborist, Restoration Ecologist, Educator; Environmental Landscape Consultants, LLC, Cape Cod, Massachusetts



A “field” of young scotch broom (*Cytisus scoparius*) takes over after a September, 2007 wildfire in a Washington State oak woodland. Before the fire, there were only scattered large individuals; 19 months after the fire, thousands of young plants are ready to flower and set seed. Re-sprouting from roots was rare. Photo by David M. Braun

In Oregon and Washington where I have lived for the past 25 years, I would nominate Himalayan blackberry (*Rubus discolor*), Scotch broom (*Cytisus scoparius*), and English ivy (*Hedera helix*) as the top three woody invasive weeds. These not only crowd out natives, but are widespread, difficult to control, thrive in sun and persist in shade, and with the first two, rapidly fill disturbed areas. While the first is no longer planted, a few varieties of broom are still planted and English ivy even more so. Both Himalayan blackberry and ivy invade intact native forest, and, growing in from the edges, the blackberry can cover small wetlands and creeks. The broom requires more sun and is adapted to dominate after a forest fire; it, and the blackberry, also increase fire risk: thickets of blackberry contain many dead canes intermingled with low tree limbs, and the broom will burn green because it contains flammable oils. I once thought that ivy “pulling down trees” was a myth, but ivy can break limbs and small trees because of its weight.

This is not to say that these plants have no positive qualities: Himalayan blackberry has tasty fruit and is both prime bird-nesting habitat and a good pollen and nectar source, scotch broom is a nitrogen-fixer, and all three have some utility for erosion control. However, landslide risk may actually increase if deeper-rooted trees that also would transpire more water have been crowded out on steep slopes.

Eradication usually takes several years because of remaining roots and seed. Some combination of mechanical control, herbicide application, mulching, and re-planting natives may be used depending on the location and objectives. Local volunteers are sometimes organized to hand-clear public green spaces and re-plant natives; this can work, but requires follow-up.

In sensitive areas like stream banks and wetlands, mechanical control plus heavy mulching and re-planting natives can be effective without herbicide use. On one project I was involved in along a creek in eastern Oregon (the “dry side” of the state) we treated a heavy infestation of Himalayan blackberry and bigleaf periwinkle (*Vinca major*) without using herbicide because of proximity to the creek. After cutting and removing the blackberry and periwinkle, sheets of cardboard were laid down and buried with 4 inches (10 cm) of ground yard waste mulch; the area was then planted with native trees and shrubs right through the mulch and cardboard. Survival was excellent the following year, with very little weed growth.

While none of these three invasives is a new arrival, they continue to spread into new areas, and can make sudden jumps following disturbance. If you wish to see one of the largest scotch broom “plantations” anywhere, drive along Interstate 5 near Castle Rock in southern Washington, where it covers extensive piles of ash dredged from the Toutle River after the eruption of Mt. St. Helens in 1980. Mitigation has begun on the piles; that would be worth a look.

—David M. Braun, Braun Arboricultural Consulting LLC, Hood River, Oregon

Over the years that I have been inspecting trees and landscapes, I have had to come to terms with some of the invasive species that we encounter in the Pacific Northwest. Although I fervently wish for a way to eradicate troublesome plants such as English ivy (*Hedera helix*), clematis (*Clematis vitalba*), Himalayan blackberry (*Rubus discolor*), holly (*Ilex* sp.), English laurel (*Prunus laurocerasus*), and Japanese knotweed (*Polygonum cuspidatum*), I am not waiting around for a magic bullet. Instead, within our office we have focused on education and understanding when and how to attempt to control or eradicate invasive plants on our clients’ properties.

On smaller residential sites, I have learned to look for opportunities to eradicate the problem plant within a defined area. For instance, it is much easier to work within a space contained by infrastructure, where the plant you are dealing with is not immediately present but waiting to invade again. This situation is very common here in the Seattle area with many properties adjacent to parks, greenbelt areas, or neighboring properties that are often overrun with ivy, blackberries, or other nasty invasives.

Another way that we have made progress with eradication of invasive species is by building relationships with contractors that specialize in ecological restoration. These specialists have extensive experience and know what works and how to accomplish it. Having experience and knowledge is especially important when working on difficult sites such as steep slopes. We find that when people realize there are professionals that can help with the work, they are more likely to act on our recommendations. Also, teaching people simple facts about invasive plants serves to get them interested in beginning to control the plant and sparks their awareness of the problem.



A large ivy removal and environmentally critical bank renovation in the Pacific Northwest uses geocoin for the sheet layer. Photo by Scott Baker

We try to get clients unwilling or unable to eradicate English ivy from their properties to at least keep it from climbing their trees. Because the species does not produce seed until it is climbing, this strategy reduces the spread via birds. Unfortunately, people are also under the mistaken belief that ivy is great for erosion control. What is poorly understood is that ivy obscures soil surfaces, structures, and retaining walls, hiding problems until it is too late to take action to prevent a landslide from occurring.

We find that the technique known as sheet mulching works very well with several of the invasive plants we deal with often, particularly ivy and blackberry. There are several tricks to successful use of sheet mulching; these include using of a thin layer of composted manure as the first layer to increase microbial activity before putting down the light-blocking paper or biodegradable fabric sheet, wetting the paper layer as it is installed, and using degradable wooden pegs to secure the paper layer.

—Scott D. Baker, Proprietor, Tree Solutions Inc., Registered Consulting Arborist, Board Certified Master Arborist, Certified Tree Risk Assessor, Seattle, Washington

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