

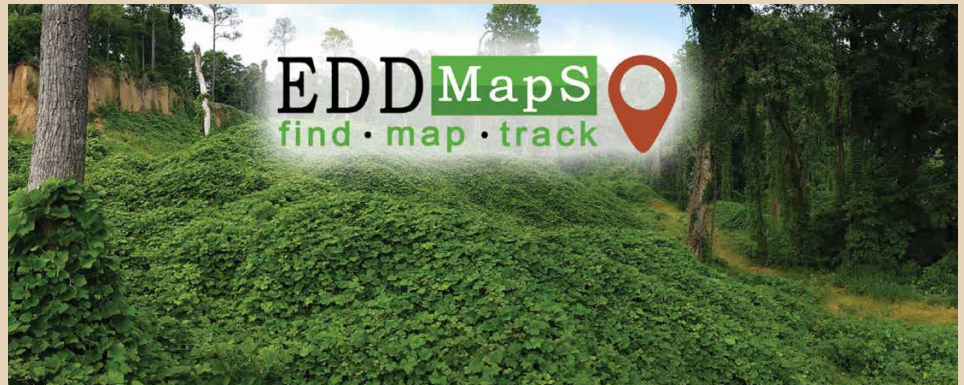
Use EDDMapS to Report Invasives

By REBEKAH D. WALLACE, CHARLES BARGERON and JIL SWEARINGEN

Invasive Species Recognized as a National Threat. Twenty five years ago, President Clinton's Executive Order on Invasive Species (E.O. 13112, 1999) officially defined invasive species and recognized them as a major threat to ecosystems, the economy, and to human health. The Executive Order also charged federal agencies with preventing the introduction and spread of invasive species and taking actions to control them. With support from non-governmental organizations like The Nature Conservancy, Exotic Pest Plant Councils, and the University of Georgia's Center for Invasive Species and Ecosystem Health (Bugwood), federal agencies eagerly responded.

Invasives Database. The first step was to evaluate a growing list of non-native pests throughout the U.S. and to create a database to amalgamate the information. Bugwood already had a large and widely used image database of pest insects, plants, and plant disease organisms (ForestryImages.org), developed with support from the US Forest Service and others. From this image database, Bugwood created the invasive.org website which became the springboard for EDDMapS.

Mapping Invasives. With collaboration and input from many agencies and organizations, Bugwood began developing an associated mapping component connected to its data. In 2006, the group launched the Early Detection and Distribution Mapping System, or "EDDMapS" to help government agencies, NGOs, researchers, and the public document invasives affecting ecosystems. At first, the tool was available only as a desktop computer operation, but Bugwood soon created a field app that was easy to use with a suitable cell phone and a little instruction. Working with the National Park Service, EDDMapS-based



apps like *'IveGot1'* (primarily for Burmese pythons in Florida) and the **Mid-Atlantic Early Detection Network (MAEDN)** were launched. These and other EDDMapS-based apps led to a surge of reporting across the U.S. and the revolutionary ability to quickly get a picture of where many invasive species occur.

One EDDMapS App. With technology advancements and the desire to streamline reporting, all of the local and regional apps have been retired in favor of a single EDDMapS app for nationwide use. EDDMapS is freely available to anyone with a cell phone or computer. You can use the app in the field to quickly report invasive plants, insects, wildlife and pathogens, and add pictures to support your identification. The app provides images and information to help with identification. Each report is reviewed and verified by qualified experts before being made available—this is a distinctive feature of EDDMapS. An account is needed to report species (you might want to do this while you're home) but is not required for looking at the field guides or maps.

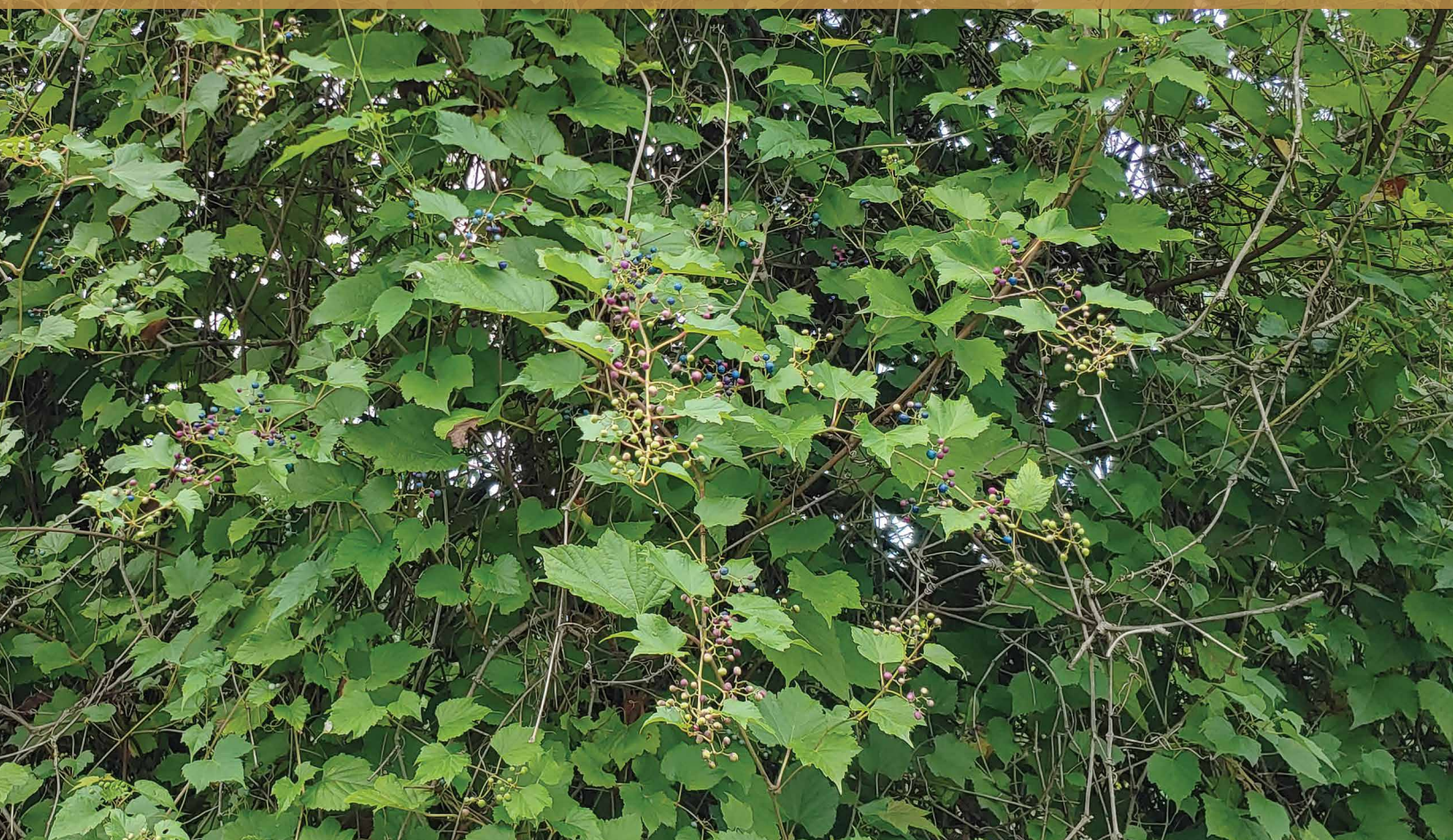
Sharing Data. Anyone can download and incorporate data from EDDMapS into their systems by using the Advanced

Query Tools or through the Bugwood API. Researchers, managers, and policymakers can access species occurrence maps and underlying data for analysis and the development of management and prevention plans. The EDDMapS Tools page and EDDMapS Dashboards allow users to query data, view graphs and statistics, and see recent observations. For grants, awareness campaigns, and other efforts, EDDMapS Projects can be used to link records related to a unique project.

EDDMapS Impacts. EDDMapS' distribution maps help educate the public, policy-makers, land managers, and others to better understand the scope of the invasive species problem, develop management and prevention plans, report new invasives, and track the spread of invasives in the U.S. and Canada. As of February 2024, EDDMapS contains 8 million reviewed and publicly available records covering over 6,000 invasive species submitted by more than 34,000 reporters across the US and Canada.

To download the app. Go to: apps.bugwood.org/apps/eddmeps/ or to your phone's app store and type in EDDMapS.

The Bottom line: If you are mainly interested in reporting invasive species, use EDDMapS. If you are trying to identify a native plant, animal, or other organism, use iNaturalist. Your observations matter!



Porcelain berry (*Ampelopsis glandulosa* ssp. *brevipedunculata*) overtakes native vegetation in a park in suburban Maryland. Photo by Jil Swearingen.

A Rational Approach to Invasive Plants

By PRU FOSTER

I spend part of every day wandering my garden. I meander along the paths and check on all the plant babies. Who is budding? Who is blooming? Who needs water? There are a thousand questions to be answered. But my peace and wonder are often shattered by anxiety at the sight of swaths of stilt grass or blankets of English Ivy. I wonder “How am I ever going to win *that* battle?” More depressing still is the thought that even if I can remove all the invasives, many of them will rebound the moment I turn my back. It’s safe to say that I am one of the more obsessive of gardeners, yet I am not winning my battle against invasives. How can we expect normal people to even try?

It turns out that I have been approaching the invasives issue in “A

hamster running in her wheel” kind of way rather than in a “Gaia bringing forth new life” way. Writing this article, I’ve learned about some critical mistakes I was making, like trying to remove the most persistent invasives first rather than targeting new arrivals. I’ve learned about easy ways to contribute to the fight against invasives beyond my patch - using iNaturalist or EddMaps (see pages 16-17). And I’ve also come to the reluctant, yet empowering, conclusion that the judicious application of herbicides is my best hope for getting rid of Japanese honeysuckle and wineberry amongst the tulip tree roots. Altogether, these new perspectives have reframed my lonely, desperate battle

against invasive plants into part of a coordinated and effective attack. One message stands out: The starting point of the battle against invasives is arming ourselves with knowledge.

Global View of Invasives. Most readers will probably know what invasives are and why there is so much concern over them. But just to be clear: invasive plants are non-native species that were introduced by humans AND disrupt ecosystem functions. Once they get a foothold, invasives replace highly diverse communities of native plants, animals, and other organisms with dense, often monocultural, growths of introduced plants. These new communities disrupt ecosystem functions by altering soil

chemistry and fertility in favor of non-natives, displacing native host plants needed by native insects, and the wildlife that depends upon the insects. There are uncountable ways in which the loss of habitats cascades into other negative impacts, including the loss of flood prevention, soil retention, and carbon sequestration.

There are about 37,000 established non-native species worldwide. Less than 10% of these exotic species—about 3,500 species, are considered invasive. Amongst non-native plants in the U.S., only 6% (1061 plants) are considered invasive. However, the impact of these species on our ecosystems is immense. Sometimes folks will use the word “invasive” for native plants that grow aggressively, such as Golden Ragwort (*Packera aurea*) or Woodland Oats (*Anemone canadensis*). However, by definition, invasives are non-native, introduced species that harm biodiversity. To avoid confusion, it's probably best to refer to the muscular natives as “aggressive” or “weedy” rather than “invasive”.

The United Nations has identified invasive species as one of the five horsemen of the biodiversity apocalypse - and we must stop this apocalypse if we are to have a viable future. The other four horsemen driving the biodiversity apocalypse are land use change, pollu-



Fig Buttercup (*Ficaria verna*) invades the forest floor and trailsides at Chesapeake and Ohio National Historical Park, Cabin John, Maryland. Photo by Jil Swearingen.

tion, climate change, and excessive hunting. Invasives are included as one of the horsemen, in part, because they have contributed to 60% of all recorded species extinctions. And, even though extinction rates today are 10 to 100 times higher than ever seen in the geological record, this is not what keeps ecologists awake at night, rather is what *accompanies* the high modern extinction rate. Underlying nearly every extinction are mountains upon mountains of losses of local populations and impairment of ecosystem functions. In other words, extinctions are usually just the tip of the iceberg of biodiversity impacts.

Invasives in Maryland. There are roughly 300 invasive plants in the mid-Atlantic. As Marylanders, we can see the contribution of invasive species to the loss of local populations across the state. Common reeds in Maryland's marshes grow deep roots and quickly outcompete natives as well as alter the soil chemistry in their favor. Barberry boosts invasive earthworm populations, leading to erosion and sediment problems, as well as harboring high quantities of deer ticks. Invasive vines like English Ivy (*Hedera helix*) and Japanese Honeysuckle (*Lonicera japonica*) strangle trees and shrubs, and displace and repel native herbaceous plants. Bradford pear (*Pyrus calleryana*) invades so fast as to reduce the meadow and shrub phase of succession (following a disturbance like a tree fall) from the normal 20 years to just 5 years - depriving our open-woodland creatures of much-needed habitat. This list, as I'm sure you know, goes on and on.

Fight invasives with knowledge.

To develop successful strategies for fighting invasive species, we first need to understand the stages involved in their establishment: simply described as “arrive, survive, and thrive”. *Arrive*: First, a plant is introduced by humans, either on purpose or inadvertently, to an area where it is



Three-way hellscape of non-native invasives: English Ivy (*Hedera helix*), Creeping Euonymus (*Euonymus fortunei*), and Lilyturf (*Liriope spicata*). Photo by R.H. Simmons.

continued on page 20

not native. Kudzu (*Pueraria montana* var. *lobata*), for example, was intentionally introduced to the U.S. and distributed in southern states to stop erosion. Stiltgrass (*Microstegium vimineum*) snuck into the US as packing material for porcelain. *Survive*: The second stage is when the non-native plant establishes a local community. Japanese Spurge (*Pachysandra terminalis*) is establishing new patches in my back garden as you read this sentence. *Thrive*: Finally, the non-native plant spreads (with help from wind, water, wildlife, or humans, including gardeners), and colonizes new locations. We can battle invasives at any of these three stages, but success requires knowledge of each species' biology and habitat adaptability, in order to choose the most appropriate control strategies.

Arrival Stage. As you may well guess, preventing the introduction of invasive species is by far the most effective way to control invasives. The metaphor "Don't let the genie out of the bottle" couldn't be more appropriate. It may surprise you that an estimated 82% of invasive species in the United States were introduced through horticulture! It is surely irresponsible to knowingly sell ecologically damaging plants, but this practice continues. Maryland law defines 'Tier 1' plants as those which can not be sold, due to their ecological or economic threat, and 'Tier 2' plants as those which can only be sold if the nursery posts signage stating "This plant is invasive". At the time this article was sent to print, there were just six 'Tier 1' and 13 "Tier 2" plants. Hopefully, these laws will be strengthened through the actions of the Maryland Native Plant Coalition, Maryland representatives Linda Foley and Ben Brooks, and our voices of support to our representatives. Meanwhile, we can all take the extremely effective action of not planting or spreading any invasives, regardless of regulation.

Survival Stage. The second phase of invasion is the establishment of patches



Giant Hogweed (*Heracleum mantegazzianum*) is by far the largest of any of the Apiaceae in Maryland and is rarely encountered. Its sap can cause serious harm to human flesh. It is sometimes confused with the much smaller and non-toxic native Cow Parsnip (*Heracleum maximum*) that lacks purple splotches on stems. Photo courtesy Invasive Species Council of British Columbia.

"Perhaps the most impactful shift
in my approach to battling invasives
is the appreciation that the war
against invasives isn't lost
just because I can't control all
the invasives where I garden."

of invasive species. It is far easier to remove a small patch than a dispersed one, but it requires quick identification and action. As naturalists, we can provide critical observations using EDDMaps, and as stewards, we can target new plant colonies for removal. My garden has small patches of four highly invasive species: White Mulberry (*Morus alba*), Leatherleaf Mahonia (*Mahonia bealei*), Fig Buttercup/ Lesser Celandine (*Ficaria verna*), and Chinese Silver Grass (*Miscanthus sinensis*).

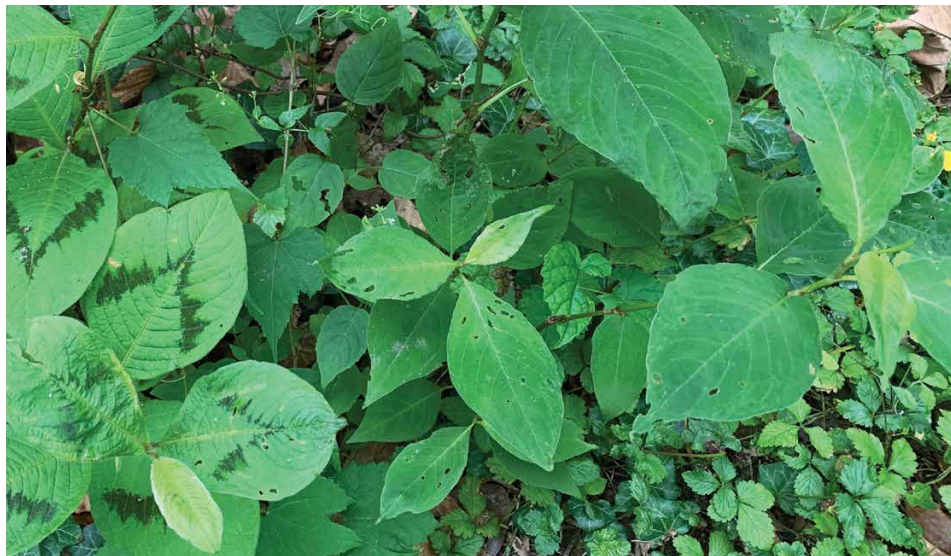
Because they are all readily spread by wildlife and the wind, and they are in small patches, I've prioritized them for removal.

Thrival Stage. (ha ha) And then there is phase three: trying to control, or even eradicate, an invasive species that is thriving. It is in this frontier that I have focused my battle against invasives, spending hour upon hour pulling and digging. Small wonder I felt defeated. Granted, I have had a few successes - garlic mustard is nearly gone and we've saved the native trees from an English Ivy (*Hedera helix*) chokehold. But I have had far more failures than successes. I've tried hard to remove Japanese stiltgrass (*Microstegium vimineum*), Amur honeysuckle (*Lonicera mackii*), and multiflora rose (*Rosa multiflora*). In retrospect, my efforts were pretty much doomed to failure.

The stiltgrass is in the lawn now as

well as being abundant on neighbors' properties. The roots of honeysuckle and multiflora rose, I've learned, are resilient, and little bits left in the soil have resulted in resprouting. Like many a naturalist before me, I've concluded that if I want native cover in my woodland, I will have to employ herbicides. Not the dreaded rampant spraying of herbicide on foliage, but rather small amounts of herbicide applied judiciously to freshly cut stems. And stiltgrass? I am endeavoring to accept that the stiltgrass will be back. This is not to say I won't pull it out and mow it down as the summer progresses. But rather I'm learning to accept that de-stilting is likely to be an annual task and I'm changing some garden beds to make trimming easier.

A new mindset. Perhaps the most impactful shift in my approach to battling invasives is the appreciation that the war against invasives isn't lost just because I can't control all the invasives where I garden. Rather, I'm learning to focus on battles that can be won: removing newly established colonies, not introducing new invasives, and strengthening laws. And we can all contribute to mapping and reporting the species that are in our areas. There's also hope for the invasive "genies that are already out of the bottle". Clever gardeners may yet develop cultural approaches to kill off invasive populations, or scientists may discover a fungus or virus or insect that attacks only a certain plant. Meanwhile, there are plenty of effective steps we can take against invasives to give our ecosystems a better chance to thrive.



Non-native invasive Asian Jumpseed (*Persicaria filiformis*) (left) and native Virginia Jumpseed/ Knotweed (*Persicaria virginiana*) (right) along Arlington Run, Arlington County, VA. Photo by R.H. Simmons.

Weapons in the Anti Invasives Arsenal

KNOWLEDGE. Which invasives are present, which are on the brink of exploding?

LEGISLATION. Support invasive species legislation by writing letters and electing sympathetic officials.

CITIZEN SCIENCE. Log your observations of invasive species with EDDMapS.

PREVENTION. Never plant or share invasive species. Cut flowers before fruit set and cut maturing fruits to prevent spread by seeds.

LOCAL BATTLES.

Take an inventory of the plants in the area you are targeting.

Prioritize which invasives to remove first - especially small new outbreaks.

Research what methods of control work best for your targets.

Make a plan and perhaps jot down a few key tasks in your yearly calendar.

Execute your plan.

SPREAD THE WORD. Share your knowledge, and maybe some of your native plants.

SMILE. Thank yourself for making a difference.

REFERENCES

IPBES 2003, *Thematic Assessment Report on Invasive Alien Species and Their Control: Summary for Policy Makers*, zenodo.org/records/10521002

Reichard, S.H. & P. White 2001, *Horticulture as a Pathway of Invasive Plant Introductions in the United States*, *BioScience* 51(2):103-113. academic.oup.com/bioscience/article/51/2/103/390610

Swearingen, J.M. & J.P. Fulton. 2022. *Plant Invaders of Mid-Atlantic Natural Areas, Field Guide*. Passiflora Press. 200 pp. www.invasive.org/midatlantic/fieldguide/index.cfm (Note from the author: Essential reading for gardeners and land stewards)

University of Maryland Extension. *Introduction to Invasive Plants in Maryland* extension.umd.edu/resource/introduction-invasive-plants-maryland. Accessed March 21, 2024