Abstracts & Author Biographies

Ohio River Valley Invasive Species Conference

March 19-20, 2025 ● Burlington, Kentucky

BUILDING BRIDGES FOR INVASIVE SPECIES MANAGEMENT

Hosted by

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MIDWEST INVASIVE PLANT NETWORK

KEYNOTE PRESENTATION

Pie in the Sky or Pie a' la Mode: What Can Molecular Genetics Contribute to Managing Invasions?

Daniel Simberloff, University of Tennessee-Knoxville

The rapid development of molecular genetic technology beginning with the discovery of allozymes in the 1950s and leading to the entire field of genomics has led to several new approaches to managing invasive species. The main ones involve attempting to silence important genes in an invader, introducing a transgene that induces functional sterility, and gene-editing, especially with CRISPR-Cas9. Although several projects along these lines have already been implemented or are nearing implementation, they are far from exhausting possible uses of molecular genetic technology to manage invaders; I will give an example of using sequence data to increase the success rate of eradication efforts. Almost all proposals to deal with invasions through molecular genetic means are bootlegged on much larger and better funded projects in medicine and agriculture. Although some ideas seem like hyped wishful thinking, and impediments abound, greatly increasing the relatively low investment in research on molecular genetic methods to manage invasions would at least lead to a firmer understanding of what might really be possible and could lead to implementing promising projects more quickly.

WORKSHOPS

Invasive Grasses of the Lower Midwest

Chris Evans, University of Illinois Extension

This workshop will cover identification and management strategies for several invasive grasses found in the lower Midwest including: stiltgrass, small carpetgrass, *Miscanthus* spp., Johnsongrass, tall fescue, Phragmites, brome grass, and reed canarygrass.

Herbicide Preparation and Application Techniques for Invasive Plant Management

Ron Rathfon and Lenny Farlee, Purdue University

This workshop will provide a comprehensive overview regarding the use of herbicides for invasive plant management. Lenny Farlee and Ron Rathfon, from Purdue University, will present on common herbicides and formulations, and how they are used. Learn about creating herbicide mixes, the best concentrations for various uses, and when to use adjuvants such as surfactants and water conditioners. This workshop will also cover a variety of application techniques and tools, including recommendations of herbicides and application methods for specific invasive plants.

An Introduction to EDDMapS: Use and Applications in the Lower Midwest

Rebekah Wallace, Center for Invasive Species and Ecosystem Health
Dawn Slack, Indiana Invasive Plant Advisory Committee

The Center for Invasive Species and Ecosystem Health (Bugwood) at the University of Georgia has spent the last 3 decades working with partners worldwide to create tools and make resources available for the invasive species and pest fields. EDDMapS was launched in 2005 and has had many upgrades over the years. A few of the most recent advances have occurred with the EDDMapS Pro app, the launching of Bugwood Connect, the debut of EDDMapS Projects, new partners and expansions with the Wild Spotter program, and updates to various tools available on the EDDMapS website. All of these features and tools are built in collaboration with partners to ensure they achieve the goals of those programs and then are made broadly available for free to help other programs. This workshop is for new EDDMaps users, or for those wanting to reacquaint themselves with this invasive species reporting tool. We will also hear from local natural resource managers on what plants you can be on the lookout for, and how the reports you submit help guide invasive species prevention and management efforts in the Lower Midwest.

CONCURRENT SESSION ORAL PRESENTATIONS

If there is more than one author, the presenting authors are indicated with an asterisk (*). See author biography section for presenter contact information.

Early Detection and Innovations

Identification of Early Detection Terrestrial Invasive Plant Species

Emily Finch, Martin County Soil & Water Conservation District

This presentation will cover the identification and known distribution of several early detection terrestrial invasive plant species in the Ohio River Valley region, particularly Southern Indiana. Some of the selected species are known to be highly invasive, but with a limited distribution in the region, whereas others are plants more recently escaping cultivation, whose final invasion status is unknown. The presentation will include a mix of woody and herbaceous species, but will focus on identification instead of control/management. Some species to be included are: Porcelain Berry (*Ampelopsis glandulosa* var. *brevipedunculata*), Chinese Wisteria (*Wisteria sinensis*), Japanese Spiraea (*Spiraea japonica*), Jetbead (*Rhodotypos scandens*), and Princess Tree (*Paulownia tomentosa*).

3-D Printed Models: A Novel Approach for Invasive Species

Carrie Brown, Amy Stone*, and Ashley Leach, Ohio State University Extension*

Addressing the pressing challenge of invasive species detection, this presentation explores an innovative approach utilizing 3-D printed models to enhance awareness and scouting efforts. Invasive species pose significant threats to ecosystems worldwide, necessitating effective detection and control strategies. Traditional scouting exercises frequently rely on visual identification presented in 2-D format, oftentimes removed from the environment in which the species is actually found. To overcome these limitations, Ohio State University has turned to 3-D printing technology to create replicas of invasive species. Through hands-on exploration, their use

can effectively convey key identification features, behavioral traits, and ecological impacts associated with invasive species. We'll explore how these models have been used in scouting exercises in a variety of audience collaborations including green industry professionals, state agencies, educators, youth, and land managers. Models facilitate interactive learning sessions and serve as versatile teaching tools, and the accessibility and affordability of 3-D printing technology make it feasible for professionals to create customized replicas tailored to local invasive species priorities. Whether focusing on aquatic invaders, forest pests, or urban nuisances, 3-D printed models can be adapted to address specific regional challenges and conservation needs. A case study is presented on spotted lanternfly (*Lycorma delicatula*) in which 3-D printed spotted lanternfly lifecycle stages, including nymphs, adults, and egg masses have been utilized in scouting efforts with a variety of audiences around the state.

The Role of Ornamental Cultivars in Plant Invasions in the Midwestern U.S.

Theresa Culley, Robert Elam, Megan Callahan, Caitlin Barilleaux, Jenn Breiner, Becca Erikson, Sandro Chikovani, and Olivia Leek, University of Cincinnati*

Many non-native plant species have been imported into the US for horticultural purposes since the 1600's. Although most introduced species are not problematic, a small number have escaped cultivation and spread into natural areas to form invasive populations with substantial negative impacts. In some cases, ornamental species are commercially sold as cultivated varieties ("cultivars"). The invasive behavior of some non-native species may be due in part to the introduction of one or more of these cultivars, but the actual mechanisms have been relatively understudied. We examined the role of cultivars in four invasive species with a past or present ornamental use: *Pyrus calleryana* (Callery pear tree), *Euonymus alatus* (burning bush), *E. fortunei* (wintercreeper vine) and *Miscanthus sinensis* (maidenhair grass). Using molecular microsatellite markers, we genotyped available cultivars of each species and compared that to wild populations. In each case, we found that cultivars contributed to plant invasions but in different ways. Invasive spread in self-incompatible *P. calleryana* and in *M. sinensis* was due to cross-fertilization of genetically different cultivars, while invasion of *E. fortunei* was caused by the spread of a single tetraploid cultivar ('Coloratus'). Similarly, spread in *E. alatus* was also due largely to a common cultivar ('Compactus') but wild populations also contained a mix of genotypes. As individual US states grapple with regulation, we recommend that introduced species with cultivated varieties (including those advertised as "sterile" or "low seed") be examined and tested thoroughly before commercial release. This requires researchers, land managers, public garden staff, and nursery professionals to work together on potentially problematic species and identify non-invasive alternatives. In this way, we can reduce the spread of non-native species through the horticultural pathway to ensure the integrity of natural areas throughout the Midwestern US.

Public Gardens as Sentinels of Plant Invasion

Theresa Culley, University of Cincinnati; Kurt Dreisilker, The Morton Arboretum; Michelle Beloskur, Midwest Invasive Plant Network; Nadia Cavallin, Royal Botanic Garden; Kayri Havens, Chicago Botanic Garden; Hans Landel; Brittany Shultz, Missouri Botanical Garden; Jenn Breiner, University of Cincinnati*

Established invasive plant species negatively impact natural areas and incur huge economic costs associated with control and management. A new approach to significantly reduce these effects is to identify and target plant species in their earliest stages of spread, using data being collected internally by many public gardens and arboreta across North America. These gardens have historically monitored and documented changes in their plant collections over time, including any spread of a plant from cultivation. These valuable data are now being collected and shared among gardens in the form of a garden sentinel network. Launched in 2016 as Public Gardens as Sentinels against Invasive Plants (PGSIP), this initiative now includes 57 gardens across North America, each submitting their reports of problematic species to a shared database, using standardized guidelines. We now examine this PGSIP dataset to answer: (1) Which plant species are most problematic across sentinel gardens? (2) Have these species already been reported outside of gardens (as state-listed or regulated)? (3) What up-and-coming species are of greatest concern within gardens? and (4) What characteristics are shared among these problematic species? As of November 2024, PGSIP gardens in 28 US states and Canadian provinces had submitted 996 reports of problematic species, consisting of 597 unique taxa. The most commonly listed species was Amur corktree (*Phellodendron amurense*) in 12 gardens, followed by burning bush (*Euonymus alatus*) and wintercreeper (*E. fortunei*) in 8 gardens. Other frequently listed species in fewer gardens included golden rain tree (*Koelreuteria paniculata*), Norway maple (*Acer plantanoides*), and castor aralia (*Kalopanax septemlobus*), in addition to more well-known invasives such as common buckthorn (*Rhamnus cathartica*), Amur honeysuckle (*Lonicera maackii*) and Callery pear (*Pyrus calleryana*). Of the 597 species, 36% were not listed by any state or province as invasive or noxious. Midwestern gardens also identified several newer species of concern on their watchlists, including Japanese tree lilac (Syringa reticulata) and Siberian squill (*Scilla siberica*). Although most of the top reported species were woody trees and shrubs, 63% of all problematic species were non-woody, including 49% herbaceous species. Top families represented in the dataset were *Rosaceae, Fabaceae, Poaceae, and Asteraceae*, with the most frequent genera consisting of *Acer, Allium, Berberis, Clematis, Lonicera, Prunus, Sedum, and Viburnum*. Taken together, this garden information can now inform the efforts of land managers in the field, invasion biologists, the horticultural industry, and agencies tasked with invasive plant monitoring and assessment.

Tracking Early Detection Non-Native Plant Invaders in the Mid-Atlantic: Wavyleaf basketgrass (*Oplismenus undulatifolius*), Goatsrue (*Galega officinalis*), and Glossy Buckthorn (*Frangula alnus*)

Heather Smith, USDA Forest Service

Early detection and rapid response of emerging invasive plant species is critical for preventing their spread across the landscape and into high-value ecosystems. Three emerging non-native invasive plant species currently in focus for the USFS Morgantown Field Office in the Mid-Atlantic states are Wavyleaf basketgrass, Goatsrue, and Glossy buckthorn. Each of these species poses significant threats to forests and natural areas of the region. Wavyleaf basketgrass, an aggressive understory invader, creates continuous carpets in forests and is spreading rapidly in the Mid-Atlantic. The invasive shrub Glossy buckthorn, spreading in Northeastern United States, is forming dense patches, outcompeting native plants, and reported to be spreading further into the Mid-Atlantic states. Finding the invasion edge is important for slowing the spread. Goatsrue is a federal noxious weed with a very limited distribution in northern Pennsylvania – just a few counties. Targeted for eradication, landowners/managers must be on the lookout for this species. Early detection will support efforts for rapid response as we determine invasion fronts for these emerging invaders. A goal of this presentation is to expand the knowledge base and monitoring network for these three species.

Forest Health

Association Between Invasive Plant Species, Tick Abundance and Pathogen Carriage in Southern Illinois

Chris Evans, Teresa Steckler, and Yvette Johnson-Walker, University of Illinois; Holly Tuten and Chris Stone, Illinois Natural History Survey; San Myint and Erica Jackson, University of Illinois*

The risk of tickborne disease in humans and livestock may be altered by the abundance of some invasive plant species. The objective of this project was to examine the relationship between different species of invasive plants and the prevalence and diversity of tick species and associated pathogens. Plots (n=10) located in southern Illinois were classified as uninvaded or invaded by *Alliaria petiolata, Microstegium vimineum*, or *Lonicera maackii*. A standard tick dragging protocol assessed tick abundance (April - December of 2021 and 2022). Collected ticks were identified for developmental stage, species, and tested for pathogens by PCR. Dataloggers recorded temperature and relative humidity at sites. The Kruskal-Wallis and Chi2 tests were used to assess associations between risk factors of interest and outcomes. Mixed multivariable regression models were used to control for potential confounders. A total of 457 adult (n=118) and nymph(n=339) ticks were collected (A. Americanum, n=376; D. variabilis, n= 70; and I. scapularis, n=11). PCR identified 6 pathogen positive ticks (*E. ewingii* (n=2), *E. chaffensis* (n=4)). There were significant differences in relative humidity ($p<0.001$) and nymph abundance ($p=0.0014$) by plant species. The median number of nymphs in plots invaded by *A. petiolata* (7.0) or *L. maackii* (7.0) was significantly greater than the median number of nymphs in plots invaded by *M. viminuem* (4.0) or uninvaded plots (3.0). This study identified an association between plant species and nymph abundance. The significant difference in relative humidity associated with plant species, may indicate one mechanism by which plants influence tick abundance. Assessment of seasonal and secular patterns would require additional years of data collection.

These findings enhance understanding of the relationship between humans, animals, ticks, and the plants in their shared environment. Additional research is needed to apply these finding to the development of sustainable approaches to reduce transmission of tickborne diseases.

Updates on Laurel Wilt Disease in Kentucky, A New Threat to Sassafras

Ellen Crocker, University of Kentucky; Tyler Dreaden, USDA Forest Service*

Laurel wilt is a disease that kills plants in the laurel (*Lauraceae*) family. It is caused by a fungus (*Harringtonia lauricola*) carried by redbay ambrosia beetles (*Xleborus glabratus*), both of which are native to Asia and invasive in North America. Laurel wilt disease was first detected in the US in 2002 when it was observed causing widespread death of redbay (*Persea borbonia*) in Georgia and other coastal areas. In 2019, a large jump in its range was detected when laurel wilt disease was confirmed in Kentucky and Tennessee causing death of sassafras trees, the furthest north laurel wilt disease has been observed. Here we will present findings from several laurel wilt disease-related projects in Kentucky including updates on long-term monitoring plots, results of a fungicide trial, and progress on the search for surviving sassafras trees in impacted areas. As this disease

continues to spread throughout the region, these finding provide insight into what other states north of laurel wilt's history range further south can expect.

Deer and Invasive Plants: Impacts and Interactions

David Gorchov, Miami University

In much of the United States, white-tailed deer occur at much higher density than before European colonization. Impacts of high deer density on native biota, particularly tree regeneration are well documented. In many areas, invasive non-native plants are also abundant, with documented impacts on native biota. Which of these stressors is more serious, and how do they interact? With several co-authors, I reviewed field experiments in eastern U.S. forests that simultaneously investigated deer and invasive plant impacts on native plants, animals, and ecosystem processes. We found deer impacts were more frequent, and more consistently negative, than invasive plant impacts. Deer impacts also likely more difficult to reverse than invasive plant impacts. Some of these field experiments revealed significant interactions between deer and invasive plants. The most frequent interaction involved no main effects, but a sub-additive interaction of deer and invasives; removing both generated higher responses than the other three treatment combinations. This interaction could be caused by deer mitigating the effect of invasives, or invasives mitigating the effect of deer. We have evidence for both in our deer X *Lonicera maackii* (Amur honeysuckle) studies in southwest Ohio. Deer browse *Lonicera*, reducing its cover and basal area growth, hence its impact on forest floor plants – and high deer density may impede re-invasion by shrubs. Deer particularly browse *Lonicera* in early spring, due to its early leaf expansion. Areas with high density of *Lonicera*, or other invasive shrubs with extended leaf phenology, may sustain high deer density. Lonicera also mitigates deer browse, facilitating survival and growth of sugar maple seedlings. Removal of Lonicera and other invasive shrubs before reducing deer density puts tree seedlings at greater risk. In contrast, many invasive herbs are not eaten by deer, and are facilitated by deer (through browse on native plants, trampling, and invasive earthworms).

How Effective are Emerald Ash Borer Parasitoids, and Can We Integrate Them with Insecticide Treatments?

Caleb Wilson, University of Kentucky; Louise Labbate, Toby, Petrice, and Therese Poland, USDA Forest Service; Deborah McCullough, Michigan State University

Emerald ash borer (EAB) is the most devastating forest pest to have invaded eastern North America. Currently, USDA-APHIS releases four introduced parasitoid species to manage EAB across the U.S. The question on everyone's mind these days is: will these parasitoid releases effectively manage EAB? A second commonly asked question is: "are parasitoid releases compatible with insecticide treatments?" In this talk I will describe ongoing research examining how effective parasitoids are at managing EAB in post-invasion stands in south central Michigan, and if parasitoids appear to work synergistically or antagonistically with insecticide treatments for reducing EAB densities and improving tree health.

Seeding Log Landings to Benefit Pollinators and Limit Non-native Plant Invasion

Jen Larson, Lauren Piel Knapp, and Dacoda Maddox, USDA Forest Service*

Active forest management is anticipated to favor early successional and open forest wildlife including native pollinators, especially in aging, homogeneous forested landscapes. However, the heavily impacted areas from timber harvest (e.g., log landings, skid trails, and forest roads) are slow to recover, are often hot zones and conduits of plant invasion, and typically result in an indelible visual impact resulting from forest operations. Further, scientific evidence suggests that many pollinating species, including native bees, are declining in range and abundance and that habitat loss is likely the most significant driver. Log landings that serve as semi-natural habitats may boost the abundance, diversity, and floral continuity of food and nesting resources for native bees. Staff from National Forests (i.e., Hoosier, Mark Twain, and Shawnee) in the midwestern US wanted to 'do something better' than typical log landing closeout procedures by providing ephemeral, rapidly establishing pollinator habitat. Scientists and managers came together to develop a project to reduce compaction, improve soil conditions, and establish floral resources across the growing season. We will highlight the treatments and the outcomes – for soils, plants, and native bees. While this project was highly successful, the low seeding rate (8 pounds/acre) had marginal impact on preventing initial invasive plant establishment, but native plant gains occurred in subsequent years. A new project to test the effects of increasing seeding rates of the more readily establishing native species to limit invasive plants was initiated in 2024 at Hoosier and Shawnee National Forests. With increases in the pace and scale of active forest management, log landings resulting from timber harvest and scaled across the landscape offer the opportunity to promote and sustain a diversity of native pollinators while also limiting establishment of aggressive invasive plants.

Control and Management – Part 1

Invasive Plant Control Priorities & Goals for Landowners

Emily Finch, Martin County Soil & Water Conservation District

Invasive plant management is often overwhelming for Landowners and managers. Even experienced Landowners can feel the need to give up in the face of a heavy infestation or large acreage filled with invasive plants. After years of providing invasive plant site visits and technical assistance to private Landowners, Emily Finch share's her outlook on how best to work with individual Landowners to prioritize their invasive control efforts, and set realistic and achievable goals. The aim is to increase the efficacy and adoption of invasive management practices by individual Landowners.

Are *Elaeagnus umbellata* invasions limited by microbial mutualists?

Scott Meiners and Cody Leverette, Eastern Illinois University*

Mutualistic interactions with soil microbes are a key component of plant invasions. Mutualists such as *Rhizobia* bacteria often limit invasive plant establishment and performance, but the role of nitrogen-fixing *Frankia* bacteria in invasions is much less known. We quantified the net effects of plant-soil feedbacks, including *Frankia* nodulation, on invasive *Elaeagnus umbellata* (autumn olive; hereafter AO) seedling performance and allocation.

The inoculation experiment used soil collected at varying distances from focal shrubs and used live soil and sterilized (autoclaved) soil to separate biotic from abiotic effects. We expected seedling performance would decrease with further distance from shrubs as Frankia abundance and nitrogen inputs decreased. Contrary to expectations, seedling biomass increased with increasing distance from focal shrubs in live soil. The observed distance effects were driven by *Frankia* colonization as both nodule biomass and nodulation likelihood increased with distance from focal shrubs. Nodule formation was always beneficial to plant growth, as biomass was strongly associated with nodule biomass. Seedling performance and allocation did not respond to distance in sterile soil, suggesting abiotic effects play a minimal role in inhibiting nodulation near focal shrubs. These data demonstrate that, while Frankia nodulation positively impacts AO performance, the abundance of Frankia does not limit AO establishment at local scales. Future studies should evaluate the specificity of the AO- *Frankia* mutualism and the availability of these strains in uninvaded landscapes to understand why these mutualisms do not appear to limit invasion.

Native Forb Cover and Density are Increased by Cut Surface and Foliar Herbicide Applications to Woody Shrubs Invading Restored Midwestern Prairies

Mark Renz, University of Wisconsin-Madison

Contact Dr. Renz or visit renzweedscience.cals.wisc.edu for more information.

Herbicide and application timing trials for controlling winter creeper and oriental bittersweet

Ron Rathfon, Purdue University

Well established winter creeper (*Euonymus fortunei*) has proven challenging to control using the more standard herbicide treatments commonly used for invasive brush management. However, its evergreen foliage provides an opportunity for dormant season control. Two trials were conducted from 2016 to 2018 testing twelve different herbicides and tank mixes, including a relatively new herbicide, aminocyclopyrachlor (Method 240SL), being tested in forestry and invasive brush applications. Seasonal timing of these herbicide applications tested whether dormant season applications were as effective as growing season applications. Results of these trials will be presented in the context of an overall winter creeper management program.

Aquatic Invasives

The Kentucky Aquatic Nuisance Species Plan (KANSP)

Jeffrey Herod, Kentucky Dept. of Fish and Wildlife Resources

Building any bridge requires planning and expertise. In 2008, the Kentucky Aquatic Nuisance Species Plan (Plan) was approved by the National Aquatic Nuisance Species Task Force (ANSTF) and signed by Governor Steve Beshear. The Plan was written by a diverse group of people from many disciplines as well as the government and private sectors. The approved plan receives funds to implement from the U.S. Fish and Wildlife Service. The

Kentucky Department of Fish and Wildlife Resources, Fisheries Division, which plays a pivotal role as steward of the Plan, uses these funds to implement the Plan. The Aquatic Nuisance Species (ANS) Coordinator implements the plan, coordinates with partners, and track progress on the implementation of the Plan. This presentation will provide an overview of the Plan's 69 pages and will feature examples of selected aquatic nuisance species (i.e., plants, fishes, mollusks, etc.), the four (4) main goals, four (4) objectives, and strategies that support these goals and objectives. The goal of this presentation is to raise awareness of the Plan's existence, its framework, and provide a point of contact for everyone who has an interest in the Plan and would like to discuss more.

Overview of Aquatic Invasive Species in Kentucky: Building a Team

Jeffrey Herod, Kentucky Dept. of Fish and Wildlife Resources

Building a bridge takes teamwork. Across Kentucky there are different groups working on invasive species management, and these groups are largely based on taxonomy. This presentation is a callout to individuals and groups working on aquatic invasive species (AIS) issues. Kentucky has a long history of AIS introductions, and these introductions are influenced mostly by different pathways of introduction and environmental similarity to other locations in North America and the World. Not all introduced species establish populations and spread within Kentucky, but some do. This presentation summarizes information gathered from the US Geological Survey Nonindigenous Aquatic Species database (USGS-NAS) for the purpose of raising awareness and bring a spotlight on AIS. Briefly, the presentation will discuss >100 AIS found in Kentucky (i.e., crustaceans, fishes, mollusks, plants, etc.), that most species originate in North America (i.e., native transplants), and that nine (9) major pathways account for the introduction and spread of AIS in Kentucky. These introduced species represent a diverse group of species influenced by anthropogenic behaviors and most species are AIS plants and fishes. This presentation will conclude with details about some countries of origin for representative species, give examples of the how the species were introduced, and share some tools to stop introductions and prevent the spread of aquatic invasive species. The hope is to garner support through sharing this information for the development of a team or network of teams across Kentucky to prevent new AIS introductions.

Would the real Rusty Crayfish please stand up? Genetic and Morphological Evidence of Cryptic Diversity in its Native Range

David Hayes and Mauro Madrid-Perez, Eastern Kentucky University*

Despite extensive research on the Rusty Crayfish (*Faxonius rusticus*) in its introduced range, little work has been done with the species in its native range. Here, we present COI and 16s sequence data and phyogeographic analysis from approximately 300 crayfish specimens collected in all major drainages in the Commonwealth of Kentucky, with special emphasis on the stream-dwelling crayfishes in the genus *Faxonius*. Results from this work suggests the presence of cryptic lineage previously referred to as *F. cf. rusticus* present in the Green, Salt, and Cumberland Rivers and a narrower range for true *F. rusticus* in the state, mainly in the Licking and Kentucky River drainages. Populations from the Big South Fork of the Cumberland River were identified as highly divergent from Licking River populations, calling into question its introduction status in the Big South Fork. Some populations of *F. rusticus* were identified as being introgressed with mtDNA from the downstream conger, *F. juvenilis*, which suggests using caution when interpreting DNA barcoding results in the absence of morphological information. Geometric morphometrics of carapace shape suggests that the cryptic lineage is morphologically intermediate to *F. rusticus* and *F. juvenilis*, but has extensive overlap with both species, which is why it was likely

undetected in previous work. A survey of iNaturalist sightings for *Faxonius* in Kentucky suggests that the three lineages can be distinguished by life color patterns that are mostly congruent with distribution of mtDNA lineages. DNA data presented here will be useful for future taxonomic and eDNA detection efforts. Future work on this group should include population genetic/genomic analyses to clarify species limits.

Identification and Ecology of the Native Common Reed (Phragmites americanus)

Zach Poynter, Ramboll

Land managers and restoration practitioners are familiar with the invasive common reed (*Phragmites australis*), however, the native counterpart is overlooked and under documented across its range due to the ubiquitous presence of the invasive species. The native species, *Phragmites americanus*, was first described in 2003, but remains relatively unknown to most natural resource professionals. There are subtle differences between the native and the invasive species and their ecology differs. The native *Phragmites americanus* is most common in the upper Midwest and along the eastern seaboard where it inhabits high quality wetlands and coastal regions. *Phragmites australis* has shorter ligules, shorter glumes, and leaf sheaths which persist in contrast to the native *Phragmites americanus* with longer ligules, longer glumes, and leaf sheaths which are deciduous, revealing a shiny smooth red to purple culm. The native *P. americanus* also typically inhabits higher quality wetland areas in contrast to the non-native *P. australis* which is frequently found in waste areas, roadside and agricultural ditches, and low-quality disturbed wetlands. When *P. americanus* does occur, it often intermingles with native vegetation and does not form the dense monoculture stands that the non-native *P. australis* does.

Opportunities and Barriers to Collective Action for Controlling *Phragmites* in Suisun Marsh

Erica Kronenberger and Zhao Ma, Purdue University; Baishnavi Tripuraneni, University of Delaware; John Takekawa, Suisun Resource Conservation; Karin Kettenring, Utah State University*

Managing invasive plants requires both individual and collective actions as invasive plants do not respect property boundaries. Extensive research exists on factors influencing private landowners' adoption of conservation practices in forestry, agriculture, and water management, and there is a growing body of literature examining barriers to and opportunities for individuals (private landowners, urban residents, and others) to engage in collaboration and collective action to manage natural resources or environmental risks. Our study integrates these two areas of research to explore collective action among private and public entities in controlling invasive plants in California's Suisun Marsh—a brackish wetland threatened by invasive Phragmites (*Phragmites australis*), Russian Thistle (*Salsola tragus*), and other invasive plants that negatively influence marsh ecosystem health and waterfowl habitat viability. Using a mixed-methods research design, we collected and analyzed data from qualitative interviews of selected landowners in the marsh, participant observation of habitat management actions, invasive plant control events, duck hunting activities and landowner gatherings, and a survey of all private and public entities in the marsh. We then examined the different levels of acceptance of four collective action models (self-organized, externally led, co-managed, and organizational coalitions) and analyzed factors shaping landowners' willingness to engage in collective action, including past experiences, self-efficacy, peer norms, and trust in various local, state, and federal resource management organizations. Broadly, our findings indicate that landowners generally support all four collective action models but exhibit low trust

towards several organizations, which may hinder collaboration despite mutual interest between landowners and organizations in managing invasive plants. These findings emphasize the importance of trust-building in fostering effective collective action. Insights from this study will inform a regional collective action model for managing invasive plants, with broader applications in regions with similar invasive plant concerns and institutional landscapes.

Control and Management – Part 2

Keep Calm and Drone On: Two years of Invasive Species Treatments with Drones

Samantha Loutzenhiser, KCI Technologies, Inc.

With recent changes to FAA regulations, drone spraying has become easier to license and more widely spread in agriculture. But challenges to adapting the technology to invasive species treatments still exist. Developing procedures to maximize efficiency and maintaining operational safety is a delicate balance. Drones offer us the opportunity to reach places otherwise inaccessible or cost prohibitive to treat. They allow us to remove staff from treatment areas or hazardous areas. However, drones are susceptible to poor planning, weather, and physical barriers. In addition to spraying, imagery drones can be used to record and observe sites. With advances in image detection, we can automate the process of identifying certain invasive species. Selecting the right drone and pilot for a project can drastically change the outcome of a project. No drone is right for every project. The size of the project, the complexity, and even the client funding mechanism can determine the necessary drone type. Pilot skill level and knowledge of invasive species can also improve project success. A skilled pilot can address issues on the fly such as addressing obstacles and adjusting flight plans to best fit the target species. Identifying issues prior to take off can prevent accidents and improve project efficiency. KCI's experience with launching in difficult and remote areas has given us unique insight into addressing these challenges.

Developing Methods for Landscape-level Exotics Treatment in Heavily Invaded Areas Using UAV's

Stephen C. Tillman and Terry L. Esker, Illinois Dept. of Natural Resources*

Acquiring and managing large sites as landscape-scale natural areas is an appealing goal for land management agencies and organizations, but many of these sites have experienced extensive disturbance and heavy infestation by exotic invasive plants. Strategies used to control invasive species at landscape scales are often very expensive and present difficulties to achieving effective control, requiring that land managers plan strategically to maximize both biological and cost effectiveness over large treatment areas. In 2024, we conducted aerial herbicide application on several sites in southern Illinois, working with unmanned aerial vehicle (UAV) operators experienced in large-scale row crop agricultural applications. Our goals were to evaluate the ability of UAV tools to conduct treatments across different target species and habitats and to assess the cost efficiency of these treatments. Our treatment targets included autumn olive (*Elaeagnus umbellata*) in upland grasslands, common reed/Phragmites (*Phragmites australis*) in wet grasslands, and bush honeysuckle (*Lonicera* spp.) in forests. While future evaluations of the biological effectiveness of treatments will be of primary interest, in 2024 we collected data to evaluate treatment coverage and efficiency. UAV operators were provided with coarse maps of desired treatment areas and were able to produce precise on-the-ground treatment of target species across structurally complex treatment areas. When conducting autumn olive control, operators were

able to treat roughly 40 acres per day. When applying a triclopyr ester product (Remedy Ultra) at a rate of 4 quarts per acre, our estimated treatment costs, including both chemical and labor costs, ranged from $133 to $218 per acre. While these estimates are highly responsive to the characteristics of specific treatment areas, labor cost rates, and chemical cost rates, our project provides a general assessment of potential treatment output and costs associated with UAV treatment of invasive species.

Evaluating the Effectiveness and Cost of Integrated Approaches to Manage Woody Invasive Plants

Mark Renz, University of Wisconsin-Madison

Contact Dr. Renz or visit renzweedscience.cals.wisc.edu for more information.

Collaborating for Success!

Conservation Stewardship: Building a Network of Dedicated Volunteers

Sam Settlemyre, Civic Garden Center; Greg Torres*, Drew Goebel*, Brendan Bogosian, Christyl Johnson, Crystal Courtney, and Garrett Dienno, Cincinnati Parks*

Dedicated volunteers can play a crucial role in any conservation effort. From invasive species removal to site monitoring and seed collection, knowledgeable volunteers can help build the capacity to sustain conservation projects over time. Over the past few years Cincinnati Parks has partnered with the Civic Garden Center to build the Cincinnati Conservation Stewards (CCS) Program. The CCS Program is focused on recruiting a dedicated group of volunteers to restore and manage Cincinnati's forest park land. In this session we will explain how this program came about, what it looks like today, and the obstacles and opportunities that have popped up along the way.

Community Conservation: Turning Intention into Action with the Meridian Conservation Corps

Emma Campbell, Meridian Township

Many in the field of conservation could argue that land managers have one of the hardest jobs around! They must consider several complex factors in an attempt to restore or perform baseline management on the land they are responsible for. Often charged with many acres of land, with little to no staff or budget, they are faced with overwhelming obstacles to reach their goals. In addition, if the land is public, managers must also perform outreach and mitigate negative interactions between the public and the land. With all this work to do, it is of utmost importance for staff to enlist the help of the surrounding community. That is the exact reason the Meridian Conservation Corps (MCC) came into existence; a group of volunteers knowledgeable enough to be the vehicle of widespread change and conservation in Meridian Township. But how does one start the task of educating and promoting this work on a level that will interest individuals from all backgrounds, ethnicities, and abilities? How can someone inspire others to come back again and again? This presentation will take you through the journey one stewardship coordinator has taken to bring conservation and stewardship to the forefront of their local community. Through the MCC, real change has been made possible by engaging the community and giving them the tools and knowledge to steward what they care about. This change goes far

beyond the borders of Meridian's natural areas and into the backyards of residents, who now care for native plants in gardens, and nurture wetlands once mowed. From individuals who are botanists, to those who only know the joy that the surrounding nature brings them, the MCC has brought all these wonderful humans together for one common goal: connect, learn and conserve!

On the Front Lines: Building an Effective CISMA Strike Team

Claire Lane, Hamilton County Invasives Partnership

This presentation provides an inside look at our CISMA's dedicated invasive species strike team, formed to tackle high-priority infestations across the landscape. We will share the process behind creating this rapid-response team, including our criteria for selecting work sites, strategies for planning effective workdays, and the tools and resources we deploy. Attendees will gain insights into the team's significant successes and learn about the challenges we face. Join us to learn how a targeted approach to invasive species management is making a measurable difference in our county.

Unlikely Allies: How Strategic Partnerships Advance Our CISMA's Invasive Species Goals

Claire Lane, Hamilton County Invasives Partnership

In this session, we explore how unexpected partnerships with local organizations—ranging from a brewery to a tourism agency and a realtor association—have amplified our Cooperative Invasive Species Management Area's (CISMA) reach and impact. By joining forces with these "unlikely allies," we've raised our profile in the community, expanded our support network, and gained new avenues for public education on invasive species. This presentation will discuss how these partnerships were formed, the resources and expertise each partner brings, and how leveraging diverse local connections strengthens our shared commitment to environmental restoration.

Tackling Invasive Species Across 55 Counties in Indiana

Dawn Slack, State of Indiana Cooperative Invasives Management

Effective land management requires collaboration that inspires accountability, responsibility, and action from landowners and professionals. It requires that we count on local solutions and resources while collaborating locally and regionally. It requires that we educate, engage, and empower the often-forgotten component of our ecosystems – our citizens, especially since research indicates about 83% of the woody invasives in our natural areas come from our landscaped areas. Indiana Invasives Initiative brings together the expert and the novice. To encourage these inorganic partnerships, we facilitate county level CISMAs and primarily use three tools; Weed Wrangles®, free landowner surveys, and outreach (inspiring events, training, conferences, etc.). We meet citizens where they are, share information and provide tools so they can be part of the solution for healthy lands, waters, and wildlife. During our presentation, we will share some of the tools and collaborations we use to inspire ownership and action that together are fostering conservation in Indiana. Over the past five years we have written management plans or helped with the management of over 44,000 acres and met with over 1300 landowners. We have conducted over 1,300 outreach events and an average of 165 Weed Wrangles a year.

POSTERS

Controlling Oriental Bittersweet: Herbicide Trials in Southwest Ohio Forests

Chad Gibson and Zach Marcum, Greenacres Foundation

Southwest Ohio forests are no stranger to invasion from non-native plant species. One species that has emerged as a challenge on Greenacres' properties is oriental bittersweet (*Celastrus orbiculatus*). Land managers report mixed results from trials with various herbicides; thus, in order to identify best management practices, two herbicide trials were implemented. Both trials used a randomized block design. Trial one included four treatments: hand pulling; 2% glyphosate (Roundup Custom); 1% triclopyr (Vastlan); and, 2% triclopyr (Vastlan). Trial two included three treatments: 3% triclopyr (Vastlan); 2% triclopyr (Vastlan) mixed with 2% glyphosate (Roundup Custom); and, 2% triclopyr (Vastlan) mixed with 4% glyphosate (Roundup Custom). Foliar applicators aimed to apply a uniform spray pattern across 80-100% of plant foliage but not to the point of run off. Due to this spot treatment application method a per acre application rate was not determined. Oriental bittersweet cover and tree seedling numbers were recorded. Trial one data showed that 2% triclopyr was the only chemical treatment that significantly reduced oriental bittersweet without requiring a second application. Total tree seedling numbers did not change over the course of the study. All treatments in trial two significantly reduced oriental bittersweet cover within a similar time frame. 3% triclopyr was the only treatment in trial two that showed a reduction in total seedlings. Based on the data collected, a 2% triclopyr mixed with 2% glyphosate application allows for control of oriental bittersweet without damaging tree seedlings.

Influence of White-tailed deer herbivory on the invasion of Callery Pear

Haley Weber and Dave Gorchov, Miami University

White-tailed deer (*Odocoileus virginianus*) are herbivores which have become overabundant in much of the United States. Deer herbivory limits the growth of palatable plants, some of which are invasive species. Deer also consume and disperse the seeds of some invasive plant species, which promotes range expansion. Callery pear (*Pyrus calleryana*) is an invasive tree species in much of the eastern United States, but the effect of deer on this species through seed dispersal and herbivory has not been investigated. This study seeks to understand how deer interact with Callery pear and what influence these interactions have on the invasion of this species. I hypothesize that deer disperse viable seeds of Callery pear and that deer herbivory on Callery pear reduces seedling recruitment. This study is being conducted in three mature southwest Ohio forests with adjacent fruiting Callery pear. I am estimating deer density using pellet-based distance sampling. To test whether deer disperse Callery pear seeds I am collecting fecal pellets from each site to stratify and germinate seeds. At two sites I tagged Callery pear seedlings 0.3-1.7m tall in June 2024. Randomly half of the individuals in the sample were caged to protect them from deer browse. Browse damage was tracked for unprotected seedlings. Survival, growth, and aboveground biomass in summer 2025 will be determined for each seedling. To explain the absence of Callery pear seedlings at the third site I am testing whether it has greater canopy cover or deer browse pressure than the other two sites. My findings will help us to understand the effects of deer herbivory and seed dispersal on Callery pear and inform future management decisions for both of these species.

Effects of White-tailed Deer and Woody Invasive Plants on Native Tree Seedlings

Abby Hay, Emma Jeffers, and Dave Gorchov, Miami University

Regeneration failure is a pressing issue endangering the health of forests throughout eastern North America. Invasive plants and white-tailed deer (*Odocoileus virginianus*) contribute to regeneration failure by impacting tree seedling growth and survival. This study investigated the individual and interactive effects of deer and woody invasive plants on seedlings in an early successional forest. In a stand of *Juniperus virginiana* near Oxford, OH, we initiated a factorial experiment with each combination of deer access/exclosure and invasive woody plants removed/not removed. In June 2022, we applied treatments by placing deer exclosures, 2.13m tall fences using four trees as corner posts, and by removing all woody invasive shrubs and vines. We planted native tree seedlings and monitored natural regeneration (tree seedlings 0.3 - 2 m) in each plot. Survival of planted black walnut (*Juglans nigra*) seedlings was generally higher in invasive removal plots with the greatest survival where both deer and invasives were removed. Survival of natural regeneration from 2022 to 2024 was lowest where deer had access and invasives were removed. Treatment effects on tree seedling (>0.3 m) recruitment differed between years. In 2023 recruitment was significantly greater where deer were excluded. However, in 2024, there was a significant effect of invasives, but not deer, on recruitment, with greater recruitment in invasive removal plots. These preliminary findings suggest that land managers with the primary goal of tree regeneration in comparable early-successional forests focus on removing invasive plants and alleviating deer pressure. However, these plots will continue to be monitored in the future to see if different effects arise over time.

Effectiveness of Foliar Herbicides on Privet and Burning Bush

Luke Weyer, AJ Norton, and Zach Marcum, Greenacres Foundation

Privet (*Ligustrum* spp.) and burning bush (*Euonymus alatus*) are invasive plants that have invaded Southwest Ohio forests. Land management staff noted inconsistent effectiveness of herbicides on these plants. These observations, in addition to conflicting and—in the case of burning bush—limited recommendations from land managers, led to the creation of trials to determine best management practices to effectively control these plants via foliar herbicide application. The trials tested four herbicide treatments (2% glyphosate (Roundup Custom), 2% triclopyr (Vastlan), 2% 2,4-D (Weedar 64), and 3% 1:1 glyphosate/triclopyr tank mix) alongside an unsprayed control group. Treatments were randomly assigned to individual plants, which were then foliar sprayed to >80% coverage but not to the point of run-off. Plants were assessed for health and/or mortality at two and four weeks after application, and additional follow-up data will be collected in May 2025. For both plants, the tank mix of glyphosate and triclopyr was the most effective, though glyphosate alone was also effective and may be more economical. In the burning bush trial, the other treatments besides the tank mix showed mixed efficacy and may require further testing.

Control Options for Japanese Knotweed Along Roadsides

Joe Omielan, University of Kentucky

Japanese knotweed (*Polygonum cuspidatum* Siebold & Zucc.) is a problem for land managers and along roadsides due to its aggressive nature and reproductive potential. This trial was established beside guardrail

along US 27 near Halls Gap, KY. The trial had 11 treatments with 3 replications of each arranged in a randomized complete block design. On July 15, 2022, three treatments (mid-season) were applied with a spray volume of 486 L ha-1 using a directed spray swath over the canopy beside the guardrail for a plot width of 2.1 m and length of 3.7 m (two areas between guardrail posts per plot). Canopy height was 3 m with the spray swath at 2.5 m. All herbicide treatments included LI 700 at 0.25% v/v. The seven late-season treatments were applied August 18, 2022. Rodeo @ 9.5 L ha-1 (glyphosate) and AC Polaris Complete @ 2.3 L ha-1 (imazapyr) were applied at both spray timings while Capstone @ 10.5 L ha-1 (aminopyralid + triclopyr) was only applied at mid-season. The remaining late-season treatments included Milestone (aminopyralid) at both the broadcast (0.5 L ha-1) and spot treatment (1 L ha-1) rates; TerraVue (aminopyralid + florpyrauxifen-benzyl) also at both the broadcast (200 g ha-1) and spot treatment (400 g ha-1) rates and Vastlan @ 3.5 L ha-1 (triclopyr) + TerraVue @ 200 g ha-1. Visual assessments of percent knotweed control in 2022 were done 34 (8/28/2022) and 77 (9/30/2022) days after the mid-season treatment (DAT1) and 43 DAT2 the late-season application for the trial. Data were analyzed using ARM software and treatment means were compared using Fisher's LSD at p = 0.05. At 34 DAT1 the greatest control was with Capstone (58%) while Rodeo and AC Polaris had 2 to 10 % control. At 77 DAT1 Capstone had similar control (57%) while Rodeo and AC Polaris had 12 to 15% control. Rodeo and AC Polaris at the late-season timing 43 DAT2 had 33 to 60% control ratings. The top group of treatments (67 to 90% control) included the spot treatment rate for Milestone, both rates of TerraVue, and Vastlan + TerraVue. In 2023, assessments were done 336 (6/20/2023) and 440 (9/28/2023) days after the mid-season treatment (DAT1) and 302 and 406 DAT2 the late-season treatment. At 336 and 440 DAT1 control with Capstone was only 12% while control with the Rodeo and AC Polaris treatments was 47 to 60%. The top group of treatments 302 and 406 DAT2 were Rodeo and AC Polaris (75 to 83% control). Early visual control of above ground vegetation may not result in as good control of rhizomes as treatments with less initial control.

Kudzu in Covington

Kyle Pickering and Chris Kaeff, Williams Creek Management

Kudzu (*Pueraria montana*) is known as the weed that ate the South. With climate change extending growing seasons and hardiness zones shifting, kudzu has reached the Midwest. Williams Creek Management is in year 3 of a 5-year management plan to eradicate kudzu along the Licking River, in Covington, Kentucky. The poster will highlight effective treatment and restoration strategies implemented to date and scope the remaining work. The poster will also include a map of other known kudzu infestations in the Greater Cincinnati area.

Answering a Burning Question: Are Invasive Populations of Winged Burning Bush (*Euonymus alatus*) Related to Ornamental Cultivars?

Theresa Culley, Megan Callahan, and Sandro Chikovani, University of Cincinnati

Winged burning bush (*Euonymus alatus*) is a popular ornamental shrub commonly planted in residential yards and commercial landscapes throughout the Midwest. Known for its bright red fall color, this Asian species is commonly sold today as the cultivar ‘Compactus’ or in the past, as ‘Rudy Haag’. New cultivars, such as ‘Fireball’, ‘Unforgettable Fire’ and most recently a putatively sterile cultivar, are becoming increasingly available. In recent years, escaped populations of this species have been observed in natural areas, and the species is now recognized as invasive in Ohio. Despite the spread of *E. alatus*, little is known about the genetic identity of escaped individuals. Are they the original imported species, an escaped cultivar, or a hybrid among cultivars or

with other native or non-native *Euonymus* species? The purpose of our study was to identify how *E. alatus* is spreading using microsatellite markers to examine multiple individuals obtained as cultivars of *E. alatus*, as well as shrubs planted in Ohio in residential areas and wild populations throughout the state. We found that some cultivars are genetically differentiated from one another, such as 'Compactus', 'Rudy Haag' and 'Fireball'. Some plants were also being sold mislabeled – mainly 'Compactus' at a big box store. All residential samples consisted of 'Compactus' (genetically identical to 'Little Moses'). DNA was most readily obtained from green leaves as opposed to leaves with red fall coloration. Some wild populations of *E. alatus* contained the 'Compactus' genotype, but others were comprised of F1 or advanced generation hybrids. Some genotypes could be attributed to one or more cultivars, but other genotypes were completely different. Information from this study will aid land managers and researchers in culling *E. alatus* from natural areas and also help inform state agencies as they consider *E. alatus* for commercial regulation.

Invasive Carp Harvest within the Ohio River Basin

Maris Weihe, Chris Bowers, Logan Clark, Chris Hickey, and Jeffrey Herod, Kentucky Department of Fish and Wildlife

Though numerous attempts were made to prevent the spread of invasive carps (Bighead, Black, Grass, and Silver carp) since their introduction to the US in the 1970's, populations in the lower Ohio River Basin (ORB) are established and especially abundant for Silver Carp (*Hypophthalmichthys molitrix*). With the threat to native fish populations and our natural resources, it is essential to decrease upstream immigration by applying pressure and reducing population densities downstream. Control and containment of these invasive fish are the primary management strategies in place to combat further spread. Kentucky, along with other ORB partners, combine tactics such as contracted commercial fishing and agency removal to suppress populations. Kentucky established their contract commercial harvest program in 2019 and have since removed millions of pounds of invasive carp from the river system. This poster presentation will describe those harvest efforts within Cannelton pool of the Ohio River and give an overview of population demographics for Silver Carp since the program's inception. Building bridges between state agencies, commercial fishers, and fish processors has proved crucial to ensuring the control of invasive carp.

Answering a mystery: Genetic analysis of seeds produced by wintercreeper (*Euonymus fortunei*), an invasive ornamental groundcover

Robert Elam, Caitlin Barilleaux, Becca Erikson, and Theresa Culley, University of Cincinnati

Originally brought to the US for horticultural purposes, the evergreen wintercreeper vine (*Euonymus fortunei*) is now considered largely invasive across the Midwest. Wild wintercreeper consists primarily of a single polyploid genotype, the ornamental 'Coloratus' cultivar, but it is still unknown how this species produces its abundant fruit during the fall. One possibility is that wintercreeper reproduces via apomixis (asexual reproduction) such that seeds are identical to the maternal parent. We examined the mating system of wintercreeper by collecting leaves from 15 wild plants from Cincinnati, Ohio and embryonic tissue from their multiple fruits. In this genetic survey, we analyzed microsatellites (repeating DNA segments) in the embryos to identify their male parent (the pollen donor), including possibilities such as other Euonymus species. During embryo extraction, we discovered

that polyembryony was relatively common in this species, with 2-4 embryos found within 45% of all seeds. We determined that many of the 490 tested embryos were outcross-pollinated (50.1%), followed by apomixis (34.4%) and self-fertilization (15.5%). The observed mix of sexually produced (outcrossed and selfed) and asexual (apomictic) offspring is relatively rare in plants but does occur in citrus and in other species in *Celastraceae*. The observation that all adult wintercreeper plants in natural areas consist of a single genotype is consistent with the production of apomictic offspring. However, the lack of sexually-produced wild plants, despite their appearance in the embryonic stage, is noteworthy and warrants further study. There could be selective pressures in the field that may negatively act against sexually-produced progeny and/or favor a specific apomictic genotype. Consequently, more research is needed into how different reproductive strategies may influence plant invasion in wintercreeper, in order to advise land managers on appropriate control methods for this species.

Origin of Invasive *Miscanthus sinensis* Populations in North America: Do Cultivars Play a Role?

Theresa Culley and Olivia Leek, University of Cincinnati

Within the past decade, ornamental grasses have gained popularity due to their screening ability, rapid growth, and attractive traits such as leaf coloration and variegation. One commonly planted grass is *Miscanthus sinensis* - known as eulalia grass, Chinese silver grass, or Japanese silver grass. This non-native species has been sold in the US as more than 96 cultivated varieties ("cultivars") over the last few decades. But as its popularity has increased, so too have wild populations in North America. The purpose of this study was to examine the possible role of commercial cultivars in the formation of invasive populations of *M. sinensis* in Ohio, Kentucky, North Carolina, Pennsylvania, and New Jersey. Using 15 microsatellite genetic markers, we tested whether invasive populations may result from cross-pollination among any of 36 locally available cultivars. If so, are there any cultivars more or less likely to contribute to these populations? We found that several different cultivars do contribute to invasive populations of *M. sinensis* in the Midwest, several of which have been advertised as having low seed set. Some populations also appear to consist of F1 hybrids or even an escaped cultivar. Consequently, spread of *M. sinensis* may be exacerbated by planting certain ornamental cultivars within the landscape, contributing to this species invasive behavior in the Midwest. This information can now be used by land managers, state regulators, gardeners, and the nursery industry to pivot to non-invasive alternatives to reduce impacts of this species in our natural areas.

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Carrie Brown is the Agriculture and Natural Resources Educator for Ohio State University Extension in Fairfield County. She brings specialized knowledge on topics including native plants, citizen science, small woodland management, and invasive species identification & control. Carrie is a member of the OSU Woodland Stewards and Buckeye Environmental Horticulture Team, and she is a contributing author to the Buckeye Yard and Garden Line (BYGL) blog. Other responsibilities include teaching both adults and youth, pollinator research, and collaborating on publications on an assortment of natural resource topics. Amy Stone has served as an ANR Educator for OSU Extension for over 30 years. She provides leadership in the areas of horticulture, natural resources, agriculture and sustainability in Lucas County. Amy is member of the OSU Woodland Stewards Team, The Toledo/Lucas County Sustainability Commission, and the Toledo Urban Forestry Commission. She provides co-leadership to the Buckeye Environmental Horticulture Team (BEHT). Additional team roles include contributing author to the Buckeye Yard and Garden Line (BYGL); plant and pest monitoring; teaching; writing a garden column; and collaborating on publication efforts. Amy's specialization is invasive species, which includes plants, insects and diseases and their identification, detection, scouting and management.

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Megan Callahan is a past graduate of the Culley Lab at the University of Cincinnati, where she worked on genetic studies involving invasive species, including Burning Bush (*Euonymus alatus*). She currently works as a laboratory researcher and is interested in pursuing a graduate program in the near future.

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Emma Campbell is the Land Stewardship Coordinator for Meridian Township, where she started her work in January of 2020. She earned her B.S. in Fisheries and Wildlife from Michigan State University, where she became interested in land management and invasive species. Her career through the years has revolved around environmental education, invasive species management, native habitat restoration and volunteer coordination, with a special passion for vernal pool conservation. She manages and coordinates stewardship for 1,700 acres of parks and land preserves as part of the Parks and Recreation Department in Meridian. Emma started the Meridian Conservation Corps (MCC) in 2020 and has implemented community stewardship of invasive species and native plant restoration through native seed collection, planting and seed sowing. Her mission is to connect

folks to natural areas through education of local species and conservation issues, giving them the tools to steward these important green spaces for generations to come.

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Sandri Chikovani (Alex) is an undergraduate researcher in the Culley Lab, where he has been developing expertise conducting genetic studies in wintercreeper seeds (*Euonymus fortunei*) along with work in the UC Margaret H. Fulford Herbarium (CINC).

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Dr. Ellen Crocker is an Assistant Professor of Forest Health Extension in the Department of Forestry and Natural Resources at the University of Kentucky. She has a BA in Biology and History from Williams College and a PhD in Plant Pathology from Cornell University. Her current focus is on education and outreach related to forest health issues such as invasive plants, insects, and pathogens. In addition, she conducts a range of applied research related to forest health and the management of invasive species.

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Theresa Culley is a Professor of Plant Biology at the University of Cincinnati. The Culley lab is interested in the evolution of plant breeding systems and the interplay between the reproductive biology of a species (its pollination biology, seed production, susceptibility to herbivory, etc.) and population genetics. Dr. Culley incorporates both ecological and genetic approaches in her research because they both yield valuable insights into evolutionary questions. She also heads the invasive plant assessment team for the state of Ohio through the Ohio Invasive Plants Council, serves on the ODA Invasive Plant advisory Board, and is a board member of the Midwest Invasive Plant Network.

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Dr. Robert Elam was a graduate student in the Culley Lab at the University of Cincinnati. Robert worked on the genetic analysis of seeds produced by wintercreeper (*Euonymus fortunei*) and the invasive species effect on arthropods as part of his PhD dissertation.

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Becca Erikson is an undergraduate, senior researcher in the Culley Lab at the University of Cincinnati who will be graduating this spring. Becca is working on a study of wintercreeper fruit parentage, which also involves apomictic polyembryony.

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Chris Evans is an Extension Forestry and Research Specialist with the University of Illinois. Chris has 20+ years of experience working with invasive species throughout the Eastern United States. Chris currently serves as Vice President of the Midwest Invasive Plant Network and Co-chair of the Illinois Invasive Species Council's Terrestrial Invasive Plant Subcommittee.

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Lenny Farlee has served as an extension forester with the Hardwood Tree Improvement and Regeneration Center since January, 2007. Lenny engages private landowners, land management and resource professionals, educators, and general audiences with field days, education programs, extension publications, videos, and presentations to provide relevant, science-based forest management and tree regeneration information for the Central Hardwood Region.

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Emily Finch serves as the Invasive Species Specialist for the Martin, Daviess, and Orange County Soil and Water Conservation Districts (SWCDs) in southern Indiana, a position funded by a Clean Water Indiana Grant. In addition to providing landowners with invasive species technical assistance, she also coordinates two local Cooperative Invasive Species Management Areas or CISMAs (the Daviess-Martin CISMA, and the Orange County Invasives Partnership), and sits on the board of the Midwest Invasive Plant Network. Emily holds a B.S. in Environmental Science from Northland College in Ashland, Wisconsin. She spent several years in Wisconsin and Michigan managing invasive species for the Wisconsin DNR and then the Wild Rivers Invasive Species Coalition. Since coming to Indiana, she has also worked for USDA Wildlife Services on their Feral Swine control project, as well as the nonprofit Southern Indiana Cooperatives Invasives Management (SICIM), before beginning her work with Indiana SWCDs in 2019.

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Chad Gibson is an avid outdoorsman and a researcher with an interest in removing invasive species and restoring native habitats. Chad earned his B.S. in Wildlife and Fisheries Resource Management from West Virginia University and his M.S. in Plant and Soil Science from Texas Tech University. Chad is currently the Senior Research Assistant at Greenacres Foundation conducting agricultural and ecological research. Chad’s passion for nature has led to his interest in habitat restoration and has been a driving force for invasive species removal trials implemented at Greenacres Foundation.

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Abby has over 5 years of experience in invasive plant research and management. This project was established as her Master's thesis, which she defended in Summer 2023. The project continues to be monitored by students in the lab of Dr. David Gorchov. Abby now works as a visiting instructor of biological sciences at Miami University regional campuses.

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Dr. David Hayes is a Professor of Biological Sciences at Eastern Kentucky University, specializing in the taxonomy, ecology, and evolution of freshwater invertebrates.

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Jeff's has 30 years of service working on invasive species issues with the U.S. Geological Survey, U.S. Fish and Wildlife Service (USFWS), U.S. Navy, Bureau of Land Management, and Kentucky Department of Fish and Wildlife, Fisheries Division. He designed and conducted field studies throughout the Southeastern U.S., California, Nevada, and Pacific Islands. The results are summarized in technical reports and peer-reviewed journal articles. As a National Consultation biologist USFWS, he reviewed field and laboratory data and provided Biological Assessments for Endangered Species Act section 7 consultations for permits to release biocontrol agents of weeds issued by USDA APHIS. He worked with teams to conducted invasive species risk-assessments, control projects, developed and implemented invasive species management plans, and produced biosecurity protocols for aquatic and terrestrial invasive species. Currently, Jeff is Kentucky's Program Coordinator for invasive carp work in the Ohio River Basin, and Kentucky's Aquatic Nuisance Species Coordinator. His focus is on implementing control projects for invasive carp and revising the State Aquatic Nuisance Species plan. He represents Kentucky on the Mississippi River Basin Panel (MRBP), the Mississippi Interstate Cooperative Resource Association (MICRA) Aquatic Invasive Species Committee, and serves as the Secretary/ Treasurer for The Wildlife Society's Invasive Species Work Group.

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Erica Kronenberger is the Research Coordinator for the Human Dimensions Lab at Purdue University. She earned her B.A. and M.S. in Geography and Environmental Sustainability from the University of Oklahoma. Erica supports research projects focused on a variety of natural resource topics, utilizing both quantitative and qualitative methods to examine human behavior and decision-making in the context of social-ecological change. Erica has led and contributed to research projects on climate change adaptation, natural disaster resilience, environmental justice, invasive plant management, and public perceptions of natural resource management.

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Claire Lane is the Urban Conservationist at the Hamilton County (IN) Soil and Water Conservation District. In 2019, she led the development of her county's CISMA, the Hamilton County Invasives Partnership (HIP), and serves as the HIP coordinator, overseeing HIP programming, partnership development, and strategic planning. Claire has a master's degree in environmental science, is a certified Green Infrastructure Practitioner, and serves on the board of the State of Indiana Cooperative Invasives Management (SICIM).

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Olivia Leek is a graduate student at the University of Cincinnati where she is conducting a historical study of invasive species in the Appalachian area. She is also the collections manager of the UC Margaret H. Fulford Herbarium (CINC).

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Samantha Loutzenhiser has more than 11 years of experience with invasive species management, ecological restoration, and GIS. She has been a drone pilot for seven years and is certified by the FAA as a Chief Supervisor in UAS agricultural systems operations. allowing her to operate a sprayer drone under a Part 137 exemption.

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Mike is a Territory Sales Manager with Alligare with experience in forestry, turf and ornamental, vegetation management, invasive species, utility, and aquatic management. He has worked with many county highway departments in Minnesota and Iowa providing recommendations for roadside invasive species management. He has also worked with ecological restoration companies in Minnesota and Wisconsin consulting on, and providing recommendations for, controlling invasive species in various habitats. Prior to joining Alligare, Mike worked in the industry for over 10 years leading crews in various invasive species and utility brush management projects. Mike joined the MIPN Board of Directors in 2023.

Marcum, Zach
Greenacres Foundation
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Zach Marcum is a land manager and outdoorsman. In 2016, Zach leveraged his passion for the outdoors into a career in natural resources. He became the Land Manager at Greenacres Foundation in 2023 after several years of working in county park districts focusing on invasive plant control and ecological restoration projects. Zach is motivated by the challenge to educate local landowners about their land and how to manage it to be more beneficial for wildlife and humans alike.

Meiners, Scott
Eastern Illinois University
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Scott Meiners is a Plant Ecologist whose research focuses on community dynamics, particularly in the context of succession and biological invasions. Cody Leverette is a graduate student in the Department of Biological Sciences whose thesis focused on the role of soil microbes in *Elaeagnus umbellata* invasion.

Omielan, Joe
University of Kentucky
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Joe has been with the University of Kentucky working on Roadside Vegetation and Invasive Species Management since 2010. His background includes agronomy, cropping systems, plant pathology, plant physiology, and weed science.

Pickering, Kyle
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Kyle Pickering is a Maintenance & Preservation Crew Foreman for Williams Creek Management. He has 7 years of professional experience in natural resource management and holds a Bachelor of Science in Agronomy from Western Kentucky University.

Poynter, Zach
Ramboll
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Zach Poynter is a consulting botanist and ecologist that has worked professionally in the Midwest for over 10 years. He has a background in ecological restoration, natural resource surveys, floristic studies, and environmental consulting. Mr. Poynter earned a Bachelor of Science in Environmental Science at Northern Kentucky University before earning a master's degree at the University of Kentucky studying forest ecology in

relation to prescribed fire and wildfire. He then moved to Indiana where he worked as a Restoration Supervisor and Field Botanist in the private sector before moving back to his home in northern Kentucky to work as a consultant. He first encountered the subject of his talk, the native common reed (Phragmites americanus) in 2019 in northwest Indiana which spurred his interest in this overlooked species. Since then, he has encountered the species only two other times during his work, which illustrates the rarity of the native common reed across the Midwest.

Rathfon, Ron
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Extension Forester for Purdue University since 1992, stationed at Southern Indiana Purdue Agricultural Center (SIPAC). Research interests include hardwood forest management, the regeneration of oak forests, and management and control of invasive vegetation in forest environments, including the use of prescribed grazing with goats and prescribed fire. Provides continuing education programming for forest landowners, professional foresters, and other natural resource professionals.

Renz, Mark
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Mark Renz (PhD) is a professor and extension weed specialist with the University of Wisconsin-Madison. Dr. Renz researches and extends information about the biology and management of invasive plants. Research goals in Dr. Renz's lab are centered on developing information that will improve management by improving the knowledge and understanding of invasive plant biology. Dr. Renz has over 20 years of experience with management of invasive plants throughout the United States in a wide range of habitats including riparian zones, roadsides, floodplains, prairies, wetlands, and forests. Education efforts focus on providing technical information and educational opportunities for agency staff, consultants, companies, and citizens concerned about invasive plants. Dr. Renz also is the president of the Midwest invasive Plant Network whose mission is to reduce the impact of invasive plants in the Midwestern United States.

Settlemyre, Sam
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Sam is the Conservation Program Manager at the Civic Garden Center of Greater Cincinnati.

Simberloff, Daniel
University of Tennessee-Knoxville
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Daniel Simberloff is the Nancy Gore Hunger Professor of Environmental Studies at the University of Tennessee. He received his A.B. (1964) and Ph.D. (1968) from Harvard University and was a faculty member at Florida State University from 1968 through 1997, when he joined the Department of Ecology and Evolutionary Biology at the University of Tennessee. His publications number ca. 500 and center on ecology, biogeography, evolution, and conservation biology; much of his research focuses on causes, consequences, and management of biological invasions. His research projects are on insects, plants, fungi, birds, and mammals. He was editor-in-chief or co-editor-in- chief of Biological Invasions (2009-2024), senior editor of the Encyclopedia of Biological Invasions (2012), author of Invasive Species: What Everyone Needs to Know (2013), co-editor of Integrating Biological Control into Conservation Practice (2016), and serves or has served on the editorial boards of several journals. In

2006 he was named Eminent Ecologist by the Ecological Society of America, in 2012 he won the Margalef Prize for research in ecology, and in 2015 he won the Wallace Prize of the International Biogeography Society for lifetime contributions. He is a member of the U.S. National Academy of Sciences and the American Academy of Arts and Sciences.

Slack, Dawn
State of Indiana Cooperative Invasives Management
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Dawn Slack is the Project Manager/Coordinator for the Indiana Invasives Initiative (III). She has been studying natural resources for over 30 years as a botanist and biologist. She has worked for our military and state governments, and for profit and not for profit entities. Her work and military lifestyle has led her coast to coast in the U.S. and to Europe where she has been privileged to study and manage our natural resources with many. She currently resides in Milton, Indiana where she works to share conservation practices and build collaboration for healthy lands, water and wildlife and people.

Smith, Heather
USDA Forest Service
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Heather Smith, Plant Biologist, USDA Forest Service Eastern Region, State, Private, and Tribal Forestry, works for the Morgantown Field Office in West Virginia. She serves as the Forest Health program Botanist leading invasive plant management efforts in Ohio, West Virginia, Pennsylvania, Maryland, New Jersey, Delaware, and the District of Columbia. Her invasive plant responsibilities include early detection/rapid response, completing biological assessments, and tracking infestations in the region. Heather authors USFS Pest Alerts, she manages Great Lakes Restoration, Landscape Scale Restoration, and state forest health grants for a diverse network of partners. She is a co-lead for the Ohio Interagency Forestry Network for Non-Native Invasive Plants. As a Botanist for the USDA Forest Service Northern Research Unit, Ecology and Management of Invasive Species and Forest Ecosystems, Heather co-authored “Invasive Plants Field and Reference Guide: An Ecological Perspective of Plant Invaders of Forests and Woodlands”.

Steadman, Nicholas
Williams Creek Management
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Nicholas Steadman is the Director of Operations for WCM. He has 20 years of professional experience in natural resources and holds a Bachelor of Science in Public Affairs from Indiana University.

Stone, Amy
Ohio State University Extension
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Amy Stone has served as an ANR Educator for OSU Extension for over 30 years. She provides leadership in the areas of horticulture, natural resources, agriculture and sustainability in Lucas County. Amy is member of the OSU Woodland Stewards Team, The Toledo/Lucas County Sustainability Commission, and the Toledo Urban Forestry Commission. She provides co-leadership to the Buckeye Environmental Horticulture Team (BEHT). Additional team roles include contributing author to the Buckeye Yard and Garden Line (BYGL); plant and pest monitoring; teaching; writing a garden column; and collaborating on publication efforts. Amy’s specialization is

invasive species, which includes plants, insects and diseases and their identification, detection, scouting and management.

Tillman, Stephen
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Stephen Tillman works as a District Biologist in southern Illinois for the Illinois Department of Natural Resources' Division of Natural Heritage. He is responsible for natural community management and biological inventories in high-quality state-owned natural areas. He also conducts grassland restoration at Pyramid State Recreation Area, Illinois' largest state-owned property and the site of large-scale conversion of former strip-mined land into habitat managed for grassland wildlife.

Torres, Greg
Cincinnati Parks
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Greg is the Conservation Technician at Cincinnati Parks.

Wallace, Rebekah
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University of Georgia
Rebekah Wallace is the EDDMapS Coordinator and Bugwood Images Coordinator at the Center for Invasive Species and Ecosystem Health (Bugwood). She primarily works with programs and agencies to format and incorporate their existing databases into EDDMapS, making that information available to the public. By aggregating data from multiple sources, we are able to display complete and accurate maps of invasive species spread across the United States.

Weber, Haley
Miami University
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Haley Weber is an ecologist, interested in the interactions between deer, invasive plant species, and native species of plants and wildlife. She earned her B.S. in Environmental Science from Drew University in New Jersey before moving to Southwest Ohio to work toward her M.S. in Botany at Miami University.

Weihe, Maris
Kentucky Department of Fish and Wildlife Resources
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Maris Weihe is a fisheries biologist with the Kentucky Department of Fish and Wildlife Resources. She has been with the department for over 4 years, working to remove and manage invasive carp within the Ohio River Basin. Maris serves as part of Kentucky’s Aquatic Nuisance Species (ANS) management team.

Weyer, Luke
Greenacres Foundation
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Luke Weyer is a researcher with a natural curiosity for how the world works which led him to the University of Cincinnati, where he earned a B.S. in Environmental Science. He now works as a Research Assistant at Greenacres Foundation performing ecological research that informs management at Greenacres as well as in the wider community. Luke enjoys being part of a team that generates meaningful knowledge and improves ecosystems in his local community.

Wilson, Caleb
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Caleb Wilson is an assistant professor at the University of Kentucky in the Department of Entomology. Caleb's lab group researches sustainable insect pest management strategies in urban landscapes through the conservation of natural enemies. Current projects entail developing novel scouting and management strategies for scale insects in urban trees and emerald ash borer in forests. At UK, Caleb also teaches undergraduate courses on Insect Biology and Horticultural Entomology.