2025 National Forum on Biological Control Conference (NFBCC) Summary

Graduate Hotel, Annapolis, Maryland

April 14-17, 2025

https://naisma.org/programs/national-forum-on-biological-control-conference/

Prepared by Robert Smith

CONFERENCE SUMMARY:

The NFBCC focused on both weed and arthropod biocontrol and brought all biocontrol practitioners, researchers, and policy makers together to address the shared challenges (i.e., communication, capacity, changing landscapes) and opportunities that exist in this area. The meeting themes were centered around biocontrol research, management, and impacts in natural areas. This Forum was developed by joint agencies/organizations working on biocontrol (USDA Forest Service, Animal and Plant Health Inspection Service, Agricultural Research Service, DOI Bureau of Land Management, and University of Florida) and is hosted by the USDA Forest Service in partnership with the North American Invasive Species Management Association (NAISMA), USDA Agricultural Research Service (ARS), and the National Association of State Foresters (NASF).

With over 100 in attendance and about 40 speakers, the conference covered a wide range of topics relevant to biocontrol practitioners around the world. SLELO PRISM contributed through networking with those in attendance, learning about programs and research from around the country and the world, and representing the PRISM network. This conference facilitated a large exchange of information and enhanced our efforts in using biological controls for invasive species management. The sharing of this information with other agencies in New York will result in more focused and meaningful use of biological controls throughout the state and create a more impactful, lasting conservation. The conference also strengthened our connections with numerous partners, agencies, and non-governmental organizations.

April 15, 2025, Keynote Speaker: Willie Cabrera Walsh

Guillermo 'Willie' Cabrera Walsh; Sc.D. in Biological Sciences, University of Buenos Aires. Applied entomology and pest control through their natural enemies, has been working on biological control since the 80s. His research projects have ranged from study and

breeding of biological control agents for dung flies and problems related to the accumulation of cattle manure in pastures, agricultural pests, such as corn rootworms, fall armyworm, and sugarcane borer, and 15 aquatic and rangeland weeds, as well as studies on plant kairomones and synthetic pheromones with potential in integrated control and monitoring of crop pests. He is a member of several advisory committees of the Ministry of Agriculture, vice president of the Entomological Society of Argentina, and advisor for the IOBC. He currently directs the Foundation for the Study of Invasive Species (FuEDEI), which is the South American USDA-ARS Overseas Biological Control Laboratory (OBCL).

Presentation Title: Changing the Culture: How Weed Biocontrol Went from Suspect to Cool in Argentina

Classical weed biocontrol (CWB) depends on international collaboration between the countries that have the invasive (receptor countries), and the ones where the invasive is native (donor countries), in order to obtain the specialized, coevolved biocontrol agents needed to control it. The U.S. has research facilities in other countries precisely for this purpose known as the OBCLs (Overseas Biological Control Laboratories). The FuEDEI has worked on 40 target weeds since its inception in 1962, resulting in 20 biocontrol agents released. But the services provided by the OBCLs are not limited to shipping organisms to the U.S. These include specificity/safety testing, phylogenetics and molecular taxonomy, biogeography (origin and geographical range), analyses of potential impact (is the agent actually going to do anything?), field host range, and agent compatibility. In addition, OBCLs can procure savings in quarantine or post-liberation experiments, perform field studies to minimize the rejection of suitable candidates, transport 'unlimited' samples to the lab., and set-up experimental plots in the field. In addition, the CBD has complicated access to natural resources. We describe our four-pronged strategy to work within these new conditions: Promotion-Initiative-Bargaining-Education (PIBE). Finally, we present a list of South American aquatic and terrestrial invasive plants that may warrant discussion as biocontrol targets.

Session: Prioritization & Genetic Approaches in Biological Control

Speakers:

Rachel Winston has been involved with weed biological control since obtaining her M.S. in Environmental Science in 2007. In collaboration with public and private organizations in various countries, she produces public outreach/education material for weed identification and biological control, helps petition for new biocontrol agents, and assists developed and developing nations in customizing potential weed biocontrol programs. Since 2010 she has been the curator of the world database Biological Control of Weeds: A World Catalogue of

Agents and Their Target Weeds. https://link.springer.com/content/pdf/10.1007/s10526-024-10243-8.pdf

Presentation Title: Prioritizing Weeds for Biocontrol Using a Targeted Selection System

Key Takeaways: Biocontrol programs require careful prioritization of target weeds to ensure the most appropriate targets are selected to obtain the greatest beneficial outcomes with available resources. The Biological Control Target Selection (BCTS) system was developed by researchers in South Africa as an objective, transparent approach to prioritizing new weed biocontrol targets. The BCTS system was recently modified and applied to 295 state regulated weeds in the western USA for which no biocontrol agents have yet been released. Fifteen of the 20 top-ranked species are already targets of ongoing biocontrol programs in the USA. Results from this framework provide valuable insights to the prioritization of current and future biocontrol research programs in the western USA.

Kumaran Nagalingam is an ecologist dedicated to advancing the understanding of plant-insect interactions for more effective pest and weed management strategies. With a keen focus on ecological and genomic methodologies, Dr. Kumaran investigates intricate insect pest and weed dynamics, aiming to develop innovative management solutions. Managing a dynamic team, Dr. Kumaran leads the development of biocontrol and genetic control techniques to tackle invasive insect pests and weeds. Through leading-edge research projects, Dr. Kumaran translates novel technologies into practical tools for on-the-ground deployment, facilitating their adoption and implementation by end-users.

Presentation Title: Genetic Approaches to Managing Invasive Plants: Prospects, Challenges, and the Need for International Collaboration

Key Takeaways: Gene silencing offers promising avenues for developing innovative genetics-based biocontrol tools for the sustainable management of invasive plants. Notably, RNA interference (RNAi) can effectively silence genes that are critical for essential functions (e.g., growth, reproduction) and herbicide resistance. In October 2024, scientists from Australia and the USA convened in Brisbane, Australia for a two-day workshop to explore these challenges. The participants acknowledged the rapid advancement of gene silencing technologies, noting the availability of RNAi-based pesticides in the market. However, they also recognized that the effectiveness of RNAi varies among different target species, influenced by factors such as the stability and cellular delivery of gene silencing molecules and the target organisms' responses to RNAi-based treatments. To overcome stability issues, participants discussed recent advancements, including the use of 'nano clay' for molecule protection and the development of structurally stable double-stranded RNA molecules. Addressing delivery

challenges was a central focus of the discussions and the potential to integrate RNAi based methods with traditional control measures (e.g., classic insect biocontrol) was explored, including the use of insect biocontrol agents as delivery vectors for RNAi molecules.

Dan Bean received a PhD in entomology from the University of Wisconsin, Madison, studying the physiology of an invasive pest, the European corn borer. My early work in insect physiology taught me the need to consider biological relationships in all elements of pest control. I began my career in biocontrol at the USDA-ARS facility in Albany, CA, where I investigated the physiological ecology of the tamarisk beetle and use of that knowledge for suppression of tamarisk. Since 2005 I have been director of Colorado's biological control program, which is part of the Colorado Department of Agriculture, and is headquartered at the Palisade Insectary. I have maintained my interest in using knowledge of insect physiology, behavior and ecology to improve our ability to utilize biological controls. I am also interested in developing better protocols for incorporating biological control into IPM-based weed and pest management strategies.

Presentation Title: Promoting Undergraduate Research in Biocontrol Through Genomics
Key Takeaways: Using recently developed technology it is now possible to investigate the genomic structure and molecular genetics of non-model organisms, including biocontrol agents. Through a partnership with the USDA ARS we have sequenced and assembled genomes of four species of *Diorhabda* that feed exclusively on exotic invasive shrubs in the genus *Tamarix*. Research questions involving taxonomic relationships, physiological ecology, and evolution within newly introduced biocontrol agents can be investigated through gene annotation, the process of defining genes within genomic sequence. Since gene annotation is done manually it offers excellent research opportunities for undergraduates interested in molecular genetics and bioinformatics.

Matthew A. Tancos is a Lead Scientist and Research Plant Pathologist with the United States Department of Agriculture – Agricultural Research Service (USDA-ARS) located at the Foreign Disease-Weed Science Research Unit (FDWSRU) at Fort Detrick in Frederick, Maryland. He is originally from Indiana and received his B.S. in Biology, specializing in genetics and ecology, from Ball State University. He received his Ph.D. in Plant Pathology & Plant Microbe Biology from Cornell University in 2016. Matthew's research program is (i) investigating the use of microbes as biological control agents to manage invasive weeds in the United States, (ii) defining the biosecurity risks of pathogen evolution and strain emergence within invasive weed populations, and (iii) investigating novel molecular-based invasive weed management strategies. His research leverages advances in plant genomics and molecular biology to develop enhanced biocontrol solutions to prevent and manage agronomically damaging invasive weeds.

Presentation Title: Emerging Genomic Technologies for Biological Control of Invasive Weeds

Key Takeaways: Numerous challenges associated with biocontrol agent discovery, testing, and certification, result in prolonged, multiyear developmental timelines that lead to expanded invasions and compounded damage due to delayed treatments. As new agroecological pests emerge and biological invasions expand, it becomes critical to develop novel genomic technologies that leverage molecular advancements needed to rapidly respond to emerging threats. New agricultural biosecurity threats can be targeted pre-emptively with species-specific genetic biocontrol tools. Incorporating flexible, pre-designed genetic biocontrol tools can result in earlier deployment, thereby targeting earlier stages of the invasion curve and minimizing damages. As with any new technology, demonstrating safety and efficacy will be critical to stakeholder acceptance.

Dean Brookes' research background is in ecological genetics and insect-plant interactions in agriculture and biological control. For two years Dean has been working for the Australia Biological Control Laboratory (ABCL), a USDA-ARS overseas laboratory that is partnered with the Australian federal Commonwealth Scientific and Industrial Research Organization (CSIRO). Dean is currently team leader within ABCL, overseeing the team's research projects, conducting surveys for potential agents throughout Asia and Australia, and building molecular capacity within the team. Dean's current research focus is the broader integration of molecular techniques into biological control to fast-track agent discovery and evaluation, and to better understand the host associations of potential biological control agents across the native and introduced distributions of invasive weeds. https://www.ars.usda.gov/research/publications/publication/?seqNo115=423193

Presentation Title: Prioritizing Regions for Native Range Surveys: Imperata cylindrica (Cogongrass)

Key Takeaways: Prioritizing regions for native range surveys is challenging for weeds that are genetically and phenotypically diverse. Imperata cylindrica (cogongrass) exemplifies this challenge. This invasive grass is globally distributed, has several distinct evolutionary lineages, and there have been multiple introductions into the United States. Several promising agents have been discovered across the native range of cogongrass. Work is being done to experimentally test how different cogongrass lineages affect the suitability of our biocontrol agents, and choose those that will be suited for, and impactful against, the US lineages of this weed.

Lauréline Humair started working at CABI as a summer student in 2020 and is now a Junior Scientist working on the biological control of invasive weeds. She is currently working on the development of weed biological control for several projects which includes field surveys for potential biological control agents and quarantine work testing the environmental safety of the potential biological agents. In 2023, she started a PhD that will investigate prioritizing agents to invest limited resources by understanding their thermal physiology as well as preliminary host range. Lauréline is also involved in citizen science, giving courses on insects and biological control to school classes of ages 5 to 16 years.

Presentation Title: Can We Better Prioritize Potential Biological Control Agents in a Changing Climate?

Key Takeaways: In recent years tropical and sub-tropical plants are invading temperate regions thought to be driven by climate change. One such species is parrots feather, *Myriophyllum aquaticum*, originally from the Amazon and Parana basins, it has now spread worldwide and is considered invasive in several temperate regions including western North America and Europe. Biological control in these environments poses constraints, not only on host specificity but also potential climatic limitations linked to increased extreme weather events and cooler climates than the native range. There are three potential biological control agents worth further investigation for parrot's feather: leaf-feeding flea beetle (*Lysathia* sp.) and the stem-mining weevil *(Listronotus marginicollis*), both native to South America and North American native weevil (*Phytobius vestitus*). By rapidly assessing both the host range and thermal physiology, a biological control program can prioritize which species to invest limited resources and ensure a likely successful outcome. management.

Session: Evaluating and Modeling Impacts of Biological Control

Speakers:

Greg Wheeler is a Research entomologist who has been working for over 30 years on biological control of invasive weeds of Florida natural areas. Weed targets have been primarily, Old-world climbing fern, cogongrass, Brazilian peppertree and Chinese tallow tree for which safe agents have been developed.
https://www.ars.usda.gov/research/publications/publication/?seqNo115=423189

Presentation Title: Ecological Niche Modeling and Threats to a Temperate Non-target Species from Tropical Biological Control Agents of *Lygodium microphyllum*

Key Takeaways: Old World climbing fern, *Lygodium microphyllum* is one of the worst environmental weeds of Florida. *Callopistria exotica* (Lepidoptera: *Noctuidae*) and *Lygomusotima stria* (Lepidoptera: *Crambidae*) are being examined as potential biological control of this invasive species. Both agents were found in tropical regions of Southeast Asia feeding on the target weed. They also both completed development on a temperate native species, *L. palmatum*. Studies indicated that populations of neither potential agent would survive in the temperate areas where the non-target *L. palmatum* grew naturally.

Colin R. Morrison is a Postdoctoral Research Associate in the Department of Integrative Biology at the University of Texas at Austin, working under the mentorship of Dr. Rob Plowes and Dr. Larry Gilbert. As part of the Invasive Species Research group at UT Austin's Brackenridge Field Laboratory, Colin investigates the ecology and biological control of invasive species. Colin specializes in chemical ecology and species interactions. His work focuses on understanding how host plant metabolomics (complete chemical profile of an organism), host plant phylogenetics, and host specificity influence community structure and stability. This research is particularly relevant to ecosystems dominated by invasive weeds or those with foundational plant species attacked by invasive insects. Current research includes efforts to control invasive perennial grass weeds, such as Guinea grass (Poaceae: *Megathyrsus maximus*) and buffelgrass (Poaceae: *Cenchrus ciliaris*), and mitigating the spread of the invasive cactus moth (Lepidoptera: *Pyralidae*: *Cactoblastis cactorum*).

Presentation Title: Evolutionary and Ecological Drivers of Grass-Insect Herbivore Specialization Patterns: Understanding Assumptions Critical to Successful Biological Control of Invasive Weeds

Key Takeaways: This study investigates the evolutionary ecology of insects associated with native grassland grasses in Texas, Kenya, and South Africa to identify mechanisms shaping grassland communities so that we can deliver biological control solutions for invasive weeds dominating these ecosystems. Phylogenetic similarities (ITS locus) and metabolomic profiles (all measurable chemicals compounds) were measured to correlate host grass traits with herbivore assemblage similarities in each biogeographic region. Results showed strong evidence for host specificity in all regions, particularly among internal feeding herbivores like gall midges (Diptera: *Cecidomyiidae*), highlighting their potential as biocontrol agents for invasive grasses.

Patrick J. Moran is a Research Entomologist with 23 years of experience at the USDA-ARS studying classical biological control of invasive, non-native weeds, with a special focus on weeds that threaten scarce water resources in the southwestern U.S. in rangeland, forest, riparian and aquatic systems. He focuses on characterization of the biology, host range and

efficacy of candidate biocontrol agents in quarantine lab and overseas studies, release and evaluation of establishment of permitted agents and efficacy assessments, and IWM approaches involving biocontrol.

Presentation Title: Measurement of Biological Control Impact Targeting Attributes of Population Expansion of Two Clonal Weeds

Key Takeaways: Assessments of impact of biological weed control must consider impacts on weed population survival and spread. Programs targeting weeds that reproduce mainly or entirely through vegetative means must exploit and measure key determinants of weed population growth without reference to flowering, fruiting and seed dispersal.

Cody-Ellen Murray is a PhD Candidate at the University of Queensland, Australia and Research Technician for the Weed Management Systems group at the CSIRO. Cody conducts research in weed biological control, integrated pest management and sustainable agriculture. Her research interests and experience include the application of chemical, behavioral and molecular tools to biological and ecological research questions for applied outcomes. She has multidisciplinary experience in behavioral entomology, the chemical ecology of insects (sex pheromones) and their hosts (foliar volatile organic compound emissions), the biological control of weeds, conventional and molecular diagnostics, species delimitation, the development of novel herbicides and insecticides, and the development of accessible programs for implementing safe and practical integrated pest management strategies in rural and developing communities.

Presentation Title: Threats to Biocontrol—Anticipating Cryptic Species: the Example of Pug Moths *Eueupithecia cisplatensis* and *E. vollonoides*, biocontrol agents of the weed Jerusalem Thorn (*Parkinsonia aculeata*) in Australia

Key Takeaways: In weed biocontrol, cryptic species in both the target weed and putative agent pose significant threat to each phase of the biocontrol pipeline. Inaccurate taxonomy may impact our understanding of weed origin and distribution, provenance testing of invasive populations and subsequent native range surveys for agents. This extends to identifying host-specific agents, host-testing and mass-rearing. An integrative approach (Behavioural, chemical, morphological and molecular) can accurately clarify species boundaries and infer the outcomes for biocontrol.

Jackson R. Strand is a Ph.D. candidate at Montana State University. He earned his B.S. in Biology from the University of Minnesota in 2017 and his M.S. in Entomology from Montana State University in 2024. His master's research centered on the role of smooth brome in supporting two congeneric parasitoids that target the wheat stem sawfly in dryland agricultural systems in Montana. Currently, he is investigating the biological control of

yellow and Dalmatian toadflax in Montana and South Dakota. Broadly, his interests include beneficial insect ecology and chemical ecology. https://www.jackson-strand.com/qmd/talks.html

Presentation Title: Understanding Host Preference in *Mecinus janthinus* and *M. janthiniformis*: Implications of Hybridization for Effective Biological Control

Key Takeaways: The efficacy of the stem mining weevils *Mecinus janthinus* and *M. janthiniformis* as biological control agents were examined, respectively, for invasive yellow toadflax (*Linaria vulgaris*) and Dalmatian toadflax (*L. dalmatica*). By clarifying how hybridization influences host selection in these weevils, our findings underscore the complexities in predicting *Mecinus* biocontrol success in hybrid toadflax populations and provide valuable insights for other weed biocontrol programs.

Flaminia Mariani is a postdoctoral researcher at Louisiana State University, where she focuses on the biological control of invasive aquatic plants, including water primrose, water hyacinth, and alligator weed. Her research investigates the effectiveness of natural enemy transfers across diverse U.S. regions and develops mass-rearing techniques for targeted release programs. Flaminia earned her Ph.D. in Environmental Biology from Roma Tre University in Rome, Italy (2021), with a focus on biological control methods for invasive duckweed species in Europe.

Presentation Title: Abiotic and Biotic Factors Influencing *Niphograpta albiguttalis* establishment in Southern United States: Implications for Water Hyacinth Biocontrol

Key Takeaways: Water hyacinth (*Pontederia crassipes*) is a highly invasive species in the United States, prompting biocontrol measures since the 1960s. Among the introduced agents, water hyacinth moth (*Niphograpta albiguttalis*) has been established in the southern U.S. for several decades but failed to persist in California. This study aims to identify abiotic and biotic factors limiting *N. albiguttalis* distribution to improve water hyacinth control in target regions. Specific objectives included: (i) identify thermal and water quality conditions that affect the survival of *N. albiguttalis*, (ii) assess whether petiole morphology (bulbous vs. elongated petioles) or toughness influences insect establishment, (iii) quantify *N. albiguttalis* density and its relation to interspecific interactions with other biocontrol agents, and (iv) evaluate nutrient availability in plants and water that may impact insect abundance. Results will guide targeted release protocols, focusing on favorable conditions, particularly in California's San Joaquin Delta, to maximize biocontrol success.

April 16, 2025, Keynote Speaker: Stephen Enloe

Dr. Enloe is a professor and extension specialist at the IFAS Center for Aquatic and Invasive Plants at the University of Florida. He has been involved with invasive plant research and extension for the past two decades and has worked throughout the western and southeastern United States on developing innovative management strategies for many of the worst invasive tree, shrub, vine, and herbaceous species in the US. Dr. Enloe earned his Ph.D at UC Davis in Plant Biology, a Master's degree in weed science from Colorado State University and an undergraduate degree in Agronomy from N.C. State.

Presentation Title: Plus Sperare Quam sit Possible: Is our Expectation of IPM for Invasive Plants Even Realistic?

The persistence of invasive plant species poses an existential threat to global ecosystems, necessitating the deployment of integrated pest management (IPM) strategies for effective mitigation. While IPM has become an essential paradigm for invasive species management, the integration of its constituent tools often proves intractable, necessitating expedient workarounds that compromise fluidity and efficacy. Biological control, in particular, stands at the confluence of this conundrum, as other IPM tools frequently exhibit potential to negatively impact biocontrol populations, thereby hindering the realization of optimal management outcomes. The paucity of compelling research aimed at refining integration in various systems is partly attributed to the persistence of disciplinary dichotomies, arising from fundamentally divergent philosophical expectations regarding management success within the fields of entomology and weed science. While weed scientists often harbor reservations regarding the efficacy of biocontrol due to its mixed record of performance relative to herbicides, entomologists tend to adopt a more nuanced perspective, emphasizing the strategic value of long-term control outcomes. Can these disparate viewpoints be reconciled? This keynote presentation will engage with the contentious issues surrounding this disciplinary conflict, facilitating a synthesis of insights and fostering a consensus among researchers and land managers to enhance the effectiveness of IPM for invasive plants.

Session: Competing Priorities & Holistic Approaches in Management

Speakers:

Alexander M. Gaffke is a research entomologist at the Center of Medical, Agricultural, and Veterinary Entomology for the United State Department of Agriculture. His research focuses on the integration of chemical ecology, biological control, and integrated pest management. He has worked with multiple invasive weeds across the country and his research has resulted in the development of novel strategies to improve and enhance

biological control programs.
https://www.sciencedirect.com/science/article/pii/S1049964425000301

Presentation Title: Tallow Tree Biological Control and Beekeeping: Assessing the Misconceptions and Possible Resolutions to Protect Native Ecosystems

Key Takeaways: Chinese tallow (*Triadica sebifera*) is a tree native to southeast Asian that was introduced to North America in the late 1800's. Since its introduction, it has escaped cultivation and has spread throughout the southeastern United States, degrading natural habitats. Petitions for release have been approved for two, host specific, biological control agents. During the petition process, beekeepers expressed broad resistance towards the biological control program, resulting in significant delays to the permitting. Multiple research studies were therefore conducted to determine the importance of tallow for honey production. The results of these studies are mixed, supporting and contradicting the importance of Chinese tallow to beekeepers.

Mikenna Smith has a Master of Science in Entomology from the University of Florida, a Master of Science in Agricultural Sciences from Hohenheim University in Germany, and a Bachelor of Science in Environmental Science and Biology from Westminster University in Utah. At Teton County Weed & Pest District, Mikenna is responsible for laboratory oversight, vector surveillance, biological control, and insecticide resistance and efficacy monitoring. Mikenna has taken her enthusiasm for applied science and entomology to strengthen the District's scientific and research capabilities in both its laboratory and field programs. In her first few years with the District, Mikenna began turning the "laboratory," which was a big storage room with a microscope in it, into a fully equipped BSL2 with BSL3 practices laboratory. Mikenna is continuously bolstering mosquito management and research capacities not only in Teton County, but throughout the state of Wyoming through targeted partnerships and collaborations.

Presentation Title: Concerns of Impacts to Weed Biocontrol from Mosquito Abatement

Key Takeaways: The application of insecticides for the protection of human health against mosquito-borne diseases is one pillar of the integrated mosquito management approach. But how does the chemical treatment of mosquito's impact non-target insects such as biological control agents that are vital to the integrated pest management approach against invasive species? More commonly than not, there is little crossover between agencies conducting mosquito abatement and the biological control of invasive species.

Melissa C. Smith is a research ecologist with the USDA's Invasive Plant Research Laboratory in Fort Lauderdale, Florida. Melissa joined USDA in 2012 and focuses on broad ecological interactions of largescale plant invasions with the native community and

introduced biological control herbivores. Some of the species to which Melissa contributes include *Melaleuca quinquenervia*, *Acacia auriculiformis*, *Lygodium microphyllum* and *Pontederia crassipes*. At the Invasive Plant Research Laboratory, Dr. Smith has delved into many collaborative projects to investigate larger ecological questions (e.g., competition, predation, parasitism, succession) within a biological control context. https://www.sciencedirect.com/science/article/pii/S1049964425000350

Presentation Title: Biological Control as an Early Conservation Effort: Pre-emptive and Early Application in Biological Control of Invasive Plants

Key Takeaways: Invasive alien plants (IAPs) pose serious threats to biodiversity, exacerbated by climate change and habitat loss. Effective management typically involves cultural, chemical, and biological control methods. While cultural and chemical strategies have established protocols for addressing new invasions quickly, biological control is often only considered after significant negative impacts occur. Mounting evidence supports strong early investments in proactive prevention and early biological control as more cost-effective than reactive measures. We propose a framework for earlier biological control investigation and implementation. This framework involves risk assessments and horizon scanning to prioritize and identify targets, literature searches and cursory field searches to find potential control agents, and resource sharing among regions with similar challenges.

Rodrigo Diaz is an Associate Professor in the Department of Entomology at Louisiana State University working on biological control and invasive species ecology. Since 2014, Rodrigo has conducted research on the biological control of giant salvinia, and leads the mass rearing program of the salvinia weevil in Louisiana. Rodrigo has several scientific publications on the impacts of giant salvinia on aquatic ecosystems in Louisiana, ecology of the salvinia weevil, and quantification of biological control of giant salvinia at the landscape level.

Presentation Title: Leveraging Augmentation Biological Control for Aquatic Weed Management

Key Takeaways: Prioritizing regions for native range surveys is challenging for weeds that are genetically and phenotypically diverse. *Imperata cylindrica* (cogongrass) exemplifies this challenge. This invasive grass is globally distributed, has several distinct evolutionary lineages, and there have been multiple introductions into the United States. Several promising agents have been discovered across the native range of cogongrass, and although this is great, choosing which agents to prioritize presents further challenges. The next step is to experimentally test how different cogongrass lineages affect the suitability of

our biocontrol agents, and choose those that will be suited for, and impactful against, the US lineages of this weed.

Chandra Moffat is a Research Scientist in Entomology and Biological Control with Agriculture and Agri-Food Canada, located in British Columbia. Her team conducts research to develop, evaluate, and improve classical/importation biological control programs for (i) invasive arthropod pests of cultivated horticultural crops and traditional Indigenous food plants, and (ii) invasive hardwood trees and herbaceous plants that impact horticulture, rangeland, Indigenous food systems, and natural areas. Her team uses integrative methods in field ecology, natural history, plant and insect taxonomy, and molecular ecology (both DNA barcoding and population genomics) to develop new knowledge of invasive species impacting diverse agroecosystems, and new potential biological control solutions for invasive species management. Current study systems include (i) insects - spotted lanternfly and spotted wing drosophila, (ii) weeds - Tree of Heaven, St Johns Wort, Russian Olive, knapweed species. Key collaborators include CABI Europe-Switzerland, BBCA Italy, and the British Columbia Ministry of Forests.

Presentation Title: Potential for Indirect Biocontrol for the Invasive Insect, Spotted Lanternfly, via Direct Biocontrol its Host Weed, Tree of Heaven

Key Takeaways: Biological control programs generally target one or more closely related organisms to directly reduce invasive species abundance. However, opportunities may exist for indirect biocontrol, i.e., reducing the abundance of an organism on which a target invasive species relies. Spotted lanternfly (*Lycorma delicatula*, SLF) is an invasive insect species that, since establishment in the USA in 2014, has had heavy impacts in horticulture and threatens forestry, ornamental, and natural resource sectors. An opportunity may exist to use indirect biocontrol to exploit spotted lanternfly's strong association with select hardwood trees of Asian origin, primarily the invasive weed Tree of Heaven (*Ailanthus altissima*, ToH—note, SLF can develop without access to ToH). To date, two ToH candidate agents are being considered for release in Canada. If approved and successful in reducing the spread density of ToH, this weed biocontrol program has the potential to serve as an indirect biocontrol for SLF by reducing its potential for establishment and spread, particularly in Canada.

René F.H. Sforza is a research entomologist and weeds research leader for USDA-ARS, at the European Biological Control Laboratory (EBCL) located in Montpellier, France. His current research focuses on classical biological control of invasive weeds and insect pests with a special emphasis on foreign exploration in Eurasia, Africa and Asia. He aims at

collecting insects and mites for potentially negatively impacting and controlling U.S. noxious alien invasive species, both present in environmental and agricultural settings. His main research topics are insect biology and ecology, plant-insect relationships, and phylogeography of invasive target species. He is also interested in developing synergistic controls, combining classical biocontrol with either mechanical approach or Sterile Insect Technique. His current targets are tree-of-heaven, stinkwort, medusahead, swallowworts for weeds, and bagrada bug for insect pests. For his surveys, he visited 50+ countries.

Presentation Title: Synergism Between Biological and Mechanical Control for the Management of Tree-of-Heaven

Key Takeaways: Tree-of-heaven (Ailanthus altissima, Simaroubaceae) (ToH), a fast-growing deciduous tree native to China, is considered a serious invasive species worldwide, including the Americas and Europe. One biocontrol candidate is a phytophagous eriophyid mite (*Aculus taihangensis*, *Eriophyidae*) recorded in 13+ European countries and in the USA. Recent studies have shown its high host specificity and significant impact on ToH by reducing the fitness and the biomass of new sprouts and seedlings. The role of released mites alone has shown a high impact on seedlings by reducing growth and inducing a premature leaf fall in June of the same year. These preliminary results are very promising and need to be standardized into a cost-free and less labor-intensive method for releasing mites outdoors.

Harrison Miles is a PhD student in the Department of Forest Resources and Environmental Conservation at Virginia Tech. His dissertation research focuses on the use of the native fungus *Verticillium nonalfalfae* as a biological control for the invasive Ailanthus altissima (Tree-of-Heaven). Additional questions include the role of *V. nonalfalfae* in the endosphere of Ailanthus and other plant species; whether *V. nonalfalfae* changes the feeding behavior of *Lycorma delicatula* (spotted lanternfly); and whether *L. delicatula* can vector V. nonalfalfae in the field. Harrison previously studied psychology, elementary education, and conservation biology at the University of Mary Washington in Fredericksburg, VA. His biology research there focused on entomopathogen production by the fungus *Beauveria bassiana*. Harrison's broader scientific interests include invasion biology, microbial ecology, and the interaction of science and culture. When not doing science, Harrison enjoys spending time with his wife and daughter, playing video games, and attempting home improvement projects.

Presentation Title: Understanding the Eradication and Restoration Potential of Sites Following the Removal of *Ailanthus altissima* Using Biocontrol

Key Takeaways: *Ailanthus altissima* (hereafter *Ailanthus*) is an invasive deciduous tree first brought to the United States in 1784. Native to the temperate forests of East Asia, Ailanthus is now one of the worst invasive plants in North America. Conventional control methods of *Ailanthus* are ineffective at large scales due to its rapid growth, high rate of sexual reproduction, and ability to vegetatively reproduce from lateral roots and stumps. Compounding these issues is Ailanthus' production of an allelopathic quassinoid, ailanthone, known to inhibit growth and germination of native plant species. native fungus, *Verticillium nonalfalfae*, was identified as highly selective for Ailanthus and is currently being tested as a biological control agent to manage *Ailanthus*. Understanding the persistence of ailanthone in soil after release of *V. nonalfalfae* will help managers determine the most effective restoration strategy to improve degraded sites and prevent re-establishment of *Ailanthus* and/or other nonnative, invasive plants.

Session: Evaluating B.C. Agen Impacts & Strategies Across Landscapes

Speakers:

Victoria Ayala was born and raised in San Miguel, El Salvador. She completed her undergraduate studies at the Escuela Agrícola Panamericana – Zamorano in Honduras, earning a degree in Environmental Sciences and Social Development Engineering in 2022. Currently, she is in her second year of a Master's program in the Department of Entomology at Louisiana State University, working under the supervision of Dr. Rodrigo Díaz. Victoria's research focuses on the biological control of the aquatic invasive weed, giant salvinia (*Salvinia molesta*). Specifically, she is developing a realtime web application to monitor the plant across the landscape and enhance targeted salvinia weevil (*Cyrtobagous salviniae*) releases using satellite and drone imagery. After completing her M.S. program, she looks forward to pursuing a Ph.D. to further exploring research interests in invasive species ecology, biocontrol and biodiversity conservation through emerging technologies.

Presentation Title: Real-Time Satellite Monitoring for Early Detection of Giant Salvinia (*Salvinia molesta*) and Optimization of Biocontrol with the Salvinia Weevil (*Cyrtobagous salviniae*)

Key Takeaways: Giant salvinia (*Salvinia molesta*) is an invasive aquatic weed that presents significant management challenges in the southeastern United States. While biocontrol with the salvinia weevil (*Cyrtobagous salviniae*) effectively manages salvinia infestations, the reliance on manual field observations delays rapid detection and optimal deployment of this biocontrol agent. This project utilizes real-time satellite monitoring and machine

learning to enhance early detection of giant salvinia and optimize the weevil biocontrol program.

Natalie M. West is a Research Ecologist at the Pest Management Research Unit in Sidney, MT, studying applied weed ecology and classical biological control of weeds. Her research focuses on quantifying interactions between weed populations, introduced biological control agents, and their associated plant and insect communities, with the goal of increasing the efficacy of weed management and improving health and sustainability of wild and rangeland systems.

Presentation Title: Linking Weed Biological Control "Impacts" to Reductions in Weed Population Density Through Seed Augmentation and Large-Scale Surveys

Key Takeaways: Reducing seed numbers is a common mechanism for weed biological control. However, we often lack data on how much annual seed numbers influence weed population density in time and space. Seed augmentation experiments and multi-year plot surveys were used to: 1) compare how much seed was required to influence weed density in different populations of the federal noxious weed *Crupina vulgaris* (common crupina); and 2) extrapolate the time and within-year seed reductions required to effectively reduce weed density. All populations were found to be seed limited, but that the average seedling density and the relationship between seeds added and number of new plants varied among sites and was key to predicting weed abundance.

Ikju Park is an assistant professor in biological control of invasive pests and weeds at the Department of Entomology, University of California, Riverside. His research interest is classical biological control of invasive plants. He has conducted research projects on honey mesquite, houndstongue, musk thistle, and yellow starthistle. Insect Sensory and Behavioral Ecology Laboratory studies the host recognition mechanisms of weed biological control agents in pre-release risk assessment and post release monitoring. Dr. Park serves on a scientific committee for the XVII International Symposium on Biological Control of Weeds in Rotorua, New Zealand, in 2026.

Presentation Title: Revisiting *Rhinocyllus conicus* on Federally Listed Threatened and Endangered Plants

Key Takeaways: The Eurasian flower-head weevil (*Rhinocyllus conicus*) was introduced into North America in 1969 as a biological control agent for invasive thistle species. While weevils suppressed invasive thistles with remarkable establishment rates, non-target attacks have also been reported on multiple federally listed threatened and endangered (T&E) thistle species. To conduct a potential threat assessment of *R. conicus* on the natural habitats of Chorro Creek Bog thistle, we examined insect herbivores in seedheads of

Chorro Creek Bog thistle in San Luis Obispo and the Los Padres National Forest in California. Seedhead volumes, photosynthesis rates, and volatile profiles of Chorro Creek Bog thistle were also measured. The findings from this pilot study in California will provide a foundation for developing insect repellents to reduce *R. conicus* populations on seven T&E thistles in North America.

Megan Reid completed her MSc. and PhD at Rhodes University in Makhanda, South Africa under the supervision of Julie Coetzee and Martin Hill, where she investigated biocontrol of a waterlily invasive in South Africa but native to Florida. During her studies she met Lyn Gettys at University of Florida, with whom she now works as a postdoctoral researcher investigating IPM for water hyacinth. Melissa Smith from USDA is also an integral contributor to the research on water hyacinth, and together they work collaboratively with several international institutions to improve management efforts of invasive plants.

Presentation Title: From Classical Biological Control to Inundative Releases: The Path to Better Management of Water hyacinth

Key Takeaways: Water hyacinth (*Pontederia crassipes*) is an invasive plant from South America that is problematic worldwide. Several biocontrol agents have been released to manage this plant in regions where it is invasive, including South Africa and USA. Efficacy of these biocontrol agents has been variable, due to challenges such as climatic differences and eutrophication of waterbodies where water hyacinth is present. In the last few years, researchers in South Africa have had promising reductions in water hyacinth coverage using inundative releases of *Megamelus scutellaris*. In Florida, efforts are underway to develop mass rearing and frequent releases of *M. scutellaris*.

Aaron N. Schad is a Research Biologist with the U.S. Army Engineer Research and Development Center. As a part of the Aquatic Ecology and Invasive Species Branch, his research and work focus include aquatic ecosystem restoration, habitat mitigation, and vegetation establishment and management.

Presentation Title: Ecological and Economic Benefits of a Weed Biological Control Program in a Federal Habitat Mitigation Project with Culturally Sensitive Areas

Key Takeaways: Classical biological control (CBC) can be a valuable strategy in habitat improvement projects with ecologically or culturally sensitive areas. Implementation and benefits of a CBC program in a federal habitat mitigation project with sensitive archeological sites, which presented limitations to traditional vegetation restoration and management was demonstrated in McClellan-Kerr Arkansas River Navigation System after flooding. Alligatorweed flea beetles (*Agasicles hygrophila*) and thrips (*Amynothrips andersoni*) were released for alligatorweed (*Alternanthera philoxeroides*) control, which

reduced weed coverage and biomass by approximately 50%. This effort not only substantially reduced the invasive species but saved federal agencies $1.5M by allowing mitigation efforts to commence immediately and not force an increased mitigation acreage requirement at 10% per each year delayed.

Iain Paterson is a biocontrol researcher specializing in exploratory surveys and pre-release assessments of weed biocontrol agents. He works on several projects on African plants that are problematic elsewhere in the world, including the USA. Although he is based in South Africa, he has worked in several other African countries, including countries in West, Central and East Africa. His work emphasizes the importance of data collected in field studies in the indigenous distribution of target weeds to complement laboratory host specificity testing and pre-release efficacy assessments.
https://www.ars.usda.gov/research/publications/publication/?seqNo115=423184

Presentation Title: Africa as a Source for Weed Biological Control Agents

Key Takeaways: Africa is a prolific donor of invasive alien plants to other parts of the world. There are 1863 plants indigenous to African that are naturalized outside of the continent and, of the 200 most widely distributed invasive plants globally, 40 are of African origin. Despite being a donor of invasive plants, there are few cases of biocontrol agents from Africa being released elsewhere. Only 24 species of African origin have ever been released as biocontrol agents, with only eight released in North America. Africa is a largely untapped resource of biocontrol agents for invasive alien plants both globally and in North America, with many opportunities for developing new biocontrol programs.

Dylan Parry is a professor and ecologist at the State University of New York College of Environmental Science. His research focuses on biological invasions, especially insects in temperate forests. The spongy moth and other invasive lymantriid moths and the long-running biological control programs directed against them have been of particular interest, including both the intended and unintended effects of these efforts. In addition, Parry has ongoing research projects on the biological control of invasive weeds, interactions between invasive earthworms and non-native plants and has previously worked with native and introduced parasitoids of the invasive sirex wood wasp. He teaches a long running course on the ecology and management of invasive species.

Presentation Title: Extirpation of a Legacy Biocontrol Parasitoid Assemblage Following Arrival of an Adventive Exotic Pathogen

Key Takeaways: One of the most comprehensive biological control efforts in history was directed against the spongy moth (Lymantria dispar L.) after its invasion of North America. A suite of natural enemies were established and persisted, many for more than a century.

In 1989, a fungal pathogen *Entomophaga maimaiga* arrived, apparently accidentally from Asia, and fundamentally changed the population dynamics of spongy moth, out-competing all other biocontrol agents. Following its advent, regional outbreaks of spongy moth disappeared in northeastern US for more than two decades. However, in 2015 a series of discrete outbreaks have occurred in northeastern North America. Studies found that the formerly most abundant tachinid (*Blepharipa pratensis*) was absent entirely in contemporary outbreaks and two other once common species *Parasetigena sylvestris* and Compsilura concinnata occurred only sporadically in the samples. The biology of these species makes them highly vulnerable to competition with the fungus. While *E. maimaiga* is viewed as an effective control agent, its simplification of this system may have unintended consequences under drier conditions or in areas where the fungus is less successful.

Hung-Jen Lin is a dedicated expert in biological pest control, with a strong focus on developing innovative insect mass production technologies. Since 2016, he has successfully advanced the production of natural enemy insects and insect carriers, contributing significantly to sustainable agricultural practices. As the founder of BuggiPro CO., Ltd., Hung-Jen Lin has been actively promoting biological pest control solutions in the agricultural industry, striving to reduce the reliance on chemical pesticides. His dedication have played a crucial role in improving eco-friendly pest management strategies, fostering healthier ecosystems, and supporting sustainable food production.

Presentation Title: Enhancing Market Feasibility of Biocontrol Products Through Smart Rearing Technologies

Key Takeaways: This study explored the application of smart production technologies in the manufacturing of biocontrol products. In the case of *Mallada basalis*, through an automated egg-sorting system, the complex manual work can be completely replaced. Additionally, this automated system integrates an AI-based imaging recognition system to distinguish between healthy or unfertilized eggs. As a result, the hatching rate of eggs selected by the system has increased from 80% to 94%, significantly enhancing rearing efficiency.

April 17, 2025, Keynote Speaker: Christy Martin

Christy Martin has worked on terrestrial and marine invasive species issues in Hawai‘i and the Pacific region for more than twenty years. She is the program manager and spokesperson for the Coordinating Group on Alien Pest Species (CGAPS), a partnership of

agencies and organizations working to protect Hawaii from the impacts of invasive species. Christy is also one of the co-founders of the Pacific Regional Invasive Species and Climate Change (Pacific RISCC), whose aim is to focus research and communications on the confluence of invasive species and climate change in the Pacific Island region. Social science and communications are integral parts of her work. CGAPS is a project of the Pacific Cooperative Studies Unit of the University of Hawai'i at Mānoa.

Presentation Title: Biological Control: Programs, Plans, and Policies

The annual estimated costs of invasive species to the U.S. exceeds $21B, with impacts to agriculture, the economy, and public health. Invasive species are as costly as natural disasters, yet unlike storms, earthquakes, and other disasters, invasive species can result in long-lasting, if not permanent, damage. Invasive species are the greatest driver of biodiversity loss on islands and a top driver of global biodiversity loss. Invasive weeds, pests, and pathogens can alter the composition of forests and ecosystems, increase fire susceptibility, and reduce a forest's ability to buffer severe weather, keep soil moist, accelerate water infiltration, hold topsoil, and store carbon. At the same time, the incidence and impacts of vector-borne diseases are increasing as the U.S. warms. The need for controlling invasive species and their impacts is immense, yet classical biological control is an available but underutilized tool, while new biotechnology tools may also offer relief. Programs, plans, and policies can be modernized to meet the invasive species challenge.

Session: Regulation and Impacts of Biological Control Programs

Speakers:

Nicholas Manoukis is the director of USDA-ARS' European Biological Control Laboratory (EBCL) in Montpellier France and Thessaloniki Greece. His regular post, to which he plans to return in October 2026, is as research leader of the Tropical Crop and Commodity Protection Research Unit in Hilo, Hawaii, where he has been since 2010. His research focuses on the ecology, behavior, and biocontrol of tephritid fruit flies, particularly species of economic importance in Hawaii and potential invaders of the US Mainland. He has also worked on other invasive tropical pests of economic importance like the coffee berry borer. Prior to working at ARS, Dr. Manoukis spent almost a decade studying the ecology, evolution and behavior of the malaria vector Anopheles gambiae in Mali, West Africa.

Presentation Title: European Biological Control Laboratory Perspectives and Updates

Key Takeaways: For over 100 years, USDA Agricultural Research Service's (ARS) European Biological Control Laboratory (EBCL) has helped provide solutions for invasive weeds and insect pests impacting U.S. agriculture and the natural environment. EBCL belongs to a

wider network of overseas biological control laboratories (OBCLs) and ARS domestic locations that collaborate on biological control.

Bob Pfannenstiel is a Senior Entomologist and the Biological Control Specialist with the U. S. Department of Agriculture, Animal Plant Health Inspection Service (USDA-APHIS) Pest, Pathogen and Biological Control Permitting Unit. Bob coordinates the environmental compliance and risk assessment for petitions proposing the release of novel biological control agents of insect pests and weeds in the U.S. Additionally, Bob is in charge of permitting functions within USDA-APHIS for importation and interstate movement of

biological control agents in the U.S. Before coming to USDA APHIS in 2017, Bob was a Research Entomologist for 17 years with the Agricultural Research Service (USDA) and studied the ecology and behavior of biological control agents of insect pests in annual and perennial crops.

Presentation Title: APHIS Regulations

Key Takeaways: The Animal Plant Health and Inspection Service (APHIS), Plant Protection and Quarantine (PPQ) Pests, Pathogens and Biocontrol Permitting (PPBP) Unit is responsible for policies and processes to approve movement and release of commercial and classical biological control agents to and within the United States. Updates

Jian Duan is a research entomologist. His current research focus is on biological control of invasive wood-boring pests such as emerald ash borers and Asian long horned beetle, which involves natural enemy introduction, quarantine safety testing, and non-target risk assessment as well as evaluation of the establishment and impact of introduced natural enemies on the target pest.

Presentation Title: Biological Control of Emerald Ash Borer: A Sustainable Solution to Ash Recovery and Regeneration

Key Takeaways: Emerald ash borer (EAB) is the most devastating invasive forest insect pest in North America, killing 100's of millions of ash trees across 37 states since it was discovered near Detroit, Michigan in 2002. Four natural enemies (parasitoids) were introduced from EAB's native range at different times: three from Northeast China in 2007, including two larval parasitoids (*Tetrastichus planipennisi* and *Spathius agrili*) and one egg parasitoids (*Oobius agrili*), and additional larval parasitoid (*Spathius galinae*) from the Russian Far East in 2015. Data from Northern U.S., which indicate we are moving closer to the goal of maintaining ash as a viable component of North American forests. However, there may be significant challenges in Southern U.S., as well as in the most recently invaded west coast (Oregon), where the successful establishment of those parasitoids introduced from Northeast Asia remains limited and largely unknown.

Philip Weyl is an entomologist with CABI where he currently leads a team of researchers in the weed biological control section at the Swiss center, working with existing biological control agents as well as developing new agents for release. This role involves managing approximately 20 projects, mainly for the USA and Canada, but also for Australia and South Africa. He remains active in student supervision, with MSc and PhD students at the University of Neuchatel, Switzerland, CBC, Rhodes University, South Africa and the University of Idaho, USA.

Presentation Title: Success in Weed Biological Control: Revisiting Old Programs with Shifting Goal Posts

Key Takeaways: Many invasive plant species are managed once they start causing economic or ecological impacts above a perceived damaging threshold. Biological control can offer a sustainable, cost-effective management method of invasive plants, but understanding whether success has been achieved can be challenging. Once populations of an invasive plant are reduced, the perceived damage threshold may change and thus a program once deemed a success may no longer be considered successful. This presentation discussed whether revisiting some old programs would be a worthwhile option by reassessing agents that were once permitted for release but may not have established, or potentially sourcing populations better genetically or climatically suited to the invaded range. Also discussed was the viability of better managing expectations under scenarios where biological control needs to be part of an integrated management approach.

Session: Biological Control Community Strategic Discussions

Speakers:

Bryan Falk is a program analyst for the National Invasive Species Council, where he leads interagency teams to complete tasks prioritized by the Council.

Presentation Title: Opportunities in a NISC Strategic Framework for Biological Control

Key Takeaways: The National Invasive Species Council (NISC) prioritized the development of a Strategic Framework for Biological Control. The framework is being drafted by a federal interagency team with expertise in the regulation, research, and management application of biological control, and it will identify challenges facing biological control as well as strategies for the federal government to overcome them.

Bob Simpson is President and CEO of GreenWoodGlobal Consulting, Ltd. His firm specializes in working with forest products companies, natural resource and other governmental agencies and natural resource NGOs, helping them meet their strategic

directives involving forest sustainability, with focus on family forest owners, cooperatives and communities owning and managing forest land.

Presentation Title: The Importance of Science and Research for America's Forest Landowners

Key Takeaways: US private forest landowners currently hold approximately 60% of this nation's forest land. For decades they have relied on several sources of information to help them manage their forests. These sources include state forestry agencies, consulting foresters, and university extension programs.

Jennifer Andreas received her Master of Science in Entomology from the University of Idaho in 2004 and has worked in biocontrol since 1998 in Canada, Switzerland, Idaho, and Washington. She joined Washington State University Extension in 2005 and leads the Integrated Weed Control Project (IWCP). The IWCP provides biocontrol education and biocontrol agents to land managers and landowners across Washington State. In addition to this work, Jennifer is chair for the Flowering Rush Biocontrol Consortium, co-chair of the Columbia Basin CWMA, member of NAISMA's Classical Biological Control Committee, and conducts research for several weed-biocontrol systems.

Carey Minteer received her undergraduate degree in Biology from the University of Central Arkansas. She received her master's degree in Biology and her PhD in Entomology from the University of Arkansas. Dr. Minteer is now an Assistant Professor at University of Florida Indian River Research and Education Center where she leads a research program focusing on the classical biological control of invasive plants. Dr. Minteer has worked in the field of biological control for 15 years. Dr. Minteer has particular interests in developing sustainable control methods for invasive plant species, integrating classical biological control with other weed management techniques, and educating the public about invasive species.

Joseph "Joey" Milan is the National Biological Control Specialist for the Bureau of Land Management (BLM) based in Boise, ID USA. Joey received his B.S. in Biology from the College of Idaho and his M.S. in Entomology from the University of Idaho. His work focuses on promoting biological control in the Great Basin region, combating invasive weeds in sagebrush steppe communities, restoring natural controls, and reducing the dominance of invasive plants. Joey serves as the co-chair of the North American Invasive Species Management Association (NAISMA) Classical Biocontrol Committee, chair of the Biocontrol Task Force, and the secretary of the Western Weed Coordinating Committee.

Bryce Christiaens is the director at Missoula County Department of Ecology & Extension. Bryce has been working on invasive species management and plant restoration in Western

Montana for over 20 years. He has worked for Missoula County since 2011, assisting residents, landowners and public agencies meet their management goals. He was a founding member of the Montana Invasive Species Council and served as its chair from its from 2014 to 2023.

Presentation Title: Non-Federal Biocontrol Prioritization and Actionable Steps Forward

Key Takeaways: In recent years, biocontrol has been garnering interest and attention from invasive species organizations, potentially offering opportunities to develop partnerships and increased advocacy. Given current challenges and uncertainties, the biocontrol community will need to build on these relationships and work together to develop a road map that provides cohesive messaging and objectives that aim to maintain support for research, development, education, and implementation.