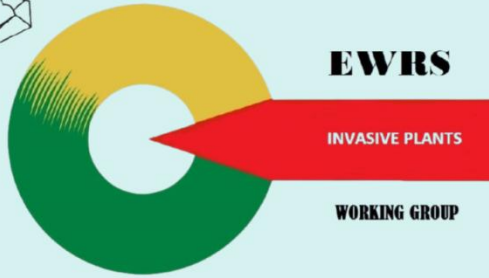


EWRS Workshop „Managing the Plant Invasions by Biological Control“

A Joint Workshop of the EWRS WGs „Invasive Alien Plants“ and „Biological Control“



PROCEEDINGS

Editors

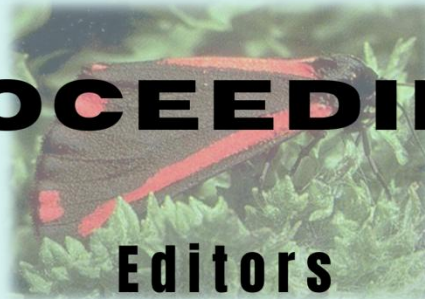
Ahmet ULUDAĞ

Marion SEIER

Bojan KONSTANTINOVIĆ

Philip WEYL

Tijana STOJANOVIĆ



30 October - 2 November 2024
Megasaray Westbeach Hotel, Antalya, Turkey

**EWRS Workshop „Managing the Plant Invasions
by Biological Control”**

**A Joint Workshop of the EWRS WGs “Invasive
Alien Plants” and “Biological Control”**

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FOREWORD

The challenges posed by invasive alien plants continue to grow in complexity, as ecosystems across Europe and beyond face increasing pressure from human activities, climate change, and global trade. At the same time, scientific and technological advancements offer new opportunities for sustainable management of biological invasions. In this context, collaboration between different fields of research becomes not only valuable, but essential.

The EWRS Joint Workshop of the “Invasive Alien Plants” and “Biological Control” Working Groups, held from 30th October to 2nd November 2024 in Antalya, Turkey, was designed to foster such interdisciplinary exchange. The workshop brought together researchers and practitioners working on invasive plants management, with a special emphasis on biological control strategies. The programme combined invited talks, oral and poster presentations, brainstorming sessions, and field visits, offering both scientific depth and practical relevance.

This workshop focused on two key areas: the current state and future directions of the invasive alien plants research and control, as well as the role biological control can play within that framework. Through scientific presentations and open discussions, participants explored how our joint expertise can contribute to sustainable solutions and how future collaborative efforts might be shaped.

The venue, nestled between the Mediterranean coastline and ecologically rich landscapes, provided the perfect backdrop for discussion and reflection. A total of 18 participants from 8 countries engaged in this exchange of knowledge and ideas. We believe that the outcomes of this meeting, reflected in the presented abstracts, the “Workshop Report”, as well as the “Discussion” chapter of the Proceedings, will serve as a foundation for new joint initiatives and lasting professional connections.

We thank all participants for their contributions and enthusiasm, and we look forward to continued collaboration in tackling the complex and pressing issue of invasive alien plants through shared knowledge and coordinated action.

The Organizers

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EWRS Joint Workshop of “Invasive Alien Plants” and “Biological Control” Working Groups: „Managing the Plant Invasions by Biological Control“

A Joint Workshop of the EWRS WGs „Invasive Alien Plants“ and „Biological Control“

30th October – 2nd November 2024

Antalya, Turkey

PROGRAMME

WEDNESDAY 30.10.2024.

Registration (14:30-18:00)	
Pre-meeting Discussion (17:00-18:30) Chairperson: Ahmet Uludağ	Weed Science and Invasive Alien Plant Science
Ice breaking (19:30-21:00)	

THURSDAY 31.10.2024.

Registration (08:30-10:15)	
Opening (10:15-10:30)	
Invited talk (10:30-11:30) Chairperson: Marion Karin Seier	10:30-11:10 <u>Ricardo Labrada Romero</u> “Two troublesome invasive weeds: <i>Parthenium hysterophorus</i> and <i>Commelina benghalensis</i> ”
	11:10-11:30 Discussion
IAP (11:30-12:30) Chairperson: Tijana Stojanović	11:30-11:50 <u>Ahmet Uludağ</u> , <u>Deniz Inci</u> , <u>Necmi Aksoy</u> , <u>İlhan Üremiş</u> and <u>Giuseppe Brundu</u> “New Alien Plant Taxa for Flora of Türkiye: Checklist, Taxonomical and Chorological Notes”
	11:50-12:00 Discussion
	12:00-12:20 <u>Ahmet Uludağ</u> , <u>Muhamad Shakirin Mispan</u> and <u>Sze-Looi Song</u> “Use of eDNA in implementation of invasive alien plant strategy”
	12:20-12:30 Discussion
Lunch (12:30-14:00)	
Biological control of IAP (14:00-15:30) Chairperson: Gerhard Karrer	14:00-14:20 <u>Marion Seier</u> and <u>Philip Weyl</u> “Biological control of invasive alien plants in Europe – opportunities and challenges”
	14:20-14:30 Discussion
	14:30-14:50 <u>Taseer Ahmad</u> and <u>Khawar Jabran</u> “Biological control of dyers woad; Current status and future prospects”
	14:50-15:00 Discussion
	15:00-15:20 <u>Marion Seier</u> , <u>Djamila Djeddour</u> , <u>Daisuke Kurose</u> , <u>Kate Pollard</u> , <u>Corin Pratt</u> , <u>Richard Shaw</u> , <u>Sarah Thomas</u> , <u>Sonal Varia</u> and <u>Suzy Wood</u> “An overview of the classical biological control programme against invasive non-native plant species in the UK”
	15:20-15:30 Discussion
POSTER SESSION (15:30-16:10) Chairperson: Ahmet Uludağ	15:30-15:40 <u>Agita Treimane</u> , <u>Linda Gerra-Inohosa</u> and <u>Jānis Donis</u> “Coexistence and competition: How invasive alien species affect non-wood resources dependent on native species”
	15:40-15:50 <u>Tijana Stojanović</u> , <u>Milena Popov</u> , <u>Bojan Konstantinović</u> , <u>Nataša Samardžić</u> , <u>Milica Aćimović</u> and <u>Stefan Ugrinov</u> “The effect of three

	different hydrolates on the germination and growth of <i>Portulaca oleracea</i> L.” 15:50-16:00 <u>Līga Pentjuša</u> , Zane Lībiete and Linda Gerra-Inohosa “Invasive alien species on forest roads in Latvia” 16:00-16:10 <u>Stefan Ugrinov</u> , Nataša Samardžić, Bojan Konstantinović, Milena Popov, Milica Aćimović, Tijana Stojanović and Anastasia Rodić “Assessing the germination response of selected species to lavender hydrolate”
Coffee break (16:10-16:30)	
Ambrosia (16:30-18:00) Chairperson: Bojan Konstantinović	16:30-16:50 <u>Gerhard Karrer</u> , Rea Maria Hall, Valérie Le Corre and Matthias Kropf “Population genetics and ecology of the invasive <i>Ambrosia psilostachya</i> DC. in Europe” 16:50-17:00 Discussion 17:00-17:20 <u>Peter Tóth</u> and Monika Tóthová “Common ragweed without pollen” 17:20-17:30 Discussion

FRIDAY 01.11.2024.

Brainstorming (09:00-10:30) Chairpersons: Philip Sebastian Richard Weyl	What can we do together?
Biological control of IAP (10:30-12:30) Chairpersons: Necmi Aksoy and Cumali Özaslan	10:30-10:50 <u>Cumali Özaslan</u> and Osman Sert “Biological control possibilities of noxious <i>Lythrum hyssopifolia</i> L. by <i>Dieckmanniellus nitidulus</i> (Gyllenhal, 1838): A new addition to the insect fauna of South-eastern Anatolia, Turkey” 10:50-11:00 Discussion 11:00-11:20 <u>Jonathan Binder</u> , Kazumi Nakabayashi, Thomas Holloway, Ben Oyserman and Gerhard Leubner-Metzger “Seed and soil microbiomes of agricultural weed <i>Alopecurus myosuroides</i> ” 11:20-11:30 Discussion 11:30-11:50 <u>Philip Weyl</u> and Marion Seier “Classical biological control of weeds: dealing with misconceptions and conflicts of interests” 11:50-12:00 Discussion

Discussion (12:00-12:30) Chairperson: Tijana Stojanović	Workshop Report
Lunch (13:00-14:00)	
Field Work (14:00-17:00)	

SATURDAY 02.11.2024.

Discussion (9:00-11:45) Chairperson: Ahmet Uludağ	Future common works
Closing (11:45-12:00)	

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INVITED TALK

Two troublesome invasive weeds: *Parthenium hysterophorus* and *Commelina benghalensis*

Ricardo Labrada Romero

ex-FAO Agriculture, Valencia, Spain

Invited Talk

There is increased evidence that climate change interferes with processes of biological invasions, triggering the establishment of several alien tropical or sub-tropical plants in temperate climate countries. Two of these plants are the Asteraceae annual *Parthenium hysterophorus* L. (whitetop weed or amargosa) and *Commelina benghalensis* (Benghal dayflower). PTNHY is a fast growing, highly competitive and allelopathic plant, it may grow up to 2 m, and at a height of more than 1100 m (ASL). Its seeds germinate after the release of germination inhibitors. The plant causes respiratory problems and dermatitis to people and animals, it is present in more than 50 countries. The use of herbicide treatments for its control has been erratic or brought about resistant biotypes. Biocontrol seems promising using agents, such as borer moth, *Epiblema strenuana*, the chrysomelid, *Zygogramma bicolorata*, the stem-boring weevil *Listronotus setosipennis*, and rust *Puccinia abrupta* var. *partheniicola*, which require local validation. COMBE is distinguished from the rest of *Commelina* spp. by its blue flowers, the short flower stem, whose margins are partially joined, and the reddish-brown hairs on the leaf sheath. It reproduces sexually and asexually, producing more than 1500 seeds, often dormant, germinating after scarification. Fragmented stems may remain viable in the soil for several weeks, and with enough air humidity they form leaves in a couple of weeks. It is reported to be present in several regions, including a few European sites. This glyphosate-tolerant plant is difficult to remove manually, biocontrol may be a feasible option to be further developed, e.g. *Kordyana celebensis* Gäum., Brachybasidiaceae. In any case, prevention of entry and post management if necessary are the ways to avoid the problems caused by these weeds in new territories.

Acknowledgement(s): EWRS



INVASIVE ALIEN PLANTS

New Alien Plant Taxa for Flora of Türkiye: Checklist, Taxonomical and Chorological Notes

Ahmet Uludağ¹; Deniz Inci²; Necmi Aksoy³; İlhan Üremiş⁴; Giuseppe Brundu⁵

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² University of California, CA, United States

³ Düzce University, Düzce, Turkey

⁴ Mustafa Kemal University, Hatay, Turkey

⁵ University of Sassari, Sassari, Italy

Oral

Since the publication of “Alien flora of Türkiye: checklist, taxonomic composition and ecological attributes” (<https://doi.org/10.3897/neobiota.35.12460>) in 2017, many new plant taxa have been recorded in the alien flora of Türkiye. In this study, 33 new taxa published between 2017 and 2024 are included with their checklist, taxonomic and chorological status of the new alien plant taxa. Approximately, four new alien plant taxa have been recorded each year in the flora of Türkiye. The majority of these taxa are herbaceous species, while the others include two woody shrubs, herbaceous vines and a cactus life form. With the recent additions, the total number of alien plant taxa in the flora of Türkiye has reached 374 taxa. Most of the newly recorded plants are in agricultural areas, urban ecosystems, riparian area habitats, and park gardens. These new alien species are mostly native to Americas, Africa, Asia, Europe, and subtropics. The common way of introduction of these new plants and seeds for ornamental purposes is the major problem. This is due to the rapid increase in the introduction of exotic plant species as ornamental plants with the increasing tourism in the Mediterranean and Black Sea regions. Therefore, regional alien plant species on a checklists of alien plant species need to be continuously updated.

The use of eDNA in the implementation of an invasive alien plant strategy

Ahmet Uludağ¹; Muhamad Shakirin Mispan²; Sze-Looi Song³

¹ Çanakkale Onsekiz Mart University, Faculty of Agriculture, Plant Protection Department, Çanakkale, Turkey

² Institute of Biological Sciences, Faculty of Science, Universiti Malaya, Kuala Lumpur, Malaysia

³ Institute For Advanced Studies, Universiti Malaya, Kuala Lumpur, Malaysia

Oral

The management strategy for invasive alien plants (IAP) has three hierarchical steps: prevention, early detection and rapid response, and containment and control. Every step requires timely detection and precise identification of the species. Besides the commonly practiced methods, environmental DNA (eDNA) might be a more effective tool. This tool has been used for environmental assessments, planning and management in both managed and unmanaged areas for over two decades although eDNA studies date back to the 1980s. However, the use of and research on eDNA in IAP and weed science is not as advanced as in the other disciplines. It is clear that the eDNA approach will be an important tool for prevention via checking bulk agricultural consignments, for early detection via checking soil and water bodies, for fast response via checking eradication areas, and for containment via follow-up implementing control activities.



BIOLOGICAL CONTROL OF INVASIVE ALIEN PLANTS (I)

Biological control of invasive alien plants in Europe – opportunities and challenges

Marion Seier¹; Philip Weyl²

¹ CABI, Egham, United Kingdom

² CABI, Delémont, Switzerland

Oral

Biological control, defined as the use of natural enemies to control invasive species, offers an environmentally friendly, sustainable and cost-effective approach for weed control. Being complementary to other control strategies, it lends itself to form a part of an integrated weed management strategy. The approach can be divided into three main methods – conservation biological control aiming to enhance population levels and activities of resident natural enemies; augmentative or inundative biological control based on the mass production and release of natural enemies in large numbers; and classical biological control (CBC) using co-evolved natural enemies from the native range of a species for control in its invasive range. The latter approach is best suited for invasive alien plant species, whilst the former two are more applicable to native weeds in a cropping situation. In addition, botanicals and plant based products, as well as the mycotoxins, also play a role in the biological weed control approach. In contrast to regions such as Australasia, North America and South Africa the use of biological control in weed management has been less widely practised in Europe. Recently, however, the strategy has also gathered momentum in this region with a number of European countries actively pursuing research into and implementation of weed biological control. This presentation will give an introduction to the concept of weed biological control and its main approaches. Using examples of current European initiatives focussing on CBC of alien invasive weeds the opportunities as well as challenges to implement the strategy in this geographic region will be highlighted.

Acknowledgement(s): EWRS WG funding

Biological control of dyers woad; Current status and future prospects

Taseer Ahmad; Khawar Jabran

Nigde Omer Halisdemir University, Nigde, Turkey

Oral

Dyer's woad (*Isatis tinctoria* L.) is a winter annual, biennial or short-lived perennial plant species that is mostly known as a major weed of non-cropped and undisturbed rangelands. Recently, this weed has been expanding its range to cropped areas as well, due to which its management is highly important. Here, we have discussed the available biological control options that can play a critical role in the management of this weed. The first case is the introduction of *Puccinia thlaspeos* rust as a biological control agent of *I. tinctoria* on roadsides, farms, waste areas and rangelands of northern Utah, USA. An inoculum dose of the rust as low as 1 mg/plant proved effective in infection establishment and a dose higher than 1 mg provided significant level of infection on *I. tinctoria* rosettes. A product called "WOAD WARRIOR" was prepared from this rust fungus and registered as a biopesticide in the USA during 2002. Another example is a classical biological control program that was introduced for *I. tinctoria* in 2004 in North America and three European insect species were chosen, of which the root-mining weevil (*Aulacobaris fallax*) was the most effective and up to 62% of the *I. tinctoria* plants were observed to be attacked by this weevil. Recently, in a preliminary experiment, two weevils, the root crown miner (*Ceutorhynchus rusticus*) and the seed feeder (*C. peyerimhoffi*) were also tested for *I. tinctoria* control. The result of this study showed that up to 72% seed production was reduced by *C. rusticus* and *C. peyerimhoffi* destroyed up to 97% of the weed seeds while both these weevils reduced the plant biomass by 46%. Overall, biological control has shown promise for *I. tinctoria* management and having multiple agents would increase the efficacy of this important tool. However, widespread infestations along diverse climatic conditions mean that biological control alone is not sufficient to reduce substantial impacts of this weed.

Acknowledgement(s): EWRS

An overview of the classical biological control programme against invasive non-native plant species in the UK

Marion Seier; Djamila Djeddour; Daisuke Kurose; Kate Pollard; Corin Pratt; Richard Shaw; Sarah Thomas; Sonal Varia; Suzy Wood

CABI, Egham, United Kingdom

Oral

Classical biological control (CBC) for the management of invasive non-native plant species is a strategy currently less widely practised in Europe compared to other parts of the world. Nonetheless, in the UK a government-funded programme, supported by other funding sources, to undertake research into the potential of CBC for selected non-native invasive weeds has now been running for a number of years. To date the research conducted has resulted in the release of four biocontrol agents - three arthropod species and one rust pathogen - against the same number of target weeds, namely Japanese knotweed (*Reynoutria japonica*), Himalayan balsam (*Impatiens glandulifera*), Australian swamp stonecrop (*Crassula helmsii*) and floating pennywort (*Hydrocotyle ranunculoides*). Potential agents for additional invasive weed species are currently also under evaluation. Other European countries are now equally interested to implement CBC against these selected invasive weeds using the agents utilized in the UK; already the insect targeting Japanese knotweed has also been released in the Netherlands. This presentation gives an overview of the UK initiative to research and implement CBC for weed biocontrol and reviews its current status for individual target weeds. Anticipated benefits and any potential risks associated with the release of individual agents will also be discussed.

Acknowledgement(s): EWRS WG and CABI funding



POSTER SESSION

Coexistence and competition: How invasive alien species affect non-wood resources dependent on native species

Agita Treimane^{1,2}; Jānis Donis¹; Linda Gerra-Inohosa¹

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² Latvia University of Life Sciences and Technologies, Jelgava, Latvia

Poster

Invasive and potentially invasive alien plant species significantly contribute to the biodiversity decline in natural ecosystems, including forests. Their occurrence has rapidly increased in recent decades, due to some contributing factors such as enhanced transportation networks and intensification of land management. In Latvia, located in the hemiboreal vegetation zone with >50% forest cover, competitive IAS pose a significant threat to native species of boreal and nemoral flora. Forest ecosystems deliver a wide range of ecosystem services, including non-wood products, such as wild berries and nuts, nectar-producing plants, medicinal herbs, resins, and others. Previous studies have confirmed that in Latvia, gathering of berries, e.g., lingonberry, bilberry, is not only a possibility to add healthy wild food but also an important recreational activity. In rural areas, the utilization and sale of berries and other non-wood resources (such as mushrooms, birch and maple sap, hazelnuts, and others) create additional income for many households. Consequently, introduction and spread of invasive alien species in the forest can significantly threaten this socioeconomically important forest function. This contribution summarizes results of Biodiversity Monitoring, performed in Latvia on a sub-set of National Forest Inventory plots to estimate the vegetation change overtime in different forest types. Data were collected from 2019 to 2023 on 483 permanent sample plots. In each stand, one 20x20m plot and twelve 1x1m plots were established. The cover of all trees, plants, mosses and lichens was recorded using the Braun-Blanquet method. There was a higher occurrence of potentially invasive alien species in forests near large cities. A total of 16 invasive alien and potentially invasive alien species was identified, and in every fifth sample plot one potentially invasive alien species was observed. The most frequently recorded species were small balsam and dwarf serviceberry. In study plots with large invasive plant species' cover, the non-wood product cover decreased.

The effect of three different hydrolates on the germination and growth of *Portulaca oleracea* L.

Tijana Stojanović¹; Milena Popov¹; Bojan Konstantinović¹; Nataša Samardžić¹;
Milica Aćimović²; Stefan Ugrinov¹

¹ University of Novi Sad, Faculty of Agriculture, Department of Environmental and Plant Protection, Novi Sad, Serbia

² Institute of Field and Vegetable Crops Novi Sad, Novi Sad, Serbia

Poster

Portulaca oleracea L. is an annual succulent herbaceous broadleaf species, considered either cosmopolitan or native to India and the Middle East. It is one of the most aggressive weeds globally, invading 311 regions, including 15 in Europe. In Serbia, particularly in Vojvodina, it is recognized as an invasive alien species, spreading rapidly in fields, vineyards, dunes, and along roads. It significantly impacts agriculture due to its allelopathic effects on crops like wheat and soybean, with a 50% occurrence in organic farming. Its seeds can germinate for up to 40 years, enhancing its invasiveness and presence in various environments. The aim of the study was to determine the potential bioherbicidal effect of three different hydrolates (rosemary, juniper and hop) on the germination and initial growth of *P. oleracea*. The *P. oleracea* seeds were exposed to the tested hydrolates at the concentrations of 10, 20, 50 and 100%, with distilled water used for the controls. The treated seeds were placed in a climate chamber under the controlled conditions, where their germination was observed for 10 days. After the experiment, the length of the hypocotyl and epicotyl of the seedlings was measured. The 10 and 20% rosemary and juniper hydrolates stimulated the germination of *P. oleracea*, while higher concentrations reduced the germination by 15 and 61% and 89 and 100% in case of rosemary and juniper, respectively. The hop hydrolate solutions decreased the germination by 38, 37, 43 and 100%, respectively. The statistically significant differences were noted in terms of hypocotyl and epicotyl growth between the control and the tested concentrations for all the examined hydrolates, with the highest inhibition obtained by 50 and 100% hydrolate solutions. The obtained results showed that the studied hydrolates have a potential to be used as bioherbicides in the control of *P. oleracea* at higher concentrations.

Acknowledgement(s): EWRS

Invasive alien species on forest roads in Latvia

Līga Pentjuša; Linda Gerra-Inohosa; Zane Lībiete;

Latvian State Forest Research Institute "Silava", Salaspils, Latvia

Poster

Invasive and potentially invasive plants are a growing concern in the Baltic countries, affecting local species and contributing to the general biodiversity decline. Ecosystems with higher degree of anthropogenic impact are more susceptible to invasion and establishment of non-native plants. Forest roads in a managed forest landscape are a potential distribution pathway for invasive alien plants, due to altered light and soil conditions and possible import of seed material from elsewhere. We studied the speed and extent of invasive alien plants spread along forest road edges in three conventionally managed forest areas in Latvia, by conducting repeated ground vegetation assessments on newly built and reconstructed forest road edges, as well as on forest roads without reinforcement. From 2016 to 2024, a total of 11 forest roads have been surveyed. Along each road, ground vegetation composition was assessed in a 1 km long road section where 20 3x10 m vegetation survey plots were established. Cover of invasive and potentially invasive alien species was assessed each year, while full vegetation survey was performed once every two years. In total, one invasive (*Heracleum sosnowsky*) and five potentially invasive plant species (*Lupinus polyphyllus*, *Solidago canadensis*, *Solidago gigantea*, *Impatiens parviflora*, *Rumex confertus*) were recorded along the studied roads in 8 years period. Our data show that two species - *Lupinus polyphyllus* and *Solidago canadensis* - have a tendency to spread on newly built and reconstructed forest road edges and their cover is increasing yearly. However, on the forest roads without reinforcement these species are rarely abundant and show no significant increase in occurrence or cover. Our results suggest that the construction of new roads can potentially contribute to the spread of invasive plant species in the forest landscape.

Acknowledgement(s): EWRS

Assessing the germination response of selected species to lavender hydrolate

Stefan Ugrinov¹; Nataša Samardžić¹; Bojan Konstantinović¹; Milena Popov¹; Milica Aćimović²; Tijana Stojanović¹; Anastasia Rodić¹

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Poster

The present study investigates the effect of lavender hydrolate on the germination of selected cultivated and weed species. Lavender hydrolate, known for its diverse biological activities, is a byproduct of the lavender essential oil distillation process. The study examined the effects of four different lavender hydrolate concentrations (10, 20, 50 and 100%) on the germination of sunflower (*Helianthus annuus*), wheat (*Triticum* sp.), lambsquarters (*Chenopodium album*), and purslane (*Portulaca oleracea*). The findings indicate that lavender hydrolate significantly reduced the seed germination of *C. album*, with the germination rates being 37.25-50.98% in case of lower concentrations. The most pronounced effects were observed for *P. oleracea*, in case of which all the concentrations significantly impaired the germination. Notably, by applying the 10, 20, 50 and 100% hydrolate solution, the germination was reduced by 78, 92, 88 and 100%, respectively. The germination rate index was highest in the control for all the tested species, with the lowest indices recorded after applying 100% hydrolate on wheat and sunflower seeds. Mean germination times were highest in case of 100% hydrolate, indicating delayed germination for the treated crops, while *P. oleracea* did not germinate at this concentration. The results revealed that lavender hydrolate had a significant inhibitory effect on the germination of all the tested species, with the highest concentration showing the strongest inhibition. Statistically significant differences in the growth of the hypocotyl and epicotyl of the weed plants were observed for all the tested concentrations compared to the control. The hydrolate more effectively reduced the growth rates of the weeds than of the cultivated crops, indicating its potential as a bioherbicide, particularly at higher concentrations. Further field research and testing on a broader range of weed species are recommended in order to fully understand its potential in sustainable agriculture.

Acknowledgement(s): EWRS



AMBROSIA

Population genetics and ecology of the invasive *Ambrosia psilostachya* DC. in Europe

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Oral

Western ragweed (*Ambrosia psilostachya* DC.) is native to North America and widely naturalized throughout Europe. Like *A. artemisiifolia* its pollen can cause allergic reactions in humans. However, different from common ragweed this *Ambrosia* species is perennial with strong clonal reproduction by root sprouts. Therefore, *A. psilostachya* could also invade less suitable (northern) areas, where *A. artemisiifolia* as annual, late-flowering species is unable to establish. To study process and patterns of spreading of western ragweed, we sampled 60 populations throughout Europe and analyzed population genetic structure and diversity based on 15 microsatellite loci primarily developed for *A. artemisiifolia* (Meyer et al. 2017), but transferable to our study species. 955 individual samples analyzed represent 792 unique multilocus genotypes. 33 populations had at least one monomorphic locus, and significant clonal structures were identified in 55.7% of all populations. Therefore, we also calculated a clone-corrected data set, which e.g. indicated negative significant correlation of mean populational H_o (ranging from 0.28 to 0.75) with latitude. Spatial structuring of genetic variation using Bayesian Clustering identified six groups, largely corresponding to six pre-defined regions located around important trading harbours, which might have acted as independent doors to Europe for *A. psilostachya*. AMOVA showed that 10.4% of genetic variation occurred among these regions, while about 40% of the genetic variation was found among populations within regions. Especially, when analyzing the distribution of specific clones in detail, common post-introductory local expansions could be traced, while the long-distance (max. 170 km) shoot fragment dispersal seems to be rare.

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Common ragweed without pollen

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Oral

Common ragweed (*Ambrosia artemisiifolia* L., Asteraceae) is an invasive species that is difficult to control. Its occurrence has been reported in Czechoslovakia since the end of the 19th century. We wanted to know whether non-pollen producing plants exist and can survive in nature. The large-scale screening by visual observation was carried out from 2014 to 2023, mainly in Slovakia (17 sites), Italy (4 sites) and Hungary (4 sites). All sites were at low altitude, warm, dry with light soils. It was possible to find very specific symptomatic plants in all regions/habitats/countries, especially in Slovakia. The panicles were pyramidal to corymbose, terminal racemes absent or with clusters of pistillate heads. These plants had no staminate heads and produced no pollen at all. Instead of pollen, plants produced viable seeds in the same place. Seeds germinate and produce normal, viable plants. We believe that this is caused by biotic factors that ensure the survival of plants despite all the facts. The research is still ongoing.

Acknowledgement(s): The research was supported by the Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic VEGA 1/0467/22



BIOLOGICAL CONTROL OF INVASIVE ALIEN PLANTS (II)

Biological control possibilities of noxious *Lythrum hyssopifolia* L. by *Dieckmanniellus nitidulus* (Gyllenhal, 1838): A new addition to the insect fauna of South-eastern Anatolia, Turkey

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Oral

Turkey has a long history of floristic research and hosts some 12000 plant species. However, there has been little work focusing on biological control of noxious and alien plant species in the country. *Lythrum hyssopifolia* L. (hyssop loosestrife) is a herbaceous and flowering plant species in the Lythraceae family. It is a mostly upright, branching annual or biennial herb growing 10 to 60 cm tall. The oval leaves are arranged oppositely lower on the plant, and often alternately towards the top. They are up to 3 cm in length. The inflorescence is a terminal spike of flowers with pinkish petals up to 0.5 cm long. The fruit is an oval capsule containing many minute seeds. Hyssop loosestrife is a noxious weed that is very common in the rice producing areas of the South-eastern Anatolia Region (SEAR), Turkey and is considered as a noxious or invasive alien plant species worldwide. An unusual insect species was detected during research on potential biological control of hyssop loosestrife in Turkish paddy fields. The insect was found on hyssop loosestrife in a paddy field in the Diyarbakır province (Ergani district, Demirli village), close to the roadside from Diyarbakır to Siverek (37° 51' 57.7152" N, 39° 44' 25.476" E) on 15.09.2023. The species identified as *Dieckmanniellus nitidulus* (Gyllenhal, 1838) and has to date never been reported from the SEAR. Thus, this study reports a new addition to the insect fauna of SEAR. This insect was feeding on the plant during the flowering stage forming galls on the aboveground stem and flower buds. Nearly all infected plants were growth suppressed compared to uninfected plants. Hyssop loosestrife occurs in cultivated and non-cultivated land, especially in paddy field where it is the most competitive and aggressive species. For this reason, it is recommended to provide early warning and assess biological control possibilities in order to limit the further spread of the species in the country and its impact on cultivated plants.

Seed and soil microbiomes of agricultural weed *Alopecurus myosuroides*

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Oral

While often disregarded and not as well understood as microbe-root or microbe-shoot interactions, microbe-seed interactions can have important impacts on plant health. Weed seed persistence in the soil seed bank depends on dormancy, longevity and defence as key traits. Although it is generally understood that soil microorganisms contribute to weed seed decay, clear and strong relationships and mechanisms are largely unknown. It is posited that certain soil management practices increase the rate of weed seed decay by microbial activity, but neither specific microbial species nor practical strategies have been rigorously studied or confirmed. While there is some research on soil microbial effects on weed seeds, few (if any) studies have investigated how innate seed microbiomes may modulate persistence in the soil seed bank.

To gain insight into the microbe-seed interactions of agricultural weed *Alopecurus myosuroides* and their implications for management and control, we studied the effect of tillage, an important agricultural tool to control weeds and a driver of soil microbiome assembly, on *A. myosuroides* germination in a controlled lab setting with collected soils. Results of how different tillage regimes affect the dynamic microbial communities of seeds and soil obtained by 16S and ITS amplicon sequencing will be presented. Investigation into how soil C content modulated microbe activity and, by extension, seed germination patterns will also be discussed. Our experimental work in collaboration with Syngenta (UK, USA, Switzerland) as industrial partner aims to deliver an improved understanding of how soil and seed microbiomes are formed and their potential to affect weed seed persistence in distinct agricultural practices.

Acknowledgement(s): EWRS

Classical biological control of weeds: dealing with misconceptions and conflicts of interests

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Oral

The management of invasive non-native weeds aims to mitigate their negative impacts on biodiversity, ecosystem services and human well-being. Modern classical biological control is a long-term sustainable option for the control of weeds and implies the deliberate release of specialist natural enemies from the weed's native range to reduce the density or spread of a weed in its introduced range. A fundamental challenge of weed biological control is assessing the risk of non-target effects by a potential biological control agent. The long history of pre-release studies in weed biological control has significantly contributed to the development of risk assessment procedures (host specificity testing) with an overwhelming success rate. Yet, despite its wide application across the world, discussions about the risks involved in classical weed biological control are often dominated by misunderstandings and misconceptions. In addition, biological control of weeds often has perceived conflicts of interests. By addressing some of these misconceptions and conflicts, key questions will be elaborated on that should be raised in public and scientific debates on the potential risks and benefits of releasing exotic organisms to control invasive non-native weeds.

Acknowledgement(s): EWRS WG and CABI funding



WORKSHOP REPORT

From 30th October to 2nd November 2024 a joint Workshop organized by the EWRS WGs „Invasive Alien Plants“ and „Biological Control“ was held at the Megasaray Westbeach Hotel in Antalya, Turkey.

Following the registration on the first day (30.10.2024.), a pre-meeting discussion concerning weed and invasive alien plant science was chaired by Ahmet Uludag before participants enjoyed an “ice breaking” get together for more informal chats. During the second day (31.10.2024.), the workshop started off with the invited talk on the invasive weeds *Parthenium hysterophorus* and *Commelina benghalensis* presented by Ricardo Labrada Romero (online). This was followed by three oral sessions on IAP, biological control of IAP and Ambrosia, as well as the poster session. The third day (01.11.2024.) started off with a brainstorming session exploring collaboration between the working groups and strategies to tackle IAPs, as well as the ideas on how to raise the profile of biological control as a management strategy. The last session of the workshop again consisted of oral presentations on biological control of IPA and afterwards the participants embarked on a field trip to the Upper Duden waterfalls (located within the park where the lecture on the present weed and invasive weed species took place) and Lower Duden, which over a rocky cliff ends in the Mediterranean Sea. The last day of the Workshop (02.11.2024.) the final discussion regarding the future common works took place, after which the closing of the Workshop was done.

During the Workshop, in which 18 attendees from 8 countries (Austria, Latvia, Spain, Serbia, Switzerland, Slovakia, Turkey and United Kingdom) participated, one invited talk, 10 oral papers, and 4 posters were presented, with the total number of the authors being 45.

Overall, the joint workshop, which brought together researchers from different scientific fields, enabled discussions and scientific exchange with respect to tackling the problem of invasive alien plants and the opportunities the biological control can bring. Future collaboration between the two EWRS working groups was also a central theme and suggestions proposed regarding this included the development of joint research proposals/projects, a joint publication summarizing the discussions points of the workshop such as regulation and legislation around IAPs, the obstacles faced in research and implementation of biological control and specific case studies as presented during the workshop, as well as preparing a blog on the workshop for wider distribution. More generally, it was highlighted that awareness needs to be raised for the threats IAPs pose to native biodiversity as well as the successes and benefits already seen in controlling IAPs using biological control.



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PICTURES







