BIOSECURITY AND SURVEILLANCE OF QUARANTINE PESTS OF TREES IN FORESTS AND CITIES

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Explore innovative approaches to urban tree health and forest pest surveillance.

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Regional and international cooperation in surveillance of quarantine pests of trees in forests

Musolin D

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Abstract

The European and Mediterranean Plant Protection Organization (EPPO) is an intergovernmental organization established in 1951. As one of ten Regional Plant Protection Organizations (RPPOs) under the International Plant Protection Convention (IPPC), EPPO supports 52 member countries in strengthening regional cooperation in plant health. It works closely with National Plant Protection Organizations (NPPOs) to develop guidance and harmonized standards.

In the field of plant quarantine, EPPO manages an early warning system (Alert List), conducts Pest Risk Analysis (PRA) for emerging threats, recommends pests for regulation in the EPPO region, and develops regional standards—especially in diagnostics and phytosanitary measures.

EPPO operates within the framework of the IPPC, a global treaty ratified by 185 contracting parties, which aims to protect plants and ecosystems from the spread of pests. The IPPC adopts International Standards for Phytosanitary Measures (ISPMs) to support coordinated pest prevention and surveillance worldwide.

Several ISPMs form the foundation for surveillance of forest pests. ISPM 6 (Surveillance) outlines requirements for national surveillance systems. Other relevant ISPMs include ISPM 8 (Determination of pest status in an area), 17 (Pest reporting), 19 (Guidelines on regulated pest lists), 29 (Recognition of pest-free areas), and 36 (Integrated measures for plants for planting).

EPPO has also developed standards directly relevant to the surveillance of forest pests. PM 1/2 lists A1 and A2 quarantine pests recommended for regulation in the EPPO region. The PM 7 series contains diagnostic protocols for specific pests (e.g. *Anoplophora* spp., *Agrilus planipennis*), while the PM 9 series provides official control guidance, including surveillance components (e.g. *Thaumetopoea pityocampa*, *Dendrolimus sibiricus*).

The importance of international cooperation and harmonized standards in forest pest surveillance will be discussed.

Optimising plant pest surveys for broadleaved trees: Application of EFSA guidelines and tools

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Abstract

Effective surveillance of regulated pests in broadleaved trees is critical for their early detection and containment across both forest and urban environments in Europe. This urgency is amplified by the increased risk of introducing new plant pests due to rapid globalisation and international trade, as well as the importance of broadleaved trees in adapting to climate change. To address the complexity and resource-intensive nature of planning such surveys, the European Food Safety Authority (EFSA) has developed comprehensive guidelines and specialized tools to support Member States in designing and optimizing plant pest surveys for broadleaved tree hosts.

This presentation introduces the practical application of EFSA's crop-based survey approach, specifically tailored for broadleaved trees, with the aim to optimize survey efforts by coordinating the simultaneous detection of multiple regulated pests. Central to this methodology are two key tools: **RiPEST** and **OptiPest**. **RiPEST** enables users to design risk-based surveys and calculate statistically sound sample sizes for multiple pests affecting broadleaved trees, adapting to diverse epidemiological contexts such as urban parks and natural forests. Building on this, **OptiPest** provides an algorithm to further optimize surveys by grouping different pests based on shared characteristics like optimal sampling periods, inspection units, and sampling matrices. This optimization leads to a reduction in field visits and allows for the reuse of collected sampling matrices, significantly enhancing efficiency in pest detection efforts.

By leveraging these EFSA guidelines and tools, Member States can more effectively plan and prepare their multi-pest surveys, ensuring compliance with EU plant health regulations and bolstering biosecurity and ecological preservation efforts for broadleaved trees.

Forest surveillance for quarantine pests: is there a divergence between regulation and science?

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Abstract

Examples of pests and pathogens moved from their native range and introduced into new geographical regions are well documented, and the likelihood of this occurrence has become much more frequent over the past 50 years aided by the huge growth in global trade and increased consumer wealth. To counter introductions, plant health measures usually rely on prior identification of high-risk organisms allied with inspection to intercept them, and surveillance to ensure their continued absence. However, there are drawbacks to this approach. In their native range, pests and pathogens associated with co-evolved hosts may be cryptic and cause little damage - therefore they remain undetected. And even if they are known in their native range, the threat they could pose if introduced into new ecosystems is hard to predict. Additionally, it can take decades to discover a new high-risk pest following an introduction, due to the challenge of detection when undertaking surveillance in heterogeneous natural environments such as forests, or because unexpected combinations of hosts and new pests/pathogen emerge over time. Scientific advances now also allow researchers to use metagenomic tools to explore what microbes exist in air, soil or water, leading to findings of DNA signatures of both unknown or regulated pathogens but often in the absence of any infected host plants or disease symptoms. This raises a question of what can be considered native or introduced and what constitutes a pest-free area, creating significant dilemmas for regulators on how to respond to such findings.

Capacity building for forest invasive species surveillance – the REUFIS (Forest Invasive Species Network for Europe and Central Asia) initiative

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Abstract

Forest invasive species (FIS) are a growing threat to biodiversity, forest health, and ecosystem services in Europe and Central Asia. Climate change, global trade, and land-use changes have accelerated their spread, often overwhelming existing national surveillance and response capacities. The absence of coordinated detection and response mechanisms in several countries in the region further compounds the problem.

REUFIS is a network Facilitated by FAO to share information and experiences and coordinate forest invasive species capacity building activities and programmes within the region and beyond. Activities to identify strategic actions for building capacity, improving coordination, and integrating early warning and contingency planning into national and regional forest protection systems will be presented.

Background information are based on a regional assessment implemented across the region including consultations with the regional authorities related to forest health, capacity assessments, and reviews of existing surveillance and phytosanitary frameworks. Case studies of effective early detection systems and contingency plans and rapid response mechanisms were also examined.

Findings reveal significant disparities in surveillance capacities and preparedness levels across the region. While some countries have advanced monitoring systems and contingency plans, many others face limitations in staffing, diagnostic infrastructure, data collections and sharing, and risk communication. Regional cooperation remains fragmented. However, examples from selected countries show that early warning systems—when linked to trained personnel, risk mapping, and rapid response mechanisms—can significantly reduce FIS impacts.

In conclusion, strengthening regional and national capacity for FIS surveillance requires a multi-level approach. Early warning systems and pre-agreed contingency plans are essential components to detect, communicate, and respond to incursions before they cause widespread damage. Regional platforms, both at the national and international level, should facilitate knowledge exchange, joint simulation exercises, and coordinated responses. Co-operation with existing institutions (e.g., EPPO) and running activities (e.g., COST Actions) are indispensable.

The growing threat of urban tree pests and diseases – Impacts, risk awareness, and action

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Abstract

Background: Urban trees and forests are increasingly threatened by tree pests/diseases, especially accidentally introduced non-native ones, requiring urgent action. Yet relatively little is known about the exact nature by which tree pests/diseases may be affecting urban environments. There is a similar paucity regarding risk awareness and knowledge of the different urban stakeholders of this growing threat and how these might respond to it.

Objectives: To gain a better understanding of the impacts of urban tree pests/diseases, stakeholder risk awareness and the actions taken.

Methods: A systematic review of the empirical evidence on the impacts of urban tree insect pests/diseases worldwide, using bibliographic databases. An online survey of different key stakeholder groups associated with urban trees and forests in Germany. An assessment of relevant regulations, policies, and guidance on urban trees at the local city level.

Results: 95 out of 100 studies reveal environmental impacts (tree damage, mortality, reduced growth, changes in tree function); 35 social impacts (aesthetics, human health, safety); and 24 economic impacts (costs of pest management, economic losses). 75.8 % of the 186 survey respondents consider urban tree pests/diseases a severe problem, and 51.1 % report high knowledge of tree pests/diseases. We found a lack of knowledge of certain reportable quarantine pests/diseases (e.g., canker stain of plane, emerald ash borer, Xylella) and pest/disease management options (e.g., manual treatment methods). The most widely used pest remedial measures are improvements of tree living conditions (60.8 %) and purchases of plants from certified or trusted local sources (59.7 %). In the city of Munich, neither policies, guidelines, nor programmes have considered tree pests, indicating a lack of awareness of this growing threat.

Conclusions: The findings will inform the development of future activities to prevent or reduce the spread of tree pests/diseases in urban areas.

Enhancing urban tree biosecurity: A policy and legislative analysis with a focus on EU frameworks

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Abstract

Background: Urban trees are increasingly threatened by quarantine pests, impacting ecological stability and urban well-being. Effective biosecurity is crucial, yet existing policy frameworks, including those at the European Union (EU) level, often face challenges in adapting to the complexities of urban environments, revealing gaps in proactive measures, coordination, and enforcement.

Objectives: This study critically analyzes current policy and decision-making frameworks for urban tree biosecurity, with a specific emphasis on the EU legislative landscape. It aims to identify strengths, weaknesses, and gaps in EU directives, regulations, and supporting mechanisms, and to propose evidence-based recommendations for enhancing policy coherence, effectiveness, and adaptability to protect urban green infrastructure within EU member states and candidate countries.

Methods: A qualitative policy analysis methodology will be employed. This will involve a comprehensive review of key EU plant health legislation (e.g., Regulation (EU) 2016/2031 - Plant Health Law), relevant EU strategies (e.g., EU Biodiversity Strategy, Green Deal initiatives), and national transpositions of these frameworks. Comparative analysis of regulatory approaches across selected EU member states and case studies will highlight practical implementation challenges and successes in the context of urban tree biosecurity.

Results: The analysis is expected to identify specific deficiencies within the EU framework and its national implementation concerning urban environments, such as in early detection/rapid response protocols for urban-specific pathways, funding allocation for urban surveillance, and the integration of biosecurity into EU urban planning and green infrastructure policies. Anticipated outcomes include identifying best-practice policy elements from EU and national contexts, innovative governance models suitable for urban settings, and strategies for strengthening stakeholder collaboration and public engagement in biosecurity in line with EU principles.

Conclusions: This research will offer valuable insights for EU policymakers, national authorities, urban planners, and National Plant Protection Organizations (NPPOs) operating within the EU context. Findings will support the development of more resilient, proactive policy frameworks, enhancing urban tree biosecurity and contributing to sustainable urban development against escalating pest threats, consistent with EU environmental and biosecurity objectives.

Optimising surveillance for multiple quarantine forest pests using a bioeconomic model

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Abstract

We designed surveillance schemes for multiple forest pests, addressing the following key questions: (i) What is the optimal total yearly investment? (ii) How should resources be allocated across pests? and (iii) At which locations should surveillance efforts be focused? To answer these questions for a surveillance programme targeting six priority quarantine and two quarantine forest pests in Switzerland, we employed a bioeconomic model.

The model optimizes the type, number, and placement of survey sites by considering variation in the likelihood of introduction, detectability, and spread rates across locations. It includes high-resolution trade data, host tree distributions in urban and forest areas, human population density, likely eradication costs, and pest-specific biological traits.

The model provided an estimate for optimal annual investment and generated species- and site-specific survey investment. For two pests (the longhorn beetles *Anoplophora glabripennis* and *Anoplophora* chinensis), the model determined that trapping surveys are economically unjustified. For these two pests, the high chances of detection by members of the public and low spread rates decreased the benefit of formal monitoring. Instead, encouraging detections by citizens by raising awareness would be more cost-effective. The model recommended focusing surveillance efforts in areas with high introduction risks and for species with low detectability by members of the public and rapid spread. We compare the model outputs to simpler heuristic approaches and discuss the advantages and limitations of using a bioeconomic framework for designing risk-based pest surveillance programmes.

Quarantine forest species surveillance in Portugal

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Abstract

The Portuguese official list of forest quarantine species includes dozens of Insects, fungi, bacteria and nematodes, with thousands of samples being analysed each year at referenced laboratories. The presentation will show the full list of species and sampling volume, with special emphasis to and the bacteria (*Xylella fastidiosa*) and Pinewood nematode – PWN (*Bursaphelenchus xylophilus*), since Portugal is the only European country where PWN is present.

Surveillance of quarantine forest pests in Croatia: analysis of practice and challenges

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Surveillance of quarantine forest pests is one of the main priorities of forest health monitoring programme in Croatia. In this presentation we will concentrate on the methodologies and equipment used for surveillance of forest pests in Croatia. This incorporates traditional approaches, such as visual inspections, trapping, morphological and molecular analyses, conforming to the EFSA and EPPO guidelines. New methods and technologies are also used: small aerial vehicles or drones equipped with multispectral, hyperspectral and thermal sensors which provide a better insight into forest health and damage where pests can be monitored over larger areas. Specific tools as LAMP essays are also used as early detection tool for quarantine forest pests. Long term experience and results from the last 10 years of surveillance can serve as a foundation for the development of targeted strategies and informed decision-making for future surveillance programs, enabling the prevention of introduction and spread of quarantine forest pests and continued protection of forest ecosystems in Croatia.

Forest Health Surveillance in Ireland

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Abstract

Ireland does not have the range of forest pests and diseases found on the European continent and overall has relatively good forest health status. Ireland has Protected Zone status, recognised in European Union Plant Health legislation, for a range of harmful forestry organisms which are present in other EU Member States but are not present in Ireland. To justify Ireland's Protected Zone status, the Forestry Inspectorate of the Department of Agriculture, Food and the Marine is required to conduct annual national forest health surveillance and submits reports annually to European Commission. In fulfilment of this requirement and for general forest health monitoring purposes, a network of observation points, pheromone traps, bait logs and sampling points distributed around the country in public and private forests, ports and forest nurseries. None of the forestry Protected Zone species, bark beetles in particular have ever been found as part of this surveillance. However, the non-European bark beetle *Pseudips mexicanus* was found in pheromone traps in Ireland in 2023 and in 2024.

Feedback from French experience with cancer stain (*Ceratocystis platani*)

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Abstract

Canker stain disease caused by *Ceratocystis platani* is a serious threat for plane tree (*Platanus* sp.) populations. The fungus reaches all *Platanus* species, and can cause significant damages on urban and natural populations of plane tree. In France, the disease has killed hundreds of thousands of planes trees since the end of World War II. On the Canal du Midi, since 2006, year of introduction of the disease, it was cut 30,000 plane trees out of the 42,000 that shaded the Canal. The Parc de la Tête d'Or in Lyon has lost half of its plane in 20 years. The mains vectors are human activities connected to infected tools, water and beetles. *Ceratocystis platani* is a quarantine organism in Europe and outbreak management is complex and very expensive

The aim of this presentation is to share the French experience regarding the management of the disease and the methods used. We will discuss the text of the law in force and the existing documents to help manage this scourge.

For now, there is no curative methods, only prophylactic actions can prevent or limit the spread of the disease.

It is necessary to alert countries, not yet affected by the disease, to implement preventive measures like prohibiting the importation of plane tree species from infected countries, and make it mandatory to disinfect tools when working on or near plane trees.

Keywords: *Ceratocystis platani, platanus,* Urban trees, canker stain

Poland's Preparedness for Plant Biosecurity Threats: The Role of Simulation Exercises on *Agrilus planipennis*

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Abstract

Agrilus planipennis (emerald ash borer) is a beetle from the *Buprestidae* family and is listed as a priority quarantine pest in the European Union. It poses a serious threat to ash trees in both urban and forest environments. Although the species has not yet been detected in Poland, its confirmed presence in neighboring countries highlights the need for effective preparedness and risk mitigation strategies.

As part of the national phytosanitary preparedness system, the State Plant Health and Seed Inspection Service (Polish National Plant Protection Organisation) organized a series of simulation exercises, addressing the potential introduction and spread of *Agrilus planipennis* in Poland. The exercises were conducted at both the central and regional levels, involving field inspectors, laboratories, and relevant partner institutions. The simulation scenarios included detection of a pest outbreak, diagnostic procedures, establishment of infested zones, implementation of official control measures, and communication with national and local stakeholders.

Simulation exercises are recognized as a key preparedness tool within the European Union. According to Regulation (EU) 2016/2031 on protective measures against plant pests, each Member State is required to conduct simulation exercises to test the functioning of their contingency plans. These exercises help verify coordination mechanisms, assess response capabilities, and strengthen operational readiness for emerging phytosanitary threats.

This poster outlines the scope, methodology, and outcomes of the exercises carried out in Poland. The initiative contributes to building a robust national response framework and aligns with EU-wide efforts to enhance plant biosecurity. It also provides valuable insights into practical implementation of contingency planning and risk communication in a real-world institutional context.

Early detection of exotic pests across urban and forest environments – integrating risk-based surveillance systems in New Zealand

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Abstract

Background: Trees—across natural forests and plantations, urban and amenity plantings, and other landscapes—face growing threats from invasive pests and pathogens. Despite strong pre-border and border biosecurity measures, new incursions are detected each year. Early detection at high-risk sites is essential to prevent establishment and spread.

Objectives: Traditionally focused within production forests, the approach to tree pest surveillance in New Zealand has evolved into a risk-based model. Rather than concentrating solely within forests, surveillance now targets high-risk entry points associated with import pathways and traveller movements. This presentation outlines two complementary national surveillance programmes currently operating in New Zealand: the *High-Risk Site Surveillance (HRSS)* and *Forest Biosecurity Surveillance (FBS)* systems. HRSS targets pests that could affect all trees and woody species across all environments, while FBS focuses on protecting commercial plantation species.

Methods: HRSS and FBS allocate surveillance effort using two complementary models:

- A common pest entry and establishment risk model, which maps the relative likelihood of introductions across sites and pathways.
- A surveillance optimisation model, used primarily in FBS, which allocates resources based on risk while factoring in cost, logistics, and survey feasibility.

Results: Both programmes improve early detection capacity across all tree types by focusing on high-risk urban and peri-urban locations. Surveillance is prioritised at sites where exotic pests are most likely to arrive, such as ports, transitional facilities, car yards, and other urban environments.

Conclusions: HRSS and FBS represent a modern, risk-based approach to forest and tree biosecurity. They also complement traditional *Forest Health Assessments*, still conducted within plantations, to monitor tree condition and detect emerging threats. Collectively, these systems provide a layered defence and offer transferable insights for other countries facing similar biosecurity challenges.

PORTRAP SORE 2021-2024: A trapping network using generic lures for early detection of non-native xylophagous species at ports-of-entry in France

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Abstract

Due to globalization and renewed trade routes, insect invaders are increasingly consisting of "emergent" species, which have never been observed before in areas other than their native ones, and thus often not included in the quarantine lists. The use of traps baited with blends expected to provide a generic attractiveness at genus or insect family level may enhance the possibilities to detect such unpredicted species at arrival. Since 2021, the National French project PORTRAP SORE deployed traps baited with a blend including 10 pheromones of Cerambycidae in 29 sites considered as potential ports-of-entry in the country. The traps were additionally implemented with ethanol and (-) α-pinene, two plant volatiles known to have a generic attractiveness for bark and ambrosia beetles. The trapping design consisted in a pair of black and green traps installed in the port and a similar pair placed in nearby wooden areas located within a radius of 1 km from the port.

Overall the 2021-2024 period, a total of 28 non-native species were detected, of which three intercepted for the first time in Europe. Species included eight Cerambycidae, 12 Curculionidae, four Bostrychidae, two Dryophthoridae, one Anthribidae and one Zopheridae. While only 11 non-native species were trapped for 510 individuals in 2021, these numbers increased to 18 species for 1503 individuals in 2024. In 2024, non-native xylophagous species have been intercepted in 24 of the 29 surveyed sites, with a maximum of eight species on the Corsican port of Bastia. Most species did not move outside the port of arrival but the trapping network allowed to follow the dispersal within the country of the cerambycid *Xylotrechus stebbingi* and the ambrosia beetle *Xylosandrus crassiusculus*, both likely vectored by domestic ornamental trade. The recurrent captures of eight of the aforementioned beetles has led to an ongoing categorization by phytosanitary services.

Role of birds as predators of non-native and native pests of urban trees

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Abstract

Background: Insectivorous birds may contribute to urban tree biosecurity by feeding on non-native (and native) insect pests of trees, potentially also reducing the likelihood of establishment of new pests.

Objectives: Our objectives were to study bird species composition and abundance in relation to gradients of urban tree cover, as well as the potential role of insectivorous birds in mitigating impacts of non-native tree pests.

Methods: We studied birds in three Swiss cities at replicated sites with tree cover ranging from industrial/commercial areas with low tree cover, to residential areas with intermediate tree cover, parks/cemeteries with high tree cover, and semi-natural peri-urban forests with high tree cover. We assessed insectivory of birds by determining predation rates of horse chestnut leaf miners as well as caterpillar mimics placed in trees. In addition, we used high-throughput DNA detection to identify prey species in faecal samples obtained from birds captured by mist-netting in urban and peri-urban areas.

Results: Tree cover and tree species composition significantly influenced bird diversity and insectivory, and urban tree cover levels >30% were found to be beneficial for both parameters. Faecal samples from birds revealed 259 zOTUs comprising 221 species, of which 13 were non-native invasive species, including the stink bug *Halyomorpha halys*, the lady beetle *Harmonia axyridis*, and the spotted-wing drosophila *Drosophila suzukii*. We found 70% fewer invasive species in forest samples and 27% more in urban samples than what was expected by chance, indicating proportionally higher levels of predation of birds on invasive species in urban areas than in forests.

Conclusions: The influence of native tree cover in particular has the potential to increase the insectivory function delivered by birds, with expected benefits for non-native insect control. We show that bird insectivory in urban habitats may mitigate the negative effects of invasive species.

The green wedges system of Poznań: An urban planning vision ahead of its time

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The green wedges of Poznań constitute a unique urban planning concept developed by Władysław Czarnecki in collaboration with Adam Wodziczko between 1930 and 1934. They represent one of the few realisations in Poland and Europe of the "green city" ideal. The plan foresaw sufficient green space for a future population of 600,000, although at the time the city had fewer than 300,000 inhabitants. Designed as a ring-and-wedge system, the layout links inner-city parks with suburban forests, with the wedges converging at the city centre and interconnected by three concentric green belts.

The first belt was created on the site of the medieval city walls, fragmented by the dense fabric of the Old Town. The second transformed the inner line of former Prussian forts, including the citadel, into green areas. The third developed around the outer line of forts. The wedges extend into the surrounding landscape, connecting the city to three Natura 2000 sites ("Dolina Cybiny", "Dolina Samicy", "Biedrusko"), as well as to Rogalin Landscape Park, Wielkopolska National Park, and the buffer zone of the Zielonka Forest. The design also incorporated the natural valleys of the Warta, Bogdanka, and Cybina rivers, alongside lakes Maltańskie, Rusałka, Strzeszyńskie, and Kierskie.

The scheme's primary aims were to safeguard water resources, establish ventilation corridors, enhance residents' quality of life, and provide accessible recreational spaces. Walking and cycling trails, and originally also bridle paths, were designated. While most areas are forested, the system also includes meadows, pastures, cemeteries, and allotment gardens. Today, Poznań's green wedges remain largely intact, though their condition varies across the city.

Synthetic Data Augmentation for Tree Pest Detection in Aerial Imagery

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Abstract

The European Union Horizon Europe Research Programme funds the FORSAID project (under grant n°101134200), which aims to leverage innovative technologies to improve the surveillance of alien and quarantine pests of trees. Remote sensing, combined with artificial intelligence, offers strong potential for the early detection and classification of tree damage. However, deep learning models typically require large volumes of human-labeled data, which in our case is both limited and unbalanced, with diseased tree instances notably underrepresented. Our work explores the effectiveness of generative methods to augment and balance a dataset dedicated to the detection of three stages of Pine Wood Nematode damage on drone imagery. We aim to improve the model's generalization capacity for detection on new imagery from different forest landscapes in France and Portugal. To this end, we curated a benchmark dataset of annotated orthoimages containing healthy, diseased, and dead pine trees. We developed generative pipelines combining GANs, diffusion models, and image blending techniques to synthesize realistic tree instances. Healthy trees in orthoimages were delineated and replaced with synthetic damaged versions within existing scenes. These methods simultaneously increased dataset diversity and addressed class imbalance. We evaluated their impact by comparing object detection model performance with and without synthetic data.

Proof of concept: Trapping for early detection of quarantine *Agrilus* species in Great Britain

Parker K

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Abstract

Forestry Commission completed an *Agrilus* trapping trial in England during 2024 to evaluate resource and design. Green sticky prism traps were deployed at 35 sites across England in close proximity to firewood importers/distributors, ports and harbours, with traps placed in the canopy of host broadleaved tree species. The target *Agrilus* species for early detection are *A. planipennis* (emerald ash borer), *A. anxius* (bronze birch borer), *A. bilineatus* and *A. fleischeri*; these quarantine organisms are not present in the UK. This study tested the trap design and implementation by aiming to capture species of *Agrilus* present in the UK as a proof of concept. Results from the preliminary year of the FC *Agrilus* trapping network proved to be very insightful and demonstrated that the deployment of green sticky prism traps in tree canopies was a relatively straightforward and effective surveillance approach for *Agrilus* beetles. The capture of 138 *Agrilus* beetles, representing seven *Agrilus* species is quite an achievement, considering that there are currently only 11 known species in the UK. A repeat survey has commenced in 2025 to further inform future trapping programme design, and ongoing literary review is used to further refine these early detection methods.

Prototype decision-making tool for choosing tree species to plant in cities

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Background

Urban forests are widely recognised for the many services they provide to citizens, including thermal comfort, pollution reduction, amenities and biodiversity. However, not all tree species contribute equally to people's well-being. They also vary in terms of their resistance to the many stresses present in urban environments and are more or less easy to plant and maintain. It is therefore necessary to help urban forest managers identify tree species that offer the best compromise between the services they provide and the constraints of tolerance and management.

Objectives

The main objective of the study was to develop a proof of concept for a user-friendly decision-making tool capable of integrating a set of criteria related to ecosystem service provision, disservices, stress tolerance and management constraints for common tree species in Europe, and to combine them in order to identify those that should be prioritised for planting in cities.

Methods

We have identified the 40 tree species most frequently planted in major French cities. For each species, we documented 38 criteria corresponding to ecosystem services (pollution control, carbon storage, heat mitigation, water runoff control, human well-being, biodiversity…), disservices (allergies, risk of injury, damage to roadways, etc.), tolerance to abiotic stresses (e.g., drought, soil compaction) and biotic stresses (native and non-native pests and pathogens), and management constraints (e.g. tree growth, pruning, etc.). We then used the Promethee algorithm to aggregate all these criteria and provide a comprehensive ranking of the tree species tested, from most to least preferred.

Results

We were able to quantitatively or semi-quantitatively estimate 28 criteria from among the 38 preselected for the 40 tree species. Preference functions were used to normalise these criteria to enable their aggregation. Tree species were successfully ranked from best to worst based on maximising service provision and tolerance to multiple stresses, as well as minimising disadvantages and management constraints. The ranking of tree species differed depending on the weighting assigned to the different criteria.

Conclusions

This study demonstrates that it is possible to design a multi-criteria decision-making tool to compare the suitability of tree species for planting in urban areas. It shows that criteria with different quantitative or qualitative measures, which must be either maximised or minimised, can be aggregated in the search for a compromise. The method also allows criteria to be weighted individually, giving users the possibility to assign different weights to different criteria, depending on their specific objectives. However, challenges remain, such as documenting a larger number of criteria for more tree species in order to transfer the tool to the European level. The data and knowledge gathered collectively as part of the Urban Tree Guard project should provide a solid basis for this development.

Two targets at one shot – entomopathogens against insect pests and plant pathogens

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Abstract

The bark beetle *Ips typographus* has recently become one of the most destructive biotic agents in mature spruce forests in Europe. This beetle is widespread in the distribution area of its main host, *Picea abies*. Ecologically, this pest is an integral part of the spruce ecosystem. It colonises fallen, stressed, or dying trees until its population exceeds a critical level. However, the rapid intensification of climate change is altering forest ecosystems. Aggressive beetles are now killing healthy trees in large numbers. Once they exceed a critical threshold, they cause considerable economic damage to European forests. Despite the presence of aggressive insect pests in European forests, phytopathogenic fungi such as *Alternaria*, *Diaporthe*, *Fusarium*, and *Phytophthora* are important for both forests and nurseries. These pathogens cause significant losses every year, so effective methods of biocontrol must be found. Chemical pesticides are widely used to control plant diseases. However, they have a negative impact on the environment and disrupt the balance of the ecosystem. For this reason, attention is increasing focussing on natural alternatives, especially on the biocontrol potential of microorganisms. Entomopathogenic fungi (EPF) are widspread in nature and have been shown to have considerable biocontrol potential against insect pests and plant pathogenic fungi. In this study the antagonistic effect of EPF's on phytopathogens was analysed. The results showed that certain isolates of the microorganisms exhibited high antagonism against the most important plant pathogens (*D. eres*, *F. culmorum*, *F. oxysporum*, *Ch. thielavioides*, *B. cinerea*, *P. cactorum*). Further studies will investigate the pathogenicity of EPF in *Galleria mellonella* (model organism) beetles. This work will help to provide information on the use of entomopathogens in biocontrol against insect pests and potential plant pathogens. The results of this study will contribute to the development of biocontrol measures for the protection of forests, seedlings and nurseries.

Foliar fungal endophytes of trees on a rural-urban gradient: a continental–scale study.

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Urban areas are characterized by habitat fragmentation, altered climate (e.g., extreme heat and drought), high pollution, and a large proportion of non-native species. These challenging conditions impact urban trees and organisms associated with them, including foliar fungal endophytes. This is important because some fungal endophytes are known to help their hosts resist biotic and abiotic stresses, while others can become pathogens in weakened hosts. Urbanisation may alter endophyte communities directly, or indirectly via stress-induced changes in their hosts, potentially reducing their diversity and favouring generalists over specialists and pathogens over mutualists, with consequences for tree health. Despite their ecological importance, endophyte diversity in urban trees remains poorly understood, with most studies focusing on culturable taxa and on a limited number of tree species within small geographical areas.

This study aims to investigate foliar fungal endophytes along urbanisation gradients across European cities using high-throughput sequencing. We focus on three widespread broadleaf tree genera—*Quercus, Acer, and Fraxinus*—including native and non-native species at each location. In collaboration with participants of the COST Action CA20132 "Urban Tree Guard," sampling was carried out in about 40 European cities in the summer of 2025. Within each city, trees were sampled at sites along a rural-urban gradient. Data on tree morphology, health status, and local tree diversity were collected and will be supplemented with open-access data on climate and land cover to analyse the relative importance of these factors in driving the differences in endophyte diversity. Additional sampling and exploratory data collection will be carried out in autumn 2025.

This study will enhance our understanding of how anthropogenic activities affect diversity patterns of tree endophytes on a continental scale and the potential consequences on tree-associated biodiversity. Ultimately, these findings represent groundwork for mitigating the effects of urbanisation and preserving the ecological functions of urban forests.

New challenges in monitoring tree health and invasive pathogens in urban environments and support decision

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Abstract

Tree health and biosecurity are paramount for ensuring the performance of urban green spaces and their provision of ecosystem services. Innovative general and specific approaches can support this mission by offering valuable tools and metadata to inform decision-making. One such tool is the Decision Support System (DSS), increasingly adopted by major cities to guide urban planning and management.

Integrating informative layers into DSSs—such as data on urban tree composition, history, and health status—can significantly enhance their capacity for monitoring tree health and assessing risk.

Multisensor devices, strategically installed across different urban green space typologies, can collect extensive temporal datasets. These data are crucial for evaluating the impact of various environmental factors, including biotic stressors. For instance, sap flow curves from chestnut trees affected and unaffected by *Phytophthora* root rot offer valuable insights into disease impact.

This information can be further enriched by metabarcoding, which explores microbial biodiversity associated with trees, as demonstrated in several recent pioneering studies.

Another emerging opportunity lies in laser scanning technologies, employed through both proximal and remote sensing methods. Alternatively, simpler panchromatic image scanning using a 'street view' approach can yield detailed, individual-level data on urban trees.

The major advantage of these novel approaches is their ability to create temporal data layers, which can be integrated into DSSs. These layers enable differential visualization of tree conditions and performance over time, enhancing urban forestry management.

These innovations represent a fundamental step toward more sustainable and resilient urban management, where tree health becomes a key indicator of environmental quality and urban well-being.

Know them to stop them: The first world database on bio-ecology and distribution of Scolytinae

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Abstract

Scolytinae (Coleoptera: Curculionidae) are one of the most successful groups of invasive forest species. They generally move among continents transported within live plants, timber and wood-packaging materials. This grants them protection from adverse travel conditions and allows them to often go unnoticed by phytosanitary inspections. The economic and ecological damage caused by these insects are caused both by the direct action of burrowing within host plant tissues and by the plant pathogens vectored by some species. Typically, monitoring protocols consist of ethanol-baited traps or pheromones-baited traps for specific surveys at points-of-entry and surrounding forests, in order to detect new introductions at an early stage. However, knowledge of their bio-ecological traits, as well as their origin, is essential to contrast the introduction of new and potentially harmful species. This kind of information is scattered through a large amount of papers, catalogs and books, not always easily available. For this reason, an online open access database collecting information for all the 6,501 Scolytinae species currently known was created: "Scolytinae hosts and distribution database" (https://www.scolytinaehostsdatabase.eu/site/it/home/). The database contains information on their reproduction, feeding habits, host plants and distribution. The database is keep updated yearly with information from new publications. Moreover, a new project aims to expand the database adding pictures and information about diagnostic methods for identification of the species, both morphological and genetic; and giving information on the impact of the species, particularly on the transmission of pathogenic fungi. With this database, it will be possible to quickly retrieve a wealth of information on Scolytinae, that will be useful in planning effective monitoring methods and thus preventing new introductions. By knowing the host plants and the origin of the species it will be possible to plan more targeted phytosanitary policies and protocols.

Improving pinewood nematode monitoring in France based on risk analysis

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Abstract

The Plant Epidemiological Surveillance Platform (ESV Platform) is in charge of improving plant health surveillance in France. The platform is made up of experts from 7 partners (INRAE, Anses, DGAl (Ministry of agriculture), Chamber of Agriculture, FREDON, Agricultural technical institute, Cirad). Surveillance, analysis, and advice are the main areas of action for public policy and plant health professionals. The ESV Platform includes many working groups dedicated to a specific topic (*Xylella fastidiosa*, Huanglongbing, pinewood nematode (PWN), vine dieback, …). PWN, *Bursaphelenchus xylophilus*, is a UE priority quarantine pest, obliging each state member to monitor and to manage this pathogen on its territory. The PWN monitoring working group brings together experts and professionals to work on improving surveillance of this pest.

As part of this effort, a relative risk analysis was conducted. After identifying the risk criteria, a multi-criteria analysis was carried out with the experts of the working group, resulting in maps that can be used by risk managers. Thus, areas at risk of PWN entry and establishment have been identified, as well as areas at risk of disease expression in France. Based on these results, surveillance conducted in recent years was evaluated, and a sampling plan is proposed.

Moreover, the insect vector population was estimated according to two models to better target the risk of establishment and improve insect monitoring through trapping.

The invasion framework helps the management of the spread of canker stain disease of plane trees.

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Abstract

Ceratocystis platani, the causal agent of canker stain disease (CSD), is an invasive forest pathogen (IFP), native to North America and introduced to Europe during World War II. The outcome of the disease is almost always fatal, and it can completely alter natural, planted and urban forests and woody landscapes. Oriental and London plane trees in some parts of Europe are currently at risk of extinction in both urban and natural areas, as there are no limiting factors to the spread of this pathogen wherever plane trees grow. This results in direct and indirect impacts on natural and human communities, including significant alterations in species richness and abundance, as well as the loss of various ecosystem services.

The invasion process of IFPs consists of four main stages: the arrival of individuals (propagules) in a new territory, sometimes followed by a phase of population establishment, then its development into an epidemic phase, and finally its geographical expansion. The principle of preventing the risks associated with these invasive species is to hinder the transition from one phase to the next as quickly and effectively as possible.

Here we highlight how the development and validation of various early and highly sensitive detection methods, both biochemical and molecular, can prevent the further spread of the CSD to the east and north Europe, as well as to better understand the biology of the pathogen.

The Status of *Ceratocystis platani* in Türkiye: Spread beyond Istanbul

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Abstract

The presence of *Ceratocystis platani* causing serious dieback and mortality of *Platanus* x *acerifolia* and *P. orientalis* was confirmed in European districts of Istanbul in 2018 (Lehtijärvi et al. 2018). At that time, a survey along roads and in parks indicated that the disease was more marked following management interventions, including pruning and felling.

In late 2023, dying *Platanus* were observed in towns, cities and the wider environment in locations in Anatolia (Asia) to the south and west of Istanbul, including the Marmara region and as far south as Denizli. A project began in 2025, therefore, to determine the spread of *C. platani* in Türkiye and to provide training to local tree managers in the recognition of the problem.

Loop-mediated isothermal amplification (LAMP) technology was used for the first time in Turkiye to identify the pathogen in infected tissues in the field. The pathogen was found in trees of both *P. orientalis* and *P.* x *hispanica* and data on occurrence analysed using the Kriging approach to visualize spatial distribution patterns, hotspots and risk areas, enabling accurate predictions in areas with low sampling density.

Information on recognition of diseased trees and infection biology of *C. platani* is being provided in training courses and workshops for municipal employees, quarantine officers and personnel from the General Directorate of Forestry, emphasizing the threat of plane stain canker and detailing the importance, use and application of the LAMP device. Practical training will be included to ensure that participants can use this technology effectively. In these courses, field personnel become more proficient in pathogen detection, enabling a more proactive role in combating serious quarantine diseases like plane tree canker.

Reference

Lehtijärvi, A., Oskay, F., Doğmuş, H.T., Aday Kaya, A.G., Santini, A. & Woodward, S. (2018). *Ceratocystis platani* killing *Platanus* trees in Istanbul, Turkey. *Forest Pathology* **47**: e12375.

Management of *Ips typographus* in the UK

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Abstract

The larger eight-toothed spruce bark beetle (*Ips typographus*) is one of the most damaging pests of spruce (*Picea* spp.) across Europe (Inward *et al.* 2024). Spruce makes up more than 50% of commercial planting in the UK, so it is vital this beetle species is prevented from establishing (Inward *et al*. 2025). Breeding populations of *Ips typographus* were not found in England until 2018, when they were discovered and eradicated from Kent, England (Blake *et al.* 2024). Since 2021, subsequent incursions in Kent, Sussex, Norfolk and Suffolk have been detected. Extensive work has shown that these are the result of long-distance dispersal from the continent (Blake *et al*. 2024; Webb, Blake & Gilligan 2024). Methods of surveillance and management of *I. typographus* in the UK have developed since 2018, leading to more efficient monitoring and detection. Evidence shows that current eradication campaigns have been successful in significantly lowering *I. typographus* activity by removing spruce and preventing onward spread to surrounding sites, compounded however, by regular dispersal events from continental Europe. This talk will explore the current surveillance and eradication methods in place to prevent this species from establishing and causing significant economic and environmental damage to our forestry and timber industries. We will also examine how our strategies have changed throughout the years and how they will develop in the future.

Fig.1: Pheromone trap baited with *Ips typographus* lure used as part of the surveillance strategy to monitor and eradicate *Ips typographus* in the UK.

References

Blake M et al. (2024). Recent outbreaks of the spruce bark beetle *Ips typographus* in the UK: Discovery, management, and implications. Trees, Forests and People, 16, 100508.

Inward D et al. (2024). Evidence of cross-channel dispersal into England of the forest pest *Ips typographus*. Journal of Pest Science, 97(4), 1823-1837

Inward D et al. (2025). Investigating the threat to Sitka spruce from *Ips typographus*: discrimination and colonization of Britain's principal commercial conifer by a damaging forest pest. Pest Management Science.

Webb CR et al. (2025). Phenology of the spruce bark beetle Ips typographus in the UK under past, current and future climate conditions. Plants, People, Planet, 7(1), 284-300.

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Pinewood nematode and the UK? Exploring potential alternative vectors of *Bursaphelenchus xylophilus* through the characterisation of beetle cuticular compounds.

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Abstract

Pine wilt disease (PWD) is recognised as one of the most serious threats to conifer forestry worldwide. The disease is caused by the pinewood nematode (PWN*), Bursaphelenchus xylophilus*, which has formed novel phoretic vector associations with different species of cerambycid *Monochamus* beetles, in each new country it has become established in. PWN aggregates toward *Monochamus* pupae using chemical cues (volatile organic cuticular compounds, VOCCs) inherent to the beetle cuticles. PWN continues to spread despite extensive containment efforts in the affected countries, whilst climate change and global movements exacerbate the risk of introduction. PWN has been intercepted at UK ports, and is expected to arrive in the UK in the coming years. In contrast to continental Europe, the UK has no indigenous *Monochamus* species, but does the absence of *Monochamus* preclude the establishment of PWN? We will examine the potential of alternative vector species that may facilitate the spread of PWN in the UK. The UK has several beetle genera (Curculionidae and Cerambycidae) with similar feeding strategies to *Monochamus*, carrying out maturation feeding on healthy plant tissues, and could hypothetically enable infection via primary transmission of the nematode. These genera and other cerambycids are already known to carry related *Bursaphelenchus* spp. (although not *B. xylophilus*), and, therefore may have previously been overlooked as potential transmitters of PWN, both in the UK and Europe. This research compares the cuticular compounds of previously characterised known-host *Monochamus galloprovincialis* to UK-native candidate vector species. Cuticular profiles are characterised by 2-dimensional gas chromatography mass spectrometry (GCxGC-MS). Comparing cuticular profiles could provide insight into why the *Monochamus* genus is favoured and may also highlight candidate species for further investigation. We will discuss the implication of our findings on the projected security of UK pine forests in the absence of a PWN preferred vector.

Emerging fungal pathogens of Aesculus hippocastanum across Europe and the worsening condition due to the correlation with *Cameraria ohridella*

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Abstract

The Horse Chestnut tree (*Aesculus hippocastanum*) is a widely distributed urban area and forest species across Europe. However, in the last two decades, it has encountered significant challenges due to a climate change promoted emergence of various fungal pathogens, and infestations of the destructive leaf miner (*Cameraria ohridella*).

To monitor the tree health along a climate gradient, a comprehensive study was conducted along a Southwest to North Europe transect across six countries and ten urban forest areas. Approximately 700 trees were investigated, and 750 symptomatic leaves were sampled to isolate fungal pathogens. Molecular markers were used for species determination of the pathogens. Additionally, the study aimed to examine the composition and distribution of fungal communities along the transect, accounting for local variations.

During the monitoring phase, notable observations suggested a potential correlation between the presence of specific pathogens and the activity of the leaf miner, *C. ohridella*. Therefore, a field experimental study was undertaken using insect nets to enclose 40 individual trees to explore this association further. Four different treatments were implemented, with ten trees assigned to each group: 1) moths transporting fungal spores by exposing five litres of fungal-infected and moth-infested leaves from the previous year; 2) enclosing five litres of fungal-infected and moth-infested leaves in insect nets, allowing spores to infect the enclosed leaves while retaining the moths; 3) moths only; and 4) control group (untreated trees). Additionally, two methods were employed to differentiate between airborne and moth-transmitted fungal spores. Illumina MiSeq sequencing analysed fungal spore traps to assess the entire fungal community composition, while media Petri-dishes captured cultivable spores using an air particle sampling device.

The study results underscore the presence of specific fungal communities exhibiting distinct patterns along the Southwest to North Europe transect. In addition, these findings highlight the influence of climate and geographic regions on the distribution of fungal populations. Moreover, the study supports the correlation between specific fungal communities and the presence of the Horse Chestnut leaf miner, *C. ohridella*. The elevated temperatures and growing correlation significantly threaten urban environments and heighten the mortality risk of Horse Chestnut trees.

Invasive pests and pathogens threatening green urban areas in 'St. George' city park in Dobrich, northeastern Bulgaria

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Abstract

Background: Urban environments harbor invasive species that pose a significant threat to established tree and shrub vegetation. Newly introduced non-native pests and pathogens in northeastern Bulgaria have been identified, causing severe damage to host plants and altering the species composition in urban green areas.

Objectives: The current study aimed to identify the threat of penetration and spread of aggressive insect pests and fungal pathogens, leading to the degradation of tree and shrub vegetation in urban green areas of a pilot site – the largest city park 'St. George' in Dobrich (northeastern Bulgaria).

Methods: Between 2023 and 2025, the health status of tree and shrub vegetation was evaluated by specific indicators, including assessment of crown condition, the presence of dried or rotted trees that pose a threat to human health, and the presence of pests and pathogens that cause allergic reactions in people. In this study, we developed a mobile-based system based on ArcGIS Field Maps from ESRI, suitable for both Android and iOS. It includes 20 specific fields for assessing the health status of trees in urban areas, collecting data from field studies, and transferring them to electronic records.

Results: Severe infestation of oak (*Corythucha arcuata*) and sycamore (*Corythucha ciliata*) lace bugs was established. The newly introduced aphid *Cinara cedri cedri* was identified on *Cedrus atlantica* trees. Both the horse chestnut leaf miner (*Cameraria ohridella*) and the fungus *Guignardia aesculi* caused foliar damage and premature defoliation of *Aesculus hippocastanum* leaves. Pine species were infected by the pathogens *Dothistroma septosporum* and *Diplodia sapinea*. The fungal pathogen *Botryosphaeria dothidea* caused blight disease on *Sequoiadendron giganteum* and *Juniperus* spp. A xylariaceous ascomycete *Biscogniauxia mediterranea* – a causal agent of charcoal canker disease was established on red oak (*Quercus rubra*) trees.

Conclusions: The adverse effects of the invasion of non-native pests and pathogens have deteriorated the health status of the tree species and reduced the ecosystem services delivered by the largest city park in Dobrich. Water stress during the last growing seasons appeared to reduce the resistance of trees and predispose them to infection by invasive pests and pathogens.

Acknowledgments This work was carried out in the framework of the project 'Threats from aggressive insect pests and fungal pathogens in green urban ecosystems in Bulgaria', Contract No. KP-06-COST/18 dated 14.12.2023, financed by the Bulgarian National Science Fund.

Birch pollen virome: fungal and plant viruses co-infecting urban trees in Berlin*

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Abstract

Viral epidemics in European birch have been spreading throughout Europe over the last two decades (Rumbou et al., 2021). The disease is called birch leaf-roll disease (BLRD) and is primarily attributed to a DNA badnavirus, birch leaf-roll-associated virus (BLRaV), although it usually involves a complex of co-infecting viruses (Rumbou et al., 2020). Consequently, a wide range of foliar symptoms may be exhibited, including interveinal chlorosis and necrosis, leaf rolling, reduced leaf size and mottling.

To investigate the virome of pollen samples from urban birches in Berlin, we applied RNA-Seq on two samples. Bioinformatic analyses revealed the presence of the known plant viruses BLRaV, cherry leaf roll virus and birch idaeovirus. Additionally, three mycoviruses were identified in those samples; the recently reported 'birch toti-like virus' (BTLV); a second totivirus not reported before; and a novel putative mitovirus. Toti- and mitoviruses commonly occur in fungal or protist hosts and not in plants. To validate the results, primers specific to BTLV were designed and pollen samples collected in spring 2025 were tested for the presence of the virus, which was confirmed.

To our knowledge, this is the first report of putative mycoviruses in tree pollen. The discovery of virus families, typically associated with fungal hosts, in birch pollen raises compelling questions about cross-kingdom viral transfer and the ecological functions of viruses within plant reproductive tissues (Vainio et al., 2024). As birches and other urban tree species propagated via tissue culture or in nurseries are not subject to virus regulatory controls, these pathogens continue to spread. Our aim is to raise awareness of the limited knowledge surrounding the biological relevance and broader ecological impact of the virome in urban tree populations, which are already under stress due to various factors.

References

Rumbou A, Candresse T, Marais A, Svanella-Dumas L, Landgraf M, von Bargen S, et al. (2020) Unravelling the virome in birch: RNA-Seq reveals a complex of known and novel viruses. PLoS ONE 15(6): e0221834. https://doi.org/10.1371/journal.pone.0221834

Vainio, E.J., Rumbou, A., Diez, J.J., Büttner C., 2024. Forest Tree Virome as a Source of Tree Diseases and Biological Control Agents. Current Forestry Reports. https://doi.org/10.1007/s40725-024-00214-8

Rumbou, A. Vainio, E.J. Büttner, C., 2021. Towards the Forest Virome: High-Throughput Sequencing Drastically Expands Our Understanding on Virosphere in Temperate Forest Ecosystems. Microorganisms, 9, 1730. In the Special Issue: "The Role of the Virome in Health and Disease". https://doi.org/10.3390/microorganisms9081730.

*These findings emerged from a collaborative Short-Term Scientific Mission (STSM) involving the Humboldt University of Berlin and the National Institute of Biology in Ljubljana, Slovenia.

Isolation and pathogenicity of Oomycetes from recreational and control sites in Spanish national parks

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Abstract

Forest diseases, particularly those caused by invasive exotic pathogens; pose an increasing threat to ecosystem stability, with significant economic and environmental impacts worldwide. Among the most concerning pathogens in forests and nurseries are species of the genus *Phytophthora* and other oomycetes, which attack tree root systems, leading to mortality and threatening forest biodiversity. Conservation areas are experiencing a growing influx of visitors, increasing the biosecurity risks associated with human-mediated pathogen dispersal, particularly through vectors such as hikers and mountain bikers. Soils in these areas are especially vulnerable, as they play a crucial role in seedling regeneration and ecosystem resilience. This study aimed to advance our understanding of visitor activity as a pathway for pathogen introduction and to assess the potential pathogenicity of these organisms in forest species. To achieve this, we collected soil samples from both recreational and control areas in six National Parks across Spain, obtaining 144 soil samples from trees of eleven forest species. To determine whether visitor presence increased the risk of soil-borne pathogen introduction, we applied the baiting method to isolate *Phytophthora* spp. from the samples. We then conducted pathogenicity tests to evaluate whether the isolated species posed a threat to the forest species present in the National Parks. From the 144 soil samples, we obtained 102 isolates belonging to *Phytophthora, Pythium*, and *Phytopythium* species. We observed a significant effect on the plant species, with *Fraxinus excelsior*, *Quercus robur* and *Betula pendula* yielding the highest number of isolates. Sampling location also had a strong effect, with certain National Parks, such as Picos de Europa and Ordesa, showing higher frequencies of pathogen presence. Soils from recreational areas had a higher isolation frequency, although the difference was not statistically significant. From the pathogenicity trials, we found one isolate of *P. plurivora* that produced necrosis, although the experiment is still ongoing. Our findings suggest that visitor presence may elevate the risk of introducing certain forest pathogens, although their establishment may be influenced by other environmental and biotic factors. These results highlight the need for biosecurity measures to mitigate pathogen spread in forest reserves.

Keywords: biosecurity, invasive exotic pathogens.

Emerging pathogens in urban forests in Germany causing an increased safety risk due to stem and branch cankers

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Abstract

Raising temperatures, less precipitation, and more extreme weather events cause trees to suffer from stress, such as drought. While the trees invest their energy in compensating for suboptimal conditions, they weaken the host tree, making it more susceptible to pest and pathogen infections.

On the other hand, insects, invertebrates, and microorganisms are emerging in areas with warmer climates, finding ideal conditions to infest and infect host trees that are too weak to defend themselves, thus becoming highly susceptible.

Starting early in 2023, red-colored bleeding cankers have been detected in various cities in Germany, primarily affecting plane trees. The symptoms of the stem and branch cankers are caused by a combination of bacteria and fungal pathogens originating from warmer climate areas, insects and invertebrates. Plane trees in urban areas undergo regular pruning measures, and observations suggest a correlation between these cuttings and increased bleeding. Raising awareness about the importance of using disinfected pruning tools may be crucial in preventing the further spread of these symptoms.

Additionally, there has been a concerning increase in stem cankers among urban tree species such as Yew Tree, Maple, Beech, and Horse Chestnuts in recent years. Wood density measurements have linked decay to the canker symptoms. The isolated fungi belong to atypical genera in relation to their corresponding host trees, indicating a broadening infection spectrum of fungal species expanding into new areas.

From a safety standpoint, close monitoring is crucial for identifying initial indications of fungal infections, as fungi often remain latent within their hosts and are not visible from the outside, posing a safety risk. When environmental conditions change, their lifestyle switches to pathogenic, and they begin to degrade the wood inside their hosts. Only in the later stages do cankers appear in the stem, indicating the unstable condition of the host trees.

These findings underscore the importance of closely monitoring urban forest trees to identify potential safety risks in a timely manner.

Biotic and abiotic damage to oaks in forest and urban habitats: A comparative study

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Abstract

Background: Oaks (*Quercus robur*, *Q. rubra*) play key ecological roles in both forest and urban ecosystems, yet they are increasingly threatened by decline caused by complex biotic and abiotic stressors. While Acute Oak Decline (AOD) has been extensively documented in natural forests, limited data are available on its occurrence in urban environments.

Objectives: This study aimed to compare the extent of biotic (mainly bacterial) and abiotic damage in oaks growing in forest and urban habitats, with a particular focus on the presence of AOD-associated bacterial pathogens.

Methods: Field surveys and microbiological sampling were conducted in 2023/2024 in two contrasting environments: urban areas of Wrocław and forest plots across western Poland. Symptomatic oaks were sampled, and DNA extracts were tested using multiplex real-time PCR targeting *Brenneria goodwinii*, *Gibbsiella quercinecans*, *Rahnella victoriana*, and *Lonsdalea quercina*. Forest trees were additionally assessed for abiotic injuries and signs of insect activity.

Results: In urban areas, 11 out of 56 oak trees tested positive for AOD-related bacteria, with *B. goodwinii* most frequently detected. Its presence in *Q. rubra* was confirmed for the first time in Poland. In forest habitats, biotic damage was less frequently linked to AOD bacteria but more often to bark injuries and secondary insect colonization, especially in sites with high drought stress. The overlap of multiple pathogens was more common in urban trees than in forest stands.

Conclusions: Urban trees, though exposed to severe abiotic stress, can serve as reservoirs for bacterial pathogens traditionally associated with forest decline. These findings underscore the need for integrated urban–forest health monitoring and highlight the role of environmental context in modulating oak vulnerability.

Possible causes of shoot dieback of *Juniperus excelsa* in Western Türkiye

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Abstract

A serious dieback problem on *Juniperus excelsa* was reported by the Turkish Forestry Directorate in the Lake District of Western Türkiye (Burdur, Bucak and Sütçüler provinces); these juniper trees are of great economic and ecological significance in Turkish forests and urban/ornamental plantings. This work, including an STSM, focused on possible fungal pathogens causing the dieback; the potential role of insects was ruled out by previous investigations.

The fungal community present in 900 shoots of 180 *J. excelsa* trees was sampled. Isolates (108) from affected *J. excelsa* trees were divided into 47 groups based on morphology. One or more isolates from each morphological group were selected and DNA extracted. PCR was used to amplify the ITS region using ITS1F and ITS4, and the amplicons sequenced at the Estonian Bioscience Centre, Tartu. BLAST analyses identified 21 species within the 47 groups, including several species previously associated with blights and cankers on junipers and several wide host-range pathogens. Potential pathogens of *Juniperus* identified included *Cytospora cedri*, *Kabatina juniperi*, *Dothiorella iberica* and *Phaeobotryon* sp., along with wide host-range pathogens, such as *Alternaria* spp., *Botrytis cinerea* and *Epicoccum nigrum*, and known decay-causing fungi.

In May 2025, pathogenicity tests were established in a growth room at IUAS, by inoculating stems of two-year old *J. excelsa* plants with mycelium from fresh cultures. Three months after inoculation, plants were destructively harvested and lesion lengths measured, to determine the most virulent of the species within the pathogen isolates.

Mapping of urban forest managers in protected areas in Serbia

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Abstract

Urban forests and protected areas are interconnected components of the broader ecological landscape, working together to provide essential ecosystem services, to support sustainable land use, particularly where protected natural spaces extend into or border urban environments, and to protect biodiversity. Their connection is particularly evident within the frameworks of green infrastructure and landscape planning. Urban forest includes all trees, forests and green spaces within and around urban areas. These spaces are managed to enhance citizens well-being and to support various recreational, aesthetic and ecological functions. From the other side, protected areas are legally and formally designed spaces aimed at long term protection of nature, biodiversity and ecosystem services. The effectiveness of both systems in delivering their intended functions is strongly dependent on the quality of urban forest management and urban forest managers play a critical role in this interface. To gain insight into who manages urban forests in Serbia, specifically within the context of protected areas, official database of the Agency of Nature Conservation was used. From this dataset, all protected areas located outside urban environments were excluded, allowing for the identification and mapping of urban forest managers operating within cities. To examine differences in the size of urban forests under various management types, non-parametric statistical tests, the Mann-Whitney U test (two groups) and the Kruskal-Wallis test (three and more groups), were applied. The analysis identified two main types and four categories of urban forest managers, which were subsequently mapped and spatially visualized (Figure 1 and Figure 2).

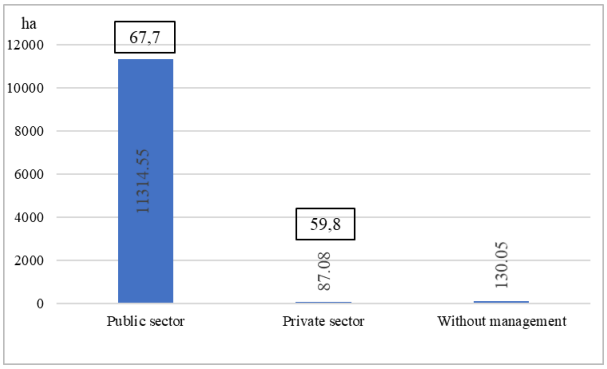

Figure 1. Type of urban forest managers (area, rank)

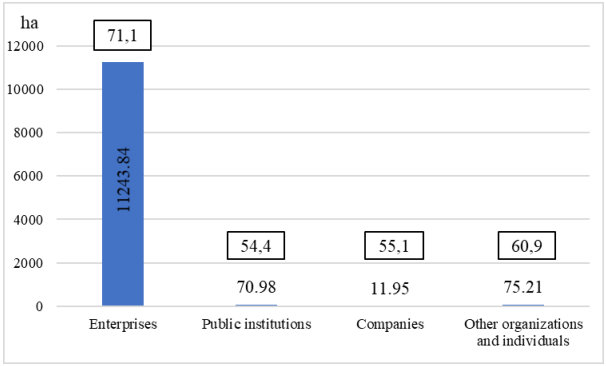

Figure 2. Category of urban forest managers (area, rank)

The results of the Mann-Whitney U test showed that there is no statistically significant difference in the size of urban forests between public and private sector managers (U = 1269.000, Z = -0.974, p = 0.330). Although the public sector had a slightly higher average rank (67,7) compared to the private sector (59,8), the difference was not statistically significant. This suggests that, on average, urban

forest areas managed by the public sector are larger than those managed by the private sector. Additionally, the number of urban forests is higher in the public sector (103) compared to the private sector (28).

The Kruskal-Wallis test did not show a statistically significant difference in the size of urban forests among different categories of managers ($\chi^2 = 4.313$; df = 3; p = 0.230). Although enterprises had the highest average rank (71,1), the differences between the groups were not statistically significant. The high average rank for enterprises suggests that they generally manage larger areas of urban forests. In contrast, institutions, companies, and other organizations had lower average ranks (54.4 - 60.9), indicating that they manage smaller areas on average. Looking at the number of urban forest, enterprises (82) have the highest urban forest, compared to other organizations and institutions (23), public institutions (21) and companies (5).

Although the results showed no statistically significant differences in the size of urban forests managed by public versus private sector managers, or among the four manager categories, certain trends were observed. Public sector managers and enterprises, on average, manage larger urban forest areas, suggesting a concentration of management responsibility and possibly greater institutional/organizational capacity within public sector. These findings suggest that while surface area alone does not significantly differ across management types/categories, there is a need for further investigation into the quality of management, stakeholder engagement, and biosecurity outcomes across these types/categories. Future strategies should aim to strengthen the coordination between public and private managers and to ensure that all managers, regardless of size, are equipped to effectively support urban sustainability and conservation goals.

Key words: urban forests, protected areas, public vs private sector, managers

Diplodia seriata is a "silent killer" of *Quercus robur* trees after replanting in Novi Sad, Serbia

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Abstract

Species of the Botryosphaeriaceae are well-known endophytes, latent pathogens, and opportunists of various forest and ornamental trees, including pedunculate oak (*Quercus robur*). In Serbia, *Q. robur* is a keystone species of riparian forests in the lowlands. It is also a valued ornamental tree, frequently produced in both forest and ornamental nurseries. *Q. robur* forests are suffering from acute oak decline, caused by various abiotic and biotic factors, including the pathogenic fungus *Diplodia seriata*. In Serbia, the fungus has been isolated from necrotic lesions on the stems of mature trees in a riparian forest; however, Koch's postulates were fulfilled on 3-year-old seedlings, and the fungus has never been isolated from a dying tree.

In May 2025, during a monthly inspection of urban greenery, several dead and dying *Q. robur* trees were observed in Zeleznicki Park, Novi Sad. These trees exhibited symptoms typical of Botryosphaeriaceae infections, such as girdled stems with sunken bark, internal necrotic lesions, and pycnidia containing spores that morphologically resembled those of *D. seriata*. Fungal isolations were performed; DNA was extracted from the cultures, amplified, and sequenced using ITS rDNA. Phylogenetic analysis confirmed that the pathogen responsible for the dieback was *D. seriata*.

Q. robur is a demanding species when cultivated for ornamental purposes, as it requires regular pruning of its deep roots to promote the development of a wide network of shallow, fine roots essential for successful replanting. However, if this is not done, as in the present case, and if mature trees, rather than young seedlings, are planted in spring instead of autumn, in sandy soil (despite the species preference for gley soils) and are not watered regularly, latent fungal infections such as those caused by *D. seriata* can become devastating. This is the first record of *D. seriata* killing *Q. robur* in urban areas in Serbia.

The evolution and impact of invasive insects and phytopathogens in urban ecosystems of the Republic of Moldova

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Abstract

Currently, the total area of green spaces in urban localities of the Republic of Moldova amounts to 6.6 thousand hectares. The largest share is found in the municipality of Chişinău, which accounts for 66.1% of this total, or approximately 4.4 thousand hectares. The municipality of Bălţi has 0.3 thousand hectares, while the city of Călăraşi reports 0.2 thousand hectares. Of the total 6.6 thousand hectares, 69.0% consist of squares, gardens, and parks. Green spaces with restricted access—such as sports parks, areas adjacent to educational institutions and residential buildings, as well as recreational areas for children and youth—represent 18.6%. Green spaces in tourist and leisure areas account for 7.8%, while those with a specialized function—such as botanical, zoological, and dendrological gardens—make up 2.7%. Additionally, some green spaces serve utilitarian purposes, including land stabilization and the protection of water sources. In these areas, the dominant tree species primarily belong to the families Pinaceae and Cupressaceae, as well as Fabaceae (*Acacia* spp., *Gleditsia* spp.), Sapindaceae (*Aesculus hippocastanum*, *Acer* spp.), *Platanus occidentalis* (Platanaceae), Malvaceae (*Tilia* spp.), Oleaceae (*Fraxinus* spp.), Ulmaceae (*Ulmus* spp.), Fagaceae (*Quercus* spp.), Juglandaceae (*Juglans* spp.), among others. Among invasive plant pathogens of trees in urban areas of the Republic of Moldova, Dutch elm disease caused by *Ophiostoma ulmi* is of particular concern. Some of the earliest invasive insect species recorded on tree species in urban and rural areas of the Republic of Moldova include *Hyphantria cunea* (Drury, 1773), first reported in 1966; *Cameraria ohridella* Deschka & Dimić, 1986, reported in 2004; and more recently, *Corythucha arcuata* (Say, 1832) in 2019, *Metcalfa pruinosa* (Say, 1830), and *Tomostethus nigritus* (Fabricius, 1804), both reported in 2020.

Presence of *Rhynchophorus ferrugineus* in the city of Porto Santo island: phytosanitary assessment and georeferencing of *Phoenix canariensis*

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Abstract

Background: Canary Island date palms (*Phoenix canariensis* Chabaud) play a central role in the public areas of the island of Porto Santo. Above all they represent an emotional value associated with the historical image that the community has built on its spaces. In 1827, in Reverend James Bulwer's work, 'Views in the Madeiras', the image of a tall palm tree marked the landscape. In late 2023, however, where vegetation is already scarce due to environmental conditions, the presence of a beetle that poses a serious threat to the island botanical heritage was detected.

Objectives: This study focuses on the phytosanitary assessment and georeferencing of Canary Island date palms on Porto Santo Island, following the detection of the red palm weevil (*Rhynchophorus ferrugineus* Olivier).

Methods: A total of 1164 palms across 22 treatment zones were inventoried and evaluated in terms of health status, geographic position, dendrometric parameters and were subjected to various mitigation strategies. Interventions included endotherapy with acetamiprid, the use of pheromone traps and, in irreversible cases, the felling and incineration of the infested trees.

Results: Sixteen palms were removed, mainly due to their height or advanced deterioration. The study also presents an economic and cultural valuation of the palms, using historical and tourism-related factors and applying the Granada Standard, which estimates their total value at approximately €2.7 million.

Conclusions: The findings support the need for an ongoing integrated control program with preventive measures such as banning the pruning of green fronds and well-monitored corrective actions. Given the potential impact of palm loss on tourism and in the iconic landscape of Porto Santo, preserving this emblematic species requires sustained, evidence-based interventions.

Artificial inoculations of *Dothistroma septosporum* and *D. pini* on urban pines: A comparative study of disease progression and physiological changes

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Abstract

This Short-Term Scientific Mission, funded by the COST Action "Urban Tree Guard (CA20132)," was carried out at the University of Aveiro aiming to perform artificial inoculations of *Dothistroma septosporum* and *D. pini* on two pine species (*Pinus sylvestris* and *P. pinea*). The main objective was to compare disease impacts on both hosts by evaluating infection rates (visual symptomatology), morphological traits (growth), eco-physiological parameters (leaf-gas exchanges and spectral reflectance indexes), and biochemical profiles. From 23 fungal isolates, one per species was selected based on highest sporulation and germination rates. Six-month-old seedlings were placed in a climate chamber under controlled conditions (16/8 h photoperiod, 18/15 ºC day/night, 95% RH, PPFD 150 µmol m^2 s^{-1}). Moisture was maintained by manual watering to promote infection. Inoculations were done by spraying seedlings with a 480,000 spores/ml suspension; control plants were mock-inoculated with water. Leaf-gas exchange and spectral reflectance were measured at two, three, and four to five weeks post-inoculation. At the end, symptoms were assessed, and healthy-looking needles from symptomatic seedlings were collected for biochemical analyses of primary and secondary metabolism. Symptomatic needles were also tested using molecular methods to confirm both *Dothistroma* species presence.

Results showed that *D. pini* caused stronger effects on *P. sylvestris*, reducing growth and photosynthetic parameters, though without mortality. In *P. pinea*, both pathogens reduced growth and photosynthetic activity, with *D. septosporum* causing significant mortality. Biochemically, *P. sylvestris* had higher photosynthetic pigments, sugars, and flavonoids contents, while *P. pinea* showed higher lipid peroxidation (MDA), phenolics, and amino acids contents.

These findings underscore the differing susceptibility between pine species to *Dothistroma* species and contribute to understanding host-pathogen interactions in forest ecosystems.

Remote sensing in invasive pest monitoring in urban forests in Croatia

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Abstract

Monitoring of pests, native or alien invasive, is a one of key activities in prevention of damages in urban forests. Conventional monitoring methods (pheromone traps, visual transects, glue rings etc) are time consuming and require significant financial inputs. Development of remote sensing sensors, GPS technology and geographic information systems (GIS) support novel approach towards detecting pests which has the potential of accurately measuring pest damage and populations on a whole area basis. Accurate and efficient monitoring of insect populations is a key point to improve pest control and mitigate damages. Technical limitations of remote scouting, especially resolution of satellite and aerial images, have until recently precluded wide scale adoption. Recent technological advancements have increased resolution of visible and NIR sensors while also decreasing size and cost providing more affordable ways to assess forest health. Therefore, usage of small aerial vehicles or drones equipped with multispectral sensors could provide a better insight into urban forests health and damages caused by pests. With relatively low-cost platform we have insight on the area with better resolution than with those from satellite. Surveys of invasive alien and quarantine pests in urban forests are being conducted in Croatia. European food safety authority (EFSA) is recommending usage of unmanned aerial vehicles (UAVs) as a versatile remote sensing-based toolkit for monitoring forest health and occurrence of forest pests.

Key words: alien invasive forest pest, remote sensing, invasive forest pests, damage

The European urban tree inventory (EUTI)

Augustinus BA[1], Kičić M[2], Avdagić A[3], Battisti A[4], Bełka M[5], Branco M[6], Brundu G[7], van den Dool RT[8], Eriksson A[9], Gomez-Gallego M[10], Gounaris N[11], Hysa A[12], Igondová E[13], Jactel H[10], Jürisoo L[9,33], Kesic L[14], Kopeć D[15], Köpke K[16], Lloyd G[17], Marzano M[18], Matošević D[2], Matsiakh I[19], Morales Rodriguez C[20], Ogris N[21], Ossola A[22], I. Papazova-Anakieva I[23], Paraschiv M[24], Petridis Z[25], Ramos A.P.[6], Romeralo C[26], Samson R[27], Teqja Z[28], Topalidou E[29], Vettraino AM[20], Wheeler P[30], Witzell J[9], Zlatković M[14], Anisimova S[31], Marčiulynienė D[32], Bhatti A[32], Queloz V[1], Brockerhoff EG[1]

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Abstract

To protect and prepare urban trees from future threats, we first need to know which trees are planted in urban environments – which is a clear knowledge gap. Many European cities are establishing and maintaining urban tree inventories. These inventories are primarily used for local tree management. While these datasets hold great potential as a foundation for research on urban biodiversity and biosecurity, their fragmented formats and limited public accessibility hinder broader scientific use.

We set out to collate a comprehensive collection of European urban tree inventories ('EUTI') as part of the COST-action UB3Guard. The taxonomically and formally harmonized collection contains 183 inventories from 31 countries with data on approximately 9.5 million individual trees belonging to more than 2,400 species. We analysed how both climatic and cultural factors shape urban tree composition across Europe, revealing strong regional differences in species selection. These patterns carry important implications for urban tree biosecurity, since different tree species may host different pests. This affects the resilience of various urban ecosystems, especially in response to climate change and the spread of invasive pests and pathogens.

EUTI provides an unprecedented resource for exploring the ecological, social, and economic dimensions of urban forestry at a European scale, underscoring the value of standardizing and sharing urban tree data for both scientific and policy purposes.

Joint Conference of COST Action Urban Tree Guard (CA20132) and European and Mediterranean Plant Protection Organization (EPPO)
'Biosecurity and Surveillance for Quarantine Pests of Trees in Forests and Cities' Oeiras, Portugal, 8-10 September 2025

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Strategies for conservation of narrow-leaved ash populations (*Fraxinus angustifolia*) in the Danube basin

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*University of Zagreb, Faculty of Forestry and Wood Technology