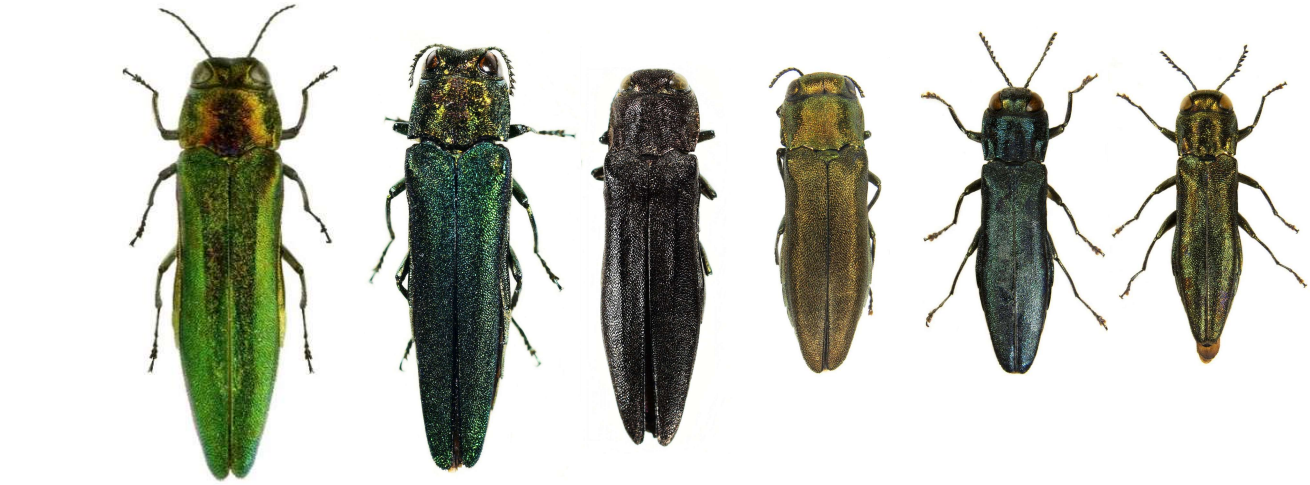
EPPO – FAO-REUFIS – BFW Conference

Safeguarding Forests in Europe: Emerging Risks of *Agrilus* Wood Borers (Buprestidae)



21–23 April 2026

Vienna, Austria

Programme and Abstracts

Editors: Dmitrii Musolin (EPPO), Ferenc Lakatos (FAO-REUFIS), and Gernot Hoch (BFW).

Cover photo: *Agrilus planipennis* (2 specimens), *A. anxius, A. roscidus, A. sulcicollis,* and *A. graminis* (the left photo by Alexander V. Petrov [IL,RU], other photos by James Connell [BFW; AT]).

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The conference: This is a joint conference co-organized by the European and Mediterranean Plant Protection Organization (EPPO), the Food and Agricultural Organization of the United Nations (FAO) – Forest Invasive Species Network for Europe and Central Asia (REUFIS), and the Austrian Research Centre for Forests (BFW).

Materials: After the conference, presentations, poster, abstract book, and recording will be available at the web-page of the meeting: https://www.eppo.int/MEETINGS/2026_meetings/conf_agrilus

Venue: Austrian Research Centre for Forests (BFW): Seckendorff-Gudent-Weg 8, 1131 Vienna, Austria

In 2026 EPPO celebrates 75 years since its establishment in 1951.

EPPO Network of experts working on surveillance, monitoring, and control of the emerald ash borer, *Agrilus planipennis*

The Network is supported by funding from the European Union's Horizon Europe Research and Innovation Programme under grant agreement No. 101134200, ***FORSAID: Forest surveillance with artificial intelligence and digital technologies.***

PROGRAMME

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15:30	**0:30**	**Organizers**	**Reflections and concluding remarks**	
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ORAL PRESENTATIONS

Day 1

The Conference in 2018: 'Preparing Europe for invasion by the beetles emerald ash borer and bronze birch borer, two major tree-killing pests'

Gernot Hoch

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In October 2018, more than 80 experts from research organizations, plant protection services and administration, representing 27 countries met at the BFW in Vienna, Austria, to discuss how Europe should best prepare for the possible introduction of the emerald ash borer, *Agrilus planipennis*, and the bronze birch borer, *Agrilus anxius*. The conference was an activity within the Euphresco research project PREPSYS and was sponsored by OECD's Co-operative Research Programme on Biological Resource Management for Sustainable Agricultural Systems.

A good number of presentations from Canada and the USA provided an excellent overview of the situation with the two pests in North America and recent developments in their management. The very fast spread of *A. planipennis* assisted by human transportation activities and its detrimental impact on the highly susceptible North American ash species were illustrated. Difficulty of early detection was emphasized.

Data on introduction to and spread in European Russia were also presented, where *Fraxinus pennsylvanica* had been massively attacked. A debate arose as to whether *Fraxinus excelsior* is similarly susceptible.

Details on research on optimized trapping systems were presented; traps and lures had been developed for *A. planipennis*, while research was at an early stage for *A. anxius*.

Management options used in North America were presented, from optimized surveillance methods and planning to chemical control to extend the lifespan of valuable ash trees, to the implementation of classical biological control programs. The socio-economic aspects of *A. planipennis* were discussed; the importance of engaging with the public to reduce human assisted spreading of the pest and to increase acceptance of phytosanitary measures was highlighted.

It was concluded at the conference in 2018 that effective early detection and response must be achieved in Europe as eradication of the pests will be impossible once local populations establish. The following important tasks were identified: (1) development of intensive risk-based surveillance programs, (2) analysis of potential pathways for introduction and spread in Europe, (3) development of control methods (chemical and biological control), (4) informing plant protection experts and (5) raising public awareness.

Program, abstracts and presentations of the 2018 conference can be accessed at https://www.bfw.gv.at/en/conference-emerald-ash-borer-and-bronze-birch-borer/

From Networks to action: How the FAO Regional Forest Invasive Species Networks contribute to the detection, monitoring and control of *Agrilus* species

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Agrilus wood borers threaten European forests and urban trees, therefore early detection, effective monitoring, and coordinated action across borders are required. FAO supports countries in managing forest invasive species through global knowledge sharing and in particular and the Regional Forest Invasive Species Networks which cover over 100 countries across five regions. Through these networks the FAO provides coordinated support to member countries in three core areas (1) early warning and knowledge sharing; (2) capacity building and harmonization of methodologies; and (3) strengthening collaboration among forestry services, National Plant Protection Organizations, researchers, and other stakeholders. In line with the needs of member countries the FAO has developed and published three key guides in recent years that strengthen regional coordination, standardized surveillance, and rapid response for high-impact forest invasive species including *Agrilus* spp.

First, the ***'Forest pest contingency plan guidelines for Europe and Central Asia'*** outlines the components of effective preparedness and response – activation triggers, command and communication structures, diagnostics, delimiting surveys, stakeholder engagement, and resource allocation. The guidelines include *Agrilus*-specific decision points covering each step from the initial suspect report through confirmed diagnosis and the subsequent choice between eradication and containment strategies.

Second, the ***'Guide to implementation of phytosanitary standards in forestry'*** (second edition). The guide describes practical application of International Standards for Phytosanitary Measures (ISPMs) in forestry through systems approaches, hygiene in nurseries and planting operations, and risk-mitigation measures for movement of wood, wood packaging and tree residues. These measures are essential to reducing the spread potential of *Agrilus* species and other wood-boring pests.

Third, the '***Pocket guide to monitor important bark and wood-boring forest insects in Europe and Central Asia***' offers standardized monitoring protocols for saproxylic beetles. By providing forest managers, inspectors, and trained volunteers with practical field-ready methods, the guide strengthens early detection which is critical for managing invasive *Agrilus* species before they spread.

Together, these resources contribute to a scalable 'network-to-field-to-decision' pathway that reduces both time-to-detection and time-to-action for *Agrilus* introductions. They help ensure greater coherence between surveillance systems, phytosanitary measures, and operational forest protection supporting more resilient and coordinated regional responses to invasive forest pests.

EPPO activities and resources on *Agrilus* species and its Network of experts working on surveillance, monitoring, and control of the emerald ash borer, *Agrilus planipennis*

Dmitrii Musolin

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As many species of *Agrilus* (Coleoptera: Buprestidae) pose a risk to woody plants, EPPO has produced a considerable number of documents and resources focused on these pests, which will be reviewed in the presentation.

The EPPO Global Database (GD) has EPPO Codes and pages for 41 species of *Agrilus*. For eight of them, information is available on distribution, host plants, and host commodities. Also, for eight pests (though not the same species) GD has reports from countries or other information. For six *Agrilus* species, EPPO datasheets are available.

Agrilus anxius is included in the EPPO A1 List (pests recommended for regulation which are absent from the EPPO Region), *A. planipennis*, *A. bilineatus*, *A. mali*, and *A. fleischeri* – are in the EPPO A2 List (pests recommended for regulation whose distribution is limited in the EPPO region); *A. auroguttatus* was in the EPPO Alert List in 2013–2017. For eight *Agrilus* species information is provided on their regulatory statuses in different countries in the world (*A. anxius, A. planipennis*, and *A. planipennis* – in several countries each).

In 2013–2024, EPPO performed and published Pest Risk Analyses (PRAs) for *A. anxius A. planipennis*, *A. bilineatus*, *A. mali*, *A. fleischeri*, and *A. mali.* These PRAs are available in the EPPO Platform on PRAs, as well as national PRAs for 16 species.

A few EPPO Standards focus on two *Agrilus* species: for *A. planipennis* – a diagnostic protocol (PM 7/154) and procedures for official control (PM 9/014), the Standard on monitoring and consignment inspection of wood chips, hogwood and bark for quarantine pests (PM 3/087), and PM 8 Standards on commodity-specific phytosanitary measures on tree genera. More regional Standards will be published in the near future.

Out of 41 *Agrilus* species included into GD, only three species (*A. planipennis*, *A. solieri*, and *A. vestitus*) have genetic sequences deposited in EPPO-Q-bank; only six pests have photos, and only four species have communication materials available. These low figures clearly demonstrate that input from NPPOs and experts is needed.

To provide assistance to NPPOs in fighting against *A. planipennis*, EPPO established in 2022 a Network of experts working on surveillance, monitoring, and control of the Emerald ash borer, *Agrilus planipennis*. Its activity supported by funding from the European Union's Horizon Europe Research and Innovation Programme (under grant agreement No. 101134200, *FORSAID: Forest surveillance with artificial intelligence and digital technologies*) and will be reviewed in the presentation.

A keynote lecture

European trees on the precipice of their demise?

Andrew Liebhold

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During the last century, Europe has been fortunate to be affected by relatively few serious alien forest insect and disease problems, compared to North America and other regions. This historical pattern may reflect the relatively low number of forest tree species native to Europe, most likely a result of historical physical geography. Low tree species richness may translate into fewer hosts for pest invasions. However in recent years, numbers of insect and disease incursions have accelerated in Europe. Two of these invasions hold acute potential for damage. The pinewood nematode, *Bursaphelenchus xylophilus,* is native to North America where host pines are largely resistant to damage. Over 100 years ago, this organism invaded Asia and as it has slowly expanded its range there, it has caused massive damage and frustrated attempts at control. In 1999 the nematode was discovered in Portugal and despite efforts to contain this organism, it was recently discovered in France where there is considerable potential for serious impacts. In a somewhat analogous fashion, the emerald ash borer, *Agrilus planipennis*, is native to east Asia where native host ash species are largely resistant to damage. However, since its accidental introduction to North America little tree resistance has been encountered and this species has proven to be the most damaging forest pest species currently in the continent. As *A. planipennis* is just beginning to invade Europe, most evidence points toward its future impacts resembling the severe damage to natural and urban forests that that have been experienced in North America. Combined with the recent effects of climate change facilitating native bark beetle outbreaks, the future collision of these two high impact alien forest pests suggests that Europe may be entering a new era of heightened forest health threats.

A keynote lecture

Outcomes of attempts to eradicate incursions of *Agrilus planipennis* in North America and potential lessons for European incursion responses

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Following the discovery of populations of *Agrilus planipennis* (emerald ash borer) established near Detroit, Michigan, numerous attempts to eradicate the species have been undertaken. Here we review the methods and outcomes of 25 eradication programmes in the United States and Canada between 2003 and 2009.

Even though numerous eradications of other insects, such as *Anoplophora glabripennis* (Asian longhorned beetle), have been successful, none of the attempts to eradicate *A. planipennis* in North America have been successful, despite considerable resourcing and efforts to detect incursions early. Consequently, eradication of newly founded populations in North America is no longer attempted. The likely reasons for the apparent impossibility to eradicate *A. planipennis* include the following: (1) the typically late detection of newly arrived populations (i.e. reproducing populations have typically been present for several years by the time they are discovered); (2) the general difficulty to delimit new populations of *A. planipennis* because offspring of colonizing insects have usually widely dispersed by the time symptoms of established populations are noticed; (3) the relatively low effectiveness of traps used to detect presence of *A. planipennis*; and (4) the comparatively fast natural dispersal of *A. planipennis*.

Insights gained from eradication attempts in North America and the potential implications for incursion response planning in Europe will be discussed.

Capacity building for reliable identification of non-native *Agrilus* in Europe: the role of the European Union Reference Laboratory for insects and mites

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The National Reference Laboratories (NRLs) of each EU member state contribute to enforce the EU regulation by providing official identifications of suspected quarantine organisms. They are assisted in this task by the European Union Reference Laboratory for Insects and Mites (EURL-IM). How does the EURL-IM help the NRLs identify the *Agrilus* specimens collected by the related phytosanitary services?

A first key action is the contribution to the production of reliable identification methods, such as the EPPO and IPPC Diagnostics Standards. EURL-IM carries out validation studies of these standards to ensure they are robust enough. This was done for the EPPO PM 7/154(1) (*Agrilus planipennis*) (EPPO, 2023), leading to revised version of the standard including the EURL-IM suggestions. EURL-IM also directly collaborates with EPPO by taking part to the drafting teams of these DPs, as it is the case for the standard upcoming for *A. anxius.* The EURL-IM also provides the EPPO Q-bank genetic database with reference barcodes issued from the validation studies. Nine sequences of six *Agrilus* species should be added to the database in 2026.

Second, the EURL-IM provides NRLs with reference material. Since its creation in 2019, it lent to 11 NRLs a total of 48 specimens of *A. planipennis* and *A. anxius*, including both adult and larval stages. Further, high-resolution pictures of the habitus and diagnostic characters of the two pests are also available on the EURL-IM website. To accomplish this, the EURL-IM maintains a reference collection dedicated to quarantine organisms and closely related species. The collection currently contains 587 specimens of 28 *Agrilus* species, some of them originating from an EPPO donation to the EURL-IM.

Finally, the EURL-IM is requested by the European Commission to assess the proficiency of NRLs to identify these two pests. This is achieved by proficiency tests. Two of these proficiency tests were organized in 2024 for the molecular and morphological identification of *A. planipennis*. The results provided an overview of the identification capacities at the European scale, showing that training was needed to increase them. The EURL-IM may also be requested for the emergency confirmation of new pest outbreaks in Europe, which is expected to happen in the near future.

Reference

EPPO (2023) PM 7/154(1) *Agrilus planipennis. EPPO Bulletin* 53, 285–308. Available at: **https://doi.org/10.1111/epp.12926**

Between bark and barcode: Integrating morphology and molecular tools in forest pest diagnostics

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The complementary use of morphological and molecular diagnostics is essential for accurate species identification in entomology, yet practical challenges remain in ensuring that specimens retain both morphological integrity and suitability for molecular testing.

During a variety of joint validation studies – consisting of both morphological and molecular testing on the same sample set – performed by the European Union Reference Laboratory for Insects and Mites, e.g. for *Agrilus planipennis*, the at times opposing necessities for each discipline have grown evident. To address the identified issues, we conducted a series of experiments aimed at refining specimen-handling and storage conditions to support integrated diagnostic workflows.

The importance of high-quality DNA and contamination-free procedures was especially evident in the context of reference material and non-destructive extraction workflows. We therefore evaluated several aspects of routine laboratory practice.

First, commonly used non-destructive DNA extraction methods were assessed for their ability to yield amplifiable DNA while preserving diagnostic morphological characters. Second, a spike-and-recovery experiment examined the contamination potential of shared storage ethanol, a critical consideration in workflows involving highly sensitive tests such as real-time PCR. These tests provided empirical evidence on the extent to which storage media can accumulate and transfer trace DNA, with implications for regulated pest detection.

Third, a long-term storage study on Lepidoptera larvae compared different preservation media and temperature regimes, evaluating effects on both morphological stability and downstream DNA yield over extended periods. Further experiments are ongoing, including the effect of larval boiling on both DNA and morphology, as well as investigations into the use of next generation sequencing in this context, to evaluate both contamination risks and the potential of frass samples for pest detection.

Together, these results support evidence-based recommendations for laboratories aiming to implement robust, integrative diagnostics. Guidance will be presented on storage practices, extraction workflows, and contamination-mitigation strategies that help maintain specimen value for both morphology-based identification and molecular analyses, ultimately strengthening diagnostic reliability across entomological laboratories.

Surveys and contingency preparedness in Sweden for bronze birch and emerald ash borers

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Sweden has organized and carried out surveys for the bronze birch borer (*Agrilus anxius*) and the emerald ash borer (*Agrilus planipennis*) since 2016. During the 10 years that surveys have been conducted (2016–2025) some developments and expansions to the surveys have taken place. In addition to surveys, in 2022, the Swedish National Plant Protection Organization developed contingency plans for both pests: *A. anxius* and *A. planipennis*. Simulation exercises have also been carried out for the emerald ash borer. We present the evolution of the surveys in a Swedish context and how survey work and contingency planning inform one another in the ongoing work to safeguard Swedish forests from these wood boring beetles.

ORAL PRESENTATIONS

Day 2

The emerald ash borer in the Russian Federation: 30 years of the range expansions

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The invasive emerald ash borer, *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae) was recorded for the first time in Europe in 2003 in Moscow and was found to be responsible for the death or decline of many ash (*Fraxinus* sp.) trees in the city. Since then, *A. planipennis* has spread to the territory of 30 administrative subjects of the Russian Federation (including those located east of the Urals), several regions of Ukraine and the city of Gomel in Belarus. At the beginning of 2026, the invasive range of the beetle was (with some gaps) from Barnaul (southern Siberia) in the east to Kiev (Ukraine) in the west and from Saint Petersburg and Yaroslavl in the north to the northern Caucasus in the south. The potential range under current climate conditions of the pest is much larger than its current invasive range in the western Palearctic. By 2030, it is forecasted to spread to eastern Siberia in the east and to Denmark, southern Finland, southern Sweden and the British Islands in the north/north-west.

In eight regions through the European range of *A. planipennis* (in Russia), we used tree-ring analysis to examine the historical dispersal patterns and spreading speed of the pest. Cross-dating dendrochronological analysis of ash trees suggest that *A. planipennis* initially became established and began to cause death of trees in Moscow as early as 1997. These data fully coincide with the beginning of the ash trees dieback in Michigan, the center of the emerald ash borer invasion in the USA.

Fraxinus pensylvanica, a widespread introduced North American ash species, is the main host plant for *A. planipennis* in Eastern Europe. The European ash species *F. excelsior, F. ornus* and *F. angustifolia* are also susceptible. Intensive damage and death of ash trees are generally observed at the forefront of the expansion of the pest's range. In the rear of the invasion, a significant number of damaged ash trees survive. There, the pest begins to be controlled by a local polytrophic parasitoid, *Spathius polonicus* (Niezabitowski). The process of adaptation to a new host takes at least 10–15 years, and after 20 years, the local native biota begins to significantly control the invasive pest. The invasive range of *A. planipennis* in European Russia completely overlaps with the invasive range of *Hymenoscyphus fraxineus* Baral et al., the pathogen originating in Asia and causing ash dieback. *Fraxinus pensylvanica* is less susceptible to *H. fraxineus* in comparison with *F. excelsior*. Larvae of the emerald ash borer develop equally well on *F. excelsior* individuals resistant or susceptible to *H. fraxineus*.

The official response to the invasion of the emerald ash borer is limited to monitoring its spread, declaring quarantine phytosanitary zones, removing dead ash trees and setting appropriate restrictions on the transportation of ash wood. Research teams in Krasnoyarsk, St. Petersburg, Sochi, and Moscow are conducting proactive research on the ecology and genetics of *A. planipennis* and methods for monitoring and controlling its populations. However, in the Russian Federation, there is still no state-coordinated research program to combat this pest.

Molecular genetics of the emerald ash borer, *Agrilus planipennis*, invasion in European Russia and eastern Europe

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The emerald ash borer, *Agrilus planipennis* Fairmaire, 1888 (Coleoptera: Buprestidae), is a major pest of ash trees (*Fraxinus* spp., Oleaceae) originating from East Asia, which continues its range expansion in Eurasia.

With the support from the Russian Science Foundation (grant no. 22-16-00075-P for N.K.), we are conducting research in the current range of the pest and reconstructing the phylogeography of this species. The goal of the study is to clarify the characteristics of the invasion and the invasive haplotypes of *A. planipennis*.

Over the period of 2022–2025, extensive entomological material (both adults and larvae of *A. planipennis*) was collected across a vast area of European Russia often with help of volunteers. Additionally, specimens from other parts of Russia (Siberia, the Russian Far East – Primorskiy Krai), Belarus, China (Tianjin and Beijing Provinces), Japan, and Canada were included in the study. The molecular genetic analysis involved 285 mtDNA COI gene sequences (658 bp): 135 were obtained by our team, and 150 were from BOLD and GenBank.

Intraspecific genetic variability of *A. planipennis* was approximately 1% (including the specimens from Siberia); the greatest differences were observed between the pest populations from Canada and China.

A total of six haplotypes, all present in Eurasia, were identified for the COI gene, with the dominating haplotype H1. The analysis suggests that the formation of the secondary range of *A. planipennis* in Eurasia occurred as a result of bridgehead effects.

Further dispersal of the species, especially over long distances, may occur primarily through unintentional human transport rather than natural dispersal.

Invasion of emerald ash borer and ash dieback in Ukraine, – concerted action: an update year 2025

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Emerald ash borer *Agrilus planipennis* has been detected in eastern Ukraine in 2019 where it established expanding population possessing potential for westward spread towards the EU. Initially, the beetle infested American ash *Fraxinus pennsylvanica* before spreading to native *F. excelsior*, both in forest and urban environments. Besides of *A. planipennis*, both ash species in Ukraine are currently threatened by ash dieback disease, caused by fungus *Hymenoscyphus fraxineus*. The infestation by *A. planipennis* combined with *H. fraxineus* infection is expected to be more lethal than either of them alone, yet the potential consequences need to be elucidated. Ukraine represents the geographic area of Europe in which both invasions overlap, thus providing for such study so far unique opportunity. The aims were to investigate: i) the expansion of *A. planipennis* range in Ukraine, ii) the relative susceptibility of *F. excelsior* and *F. pennsylvanica* to *A. planipennis* and *H. fraxineus*, iii) the combined effect / impact on ash condition imposed by both pests, and iv) to identify and map potentially resistant/tolerant trees of European *F.excelsior*. Monitoring of *A. planipennis* included: i) trap lure option, using green and violet traps, deploying those in the canopy in sunny location, randomly in regions where no *A. planipennis* has been detected, and more densely in regions where *A. planipennis* was found; ii) trap trees, by girdling young and old trees, making wounds on stems, and checking those for the attacks after flying period. The results have demonstrated that: i) the invasion of *A. planipennis* is currently accelerating both in terms of newly infested trees in initially invaded area and beetle expansion into the new territory; ii) *F. excelsior* is slightly more resistant to *H. fraxineus* than *F. pennsylvanica*, while *F. excelsior* is more susceptible to *H. fraxineus*; iii) at initial stages of invasion of *A. planipennis* the infection by ADB is likely to predispose *F. excelsior* to the infestation by *A. planipennis*; iv) at later stages, the beetle increasingly attacks and kills trees with healthy crowns, thus regardless of symptoms of *H. fraxineus*. In 2022, *A. planipennis* as been found in Kyiv, thus at over 500 km distance from its geographically continuous invasive eastern population in the east, thus apparently spreading by "hitchhiking" transport vehicles.

Recent mass outbreak of *Agrilus biguttatus* associated with local oak decline following drought and heat in south-east Germany

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In response to global change and altered climatic conditions, the relevance of certain forest pests is changing due to range expansion and invasion. There are also shifts among secondary pests towards more primary behaviour thus contributing to tree mortality. European oak species (*Quercus petraea, Q. robur*) are important due to their expected tolerance of a drier climate, their provision of habitat for numerous insects (including those that live inside or on the bark) as well as their valuable timber. The two-spotted oak borer (*Agrilus biguttatus*) is part of the entomofauna in large parts of European oak forests and is generally perceived as a secondary pest, with its larvae colonising the stronger branches of old oak trees. However, it has been observed to undergo mass outbreaks during periods of intense tree stress (e.g. after repeated defoliation). In such situations, it is assumed to be a contributing factor to oak mortality.

Here, we report on the novel relevance of *A. biguttatus* to oak decline incited by drought and heat in Bavaria (south-east Germany) in recent years. Areas affected by *A. biguttatus* are currently concentrated in the northern parts of Bavaria (Lower and Central Franconia). Stem samples were taken from infested oaks in two stands and kept in rearing cages for two years. Wood- and bark-boring insects were collected at regular intervals. *Agrilus biguttatus* was predominantly found in the lower parts of the trees (mean DBH: 35±5 cm) and was the dominant buprestid species. Several other bark and ambrosia beetles were present in significant numbers, as were several cerambycid species. Surprisingly, large numbers of the otherwise rare weevil *Gasterocercus depressirostris* were also detected. Forest practitioners urgently require evidence-based and practical management guidelines. Currently, the only available management options are long-term silvicultural preventive measures and sanitation felling which so far has unquantified effectiveness. Moreover, strong thinning resulting from sanitation felling likely impacts the thermal conditions in such a way as to further enhance the propagation of the rather thermophilic *A. biguttatus*. Sanitation felling may also conflict with nature conservation objectives in these habitats, which complicates the decision-making process.

In this context, the relevance of *A. biguttatus* for forest protection is discussed in the framework of an integrated management approach. The aim is to identify research gaps that need to be addressed in order to cope with the current outbreaks and prepare for potential mass outbreaks in the coming decades.

A keynote lecture

Urban ash trees in Europe: risks and opportunities

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Urban trees often facilitate the establishment of non-native and potentially invasive forest pests introduced with imported commodities. Given the ongoing spread of emerald ash borer, *Agrilus planipennis* Fairmaire, 1888, in eastern Europe, knowledge of the distribution and abundance of ash species in European cities is essential for guiding surveillance activities and predicting impacts of this pest which causes tree mortality.

To address this issue, we analyzed the European urban tree inventory, a collection of 200 datasets encompassing 8.6 million trees on the European continent and summarized information related to trees in the genus *Fraxinus*. We found that *Fraxinus excelsior* is amongst the ten most commonly planted urban tree species, and that European cities continue to plant ash species native to Europe and North America. Ash comprises an average of 5.7% of all urban trees in European cities, and it's ranking among the most common genera indicates that *A. planipennis* impacts will likely be widespread and substantial. While there is considerable variation in the percentage of ash trees planted among European cities, we found no clear spatial pattern in ash abundance across the continent. We also found that ash species that are relatively resistant to *A. planipennis* are present in European cities, but rare.

Our data show that emerald ash borer will have substantial impacts on urban and surrounding rural forests. Therefore, scientists working with urban green and particularly urban green managers need to be prepared to protect European urban ash trees or to remove a large number of trees and the ecosystem services they provide.

EFSA plant health activities with a focus on *Agrilus* species

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The European Food Safety Authority (EFSA) plays a central role in safeguarding plant health in the European Union by providing independent, science-based advice to support EU decision-making and Member States. EFSA's plant-health work comprises the full risk-assessment process, from evaluating individual pests to developing methodologies and supporting EU-wide surveillance including the development of guidance documents. The Panel on Plant Health (PLH Panel) issues scientific opinions on plant pest categorisations, plant pest risk assessments and high-risk plant commodity risk assessments. These assessments examine the likelihood of pest entry, establishment, spread, and impact, providing the scientific basis for EU phytosanitary measures. The Panel is supported by specialised Working Groups with expertise in entomology, plant pathology, modelling, and risk analysis. The following scientific outputs were produced on *Agrilus planipennis* and *Agrilus anxius*:

– Scientific opinion on heat treatment requirements of wood against *Agrilus planipennis* suggested by the US for imports to the EU: https://doi.org/10.2903/j.efsa.2011.2185;

– Pest survey card on *A. planipennis* which guides the Member States in preparing for surveys: https://efsa.onlinelibrary.wiley.com/doi/10.2903/sp.efsa.2020.EN-1945;

– Pest survey card on *A. anxius* which guides the Member States in preparing for surveys: https://efsa.onlinelibrary.wiley.com/doi/10.2903/sp.efsa.2020.EN-1777;

– Co-operation in crisis preparedness for *A. planipennis* in the European Union: https://efsa.onlinelibrary.wiley.com/doi/abs/10.2903/sp.efsa.2020.EN-1985;

– Commodity risk assessment of ash logs from the US treated with sulfuryl fluoride to prevent the entry of the emerald ash borer *A. planipennis*: https://efsa.onlinelibrary.wiley.com/doi/10.2903/j.efsa.2023.7850;

– Pest Report and Datasheet on *A. planipennis* to support the ranking of EU candidate priority pests: https://efsa.onlinelibrary.wiley.com/doi/abs/10.2903/sp.efsa.2025.EN-9432;

– Pest Report and Datasheet on *A. anxius* to support the ranking of EU candidate priority pests: https://efsa.onlinelibrary.wiley.com/doi/abs/10.2903/sp.efsa.2025.EN-9433;

EFSA also received a mandate for the evaluation of heat treatment of birchwood from Canada as part of a systems approach to mitigate the risk of introduction of *A. anxius*.

Project EABRACE – combined efforts in the Baltic region

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The emerald ash borer (*Agrilus planipennis*) is a quarantine species for all EU countries and on EPPO A2 List. It poses a severe threat to native ash trees in Europe and North America. In North America, the species has destroyed tens of millions of ash trees, with severe economic and ecological impacts on xylobiont beetle biodiversity. Since its first confirmation in Ukraine in 2019, *A. planipennis* has spread more than 600 km. According to predictive models based on climatic parameters, the expected spread trajectory extends westward from eastern Ukraine towards Poland, Estonia, Lithuania, and Latvia, where the species has not yet been detected.

The emerald ash borer exhibits dispersal driven by both natural spread and human-assisted transport. Current distribution pathways toward the EU border are strongly facilitated by intensive movement of military equipment and goods by road and rail through western transport corridors connecting Ukraine with Poland, Germany, and the Baltic countries. Under these conditions, the project EABRACE combined efforts to create a cross-border, pre-emptive monitoring network supported by cooperative research program.

A standardized trapping experiment was conducted in Ukraine, Poland, Lithuania, Sweden, and Latvia during 2025 and will continue in 2026, focusing on high-risk transport corridors and other prioritized sites. WITASEK GmbH (Austria) multi-funnel traps were used to monitor *A. planipennis* and to assess xylobiont beetle biodiversity. The traps were incorporated into national monitoring and surveillance programs for the emerald ash borer in each partner country. In Ukraine, the results contributed to the extension of the official quarantine zone for *A. planipennis* beyond Kyiv city. Data from the first year of trapping expanded knowledge on the diversity and distribution of targeted beetles.

Preparing for the emerald ash borer in Great Britain

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The emerald ash borer (*Agrilus planipennis* Fairmaire, 1888) presents a high risk to ash in Europe necessitating preparedness for its management to help mitigate its impact should it arrive and establish.

Informed by research and selected management strategies in North America, classical biological control and chemical control using trunk injections are the approaches that have been selected for use in Great Britain.

In support of licence applications required for the release of non-native biological control agents (BCAs) in Great Britain, risk assessments have been drafted. These have identified gaps in knowledge and areas of uncertainty where further research is required including the host specificity of the non-native BCAs and their potential to hybridise with native parasitoid species. Plans for post-release monitoring have also been developed.

Emamectin benzoate, delivered by trunk injection, is the most effective chemical treatment for the control of *A. planipennis*, and offers up to three years of protection in ash in North America. This pesticide is not approved for use for the control of forest pests in the United Kingdom, so its risk was assessed by measuring its persistence after injection into European ash, *Fraxinus excelsior*, and in composted leaves. Measures are in place for the emergency approval of emamectin benzoate in the event of an incursion of *A. planipennis* into Great Britain.

Challenges in eradication of *Agrilus planipennis* in Slovenian forests: Are we ready?

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The emerald ash borer (*Agrilus planipennis* Fairmaire, 1888) has already invaded many countries and has had destructive implications for forest ecosystems and the economy. In its invasive range in Europe it was first observed in Moscow (Russia) in 2003 and soon spread in all directions. Currently, it is in Belarus, Ukraine, and Russia near the Estonian border and is expected to enter the European Union in the coming years. The emerald ash borer is considered a quarantine species under EU plant health regulations (Regulation (EU) 2016/2031). One measure that should be taken to address quarantine priority pests is a simulation exercise to test a country's preparedness for an outbreak of a particular quarantine species. Here, we present the results of a simulation exercise of an *A. planipennis* outbreak in Slovenia, which was organized as a part of the national project CRPV4-1823. The hypothetical outbreak area of *A. planipennis* was characterized by the following: i) mixed ash stands, iii) proximity to Croatia, iv) a typical Slovenian forest ownership structure. The study area was in south-eastern Slovenia, near the Croatian border. Using a multistakeholder approach, we took into account all the stakeholders that would be involved in eradicating the emerald ash borer. We compared measures set out by EU legislation and the EPPO Standards. We organized several workshops with the stakeholders to discuss the measures and identify potential bottlenecks. We found challenges which concern ownership, logistics, forest ownership structure, and biological and geographical situations, and discussed their impact on the proposed measures. While some challenges, such as ownership and some of the measures, were feasible to address, many others were not because they are factors that cannot be modified (e.g. like biological and geographical situations, forest owner structure, or organizational reasons such as inaccessible areas or logistics).

Improving invasion scenarios for *Agrilus* species in Europe through advanced SDMs

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Anticipating potential invasion scenarios is a key component of risk assessment and pest management, and Species Distribution Models (SDMs) represent valuable tools for predicting areas that may be suitable for colonization by invasive species. This is particularly valuable during the early stages of invasion or even prior to invasion events. However, SDM performance and predictive reliability are highly sensitive to the quality, quantity, and spatial structure of occurrence data, associated sampling biases, the choice and parameterization of explanatory variables, and the modelling strategies.

In recent years, SDMs have been increasingly applied to multiple *Agrilus* species, either for applied purposes related to invasion risk assessment or to investigate their ecological niches. However, the scarcity of occurrence data from native ranges, has frequently resulted in SDMs being trained using pooled native and invasive occurrence records, despite the lack of ecological equilibrium in invaded areas. This methodological choice, together with the frequent restriction of SDMs to exclusively bioclimatic variables, has partially hindered the accurate evaluation of environmental suitability.

To address these limitations, we present a methodological framework that enables the modelling of the native environmental niche of *Agrilus* species, based on an explicit and robust characterization of both the Grinnellian (scenopoetic) and the Eltonian (local) niches. The proposed approach follows a two-step SDM framework, whereby bioclimatic and habitat models are integrated to represent the combined influence of climatic and habitat factors on species distributions. SDMs were implemented for the native range using an ensemble modelling framework with pseudo-absences (PAs) used as absence-like points. PAs allocation was specifically optimized for bioclimatic and habitat models to reduce the effects of sampling bias and to increase the likelihood that absence-like points represented true absences. The bioclimatic and habitat models were then projected at the global scale to identify potential areas suitable for colonization by *Agrilus* species.

This framework may complement existing tools, supporting the refinement of early warning activities, surveillance strategies, and decision-making within EPPO pest risk analysis frameworks.

The influence of the selected morphological features of *Agrilus biguttatus* (F.) beetles on their potential dispersal abilities

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Agrilus biguttatus is one of the most important secondary pests of oak stands in Europe. To date, there is no information on the dispersal abilities of this species and about the detailed influence of beetle morphology on their flight performance. Oak bark containing *A. biguttatus* pupae was collected in Krotoszyn Forest District (south-western Poland). We tested 52 females and 51 males on flight mill devices and measured six selected morphological factors that were reported in the literature as strongly correlated with dispersal abilities: body mass, body size (represented by elytra length, pronotum length, pronotum width, wing area) and wingloading. The duration of the flight trial was 24 h. We used Gamma GLM with a log link including sex-specific quadratic effects of each morphological factor to explain the variability of flight performance of beetles. Model selection was based on Akaike's Information Criterion (AIC) and Nagelkerke's R^2.

The mean flight distance in 24 h was 737 m for males and 948 m for females. Maximum dispersal abilities of males was 1,934 m and 3,110 m for females. All of selected morphological features influenced flight distance significantly. We found that the relationship between morphology and dispersal abilities of *A. biguttatus* beetles is nonlinear (parabolic) with optimum value of each factor for the best flight performance. The Nagelkerke's R^2 fluctuated between predictors from 0.153 for wing area to 0.277 for wingloading. We chose the model with wingloading as predictor of flight distance because of the lowest value of AIC and the highest value of Nagelkerke's R^2.

Studies focused on dispersal abilities of beetles and the influence of morphology on their flight performance could be useful in the future for predicting the spread of the pest in the environment especially invasive alien species such as *A. planipennis* or *A. anxius*.

The bronze birch borer, *Agrilus anxius*, as a potential risk for European birch: Host naivety and early detection tools

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The bronze birch borer, *Agrilus anxius*, is a destructive North American buprestid whose introduction to Europe could pose a substantial threat to native birch species due to host naivety and a lack of co-evolved defenses. Understanding host susceptibility and deploying effective early detection tools are therefore critical for biosecurity preparedness. We assessed relative susceptibility of North American and European birch species through a garden survey in British Columbia, Canada, quantifying tree-level damage associated with infestation of *A. anxius*. In parallel, we developed and validated novel quantitative PCR (qPCR) and loop-mediated isothermal amplification (LAMP) tests for rapid and specific detection of this pest. Both tests were highly specific, with no cross-amplification observed when tested against 24 non-target taxa, including European *Agrilus* and other species of Buprestidae, Scolytinae, and Cerambycidae. The qPCR test detected target DNA at concentrations as low as 20 fg μL^{-1}, whereas the LAMP test detected down to 3.2 pg μL^{-1}. To evaluate potential inhibition by host plant compounds, the sensitivity was checked using DNA extracted from birch foliage and vascular tissues. Leaf-derived compounds did not affect detection limits for either method, while vascular tissue reduced the sensitivity of the LAMP test relative to controls. Our findings indicate that European birch species exhibit damage levels consistent with naïve host responses to *A. anxius* and demonstrate that the developed molecular tests provide robust tools for early detection and surveillance. qPCR offers superior analytical sensitivity for low-level detection, whereas LAMP provides a rapid, field-deployable option to support time-critical management and biosecurity responses.

A keynote lecture

Innovative tools and strategies for the surveillance of *Agrilus* species and other beetles

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The constant increase of global trade over the last hundred years, combined with deliberate plant introductions in the past and ongoing climate changes, has facilitated the movement among continents and the establishment likelihood of an increasing number of insects. The genus *Agrilus* (Coleoptera, Buprestidae) is among the insect taxa that is most favoured by these processes and commonly transported and introduced to new regions. More than 30 species of *Agrilus* have already been introduced and established outside their native range, including the emerald ash borer *Agrilus planipennis* Fairmaire, 1888 which has caused massive ecological and economic damage in North America, Russia, and Ukraine. For these reasons, the development of tools and strategies for the early detection of accidentally introduced *Agrilus* species was identified as a research priority to trigger rapid response and reduce potential impacts in the invaded areas. Here, we present recent research efforts focused on: i) evaluating current methods for surveying *Agrilus* species as well as other wood-boring beetles (e.g., certain species in the families Cerambycidae and Scolytinae), ii) enhancing the effectiveness of existing trapping devices, and iii) accelerating the morphological identification of trapped specimens through AI-based approaches.

Design of a survey for *Agrilus planipennis* in the Benelux ecoclimatic region

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The high number of EU quarantine pests and decreasing resources encourage EU Member States to optimize their survey efforts. Because of large target populations, surveys of forest quarantine pests often require large sample sizes, even in small countries. During the 2024 Belgian EU Presidency, a proposal was made to design surveys based on ecoclimatic regions spanning multiple countries. This approach can reduce the total required sample size while enhancing survey harmonization and cross-border collaboration. As a case study, Belgium, the Netherlands and Luxembourg are jointly developing a risk-based and statistically sound survey for *Agrilus planipennis* in accordance with Implementing Regulation (EU) 2024/434. This presentation will detail the selection of survey methods and design parameters, the integration of regional risk factors, and the practical application of EFSA's RiBESS+ and RiPEST tools in a multi-country context.

Agrilus survey in the Netherlands

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This presentation aims to give insight into the monitoring of *Agrilus* in at-risk locations in the Netherlands. Monitoring methods as well as the processing of the content of traps are discussed. No *Agrilus planipennis* have been found however, two new *Agrilus* species for the Dutch fauna were identified during the survey. *Agrilus derasofasciatus* and *Agrilus hastulifer* were both found during monitoring and reported officially for the first time in the Netherlands.

Survey design and contingency planning for *Agrilus planipennis* in Austria

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Agrilus planipennis is considered a priority pest under the EU plant health legislation, requiring Member States to annually survey their territory for the beetle's presence and to put in place a contingency plan. In Austria, surveys conducted by the Federal States confirmed that the pest is currently absent. A contingency plan for *A. planipennis* (Putz et al., 2024) has been developed by the National Plant Protection Organisation (NPPO) of Austria and published in 2024. From 2027 onwards, annual surveys have to be conducted in a risk-based manner; therefore, a coordinated survey process of the Federal States is essential to ensure the timely detection of *A. planipennis* at a low incidence. The NPPO agreed to set Austria's survey design to detect an infestation of *A. planipennis* of ≥ 2 % of its target population with a confidence level of 95 %. As for the target population, common ash (*Fraxinus excelsior*) is abundant and distributed throughout the territory, while manna ash (*F. ornus*) and narrow-leaved ash (*F. angustifolia*) primarily occur sparsely in southern and eastern parts of Austria, respectively. The extent of actual ash occurrence, and especially its localisation, prove to be challenging for several reasons: 1) ash abundance has been severely affected by ash dieback, limiting the validity of existing data, 2) ash is mostly found in mixed stands, making it difficult to identify single tree occurrence by remote sensing methods employed by the national forest inventory, and 3) outside of forests, ashes are scattered throughout the landscape as solitary trees, as well as avenue and park trees. In order to create a valid basis for the work, actual inventory and tree cadastre data are combined with predicted possible ash occurrence to link risk locations to ash abundance in their surroundings. As imports from countries where *A. planipennis* is present are low, hitchhiking of beetles from infested areas in Eastern Europe is considered the main pathway for introduction. Thus, highly frequented transport hubs and resting areas along main traffic routes are identified, around which risk areas in line with EFSA's guidelines for *A. planipennis* are applied. Finally, RiBESS+ will be used to estimate the number of traps to be placed in order to achieve the survey's objective.

Reference

Putz J, Hoch G, Hoyer-Tomiczek U, Krehan H, Moser N, Pfister A, Prskawetz M (2024). Spezifischer Notfallplan für prioritäre Schädlinge Asiatischer Eschenprachtkäfer *Agrilus planipennis* Fairmaire. Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft, Österreichische Agentur für Gesundheit und Ernährungssicherheit GmbH, etc. Available at: https://www.pflanzenschutzdienst.at/fileadmin/Redakteure_pflanzenschutzdienst/Sch%C3%A4dlinge/Notfallpl%C3%A4ne/Spezifischer_Notfallplan_Agrilus_planipennis_10.06.2025_final.pdf

ORAL PRESENTATIONS

Day 3

Propagule pressure in invasive pests of woody plants: Change the metrics?

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Although relatively recent (it dates from the late 1990s), the concept of propagule pressure is central in risk analyses regarding potentially invasive species. It includes three key components: 'propagule size' (number of individuals in an introduction event), 'propagule number' (number of propagules per unit of time), and 'propagule pressure' (the distribution of propagule sizes in time). From this first set of definitions, an accurate calculation of propagule pressure should incorporate two interdependent metrics: a) the number of individuals travelling from the source area to the recipient area and the rates of such transports over time; b) the number of individuals that survive each transport event. How propagule pressure results in successful establishment would then depend on the interaction of specific factors/characteristics (e.g. polyphagy, voltinism, reproductive strategy, dispersal capacity, climatic tolerance) and environmental variables (e.g. climate, vegetation, topography).

In most cases, the various components allowing to estimate propagule are at best poorly known and are replaced by indirect estimates. The risk analysis of invasive bark- and wood-boring insect pests has thus relied on metrics such as the species' relative abundance in their native range, or on their relative abundance among other species in the invasion pathway, or, most commonly, on their historical interception frequency. With this latter option, discrepancies between interceptions and establishment rates have been attributed to insufficient inspections.

In the presentation, I will show, using examples among the bark- and ambrosia beetles (Scolytinae), that the performances of individual species vary considerably along the invasion pathways. Some appear not to be transported along introduction pathways, others are regularly transported but are not intercepted, and still others are often intercepted but do not establish.

Closer attention to individual life history traits would greatly improve our capacity to forecast invasions and perhaps help us to design a more accurate estimate of propagule pressure.

Host responses and potential diagnostic tools for the emerald ash borer in European ash

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The emerald ash borer, *Agrilus planipennis* Fairmaire, is an invasive pest threatening *Fraxinus* populations across continental Europe and the United Kingdom. Detection is difficult, as visible symptoms usually appear only when trees are in severe decline. This study investigated indicators of *A. planipennis* infestation in *Fraxinus excelsior* under the conditions of the United Kingdom. Trees of varying sizes and cut logs were inoculated with eggs of *A. planipennis* under controlled conditions, and tissues were assessed upon visible lesion formation or fluid exudation.

A purple discolouration of phloem tissue was observed in most inoculated trees, coinciding with reduced larval success and reduced lesion formation. The presence and intensity of this purple reactive zone (PRZ) were significantly influenced by tree age, with older trees displaying larger and more pronounced PRZs. This response may reflect either host defensive activity or a physiological reaction to larval feeding.

Lesion formation and bleeding were systematically recorded, and symptomatic tissues were subjected to microbial analysis using culture-based methods and sequencing. Pathogenic bacteria and fungi were detected in lesion-associated tissues, yet fungal growth was notably reduced within PRZ areas, suggesting localised antifungal properties. The PRZ also appeared to act as an antifeedant, limiting larval development of *A. planipennis*.

These findings indicate that phloem discolouration, lesion formation, and lesion-associated microbial communities could serve as early diagnostic indicators of *A. planipennis* infestation in *F. excelsior*. The observed PRZ offers insight into potential host defence mechanisms and highlights the importance of tree age in susceptibility and response. Integrating these visual and microbial indicators into surveillance protocols may enhance early detection of *A. planipennis*, inform resistance breeding programs, and guide mitigation strategies to protect ash populations in the United Kingdom.

Early detection using LAMP assays for the emerald ash borer (*Agrilus planipennis*) and the two-lined chestnut borer (*Agrilus bilineatus*)

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Agrilus spp. (Coleoptera: Buprestidae) are increasingly threatening our broadleaf forests; specifically when they are introduced to regions containing evolutionarily naïve host trees. The emerald ash borer (*Agrilus planipennis*) and the two-lined chestnut borer (*A. bilineatus*) both have this risk, having caused extensive mortality of ash (*Fraxinus* spp.) and threatening European oak (*Quercus* spp.), respectively. A challenge in managing these *Agrilus* infestations is their cryptic life style, their eggs are hidden in bark crevices and larvae develop under the bark, so the insects can remain undetected for years before visible symptoms appear. Therefore, fast and reliable early detection becomes essential to improve our surveillance capacity to support detection and delimitation efforts for these pests.

Recently, we have developed and tested loop-mediated isothermal amplification (LAMP) assays for the early detection of *Agrilus* spp. including *A. planipennis* and *A. bilineatus* (Peterson et al., 2023a,b). Both assays target mitochondrial cytochrome oxidase I (COI) gene regions. The *A. planipennis* assay was evaluated for use in European forests and demonstrated high analytical specificity among a group of native European *Agrilus* species and other co-occurring wood-boring beetles. Analytical sensitivity testing also demonstrated a reliable detection of target DNA with concentrations as low as 0.02 pg/µL. Similarly, a newly developed *A. bilineatus* LAMP assay showed high specificity across 24 non-target insect species, including closely related *Agrilus* taxa, and reached detection limits as low as 0.064 pg/µL.

Together, these studies demonstrate that LAMP-based molecular diagnostics provide a strong, sensitive, and portable approach for early detection of high-risk forest pests. Integrating such tools into biosecurity and monitoring programs can substantially improve preparedness and response capacity, reducing the likelihood of widespread establishment and long-term forest damage caused by invasive *Agrilus* species.

Reference

Peterson DL, Kyle K, Sallé A, Pecori F, Migliorini D, Santini A, Luchi N, Cleary M (2023a) Specificity and sensitivity of a rapid LAMP assay for early detection of Emerald ash borer (*Agrilus planipennis*) in Europe. *Forests 14*, 436. https://doi.org/10.3390/f14020436

Peterson DL, Pecori F, Luchi N, Migliorini D, Santini A, Kyle KE, Rutledge C, Sallé A, Kaya SO, Ramsfield T, Cleary M (2023b) Development of novel LAMP and qPCR assays for rapid and specific identification of Bronze birch borer (*Agrilus anxius*). *Environmental DNA* 5, 1177–1190. https://doi.org/10.1002/edn3.503

Current status, successes, and limitations of the USDA APHISPPQ emerald ash borer biological control program

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Emerald ash borer (*Agrilus planipennis*) was first discovered in the United States and adjacent areas of Canada in 2002, although it likely arrived in solid wood packaging material from Asia in the 1990s. Due to the magnitude of the infestation, limited detection and control methods, and high costs, USDA program objectives quickly shifted from eradication to containment and management of the pest, which was federally deregulated in 2021.

Classical biological control is a primary tool for emerald ash borer management in the United States. Four species of parasitic wasps from the emerald ash borer's native range have been discovered, evaluated for host specificity, and approved for release in the United States. These four biocontrol agents are presently being reared at the program's unique mass-production facility, which supplies wasps for releases nationwide. Parasitoids have been released starting in 2007, but we have only recently been able to begin assessing the long-term field impacts of these releases on invasive emerald ash borer populations. Climate requirements vary for the different parasitoid species, and certain parasitoids have demonstrated higher establishment success and impact than others.

In this talk I will provide an overview of the current status and scope of the emerald ash borer biocontrol program in the United States, including results on parasitoid establishment, spread, and field impacts. I will also highlight program limitations and areas that need further research, including current USDA research aims. In doing so, I hope to convey the utility of classical biocontrol for emerald ash borer management and share relevant experience that may be useful for the potential development of classical biocontrol programs for other *Agrilus* wood borers.

A keynote lecture

Parasitoids of European *Agrilus* spp. and their potential for controlling invasive *Agrilus* spp.

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The emerald ash borer, *Agrilus planipennis*, is a woodboring beetle native to East Asia. It is highly invasive in North America, where it causes large-scale dieback of American ash species, *Fraxinus* spp. This pest is also invasive in western Russia, Ukraine and Belarus, and it continues to spread towards central and western Europe, where all three native ash species are susceptible. Other *Agrilus* spp., such as the bronze birch borer, *Agrilus anxius*, and the two-lined chestnut borer, *Agrilus bilineatus*, both from North America, are listed as quarantine pests in Europe, and the latter has already been recorded in Türkiye. Biological control approaches offer sustainable solutions to control invasive pests. In North America, four Asian parasitoid species that have coevolved with EAB have been introduced to control the pest. In Europe, pre-emptive biological control approaches should be considered. The parasitoids introduced into North America should be tested against non-target European *Agrilus* spp. However, augmentative biocontrol and conservation biocontrol with native natural enemies could also be considered pre-emptively. In Europe, many species of the genus *Agrilus* occur, and it is likely that at least some of their parasitoids will be able to parasitize *A. planipennis*, or other invasive *Agrilus* spp., as hosts as they spread across the continent. Parasitoids of *Agrilus* spp. are poorly known in Europe because of the difficulty of studying the parasitoid complex of these solitary wood-boring insects. In a recent review (Kenis et al., 2024), we provided a literature overview of studies and records on European parasitoids of *Agrilus* spp. to offer a basis for future studies on the emerging parasitoid complex of *A. planipennis* in Europe. Parasitoid records were found for 24 European *Agrilus* species. Sixty-four parasitoid species were recorded, mostly larval parasitoids. However, many of them may represent erroneous host-parasitoid associations or misidentifications, and the biology of most species and their roles in the population dynamics of their hosts have been poorly studied. Here, we will provide further considerations on which parasitoid species may attack which non-native *Agrilus* species, as well as suggestions for biocontrol approaches to control these invasive species.

Reference

Kenis M, Eisenring M, Gossner M, Seehausen ML (2024) Parasitoids of *Agrilus* spp. in Europe: anticipating the arrival of *Agrilus planipennis*. *Biological Control* 199: 105655. https://doi.org/10.1016/j.biocontrol.2024.105655

Treatments against *Agrilus* borers (Coleoptera: Buprestidae) in wood products: An update on dielectric heating and fumigation with EDN as potential treatments, and a systems approach for wood chips

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Dielectric heating (DH) using microwave and radiofrequency technology is based on the principle that polar molecules, such as water, respond to rapidly alternating electromagnetic fields by rotating to align with the changing field direction. This continuous rotation at high frequencies generates friction, which is converted into thermal energy. Thus, heating occurs volumetrically and instantly throughout the treated wood, including initiating rotation of water in pests embedded in wood or in moist wood near pests. The surface of treated wood is often cooler than the interior due to evaporative cooling. The treatment was adopted under ISPM 15 in 2013, based on detailed laboratory studies specifying a dose of 60 °C for 1 min of exposure. It has not been used commercially yet due to lack of knowledge on how to uniformly apply the dose throughout the treated commodity and how to verify it in a commercial setting. However, a significant amount of work has been conducted since then and detailed practical guides are being developed, offering promising treatment options to treat various wood products, including logs, lumber, and fragmented wood in an economical and efficient manner.

The active search to find alternative fumigants to replace the phased-out ozone-depleting methyl bromide has identified ethanedinitrile (EDN, cyanogen, C_2N_2) as a broad-spectrum fumigant that efficiently causes death of various insects, nematodes, and fungal pathogens with the same or better efficacy than methyl bromide, although it has not yet been specifically tested against *Agrilus* spp. Ethanedinitrile degrades rapidly into non-toxic products, with minimal environmental impact. It does not affect the ozone layer and has no global warming potential. While already used in some countries, it faces heightened scrutiny from environmental agencies as well as from National Plant Protection Organisations on its efficacy against all pest of concern. These agencies require standardized evaluations and acceptance of the efficacy and environmental data for broader approval. Legacy alternatives like phosphine and sulfuryl fluoride may also be used as alternative in specific scenarios. The current status of these fumigants will be reviewed, with a focus on ethanedinitrile.

Finally, the potential for preventing transfer of *Agrilus* spp. via trade of fragmented wood (i.e., wood chips) using a systems approach, will be addressed through an update on the development of the '*EPPO Guidance to the assessment and management of the phytosanitary risks associated with international trade in wood chips and other types of fragmented wood*'.

Detection using tomodensitometry and heat treatment of *Agrilus* spp.: Towards efficient and sustainable phytosanitary measures

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This presentation provides an update on some of the research done in Canada on *Agrilus* species. The first study quantifies and validates detection, and measures gallery depth by using tomodensitometry (Computed tomography, CT-scan) to evaluate debarking as a phytosanitary measure for birch and ash. A CT-scan allows precise measurement of insect depth in wood: *A. planipennis* penetrates deeper into ash trees (up to 21.9 mm in sapwood) than *A. anxius* in birch trees (6.30 mm and 3.22 mm for paper birch and yellow birch, respectively). Insect depth varies according to tree species, sample diameter, and insect developmental stage.

The second study was on heat treatment and it determined the minimum effective heat treatment dose to eliminate *A. anxius* and *A. planipennis* prepupae. Using a Humble water bath simulating the temperature ramp of industrial kilns, results show that no *A. anxius* or *A. planipennis* prepupae survive exposure to temperatures above 56 °C for a minimum time of 15 to 30 min. Chronic or delayed mortality was observed at lower temperatures and durations.

We also studied the individual efficacy of each step in the milling process (debarking, sawing and heat treatment) in removing *A. planipennis* in green ash sawn wood which showed that greater than 90% of emerald ash borer were removed at the first step of the milling process (debarking) and >99% were removed before the production of sawn wood. No insects survived kiln or heat treatment.

Together, these studies provide essential data for developing phytosanitary measures that are effective, economical, and environmentally sustainable. CT-scan research provides precise data on the location of *A. anxius* and *A. planipennis* in host trees and supports debarking as an effective phytosanitary measure, while optimized heat treatment ensures pest mortality while minimizing energy costs and environmental impact. These studies contribute to protecting forest resources and securing international trade in forest products.

POSTERS

Phytosanitary risk posed by the emerald ash borer, *Agrilus planipennis*, in Hungary

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Native ash species (*Fraxinus* spp.) play a significant ecological, economic, and urban landscape role in Hungary. In recent decades, however, their condition has significantly deteriorated due to the appearance and nationwide spread of the fungal disease caused by *Hymenoscyphus fraxineus*, which particularly affects European and Hungarian ash species. Weakened stands are increasingly vulnerable to the appearance and establishment of other pests, including the emerald ash borer, *Agrilus planipennis*, which is classified as a priority quarantine pest for EU.

Agrilus planipennis is officially absent from the territory of the European Union but the spread of the species from the east – with confirmed occurrences in Russia, Ukraine, and Belarus – poses a significant risk, especially given its known presence in Kyiv, approximately 800 km from the Hungarian Záhony road border crossing point. Modified trade routes, as a result of the Russian invasion into Ukraine in 2022, particularly the rail and road transport of wood and wood materials further increase the chance of introduction. The Záhony border crossing point plays a crucial role in the entry of wood materials and goods of Ukrainian origin into Hungary, thereby justifying enhanced plant health inspections.

Observations were supplemented with sentinel trees and pheromone traps. The surveys also included symptom-based detection, including examination of the bark and wood of ash trees.

A public notification in 2025 also received significant attention, which demonstrates that involving the public in early detection is important. For this reason, significant attention was paid to the preparation and wide distribution of informative professional publications and materials aimed at raising public awareness.

Based on the survey results, the presence of *A. planipennis* was not detected in Hungary. The results, however, emphasize not the absence of the risk, but importance of preventive control measures and public involvement.

Early detection and targeted surveillance play a key role in the long-term maintenance of the ash population in Hungary. Representatives of the Hungarian plant health sector, in cooperation with forestry experts, will investigate further control and trapping possibilities, such as the green and purple traps used for *Agrilus* species.

Preliminary investigation into the threat of the bronze birch borer, *Agrilus anxius,* to Scotland

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The bronze birch borer, *Agrilus anxius*, is a North American beetle that causes periodic, severe damage to birch (*Betula* spp.). Eurasian birches such as silver and downy birch are highly susceptible even when healthy. This project assessed the threat posed by bronze birch borer to Scotland to inform risk assessment, surveillance, and contingency planning. We reviewed distribution of *Agrilus* species in the United Kingdom and the potential distribution of bronze birch borer, investigated possible introduction pathways, and evaluated the feasibility of available surveillance methods. *Agrilus* species are likely under-recorded in the United Kingdom, which may hinder early detection of *A. anxius*, and no single interception trap type could be recommended based on current evidence. Entry via birch biomass is currently considered low risk, although uncertainty remains around smaller pathways involving unprocessed birch, with initial establishment most likely near major ports in southern England. Birch species in the United Kingdom are highly susceptible, and species distribution models indicate widespread host availability across much of Scotland and England. Together, these findings highlight significant uncertainty but indicate a credible risk, underscoring the need for improved surveillance, pathway understanding, and preparedness.

Early detection of *Agrilus planipennis* in Azerbaijan and strengthening of NPPO preparedness

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According to the results of phytosanitary monitoring, *Agrilus planipennis*, *Agrilus anxius*, and *Agrilus bilineatus* (Coleoptera: Buprestidae) have been recorded within the territory of Azerbaijan. While this result demonstrates the effectiveness of the existing phytosanitary control system, the ongoing biological invasions occurring in the region require continuous risk assessment.

The phytosanitary risk of *A. planipennis* for Azerbaijan is assessed as high. The primary factors contributing to this risk include the species' distribution in Russia, the presence of both natural and introduced ash trees across Azerbaijan, the country's role as a regional transit hub, and the fact that a significant portion of timber products is imported from Russia.

Given these risks, the NPPO of Azerbaijan implements continuous preventive measures to preclude the introduction of the species into Azerbaijan. Accordingly, *A. planipennis* is listed as a quarantine pest not known to occur in the Republic (A1 Group). Over the past five years, it has been consistently included in the NPPO's annual phytosanitary monitoring plans for early detection.

In Azerbaijan's phytosanitary import requirements, it is mandated that plant seedlings of the genus *Fraxinus*, as well as forest materials from broad-leaved plants, must be free from *A. planipennis*. Similarly, plant seedlings of the genus *Betula* and forest materials from broad-leaved plants must be free from *A. anxius*. During importation, all wood-based products are inspected by officials.

To prevent the introduction of *Agrilus* species and ensure early detection, it is crucial to strengthen regional and transboundary cooperation, organize joint monitoring, increase the efficiency of information exchange, and further refine risk-based approaches. This approach will increase the NPPO's level of preparedness against potential biological invasions and allow for the effective implementation of rapid response mechanisms.

Comparing different designs of green-coloured traps for monitoring *Agrilus* beetles in oak forests

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Beetles of the genus *Agrilus* are generally considered secondary pests, however under changing environmental conditions they are increasingly recognized as primary pests in both natural ecosystems and production systems, including forestry and the agricultural sector. Increasing global trade raises the risk of introduction and establishment of non-native insect species, including *Agrilus* beetles, particularly the emerald ash borer (*A. planipennis*) and the bronze birch borer (*A. anxius*) which are both listed as regulated quarantine pests in the EU other countries in Europe. Consequently, early detection is a critical component of phytosanitary surveillance, enabling timely measures to prevent pest establishment and subsequent spread.

To support early detection efforts, we investigated the effectiveness of different trap designs with a green colour which is attractive to *Agrilus* species. We compared multi-funnel traps, sticky prismatic traps and panel traps to evaluate their effectiveness in detecting *Agrilus* abundance and species richness. In 2024, three trapping trials were conducted across six countries in Europe and North America, all located in oak dominated forest stands. All trap types proved effective in detecting *Agrilus* species, although their relative effectiveness varied depending on the country where the trials were conducted. The results provide insights into the relative efficiency of trap designs and contribute to the possibility of optimization of surveillance strategies for *Agrilus* species.

RAMWOOD: Risk assessment and mitigation in wood chips and fuelwood in international trade

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The international trade of wood chips and fuelwood (WCF) has expanded considerably over recent decades, primarily driven by the pulp and fibreboard industries and, more recently, by the increasing demand for bioenergy. This large-scale transboundary movement of commodities raises significant phytosanitary concerns. The phytosanitary risks associated with WCF vary widely and are influenced by multiple factors, e.g. tree species, origin and characteristics of pests, chip size, presence of bark, season of harvest and transport, storage conditions, etc. Though the chipping can reduce survival of certain pests (e.g. *Agrilus planipennis*; McCullough et al., 2007), WCF may still be a pathway for introduction and spread of pests (e.g. *Bursaphelenchus xylophilus*). A range of phytosanitary measures can be applied to mitigate these risks, as outlined in the International Standards for Phytosanitary Measures (e.g. ISPM 39). However, the relatively low economic value of WCF and size of consignments limit the feasibility of some of these costly measures. In addition, the transport of these materials in large bulk shipments makes inspection and pest detection challenging, especially when dealing with cryptic or microscopic organisms.

The RAMWOOD project will address these challenges by identifying phytosanitary risks and developing efficient, proportionate management measures that balance trade facilitation with biosecurity requirements. To achieve these objectives, RAMWOOD relies on a multidisciplinary international consortium bringing together expertise in wood processing and trade, phytopathology, entomology, treatment technologies, risk assessment, and data management. Key priorities include development of accurate systems for identifying WCF commodities, establishment of a centralized data platform for dynamic pest risk mapping and predictive modelling, and evaluation and improvement of phytosanitary treatments targeting priority pests. The project will also explore advanced detection tools and aims to enhance surveillance at EU entry points. Close collaboration with industry stakeholders, inspection authorities, and policymakers will ensure that outcomes are operational, scalable, and aligned with international biosecurity frameworks.

Reference

McCullough DG, Poland TM, Cappaert D, Clark EL, Fraser I, Mastro V, Smith S, Pell C (2007). Effects of chipping, grinding, and heat on survival of emerald ash borer, *Agrilus planipennis* (Coleoptera: Buprestidae), in chips. *Journal of Economic Entomology* 100 (4), 1304–1315, https://doi.org/10.1093/jee/100.4.1304

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Practical guide for quick differentiation of adult Agrilini from other Coleoptera and especially Buprestidae species

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Members of the genus *Agrilus* are often difficult to distinguish and a reliable determination requires expert knowledge and experience. For plant health inspectors in the field, it can already be challenging to distinguish Agrilini from other beetle species, especially other jewel beetles (Buprestidae). Plant protection and forestry services in Austria have requested practical assistance to support their survey activities through a simple identification guide for *Agrilus planipennis* (emerald ash borer) and *Agrilus anxius* (bronze birch borer). While the final determination of *Agrilus* species in this context will remain the task of an official diagnostic laboratory, such first assessments will be useful in surveillance from responding to citizen findings to checking traps (particularly sticky traps). The aim was to produce a clear guide that enables people with limited entomological knowledge to assess whether an insect belongs to Buprestidae and, in a second step, whether it belongs to tribe Agrilini. Common native beetle families that can be potentially confused with Agrilini – such as Elateridae or Eucnemidae – are to be presented graphically. Distinguishing features that can be identified without tools or by using simple methods are to be presented in a clear manner. The same will be done for Agrilini within Buprestidae. Subsequently, we will develop online material and printed information. Members of plant protection services which are conducting surveys for *A. planipennis* and *A. anxius* are the primary target audience. The material will also be useful for other interested parties such as forest services, forest managers, tree workers, and employees in entomological projects outside the official surveys to ensure correct assessment of catches and potential early detection of *Agrilus* quarantine pest species.

Quarantine forest pest surveillance in Croatia: Methods and results over 5 years

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Preservation of forest health and reduction of harmful impacts from native and invasive alien species on ecosystems are of critical importance in Croatian forests. Some of the non-native insect and fungal species have been recognized as potentially dangerous forest pests that could have devastating effects on natural forest ecosystems in Croatia.

In our study, we present a 5-year synopsis of quarantine forest pest monitoring in Croatia, focusing on the methodologies used and the pests monitored. The analysis incorporates traditional approaches, such as visual inspections, trapping, morphological and molecular analyses, conforming to the European Food Safety Authority (EFSA) guidelines. New methods and technologies are also used: small aerial vehicles or drones (unmanned aerial vehicle, UAV) equipped with multispectral sensors provide a better insight into forest health and damage where pests can be monitored over larger areas.

In the last 5 years we have monitored a range of quarantine insect and fungal pests in various forest ecosystems on a wide diversity of host plants. The results of our study provide valuable insights into the national surveillance scheme for invasive pests and pathogens, species of surveyed pests and their potential impact on forest health. The study highlights successful application of various methods, including visual inspections, trapping used as an early warning system, use of UAV, morphological and molecular analyses, in detecting and identifying alien insects and fungal pests. The results from this overview serve as a foundation for the development of targeted strategies and informed decision-making for future survey programs, enabling the prevention of introduction and spread of forest pests and continued protection of forest ecosystems in Croatia.

Monitoring and implementation of the emerald ash borer, *Agrilus planipennis*, survey in forests of Croatia

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The emerald ash borer, *Agrilus planipennis*, is a highly damaging invasive pest affecting ash trees (*Fraxinus* spp.). Croatia hosts valuable native species, *F. angustifolia*, *F. excelsior*, and *F. ornus*, as well as non-native *F. americana* and *F. pennsylvanica*, which are used for reforestation and ornamental purposes.

Since *A. planipennis* is an A1 quarantine pest in the EU, the Croatian Forest Research Institute (CFRI) has run a surveillance program since 2016. The program focuses on early detection, monitoring, prevention, and threat assessment. In 2025, from May to August, monitoring occurred at 12 locations using visual inspections and multifunnel traps with attractants.

Field data are collected via the PPN mobile application, an internal mobile tool developed for in situ field data entry, including QR-coded field samples. Laboratory analysis (morphological and molecular) are conducted at CFRI. All findings are stored in the web database Štetnici.hr for future risk management and strategy development.

Designing risk-based detection surveys for quarantine *Agrilus* species in Belgium

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The introduction and spread of non-native insect pests pose a major threat to global plant health, leading to substantial ecological damage and economic losses. Early detection is essential to enable timely eradication measures, prevent further spread, and mitigate impacts. This is particularly critical for priority quarantine pests, for which detection surveys must be both reliable and scientifically robust.

The 'SURQUAPUB' project aims to develop statistically sound, risk-based detection surveys tailored to the Belgian context for 12 EU priority quarantine insect and insect-mediated pests, including *Agrilus anxius* and *A. planipennis*.

The specific objectives of the project are to:

1. Identify the most appropriate survey methods for each pest—visual inspections with sampling in case of suspicion, asymptomatic sampling, traps with attractants, any other method, or a combination thereof—based on EFSA pest survey cards, EPPO datasheets, pest risk analyses, and recent scientific literature, and to develop detailed survey protocols.
2. Propose optimal survey locations using a Belgium-focused analysis of potential introduction pathways, host-plant distribution, and climatic suitability, resulting in risk maps for pest introduction, dispersal, and establishment.
3. Calculate the minimum sample sizes required to detect each pest at predefined prevalence levels, in accordance with EFSA guidelines for statistically sound and risk-based surveys.

Keeping the emerald ash borer out: Risk-based surveillance, preparedness and public engagement in Estonia

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Agrilus planipennis is one of the devastating forest pests in the world and a priority quarantine pest in the European Union. The probability of natural spread to Estonia is significant, taking into account its distribution in St. Peterburg area in the Russian Federation which is around 130 km from the Estonian border.

In Estonia, a survey for *A. planipennis* began in 2015 and was initially a visual survey. In 2019, the monitoring methodology was improved to ensure the effectiveness of early detection – pheromone traps were installed from June to August, taking into account the distribution of ash trees and previously identified risk areas. In 2019–2025, different types of traps have been used, but sticky traps baited with pheromone and kairomone have shown the best results in catching local *Agrilus* species. The following *Agrilus* species, which are native to the Estonian environment, have been identified in traps: *A. angustulus, A. auricollis, A. betuleti, A. convexicollis, A. integerrimus, A. sulcicollis, A. suvorovi, A. viridis*. ***Agrilus planipennis* has never been found in Estonia.**

In 2025, other early detection techniques were also practiced for the first time – tree-girdling and subsequent peeling of trunks in order to strengthen the survey activities.

In early detection and preparation for outbreaks, it is important to involve different target groups. In 2025, the Estonian NPPO started to involve the public in mapping ash trees and conducting visual observations of trees using the PlutoF GO application. A leaflet was prepared for the campaign which was distributed using various channels. It is important to involve the public in keeping out the emerald ash borer, especially people who spend time in nature due to their professional work, sports or hobbies.

EFSA's risk assessment of *Agrilus* species in plant commodities

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The European Food Safety Authority (EFSA), through its Panel on Plant Health (PLH Panel), conducts commodity risk assessments (CRAs) for derogation requests on various plant commodity species imported into the EU from third countries. These assessments are based on dossiers submitted to the EU by the applicant countries. For this type of assessment, the PLH Panel conducts extensive literature searches to identify pests and diseases associated with the commodity species, often resulting in a large number of potential pests being found. These pests are subsequently evaluated for their presence in the exporting country, their association with the commodity, possible pathways of movement, and their potential impact in EU Member States. Those pests that meet specific criteria are selected for further evaluation, in which the likelihood of pest freedom of the commodity is assessed for each pest using Expert Knowledge Elicitation (EKE).

The scope of a commodity risk assessment is to support the European Commission and EU Member States by providing scientific and technical evidence for phytosanitary decision-making. A case study of a commodity risk assessment of ash logs from the United States treated with sulfuryl fluoride, with reference to *Agrilus planipennis* (EFSA PLH Panel et al., 2023) is discussed to demonstrate the importance of such assessments in preventing the introduction of new plant pests.

Reference

EFSA PLH Panel (EFSA Panel on Plant Health), Bragard C, Baptista P, Chatzivassiliou E, Di Serio F, Jaques Miret JA, Justesen AF, MacLeod A, Magnusson CS, Milonas P, Navas-Cortes JA, Parnell S, Potting R, Reignault PL, Stefani E, Thulke H-H, Van der Werf W, Vicent Civera A, Yuen J, Zappalà L, Battisti A, Mas H, Faccoli M, Gardi C, Mikulová A, Mosbach-Schulz O, Stancanelli G, Stergulc F, Gonthier P (2023). Scientific Opinion on the commodity risk assessment of ash logs from the US treated with sulfuryl fluoride to prevent the entry of the emerald ash borer *Agrilus planipennis*. *EFSA Journal* 2023;21(2):7850, 44 pp. https://doi.org/10.2903/j.efsa.2023.7850

Expanding the trapping network for early detection of *Agrilus* species in Great Britain by trialing a network of traps in Scotland

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Emerald ash borer (*Agrilus planipennis*) is widespread across North America after its accidental introduction from its native range in East Asia. Another introduction in Moscow (Russia) has also led to spread of this beetle in parts of Europe (currently confirmed present in parts of Russia, Ukraine and Belarus).

The range of expansion of this beetle alongside increasing global travel and movement of plant material, especially firewood and other wood products, increases the risk of its accidental introduction in the United Kingdom.

Ash (*Fraxinus excelsior*) trees are an important native species to the United Kingdom. They have excellent timber properties and are of high ecological value. Since at least 2006, the fungus causing ash dieback (*Hymenoscyphus fraxineus*) has been present in the United Kingdom, resulting over time in a growing number of stressed to severely stressed ash trees potentially suitable for colonization by emerald ash borer.

Following work by the Forestry Commission in 2024, proving the concept of utilizing green (540 mm) sticky traps containing a lure of hexanol 3z kairomore to successfully trap and detect seven *Agrilus* species (Parker & Williams, 2025) and further refinement work in 2025, Scottish Forestry will participate in this trapping network in 2026, further enhancing trap distribution across Great Britain.

Traps utilized will be identical to those used by the Forestry Commission and will be placed in the canopy of ash and other broadleaf tree species close to Scottish importers or distributors of broadleaf firewood. Any *Agrilus* spp. trap catches will be assessed and identified by entomologists from Forest Research, Northern Research Station.

Reference

Parker K, Williams D (2025) Proof of concept: Trapping for early detection of quarantine *Agrilus* species in Great Britain. In: Witzell J, Musolin D, Bragança H (eds.). *Biosecurity and Surveillance for Quarantine Pests of Trees in Forests and Cities*, Book of Abstracts: Joint Meeting of COST Action "Urban Tree Guard" (CA20132) and European and Mediterranean Plant Protection Organization, Carcavelos, Portugal, September 8–10, 2025, p. 36. Available at: https://ub3guard.eu/news/registration-and-abstract-submission-now-open-joint-conference-cost-action-urban-tree-guard-ca20132-and-eppo

Building capacity for ash pest and disease surveillance in Eastern Europe: Botanic gardens as sentinel sites

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Ash trees (*Fraxinus* spp.) across Europe face significant pressure from two major pests: the invasive emerald ash borer (*Agrilus planipennis*) and the pathogen responsible for ash dieback (*Hymenoscyphus fraxineus*). During 2020–2025, the International Plant Sentinel Network (IPSN) worked with botanic gardens in Eastern Europe to support and strengthen their capacity to act as sentinel sites for early detection and surveillance of these organisms.

Participating institutions were identified and engaged to utilise their living collections for monitoring and trapping activities. The IPSN developed and delivered a suite of practical resources to support this work, including ash species identification guidance, surveillance protocols, visual inspection materials, training videos, trapping manuals, and the provision of traps and lures for *A. planipennis*. Targeted training sessions, delivered through workshops and online platforms, ensured that staff were equipped with the necessary technical knowledge and practical skills to undertake both visual health assessments and trapping activities in a standardised manner.

Through coordinated monitoring and reporting, participating gardens contributed valuable data on the presence and spread of ash pests (including pathogens) within the region. This project demonstrates the value of engaging botanic garden living collections as distributed surveillance assets and highlights their strategic role in strengthening plant health preparedness, fostering cross-border collaboration, and enhancing early warning systems for invasive forest pests and diseases.

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