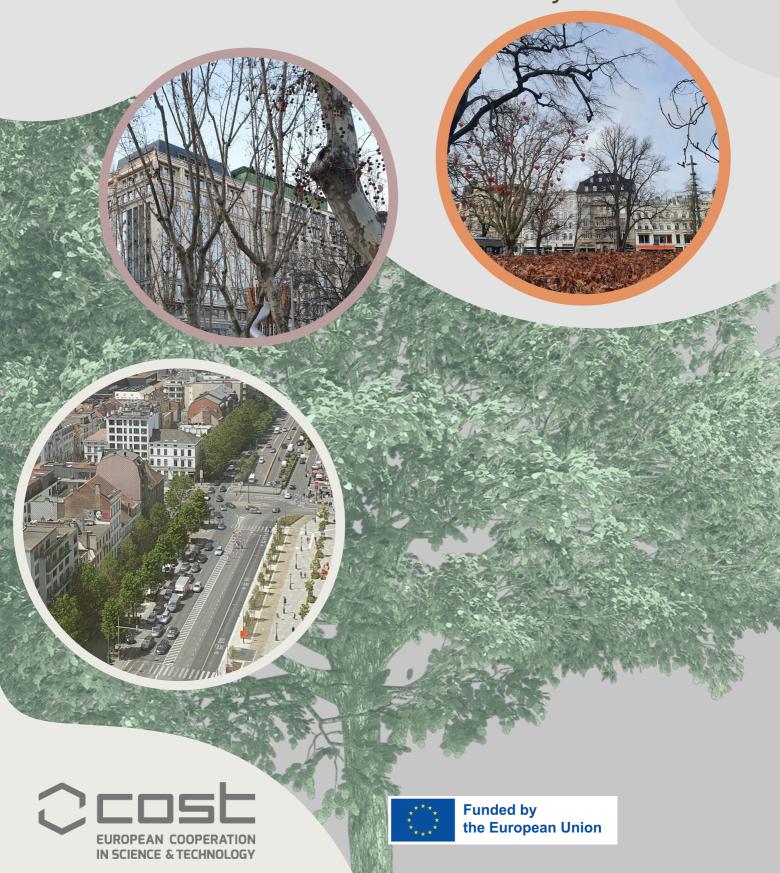
COST Action CA20132

Safeguarding European urban trees and forests through improved biosecurity

# Policy Brief

# FUTURE-PROOFING URBAN TREE HEALTH: Emerging and Innovative Technologies and Tools for Urban Tree Biosecurity



### The problem

Urban tree health is increasingly threatened by invasive pests and pathogens, yet current biosecurity approaches to protect treescapes remain reactive and insufficient. Without proactive investment in innovation, cities risk escalating economic and ecological losses. This policy brief of European network COST Action *Urban Tree Guard* (CA20132) presents key findings from expert analysis of scientific literature and horizon-scanning exercises scanning innovative, emerging technologies.



The network mapped existing biosecurity tools and methods, assessed their applicability for urban environments, and used a systematic review of 20 priority pests (EPPO A1 and A2 lists) to identify knowledge gaps and research biases. The biosecurity methods were evaluated against 25 general and urban-specific constraints, and analysed trends across pests and method types. In parallel, we conducted a horizon scan through workshops and a survey to gather and refine novel technology ideas. This process produced 18 promising future methods, which experts evaluated for Technology Readiness Level and urban applicability.

## **Policy recommendations**

## Establish National Urban Biosecurity Frameworks

 Urban tree health is not fully integrated into existing plant health legislation.

# Invest in Early Detection and Digital Diagnostics

 Urban tree biosecurity needs portable and digital tools that enable rapid, onsite, low-cost detection of pests and pathogens.

#### Strengthen Municipal Capacity

 Cities are on the frontline of detection but lack dedicated resources.

#### Modernize Regulatory and Data Frameworks

 Legal systems must adapt to robotics, drones, IoT, and citizen-based surveillance.

#### Engage Citizens as a Surveillance Force Multiplier

 Citizen science with AI ranked among the most applicable methods.

## Fund Strategic Research to Close Critical Gaps

 Urban-specific testing of detection methods and pathogen-focused research are lacking.

### **Actions**

Embed urban surveillance, rapid-response protocols, and risk pathways into national plant health strategies and EU Regulation 2016/2031 implementation.

Fund national roll-out pilots of high-ranked technologies (biosensors, AI tools, field diagnostics, eDNA stations)

Establish municipal biosecurity units, training programs, and emergency action plans.

Update legislation to support rapid deployment of new tools, ensure data sharing, and require mandatory reporting from arborists, nurseries, and contractors.

Deploy national and international apps for pest reporting and support "sentinel urban forests" as community monitoring hubs.

Prioritize Horizon Europe, national R&D, and climate funds for interdisciplinary research that combines ecology, robotics, AI, and urban planning.

This publication is based upon work from COST Action UrbanTreeGuard, CA20132, supported by COST European Cooperation in Science and Technology.

COST (European Cooperation in Science and Technology) is a funding agency for research and innovation networks. Our Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation.





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