

Empowering Small Municipalities: Practical Steps for Urban Tree Biosecurity

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K E Y M E S S A G E S

► Urban trees in small and medium municipalities (SMMs) across Europe are under growing threat from invasive pests and pathogens, yet most SMMs lack the technical capacity, financial resources, and regulatory tools to respond effectively.

► The EU Plant Health Regulation (EU 2016/2031) provides a legally binding framework for biosecurity action; European research networks and decision-support platforms offer practical tools to help municipalities implement this framework at the local level.

► Cost-effective monitoring approaches — including citizen science, digital mapping tools, and shared regional networks — can dramatically lower the barrier to compliance for resource-constrained local authorities.

► Sustainable urban tree biosecurity is not an isolated task: it is a direct enabler of the EU Biodiversity Strategy 2030, the EU Green Deal, and national nature restoration commitments.

► Early action is cost-efficient: preventing the establishment of an invasive pest is estimated to be at least ten times less expensive than controlling it after establishment (Hulme, 2021; European Commission, 2021).

1. Introduction: Why Urban Tree Biosecurity Matters for Small Municipalities

Urban forests and tree canopies deliver irreplaceable ecosystem services to city residents — from cooling urban heat islands and absorbing stormwater to improving mental health and supporting biodiversity. Recent large-scale epidemiological evidence confirms that urban tree canopy cover is directly associated with reduced heat-related mortality: a modelling study across 93 European cities estimated that increasing tree cover to 30% could avert a significant proportion of urban heat-related deaths annually (lungman et al., 2023). Similarly, urban trees moderate local surface temperatures by 2–8°C during summer heatwaves (Schwaab et al., 2021). These benefits, however, are under continuous and growing threat from invasive alien species (IAS), pests, and pathogens introduced via the international trade of plants and planting material.

Large cities often employ dedicated arborists, phytosanitary officers, or municipal ecologists. Small and medium municipalities (SMMs), which constitute the overwhelming majority of European local authorities, typically do not. This governance gap leaves millions of urban trees — and the communities that depend on them — without adequate protection.

The emerging “3-30-300 rule” proposed by Konijnendijk (2023) — every resident should be able to see 3 trees from their home, live in a neighbourhood with at least 30% tree canopy cover, and be no more than 300 metres from a quality green space — provides a simple, evidence-based benchmark for equitable urban greening. Meeting this benchmark, however, is futile if newly planted or existing trees are lost to biosecurity failures. Urban tree biosecurity is therefore not a peripheral concern but a structural precondition for delivering on urban greening, climate adaptation, and public health objectives.

This policy brief translates the scientific findings of the UB3Guard COST Action (CA20132) into practical, actionable guidance for small and medium municipalities across Europe.

2. The Regulatory Landscape: Obligations and Opportunities

2.1 EU Plant Health Regulation (EU 2016/2031)

The EU Plant Health Regulation came into full effect in December 2019 and represents the cornerstone of Europe’s plant biosecurity framework. It establishes a list of Union Quarantine Pests (UQPs) and Regulated Non-Quarantine Pests (RNQPs), mandates official surveys, and requires Member States to prepare and implement contingency plans for priority pests. Municipalities, as land managers and procurers of planting material, are directly affected by — and responsible for implementing — key provisions of this regulation.

For SMMs, this creates both obligations and leverage: the regulation provides a legal mandate to demand pest-free planting material from suppliers and to request technical support from national plant health authorities when outbreaks are detected.

2.2 The EU Biodiversity Strategy for 2030

The EU Biodiversity Strategy for 2030 calls for protecting 30% of EU land, restoring degraded ecosystems, and planting three billion additional trees across the EU by 2030. Urban trees and urban forests are explicitly included. The strategy targets the management of invasive alien species as a key action for biodiversity restoration. This means that municipal investment in tree biosecurity directly contributes to measurable national and EU biodiversity targets — creating pathways for funding and political support that previously did not exist.

Crucially, the strategy also recognises the role of urban green infrastructure — including urban tree canopy cover — in supporting pollinator populations, ecological connectivity, and nature-based solutions for climate adaptation. Small municipalities that invest in protecting and diversifying their urban tree stock are therefore contributing not only to biodiversity targets but also to the broader ecosystem resilience objectives embedded in the strategy.

2.3 EU Green Deal and Nature Restoration Law

The Nature Restoration Law (EU 2024/1991), adopted in 2024, obliges Member States to restore degraded ecosystems and to ensure no net loss of urban green space. Importantly, the law also includes binding targets related to urban tree canopy cover, recognising that tree canopy is one of the most ecologically and climatically significant indicators of urban ecosystem health. Managing existing urban trees against pests and diseases is therefore a foundational precondition for meeting these targets: a municipality cannot count newly planted trees toward restoration goals if existing trees are lost to preventable biosecurity failures.

The practical implication for SMMs is significant. Where national Nature Restoration Plans set quantitative targets for urban green space and canopy cover, municipal-level biosecurity becomes a compliance mechanism — not merely a best practice. Failure to protect existing canopy against known pest threats may constitute a de facto obstacle to national restoration commitments.

3. The Challenge: Gaps in Capacity at the Local Level

Research conducted within the UB3Guard COST Action identified three structural gaps that prevent small municipalities from fulfilling their biosecurity responsibilities:

3.1 Information Deficits

Most SMMs do not have access to up-to-date, actionable information on which pests currently threaten their region, what the early warning signs are, or what practical management steps are legally required. National and EU-level guidance documents are often technically complex and not formatted for a municipal audience.

What is needed: Spatially referenced, regularly updated, and user-friendly databases of priority pests and pathogens relevant to urban trees, mapped at the sub-national level and designed to be navigable by a municipal parks official without specialist training.

3.2 Monitoring and Surveillance Capacity

Official surveillance for quarantine pests is formally the responsibility of national Plant Health Authorities. However, the first detection of a new outbreak almost always occurs at the local level — by a city arborist, a landscape contractor, or an informed citizen. SMMs lack formal protocols for recording and reporting suspicious findings, meaning that many early warnings go unreported or are reported too slowly to prevent spread.

What is needed: Standardised reporting protocols and symptom identification guides that enable local staff and citizens to submit geo-tagged reports of suspected pest incidents, feeding directly into

national early warning networks. Citizen science programmes — such as those modelled on the LIFE ARTEMIS project (Slovenia) and Observatree (United Kingdom) — have demonstrated that trained volunteer networks can significantly expand surveillance coverage at a fraction of the cost of professional survey programmes.

3.3 Procurement and Supply Chain Risks

A primary pathway for the introduction of new pests into urban environments is the procurement of infested or infected planting material. SMMs often procure planting stock through general public tender processes that prioritise price over phytosanitary quality, and procurement staff frequently lack the expertise to assess plant health credentials.

What is needed: Simplified procurement checklists aligned with EU plant passport requirements and guidance on how to include phytosanitary quality criteria in public tender specifications.

4. Practical Steps: What Small Municipalities Can Do Now

The following action areas are grounded in the evidence base of the UB3Guard COST Action and are designed to be implementable within the typical resource constraints of small European municipalities.

- 1 **Know Your Priority Threats** Consult national Plant Health Authority bulletins and available decision-support platforms to identify which Union Quarantine Pests are present in or near your region. Prioritise awareness of species affecting the dominant tree genera in your municipality (e.g., ash dieback caused by *Hymenoscyphus fraxineus*, *oak processionary moth*, emerald ash borer, *Xylella fastidiosa*).
- 2 **Establish a Simple Monitoring Protocol** Designate a responsible officer (this need not be a specialist — a parks manager or green space officer is sufficient) and establish an annual walk-through survey of publicly managed trees using available symptom identification tools. Document findings systematically. This creates a defensible surveillance record that fulfils obligations under EU 2016/2031.
- 3 **Engage Citizens as Early Warning Sensors** Citizen science programmes have proven highly effective for expanding pest detection coverage at minimal cost. Platforms such as iNaturalist, ObsIdentify, or dedicated national reporting apps can be promoted among residents. The LIFE ARTEMIS programme in Slovenia and the Observatree network in the United Kingdom provide replicable models for engaging trained citizen volunteers in structured pest surveillance.
- 4 **Secure Your Supply Chain** Before procuring planting material, require suppliers to provide valid EU plant passports for all regulated species. For procurement above EU threshold values, include explicit phytosanitary quality criteria in tender specifications. When possible, procure from suppliers accredited under a national or regional quality assurance scheme.
- 5 **Connect to Regional and National Networks** No small municipality needs to act alone. National Plant Health Authorities are legally required to provide technical assistance upon request. Regional networks of municipalities — such as those being developed through European COST Actions and research partnerships — allow for sharing of monitoring data, expertise, and even equipment.

- 6 **Invest in Species Diversification** Monoculture planting strategies — overreliance on a single genus or species — create systemic vulnerability to host-specific pests. Municipalities should adopt diversification strategies informed by the 10-20-30 rule (no more than 10% of any species, 20% of any genus, or 30% of any family in the urban tree stock). This is not only good biosecurity but also a measurable contribution to urban biodiversity targets under the EU Biodiversity Strategy 2030.

5. Mapping Municipal Actions to Legal Obligations

The table below maps key legal obligations to the corresponding practical actions and tools, providing a quick-reference guide for municipal officials.

Legal Obligation	Relevant Legislation	Recommended Action / Tool
Awareness of priority quarantine pests	EU 2016/2031, Art. 6–10	Pest databases, regional threat maps, decision-support platforms
Contribution to official surveillance	EU 2016/2031, Art. 22–24	Standardised reporting protocols, citizen science networks
Procurement of pest-free planting material	EU 2016/2031, Art. 79–93	Procurement checklists, plant passport verification guides
Urban green space and canopy protection	Nature Restoration Law 2024/1991	Integrated pest management guidance, tree health monitoring protocols
Biodiversity restoration targets	EU Biodiversity Strategy 2030	Tree species diversification guidance, 10-20-30 rule application
Urban tree canopy cover targets	Nature Restoration Law 2024/1991; EU Biodiversity Strategy 2030	Canopy cover baseline assessment, biosecurity-integrated planting plans

6. Recommendations

The following recommendations are addressed to three key stakeholder groups, each of which plays an essential role in closing the biosecurity capacity gap at the municipal level.

For Municipal Decision-Makers:

- ▶ Formally designate a biosecurity contact point within the parks or environment department and register with the national Plant Health Authority’s notification network.
- ▶ Allocate a small annual budget line specifically for tree health monitoring — even modest investment (e.g., staff time for one annual survey) substantially reduces long-term risk.
- ▶ Include tree biosecurity as a standing agenda item in green space management plans, aligned with broader climate adaptation, nature restoration, and urban canopy cover commitments.
- ▶ Adopt species diversification targets (e.g., the 10-20-30 rule) in all new planting programmes to reduce systemic pest vulnerability.

For Regional and National Authorities:

- ▶ Provide simplified, municipality-facing guidance documents and training opportunities, ensuring technical information is accessible to non-specialist municipal staff.
- ▶ Establish co-financing mechanisms that enable SMMs to participate in regional monitoring networks without disproportionate burden.
- ▶ Recognise municipal contributions to official surveillance in national reporting to the European Commission under EU 2016/2031.
- ▶ Include urban tree canopy cover and biosecurity indicators in national Nature Restoration Plans.

For the Research Community:

- ▶ Maintain and expand publicly accessible pest databases and decision-support tools in close consultation with municipal users, ensuring these remain relevant to the operational realities of SMMs.
- ▶ Publish accessible case studies documenting successful municipal biosecurity programmes from across Europe, enabling peer learning.
- ▶ Develop and validate cost-benefit models for municipal-level biosecurity investment to strengthen the economic case for early action.

References and Further Resources

EU Plant Health Regulation (EU) 2016/2031 — <https://eur-lex.europa.eu>

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