Botanical Gardens and Biodiversity Conservation in Europe: The Role of BGCI

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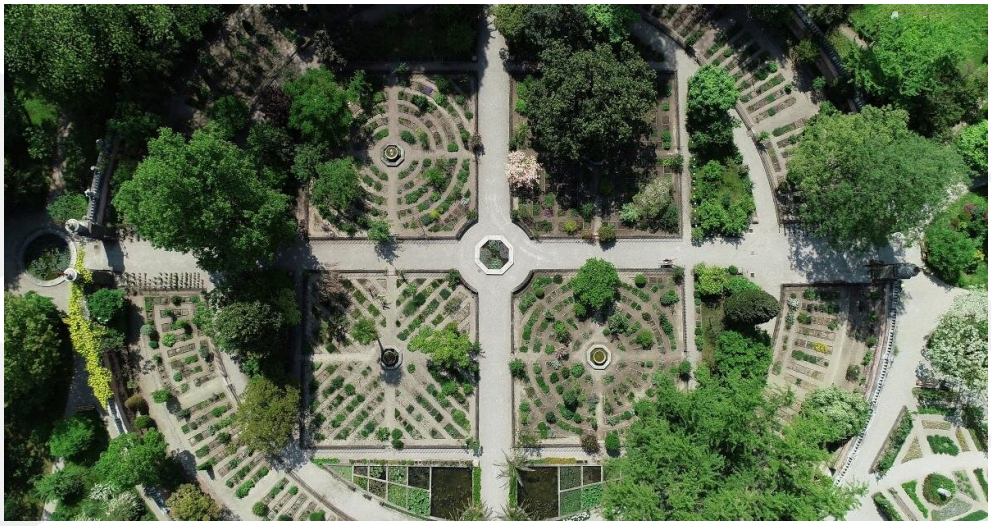

Image Caption
The Botanical Garden of Padua, Italy, a UNESCO World Heritage Site and a historic centre for plant research, education, and biodiversity conservation.

Introduction

Plant biodiversity is essential to European ecosystems, contributing to ecological balance, climate regulation, soil fertility and the survival of numerous animal species. However, plants face increasing threats from climate change, habitat loss and fragmentation, pollution, and invasive species. Their conservation therefore requires protective measures, scientific research, institutional cooperation and greater public awareness.

Botanical gardens play a strategic role in this process. Beyond living collections and ex situ conservation, they support research, seed conservation, ecosystem restoration and scientific communication. Through education and public engagement, they explain environmental issues and encourage responsible behaviour.

Botanic Gardens Conservation International (BGCI) supports these efforts by connecting botanical gardens, facilitating knowledge exchange and

promoting joint conservation initiatives. Its work demonstrates how botanical gardens can bridge scientific research, conservation policy and public engagement.

The central question is how botanical gardens can contribute more effectively to plant conservation and environmental education in Europe. Greater institutional recognition, stronger cooperation and targeted investment are essential to achieving this goal. Botanical gardens should therefore be recognised as strategic partners in implementing European biodiversity policies, rather than merely scientific centres or recreational spaces (Gaio-Oliveira et al., 2017; Wyse Jackson & Sutherland, 2017; Chen & Sun, 2018; European Commission, 2020; BGCI, n.d.-a; BGCI, n.d.-b; BGCI, n.d.-c; BGCI, n.d.-d).

1. Problematization

The European Union has made biodiversity protection a priority through initiatives such as the EU Biodiversity Strategy for 2030, which aims to protect and restore ecosystems. However, ambitious targets require adequate resources, effective coordination and practical implementation to produce tangible results.

A major challenge is the gap between scientific knowledge, public awareness, and action. Although plants are fundamental to ecosystems, they may receive less attention than other components of biodiversity. This limited visibility can weaken public support for conservation, highlighting the importance of communicating scientific knowledge through accessible, everyday experiences.

Botanical gardens also remain insufficiently integrated into some decision-making processes. Despite their expertise, infrastructure and educational capacity, their contribution remains under-recognised in environmental strategies. Unequal funding, staffing and collaboration opportunities further constrain their activities.

Addressing these challenges requires cooperation between European and national institutions, scientific organisations, botanical gardens and local communities. BGCI can facilitate knowledge exchange and connect local initiatives with wider conservation objectives. The challenge is to translate policy commitments, scientific expertise and public engagement into measurable progress (Blackmore et al., 2011; Williams et al., 2012; Chen & Sun, 2018; EEA, 2019; European Commission, 2020; Westwood et al., 2021; European Commission, 2022).

2. Analysis — Botanical Gardens as Drivers of Conservation and Education

Botanical gardens combine species protection, scientific research and public awareness. Their activities include supporting natural habitats (*in situ*)

and conserving species outside them (*ex situ*), thereby protecting threatened plants and supporting ecological restoration.

Living collections and seed banks preserve plant material and genetic diversity for research, propagation and potential reintroduction into the wild. However, *ex situ* conservation cannot replace habitat protection and must complement efforts to restore natural ecosystems and wild populations.

Research into plant distribution and ecological requirements helps identify threats and guide conservation and restoration under climate change. Sharing data and expertise between institutions strengthens these efforts.

Environmental education matters. Tours, workshops and public initiatives connect science with nature, helping visitors understand biodiversity loss and adopt responsible behaviours.

Conservation and education should therefore be treated as complementary activities. Communicating scientific findings encourages public support, while greater awareness can strengthen conservation initiatives. Botanical gardens should be promoted as spaces where research, species protection and public engagement work towards shared objectives (Mounce et al., 2017; O'Donnell & Sharrock, 2017; Chen & Sun, 2018; Westwood et al., 2021).

3. Analysis — BGCI, International Cooperation and Policy Implementation

Plant conservation depends on cooperation, resource sharing and scientific exchange. BGCI connects botanical gardens and research institutions, promoting international collaboration and coordinated initiatives to protect plant species.

In Europe, the European Botanic Gardens Consortium, established in 1994 and coordinated by BGCI, brings together representatives of national networks to facilitate information exchange. BGCI reports that Europe has over 900 botanical gardens, welcoming more than 120 million visitors annually. Together, these institutions support conservation, research and public education.

BGCI's work supports international and European biodiversity objectives. The EU Biodiversity Strategy for 2030 promotes ecosystem protection and restoration, alongside research, funding, and conservation measures. Botanical gardens can contribute through threatened-species conservation, plant collections, scientific data sharing and public education. Their effectiveness, however, depends on institutional recognition and integration into environmental strategies.

Stronger links between BGCI, European institutions, research organisations and local communities could transform individual initiatives into coordinated actions, improve access to funding and support joint projects. Botanical gardens should therefore participate more actively in developing and implementing biodiversity policies. Recognising their expertise and

strengthening international networks are essential to achieving lasting results (Cheney et al., 2000; European Commission, 2020; BGCI, 2025; BGCI, 2026; BGCI, n.d.-d).

4. Analysis — From Educational Initiatives to Public Impact

Environmental education connects botanical research and conservation with public engagement. Guided tours, workshops and school trails help participants understand plants' ecological importance and the effect of human activities on biodiversity.

BGCI's guidelines emphasise participatory learning that connects botanical collections with local environmental and social issues. Involving communities in programme design can also make activities more inclusive and responsive to different audiences.

An example is LearnToEngage, a BGCI-coordinated project funded by Erasmus+. Completed in 2019, it developed training programmes for botanical gardens and museum staff, strengthening skills in informal education, visitor engagement and programme evaluation. It shows how staff training improves communication about plants and research.

Serena Dorigotti, an Italian senior advisor in botany and winner of the 2021 Marsh Award for Education in Botanic Gardens, emphasises the importance of hands-on educational activities. "Environmental education helps people to understand plant biodiversity. Through practical activities, botanic gardens can make scientific knowledge more accessible, promoting greater awareness and responsibility towards nature."

Lasting educational impact requires combining scientific knowledge with practical activities and active participation. Awareness matters, but programmes should encourage responsible behaviour and public involvement. Integrating research, education and engagement can strengthen botanical gardens' contribution to biodiversity conservation (BGCI, 2004; BGCI, 2006; Ballantyne et al., 2008; He & Chen, 2012; Dorigotti, 2026; BGCI, n.d.-b; BGCI, n.d.-e; BGCI, n.d.-f; BGCI, n.d.-g; BGCI, n.d.-h).

Conclusion

Botanical gardens' contribution to European plant conservation could be strengthened through greater institutional recognition and systematic integration into environmental strategies. Five priorities emerge:

1. Institutional recognition: European and national institutions should recognise botanical gardens as strategic partners, drawing on their scientific expertise, conservation infrastructure and public engagement capacity;
2. Stronger cooperation: collaboration among BGCI, public institutions, universities, research centres and local communities should facilitate knowledge exchange, best practice and coordinated conservation;

3. Invest in environmental education: sustained programmes for schools and communities should promote biodiversity awareness, participation and responsible behaviour;
4. Funding and capacity building: stable funding should support threatened-species conservation, seed banks, research and staff training, while enabling resource-limited institutions to participate in joint projects;
5. Monitoring and evaluation: shared indicators should measure conservation outcomes and educational impact, enabling improvements and more effective resource allocation.

Botanical gardens connect science, environmental policy and society. Their contribution extends to research, cooperation and education. Recognising them as strategic partners would turn European biodiversity commitments into action and make plant conservation a shared responsibility. (Cheney et al., 2000; Chen & Sun, 2018; European Commission, 2020; CBD, 2022; CBD, 2023; European Parliament and Council, 2024; BGCI, 2026; BGCI, n.d.-b; BGCI, n.d.-c; BGCI, n.d.-i; BGCI, n.d.-j).

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