

# Towards Ethical Collections

Ethical cultivation, conservation and legal trade of exotic ferns in the UK





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The Exotic Fern Group is a community for enthusiasts of tropical, subtropical and indoor ferns. We bring together individuals who share a passion for these unique plants, offering opportunities to connect, learn and grow together.

Members enjoy regular newsletters, social visits to private fern collections and online presentations. We also organise trips to larger public fern collections. Members can also benefit from access to fern and spore swap schemes, to expand and develop their own collections.

Our group is committed to supporting public botanic gardens that feature exotic ferns, advocating for both diversity and specialisation within their collections. We actively promote the cultivation of ferns as houseplants. We recognise the importance of preserving and documenting private and public fern collections across the UK and worldwide.

Honorary Patron: Christopher Fraser-Jenkins

President: Dr Peter Blake

*The Glasshouse* is the official journal of the Exotic Fern Group. It covers topics related to ferns and their allies, including horticulture, conservation, taxonomy and science.

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#### **Cover Pictures**

Front (clockwise from top): *Salvinia oblongifolia*, *Tectaria hilocarpa*, *Pityrogramma austro-americana*, *Platynerium stemaria*.

Back: the South Asia enclosure at Stratford-upon-Avon Butterfly Farm, combining geographical flora and fauna.

#### **Internet access**

The most recent version of this report will be found on the Exotic Fern Group website at <https://www.exoticferngroup.org/tec>.

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The Evolution Garden at the Natural History Museum. An ambitious garden design featuring many *Dicksonia antarctica* with education at its heart.

## Introduction: A Framework for Ethical Fern Collections

The Exotic Fern Group (EFG) aims to promote the study, cultivation and conservation of exotic ferns, and to encourage the sharing of knowledge and plant material among its members and the wider horticultural community. This document supports the EFG mission by addressing several fundamental issues facing all those with a vested interest in collecting and cultivating exotic ferns in the UK. These issues include conservation, as well as the ethical and practical challenges surrounding the import and export of fern material. Although this document primarily examines these issues from a UK perspective, the approach remains relevant to EFG members based internationally.

Towards Ethical Collections sets out a practical and principled approach to the cultivation, exchange and

conservation of tropical fern collections in the UK, fostering collaboration between botanic gardens and private growers. It is intended to guide the cultivation of exotic ferns towards a shared standard of practice that is legally compliant, ethically grounded and aligned with contemporary conservation priorities, while directly supporting the EFG's aims of knowledge exchange, responsible cultivation and plant conservation.

A central theme of this document is that meaningful exotic fern collections are rarely achieved in isolation. Collaboration among botanic gardens, private growers and plant societies strengthens the resilience, diversity and impact of collections. By sharing plant material, expertise and responsibility, these partnerships create distributed networks that are better able to safeguard species and horticultural knowledge over the long term, reflecting the EFG's commitment to cooperation and collective stewardship.

The approach recognises that living plant collections are most valuable when they are purposeful, well-documented and actively contribute to wider outcomes beyond display. These outcomes include conservation, education, research and the development of horticultural expertise. This document therefore provides not only guidance, but also the basis for a framework through which collections can be understood, evaluated and strengthened over time, in line with the EFG's mission to advance both the cultivation and conservation of ferns.

## THE FRAMEWORK PILLARS

There are four interconnected pillars in our framework:

### 1. Legal and Ethical Acquisition

All exotic fern plant material should be acquired in compliance with national and international regulations, including plant health legislation and agreements governing access and benefit-sharing. Ethical sourcing prioritises legally propagated material and transparent supply chains, reducing pressure on wild populations and supporting responsible trade.

### 2. Documentation and Provenance

The long-term value of an exotic fern collection depends on the quality of its records. Accurate documentation (including provenance, accession history and cultivation data) enables collections to contribute meaningfully to conservation, research and collaboration. Transparency is essential, even where information is incomplete.

### 3. Horticultural Husbandry and Knowledge

Exotic fern collections depend not only on the plants themselves but on the expertise required to grow and propagate them successfully. Specialist husbandry knowledge, often developed over many years of private or professional growing, is a critical conservation resource. Recording and sharing this knowledge ensures that it is not lost and can support future conservation efforts.

### 4. Conservation Contribution

Exotic fern collections should be developed and managed with a clear understanding of their contributions to conservation. This may include safeguarding threatened species, maintaining genetic diversity, supporting research, enabling future recovery work, and engaging the public. Even where direct conservation outcomes are limited, collections can play a vital supporting role within broader networks.

## Using This Document

This document is divided into three sections:

**1. Part One:** Guidance for private growers and botanic gardens wishing to form partnerships to collaboratively maintain, develop, and safeguard their collections.

**2. Part Two:** Guidance for establishing and maintaining ethical plant collections.

**3. Part Three:** Guidance on importing and exporting plant material legally and responsibly.

Throughout the document, Exotic Fern Group Actions (EFGAs) have been identified and highlighted. These are tangible ways in which the EFG can support issues raised in the document and fulfil its mission statement.

The document also includes a section on further resources and a list of references.

## Background and Context

Tropical fern collections are particularly vulnerable due to their reliance on heated glasshouses—facilities that are costly to maintain and increasingly under pressure as institutions review and rationalise their collections. Ferns are often not prioritised in these reshaping programmes. As a result, not only are plants themselves at risk, but also the specialist horticultural expertise required for their cultivation and propagation. It is therefore vital that this knowledge is recorded and shared, both to safeguard living collections and to support future in situ and ex situ conservation initiatives.

This comes at a time when wider conversations about the ethics of maintaining tropical collections are increasingly needed. In general horticulture, increasing interest in native species, plants for pollinators, and initiatives like 'No Mow May' and rewilding reflect a cultural shift toward ecological responsibility. Many botanic gardens with exotic collections have moved towards educational storytelling, using evolution or ethnobotany as a backdrop. In this context, maintaining tropical plant collections purely for display risks appearing outdated or may even carry colonial associations. There is therefore a need for us to reevaluate the purpose, value and impact of living collections, both in public and private collections.

A meaningful collection is defined not by the number of species it contains, but by the clarity of its purpose and its

contribution to conservation, education and research. Central to this is collaboration: sharing plant material and knowledge between botanic gardens and private growers. Working in partnership strengthens the resilience of collections, improves horticultural standards, promotes the sharing of expertise, and ensures that species are safeguarded in cultivation for the long term.

The taxa maintained within exotic fern collections in the UK are largely remaining static and their potential for development is increasingly constrained by legislation designed to protect biodiversity and uphold biosecurity. There are concerns that some private growers may, knowingly or unknowingly, be circumventing regulations in order to grow different species. If collections, whether public or private, are to develop, the import and export of plant material will remain a necessity. This is a complex area, and it is therefore essential that growers fully understand and comply with the relevant regulations when exchanging material internationally.



A Plumed Basilisk (*Basiliscus plumifrons*) perching on the epiphytic fern *Phlebodium aureum* at Stratford-upon-Avon Butterfly Farm, United Kingdom, where they are beginning to incorporate geographical planting into their enclosures.

# PART ONE: Botanic Garden and Private Grower Partnerships

Many private growers have developed substantial expertise through long-term cultivation, propagation and study of their plants. Creating clear frameworks through which this knowledge and experience can be shared with botanic gardens, other growers and the wider conservation community represents a valuable and currently underused resource. Likewise, plants held in established private collections can add taxonomic, genetic and horticultural diversity to living fern collections in UK botanic gardens.

Collaboration between botanic gardens and experienced private growers strengthens the resilience and long-term value of living collections. Sharing plant material and horticultural expertise improves standards of cultivation, supports the safeguarding of rare species and helps ensure that collections contribute meaningfully to conservation, education and research rather than existing in isolation.

In practice, the distinction between ‘private grower’ and ‘professional horticulturist’ is often artificial. Many people working in botanic gardens began by cultivating specialist plant groups at home and continued to develop expertise through experimentation with cultivation, participation in plant societies, and informal networks. Experience of growing specialist plants is routinely expected in botanic garden horticultural roles, particularly for tropical collections. The skills gained through private growing, therefore, underpin much of the professional capacity within botanic gardens themselves.

Some private growers exchange ferns and spores among themselves, often with support from plant societies. This informal network helps maintain plant stocks and preserves the genetic diversity of some species in cultivation. Likewise, botanic gardens may share plant material with one another to strengthen their collections. Nevertheless, despite these parallel efforts, there is little coordinated oversight of fern collections in the UK, particularly with regard to tropical species.

Plant Heritage provides a framework for safeguarding collections through its National Plant Collection® scheme, available to both botanic gardens and private growers. Yet Plant Heritage’s criteria, often focusing on a single genus, a defined group of cultivars or historical theme, mean that many ferns, especially more diverse or taxonomically broad

collections, can fall outside its scope. As a result, significant living resources remain disconnected from formal conservation efforts, highlighting the need for stronger partnerships between botanic gardens and experienced private growers.

Actively propagating and sharing cultivated material can help reduce pressure on wild plant populations. Demand for tropical ferns is increasingly visible through online trade, where it is often met by illegal wild collection. Although all cultivated plants ultimately originate from wild material, expanding the availability of legally propagated material is essential to limiting further extraction from natural populations. Partnerships between botanic gardens and skilled private growers can play an important role in this process by increasing the supply of responsibly produced plants and supporting more ethical pathways for cultivation and exchange.



The magnificent Kibble Palace at Glasgow Botanic Gardens housing their National Collection of Aborescent Ferns.

At a time when many botanic gardens face limited resources, rising energy costs and pressure to rationalise glasshouse space, experienced private growers with established collections and specialist facilities represent an important component of the wider conservation landscape. It is therefore vital that cultivation knowledge is actively recorded and shared through articles, talks, mentoring and collaboration: roles that plant societies are well placed to facilitate. Knowledge that is not shared risks being lost, along with the skills and experience needed to maintain and develop living collections into the future.

Accordingly, the EFG supports the ethical sharing of knowledge and plant material between botanic gardens and experienced private growers. Partnerships built on trust and transparency can prevent privately cultivated collections from becoming isolated from broader conservation efforts, instead enabling them to contribute to long-term conservation goals through shared expertise and the safeguarding of rare species.

## EFGA1

### RELAUNCH EXOTIC FERN GROUP DATABASE 'PTERIDOBASE'

The EFG will develop its existing database to encourage structured recording of horticultural practice. We will ask experienced private growers and botanic gardens to contribute. All members will have free access. The database will include functionality to:

- record horticultural notes.
- record propagation experience.
- track and collate accession records.

## International legal agreements

Understanding the international agreements that guide the work of botanic gardens is useful for private growers because it places their own activities within a broader conservation and ethical framework. Many of these agreements, such as those on biodiversity conservation, access and benefit-sharing, and the prevention of invasive species, influence how plant material is collected, exchanged, documented and displayed. By being aware of these obligations, private growers can align their own practices with global conservation goals, avoid

unintentionally breaching regulations, and build trust with institutional partners. This shared understanding can make collaborations smoother, as botanic gardens may be more willing to partner with private growers who demonstrate responsible and informed approaches to plant management. It also benefits botanic gardens by reducing compliance risks and ensuring that partnerships support, rather than compromise, their legal and ethical responsibilities.

There are four main international agreements that are relevant to botanic gardens:

1. Nagoya Protocol
2. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
3. United Nations (UN) Sustainable Development Goals
4. European Union (EU) Habitats Directive

## Nagoya Protocol

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits was adopted under the Convention on Biological Diversity in 2010 and implemented in the UK through The Nagoya Protocol (Compliance) Regulations 2015. The Nagoya Protocol requires that genetic resources (including plant material) from other countries be obtained legally, and that any benefits from their use are shared fairly. Part of this is ensuring plants are sourced ethically and comply with international rules, supporting global biodiversity conservation. In practice, ambiguities remain about how the Protocol is enacted. For example, different countries have varying approaches to exemptions, and there is debate over whether the Protocol applies to resources collected prior to its implementation.



The behind-the-scenes glasshouses at Royal Botanic Gardens, Kew. An important living collection of ferns.

## CITES

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) regulates international trade in listed species to prevent them from becoming threatened or extinct. Botanic gardens must comply when importing, exporting or exchanging species across borders, including whole plants, spores, and herbarium specimens, and must obtain the required CITES permits. Private growers must also ensure that any CITES-listed plants acquired from abroad are legally sourced and accompanied by the appropriate permits. CITES does not restrict domestic cultivation or exchange within the UK, though other legislation and biosecurity measures may still apply.

## UN Sustainable Development Goals

Established by the United Nations, the Sustainable Development Goals (SDGs) provide a global framework for promoting environmental protection, social equity and economic sustainability. The UN Sustainable Development Solutions Network (SDSN) coordinates international expertise to advance progress towards these goals and the Paris Agreement on Climate Change. The UK government has committed to the SDGs and has reported on national progress through its Voluntary National Review.

Botanic Gardens Conservation International (BGCI) has explored the relationship between plant conservation and the SDGs in its policy paper, *Plant Conservation and the Sustainable Development Goals*. The report highlights the essential role of botanic gardens in achieving these objectives.

**SDG15: Life on Land** is the most directly applicable, calling for the protection and restoration of terrestrial ecosystems and the prevention of biodiversity loss. However, **SDG1: Ending Poverty**, **SDG2: Food Security and Sustainable Agriculture**, **SDG12: Sustainable Consumption and Production** and **SDG13: Climate Action** are also relevant, particularly as biodiversity underpins many economic activities and millions of people worldwide rely directly on natural resources for their livelihoods.

Through plant conservation, research, education and sustainable horticultural practices, botanic gardens contribute directly to the SDGs and demonstrate the



The bog garden at Treborth Botanic Garden. This part of the garden is currently being enhanced with new plantings and a purpose-built boardwalk supporting their new National Collection of Welsh Native Ferns.



Head Gardener, Colin Agnew, exploring the Palm House at Belfast Botanic Gardens with EFG member, Gordon Finch.

integral link between biodiversity and sustainable development. Strengthening partnerships between botanic gardens and experienced private growers can further advance these goals by expanding conservation capacity, sharing expertise and promoting a broader culture of sustainable plant management.

## EU Habitats Directive

The EU Habitats Directive (92/43/EEC) was established to promote the conservation of natural habitats and of wild fauna and flora across Europe. It provides the legal framework for protecting species and habitats of European importance, including through the designation of Special Areas of Conservation (SACs). Species listed under Annex II of the Directive require habitat protection, while those listed under Annex IV are afforded strict protection throughout their natural range.

Within the UK, *Vandenboschia speciosa* (Killarney Fern), is the only species of fern listed on both Annex II and Annex IV of the Directive, reflecting its exceptional rarity and vulnerability. This listing requires that sites supporting the fern are protected as SACs, and that the species itself is safeguarded from deliberate collection, damage or destruction.

In the United Kingdom, the Habitats Directive was transposed into domestic law through the Conservation (Natural Habitats, &c.) Regulations 1994, now superseded by the Conservation of Habitats and Species Regulations

2017. These regulations continue to apply following the UK's withdrawal from the European Union. As a result, *Vandenboschia speciosa* is recognised as a European Protected Species (EPS), making it an offence to pick, uproot or otherwise disturb the plant or its habitat without a licence.

## Other relevant agreements

Whilst the following agreements do not create direct legal obligations for botanic gardens, they provide an international context for plant conservation and highlight the broader environmental challenges that botanic gardens address through research, conservation, education and public engagement.

### 1. Kunming-Montreal Global Biodiversity

**Framework (KMGBF):** Establishes an overarching global mandate to halt and reverse nature loss by 2030, supported by the BGCI Global Strategy for Plant Conservation (GSPC) as a specialised 'daughter policy' that provides technical, plant-specific actions. Together, they create a comprehensive pathway where the KMGBF sets high-level targets—such as protecting 30% of the world's land—and the GSPC defines the expert botanical measures required to achieve them. Botanic gardens are vital to this joint mission, contributing by maintaining extensive seed banks and living collections to prevent species extinctions, leading large-scale restoration of degraded ecosystems with native flora, and providing the essential scientific data and educational outreach needed to track global progress toward a nature-positive future.

### 2. UN Framework Convention on Climate Change

**(UNFCCC):** Establishes a global framework for mitigating and adapting to climate change. Botanic gardens contribute by monitoring plant responses to changing climates, conserving climate-sensitive species in living collections, and engaging the public in education about climate impacts.

### 3. UN Convention to Combat Desertification

**(UNCCD):** Provides measures to prevent and reverse land degradation and desertification. Botanic gardens support these goals by maintaining ex situ collections of threatened species, researching plants adapted to degraded environments and promoting habitat restoration initiatives.

**4. Ramsar Convention on Wetlands:** Promotes the conservation and sustainable use of wetlands worldwide. Botanic gardens contribute to conservation efforts by preserving wetland-dependent species, assisting with the enhancement of wetland habitats and raising public awareness of the ecological importance of these ecosystems.

**5. International Union for Conservation of Nature’s (IUCN) Red List of Threatened Species:**

Established in 1964, it has evolved to become the world’s most comprehensive information source on the global extinction risk status of animal, fungus and plant species. Whilst not a legally binding agreement, it is used as an authoritative reference to guide conservation priorities. Many fern species appear on the IUCN Red List; however, inclusion on the Red List does not in itself confer legal protection or trade restrictions. The Red List is a scientific assessment of extinction risk, not a regulatory framework. Nevertheless, the presence of a

species on the Red List often indicates that it is threatened in some way, and it may also be protected under other national or international legislation, for example, CITES, domestic wildlife laws or plant health legislation. It is therefore essential to verify whether additional legal frameworks apply before acquiring, trading or importing such species.

## EFGA2

### CREATING INFORMATION LEAFLET FOR COMPLIANCE

The EFG will publish a leaflet for private growers outlining the key international agreements that guide the work of botanic gardens. The EFG will encourage private growers to aspire to holding equivalent standards.



Botanic gardens are an incredible resource. At Royal Botanic Gardens, Kew, Alice Taylor, Botanical Horticulturist in the Moist Tropical Unit, explores the extensive *Selaginella* collection alongside pteridologist and EFG Honorary Patron Christopher Fraser-Jenkins.



Luigi Leoni, Team Leader of the Glasshouses at Cambridge University Botanic Garden, exploring the tropical zone with members of the EFG.

## Creating partnerships

Collaborations between botanic gardens and experienced private growers bring significant benefits to both parties by enhancing conservation outcomes, education and horticultural knowledge. Many private growers possess decades of hands-on experience, detailed species knowledge and specialised cultivation techniques that complement the scientific expertise and resources available in botanic gardens. When these skills and insights are shared, collections become more resilient, better documented and more effective for conservation purposes.

Partnerships also support the safeguarding of rare or threatened species through responsible sharing of plant material. Privately cultivated plants can act as insurance populations, providing a buffer against losses in the wild or in institutional collections. Gardens benefit from increased species and genetic diversity, while private growers also gain access to material that is not widely available, alongside guidance, training and opportunities to contribute meaningfully to ex situ conservation. These collaborations encourage responsible horticultural practice and help reduce pressure on wild populations.

Knowledge exchange is reciprocal. Private growers learn from garden staff about propagation, record-keeping and conservation priorities, while gardens gain practical insights into wider cultivation challenges, techniques and long-term observational data gathered by private growers. Shared stewardship of living collections also reduces the risk of total loss from pests, disease or unforeseen events, strengthening the long-term security of species in cultivation.

Beyond individual collections, partnerships help build a more connected conservation community. By linking passionate individuals with institutions, these collaborations create networks that support the ethical sharing of plants and spores, promote education, and ensure that expertise and material held in private collections contribute meaningfully to conservation.

### EFGA3

#### DEVELOPING PARTNERSHIPS

The EFG will publish guidance on the possible ways botanic gardens could partner with private growers, facilitating these connections and assisting in developing and strengthening collections.

## Provenance requirement

The provenance of a plant is an important consideration for both botanic gardens and private growers when establishing partnerships. Knowing where a plant comes from helps gardens track genetic diversity, manage conservation priorities, and ensure compliance with legal and ethical standards. However, unknown or incomplete provenance is not necessarily a barrier to collaboration. It is important to be transparent about unknown provenance of any plant. Botanic gardens value honesty, and plants with incomplete provenance can still add value to collections.

Private growers can strengthen the value of their collections by keeping thorough records. Private growers should consider creating their own accession numbers and maintaining a database or spreadsheet with as much information as possible, including the source, date of acquisition, cultivation history and any other relevant observations. Good record-keeping not only supports partnerships with botanic gardens but also helps track plant health, propagation and long-term conservation outcomes, allows both gardens and private growers to assess risks, share knowledge and make informed decisions.

While good provenance records are always the ideal, practical limitations are recognised, particularly for private growers working entirely within legal and ethical guidelines. Some plants in private collections may lack detailed provenance, but this does not automatically prevent them from contributing to meaningful collections. For example, a garden may wish to use a plant for educational purposes or to safeguard a species that has already been lost in the wild. In such cases, recording provenance as 'plant material from hobbyist/supplier X' may be acceptable. Transparency and honesty about the limits of provenance are key, allowing both gardens and private growers to make informed decisions while still supporting conservation, education and research objectives.

### EFGA4

#### MAINTAINING PROVENANCE RECORDS ADVICE FOR MEMBERS

The EFG will provide advice for private growers who wish to keep accession records and information on provenance for their own collections. The EFG Database 'Pteridobase' will facilitate good record-keeping for private growers.

## Risk diversification

Sharing living plant material between institutions and trusted private growers is an effective way to reduce the risk of losing species in cultivation. By maintaining multiple, well-documented collections across botanic gardens and private growers, no single event—such as a pest or disease outbreak, equipment failure, natural disaster or staff change—can result in the total loss of a species. This distributed approach is particularly important for rare or highly threatened taxa, where the consequences of loss are greatest.

For botanic gardens, working with experienced private growers adds an extra layer of security and flexibility. Private collections can often respond more quickly to emerging challenges, adjusting care, distributing plants or trialling propagation techniques without the constraints of formal institutional protocols. This flexibility complements the stability and resources that botanic gardens provide. For private growers, participation in such networks offers opportunities to contribute meaningfully to conservation outcomes and to exchange knowledge and material responsibly.

### EFGA5

#### SURVEY BOTANIC GARDENS FOR CURRENT THOUGHTS ON SHARING MATERIAL

The EFG will conduct a survey exploring ways botanic gardens are already partnering with private growers.

## Biosecurity and plant health

All partnerships between botanic gardens and private collectors should be underpinned by robust biosecurity and plant health measures. Botanic gardens typically operate formal plant health and biosecurity procedures to prevent the introduction and spread of pests, diseases and invasive species. The EFG recommends that similar principles be applied when exchanging plant material with botanic gardens and between private growers.

A standard protocol should include:

- **Pre-transfer assessment:** reviewing the origin, health status, and identification of plant material before transfer.



Tom Bellamy, Curator of the National Collection of *Platyserium*, demonstrating to EFG members how to care for this group of ferns. Sharing expertise is a core responsibility of plant societies.

- **Quarantine procedures:** isolating all new plant material for a defined period to monitor for pests or diseases, supported by regular inspections.
- **Record-keeping:** maintaining accurate accession records, including source, date of acquisition and any phytosanitary documentation; material should be clearly labelled if the acquisition precedes the implementation of the Nagoya Protocol.
- **Hygiene measures:** using clean tools, disinfected surfaces and sterile potting media to prevent cross-contamination and the spread of pests and diseases.
- **Response plan:** having clear steps for reporting, isolating and eradicating any pest or disease outbreaks detected in collections.

Private growers contributing plant material should familiarise themselves with a botanic garden's plant health and biosecurity procedures before any transfer takes place. While the garden retains ultimate responsibility for assessing and managing risks, providing accurate information about the source, health and prior handling of plants or spores helps support the garden's risk assessment process. Private growers who can quickly identify, manage

and report pests or diseases are particularly valuable partners, as this reduces risk and supports the safe integration of material into collections.

## Material Transfer Agreements

Many botanic gardens use Material Transfer Agreements (MTAs) when transferring plants, spores or other plant material between institutions. MTAs are formal documents that outline the conditions under which material can be shared, including responsibilities for plant health, biosecurity, legal compliance and intended use—particularly when rare, threatened or regulated species are involved.

For private growers, MTAs are not usually required when contributing material to a botanic garden. But botanic gardens will typically require accurate information about the plant's provenance, health and history, which allows the garden to assess risks and manage collections responsibly. If a botanic garden is providing material to a private grower, it may request that the private grower sign the garden's MTA or agree to its conditions, ensuring legal, ethical and biosecurity standards are understood.

## EFGA6

### BIOSECURITY ADVICE FOR EFG MEMBERS

The EFG will provide information to its members about biosecurity and what protocols they can put in place to reduce the spread of pests, diseases and invasive species.

## EFGA7

### MTA TEMPLATE FOR BOTANIC GARDENS WORKING WITH PRIVATE GROWERS

The EFG will develop a Material Transfer Agreement template specifically designed to be used for partnerships between botanic gardens and private growers.

# PART TWO: Establishing and Maintaining Ethical Fern Collections

Creating and maintaining a diverse living collection of tropical ferns is achievable, but it carries ethical responsibilities that must be carefully considered. This is particularly important in a global context where biodiversity is under intense pressure from habitat loss, climate change, overexploitation, pollution, invasive species and the impacts of wildlife trade. These pressures contribute to widespread population declines and, in some cases, the complete loss of species from the wild. Both private growers and botanic gardens therefore have a responsibility to ensure that their collections do not inadvertently contribute to these threats.

For many growers, an initial fascination with plants is the starting point for cultivating tropical species. Ethical collections build on this motivation by ensuring that plants are acquired, cultivated, documented and shared responsibly, with a clear understanding of their wider impacts. Living collections should therefore contribute demonstrably to conservation, education and research, rather than existing solely for display.

It is important to be realistic about what private growers and UK-based botanic gardens can achieve in terms of tropical plant conservation. Direct involvement with in situ conservation of tropical species is often challenging and usually requires close collaboration with institutions and projects based in the species' native range. However, safeguarding threatened species—through ethical and legal sourcing, careful cultivation and propagation, education and the responsible sharing of plant material—is both achievable and valuable as part of wider conservation efforts.

## Justifications for maintaining living collections

Many botanic gardens justify their plant collections on educational grounds. With the availability of botany degrees diminishing in the UK, and horticulture often undervalued as a career, there is an urgent need for individuals with in-depth knowledge of plants—particularly those underrepresented or considered 'difficult to identify' taxa. Botanic gardens are therefore an essential educational resource, inspiring the next generation of botanists and conservationists.

Plant collections can also increase awareness of plant diversity and threats, promoting conservation literacy beyond formal education. Thoughtfully designed displays, outreach activities and training initiatives provide indirect conservation benefits by encouraging interest in plants and supporting training for future conservation professionals.



*Isoetes lacustris* on display at Cambridge University Botanic Garden. Part of their Evolution of Plants educational display.

Many public collections of ferns are limited in scope, often focusing on common species that are readily available from garden centres. Maintaining such material is a poor use of resources. At the same time, few botanic gardens have the funding to organise trips for the authorised collection of wild plant material. Collaborative initiatives with plant societies, other institutions and private growers provide a practical, and perhaps a more sustainable, alternative. Private growers often maintain rare and unusual species that can enrich public collections and enhance their conservation and educational value.

## EFGA8

### CREATE EDUCATION RESOURCES

The EFG will develop and make available educational resources, primarily for botanic gardens, highlighting the value of ferns in conservation.



A fertile frond of a tropical *Hymenophyllum* sp. Many private growers develop expertise in cultivating and propagating unusual species, such as this filmy fern.

### The purpose of private plant collections

Plant collections can be more meaningful and valuable to society when they serve clear purposes beyond display and aesthetics: by contributing to conservation, education and research. Meaningful collections are not just about the plants themselves, but also the knowledge required to grow them successfully. Many tropical ferns require specific conditions, and through trial and error, private growers often develop the skills necessary to cultivate these challenging species. Recording and sharing this cultural expertise is vital, as it can directly support ex situ conservation projects, including potential reintroduction or reinforcement initiatives. Experienced private growers can form productive links with botanic gardens to exchange knowledge and expertise. Private and professional growers should be encouraged to publish more about tropical ferns, including developing propagation protocols and offering

specialist workshops and talks. Maintaining private collections provides the context in which these skills are developed and sharing them ensures that collections have a greater conservation, educational and research impact.

In botanic gardens, specialist collections are often maintained by staff and volunteers with detailed knowledge of particular plant groups. Some of these individuals bring expertise developed through academic study, while others have cultivated it through personal collections. Their dedication ensures that collections are well cared for and researched, and the facilities available in botanic gardens allow them to grow species that may be difficult to cultivate in a domestic setting. When combined with expertise, documentation, and active sharing of knowledge and material, these collections become meaningful contributions to conservation, education and scientific understanding.

## EFGA9

### EXPAND CONSERVATION-FOCUSED KNOWLEDGE SHARING

The EFG will expand on existing activities by supporting members to share conservation-focused talks, workshops, online presentations and written protocols, ensuring that expertise developed in private collections directly supports ex situ conservation.

### Genetic safeguarding and material exchange

While a UK collection of tropical ferns cannot replicate the full genetic diversity of wild populations, it can maintain living material that might otherwise be lost. Good provenance and excellent record-keeping are therefore vital. Gardens and private growers can further enhance the conservation value of their collections by exchanging material and incorporating multiple provenances where possible, helping to broaden the genetic diversity of cultivated populations. Private growers in particular often maintain species and provenances not held in botanic gardens, making their collections an important source of additional genetic material.

There are notable examples of European ex situ collections contributing directly to species recovery in native habitats. *Cylindrocline lorencei*, a small tree from Mauritius, was considered 'Extinct in the Wild' in the 1990s until the Conservatoire Botanique National de Brest successfully performed in vitro culture on the only available seed. Subsequent vegetative propagation at Brest and the Royal Botanic Gardens, Kew, enabled the species to be reintroduced to its native habitat (French Embassy in Mauritius, 2021). Similarly, *Trochetiopsis ebenus* (St Helena Ebony), reduced to just two individuals in the wild, was propagated in UK botanic gardens, including Cambridge University and Kew, as part of a coordinated reintroduction programme (Smith and Barley, 2019, p. 15).

A third example involves the repatriation of cultivated *Anogramma ascensionis* gametophytes to Ascension Island. Since 2013, approximately 1,400 individuals propagated at Kew have been returned to the island, and a number of these have been introduced back into the wild (Ascension Island Government, 2015).



Part of the National Collection of *Platycterium* on display at RHS Garden Wisley for the annual Ferns and Carnivorous Plants Show.

These cases illustrate that well-managed ex situ collections, when combined with specialised horticultural expertise, can make tangible contributions to the conservation of threatened species.

## Common issues with living fern collections

Despite their ecological and conservation value, living fern collections face a range of challenges that can limit their effectiveness in supporting research, education and ex situ conservation. Key issues include:

- 1. Limited expertise:** Many smaller botanic and public gardens lack specialist knowledge in fern taxonomy and cultivation. Ferns are often perceived as lacking 'star appeal' and are used primarily as filler plants, resulting in collections dominated by garden centre species and cultivars.
- 2. Public understanding:** There is generally low awareness among the public, and sometimes within gardens, of the ecological importance of ferns. Flowering plants are often prioritised because they are assumed to be more beneficial for wildlife or more visually appealing.
- 3. Infrastructure constraints:** Several botanic gardens lack tropical glasshouse facilities or struggle to maintain and repair existing structures.
- 4. Limited conservation focus:** Ferns are often underprioritised in global conservation funding compared with flowering plants and charismatic taxa, although many species are included in IUCN assessments and targeted programmes.



The Conservatory at the Pavilion Gardens in Buxton. A beautiful Victorian structure maintained by volunteers.

- 5. Public engagement challenges:** The life cycles and ecological roles of ferns are less familiar to many visitors, making it harder to convey their value through displays.
- 6. Reliance on commercially available species:** Gardens aiming to diversify collections are often limited to species that are readily available or easy to import. Unusual imported species may have uncertain provenance and provide limited long-term conservation benefits, particularly when botanic gardens are already underperforming in species safeguarding (Cano, Á., Powell, J., Aiello, A.S. et al., 2025).
- 7. Legislative constraints:** International agreements such as the Convention on Biological Diversity and CITES, while essential, can constrain plant conservation efforts by restricting wild collection and international exchange, limiting the development of collections.

## EFGA10

### ADVICE FOR BOTANIC GARDENS WHO WISH TO FOCUS THEIR FERN COLLECTIONS

The EFG will actively encourage and advocate for public collections to specialise where possible, making the best use of available resources. The hope is to reverse the trend of using commonly available trade ferns and safeguard diversity across collections.

Types of focused collections may include:

1. Eclectic collections featuring a range of interesting and rare ferns
2. Collections based on genus
3. Collections based on geographical regions or ecological niches
4. Educational collections
5. Collections based on horticultural environments

## Conservation

Ferns are underrepresented in global conservation strategies, yet their decline represents a real and growing loss of biodiversity. Many fern species are highly specialised, slow to recover from disturbance, and vulnerable to habitat loss, climate change and over-collection. Their conservation therefore warrants greater attention within both in situ and ex situ frameworks.



Part of the *Davallia* collection of Royal Botanic Gardens, Kew. Behind-the-scenes visits can inspire and educate private growers, providing a great opportunity to share expertise and learn from others.

Most UK botanic gardens, regardless of intent, are unlikely to have a direct impact on tropical wild populations through ex situ collections alone. Native plant conservation remains a vital and achievable focus within the UK, but the conservation of tropical ferns depends on international collaboration, long-term partnerships and coordinated approaches that extend beyond individual institutions or growers. Meaningful conservation outcomes are more likely when collections are developed within networks that include botanic gardens, private growers, plant societies and in situ partners.

Cultivation expertise plays an important role within this wider conservation context. Many private growers and horticulturists possess detailed taxonomic knowledge and practical experience with specific fern groups, developed

over many years of cultivation. When integrated into collaborative conservation efforts, this expertise can support research, training and, where appropriate, field-based work alongside botanical institutions.

Even where direct reintroduction to the wild is unlikely, tropical fern collections in botanic gardens and private collections can still make valuable conservation contributions. These include safeguarding living material and genetic diversity, building horticultural and taxonomic capacity, supporting future conservation options through propagation and knowledge exchange, and engaging and educating the public. The following section sets out how these contributions can be clearly defined and assessed through measurable conservation roles.

# Defining the Conservation Roles of UK Tropical Fern Collections

ADAPTED FROM THE IUCN SSC GUIDELINES ON THE USE OF EX SITU MANAGEMENT FOR SPECIES CONSERVATION

UK collections of tropical ferns, both within botanic gardens and specialist private collections, can contribute meaningfully to species conservation when their roles are clearly defined and directly linked to identified threats or factors limiting a species' survival, reproduction or long-term viability. Following the IUCN framework, ex situ programmes should serve one or more strategic conservation functions and demonstrate how they deliver measurable benefits for species viability. In some cases, ex situ collections form a central part of a conservation strategy, while in others they support broader goals, such as education.

1

## Insurance against extinction.

By acting as a living repository, collections can maintain viable ex situ populations of species that face significant threats in the wild, preserving genetic material and maintaining options for future conservation action. For highly range-restricted or rapidly declining fern species, insurance populations reduce the probability of global or regional extinction and safeguard material that may be needed for future recovery efforts.

2

## Temporary rescue.

Ex situ collections can play a temporary role when wild populations face imminent or predicted threats, such as habitat clearance, extreme weather events, disease outbreaks or illegal collection. In such situations, removing threatened individuals into cultivation prevents immediate loss while buying time for in situ interventions.

4

## Research and training to enable in situ conservation.

Ex situ cultivation of tropical ferns builds essential horticultural and taxonomic expertise. Collections provide a setting for developing skills in husbandry, propagation, cryopreservation techniques, germination requirements, disease management, nutritional requirements and research. This knowledge directly supports effective conservation action in the wild and builds capacity for future interventions.

3

## Restoring wild populations.

Where appropriate, ex situ material can serve as a source for: reintroduction into former parts of a species' range; reinforcement of existing populations; assisted colonisation where climate change renders former habitats unsuitable. Such roles require strong provenance, genetic considerations and close collaboration with in situ partners. A notable example is the restoration of the critically endangered fern *Diplazium laffanianum* in Bermuda. Spores were sent to the Henry Doorly Zoo in Omaha, where horticultural expertise enabled the propagation of thousands of plants for reintroduction to the wild. This project illustrates how well-managed ex situ programmes, combined with specialised cultivation skills, can make a tangible contribution to species recovery (From, 2010).

## Measuring goals and objectives in tropical fern conservation

Botanic gardens should define clear, measurable goals and objectives for their collections, specifying what is to be achieved, by when, and how success will be assessed. Goals and objectives may include maintaining viable ex situ populations, conserving genetic diversity, developing propagation protocols, producing best-practice cultivation guidelines, sharing material and expertise through formal collaborations, and delivering public engagement and education. Success can be evaluated using metrics such as the number of species and provenances maintained, survival and reproductive rates of cultivated plants, propagation protocols produced, material exchanges completed, partnerships established, and the reach and impact of education outputs. Linking goals to quantifiable objectives ensures that collections deliver tangible conservation, research and education outcomes.

*Platycterium bifurcatum*

6

### Buying time for species at long-term risk.

Ferns threatened by climate change or permanent habitat loss may have no foreseeable future in the wild. For these species, ex situ management may be the only way to maintain them while strategic decisions are made about long-term conservation options, including ecological replacement or assisted colonisation where appropriate.

5

### Education and awareness.

People cannot be expected to protect what they do not understand. High-quality displays, interpretation and public engagement are therefore vital for raising awareness of plant diversity and conservation, as well as the fundamental role plants play in sustaining life on Earth. Displaying species at risk, explaining their ecological functions and highlighting threats such as habitat loss and illegal collection helps to address the social and behavioural drivers of decline. Public collections also inspire the next generation of botanists, horticulturists and conservationists at a time when formal plant science training in the UK is in decline.

*Pecluma pectinata*

*Doodia aspera*

## Criteria for prioritising species

To ensure that ex situ efforts deliver maximum conservation impact, tropical fern species for ex situ conservation should be selected based on:

1. Conservation status, including both threatened and data-deficient species.
2. Susceptibility to rapid decline due to restricted distributions or fragmented populations.
3. Availability of material with documented provenance.
4. Potential to make a meaningful conservation contribution, aligned with the IUCN SSC ex situ conservation categories.
5. Clearly defined, measurable goals and objectives, with indicators for monitoring and assessing success.

## Summary

Even where direct reintroduction may be unlikely, tropical fern collections in botanic gardens contribute meaningfully to plant conservation by:

1. Safeguarding material and genetic diversity across multiple holders.
2. Building technical capacity through horticultural and taxonomic expertise.
3. Supporting future conservation options through propagation and skill-sharing.
4. Inspiring public engagement and nurturing the next generation of conservation professionals.
5. Generating knowledge for species with limited or no ecological data.

*Neoblechnum brasiliense* 'Volcano'

*Lophosoria quadripinnata*

## EFGA11

### ASSESSMENT OF THREATENED FERNS IN LIVING COLLECTIONS

The EFG will conduct a gap analysis of globally threatened ferns to determine their representation in living collections. The project will identify priority taxa that are absent or under-represented in cultivation and provide recommendations for ex situ conservation.

### Safeguarding collections

Any specialised plant collection is inherently vulnerable, whether held in a botanic garden or a private setting. Tropical fern collections depend on controlled environments, including heated glasshouses, specialist irrigation and stable power supplies, making them sensitive to infrastructure failure, rising energy costs, or loss of technical or financial support. In addition, living collections remain exposed to sudden losses from pests and diseases, fire, extreme weather events or other unforeseen incidents.

In botanic gardens, specialist collections often develop through the expertise and commitment of individual staff members or volunteers rather than through formal institutional strategies. When these individuals move on, retire or change roles, collections can decline or be lost altogether. Encouraging gardens, particularly smaller institutions, to support succession planning and continuity strategies for specialist collections would help safeguard these resources and deliver long-term benefits for the institution.

Private collections face similar vulnerabilities. Plants may be lost when a collector becomes unable to care for them or passes away, particularly where families are unaware of their significance or lack the capacity to manage complex living collections. These situations are understandably difficult and often arise without warning. As a result, botanic gardens are sometimes approached to take on collections at short notice, when space or resources may not be available. It is therefore essential for private growers with significant collections, regardless of the age of the individual, to maintain documented succession plans.

Identifying and recording important fern collections is a critical step towards safeguarding them. The EFG proposes the development of a database to record significant collections and succession intentions, enabling greater transparency and coordination. Such an approach would support the long-term security of fern collections by facilitating continuity planning, material sharing and the distributed safeguarding of plants across multiple sites.

## EFGA12

### PROTECTING THE LEGACY OF MEMBERS' COLLECTIONS

The EFG will further develop guidance for private growers to support long-term planning and the safeguarding of their collections in the event they are unable to manage them. The EFG Database 'Pteridobase' can potentially help with managing this process.

*Polystichum prescottianum*

## PART THREE: Importing and Exporting Plant Material Legally and Responsibly

Many exotic fern enthusiasts, whether browsing online, visiting nurseries abroad or exchanging plant material with friends, may wish to expand their collections with species from overseas. However, importing or exporting plants in and out of the UK is heavily regulated to protect biodiversity and prevent the spread of pests and diseases. Failing to follow legal requirements can result in confiscated plants, fines or prosecution.

There are legal, ethical and practical considerations when planning to import or export ferns. The process is complex and primarily designed for large commercial horticultural or agricultural importers and exporters. Understanding these regulations and why they exist is essential, as they apply equally to private growers and botanic gardens.

Since the UK left the European Union (EU), the movement of plant material between the UK and EU member states has become more complex, with additional phytosanitary and regulatory requirements. Even where future agreements streamline certain processes, strict plant health controls are likely to remain, particularly as climate change increases the risk of new pests and diseases.

In the UK, the Royal Horticultural Society (RHS) advises private growers to source plants only from reputable British suppliers and highlights the regulations and risks associated with overseas imports (RHS, 2025). This guidance has also been echoed by several high-profile horticultural commentators. While this approach reduces biosecurity risks, it limits the availability of species to those already being propagated in the UK.

The number of UK nurseries capable of cultivating tropical and subtropical ferns has declined. Many UK garden centres and fern nurseries rely on Dutch-grown plug plants to maintain stock, which restricts enthusiasts to species with general market appeal that are economically viable for mass propagation.

Since the UK left the EU, the free movement of goods from the EU to Great Britain no longer applies. Regulations differ in Scotland, while Northern Ireland remains in the EU single market, with its own rules and additional protocols for movement between Northern Ireland and Great Britain. Always check the relevant regulations before purchasing or importing plants.



Part of Julian Reed's National Collection of *Polystichum*. The passion of individuals like Julian and organisations like Plant Heritage has been vital in maintaining fern collections in the UK.

# EFGA13

## CREATING INFORMATION LEAFLET FOR IMPORTING FERNS

The EFG will produce an information leaflet for private growers importing ferns.

### Options for purchasing plants from overseas

#### 1. Overseas nurseries exhibiting at UK events.

Occasionally, unusual fern species are available from overseas tropical plant suppliers exhibiting at UK plant shows. The selection is usually limited, but this usually provides an opportunity to purchase without additional paperwork, as the exhibitor has already complied with UK regulations. Large annual orchid and tropical plant shows are particularly worth checking, and it can be helpful to research which nurseries will be attending in advance. Some suppliers may allow pre-orders from their catalogue for collection at the event.

**2. Purchasing direct from overseas nurseries.** Since the UK left the EU, fewer nurseries are willing to ship to the UK due to increased complexity and costs. Only a small number of international suppliers continue to offer direct shipments or work through a UK-based intermediary. Some nurseries will manage import paperwork and associated fees, but requirements vary. It is important to research each supplier thoroughly, ask questions about shipping and documentation, and ensure that all legal requirements are met before completing a purchase.

**3. Buying ferns overseas and bringing them back to the UK.** Plants cannot be brought into the UK in luggage without the correct documentation. Depending on the species, some paperwork can take several weeks to process. Plants must be declared at UK customs, and a border inspection fee may apply. Failure to comply can result in confiscation and destruction of the plants, civil penalties such as fines, and potentially criminal prosecution.

For most exotic fern enthusiasts, the simplest and safest way to acquire unusual species is through UK-based nurseries, plant societies, or at UK events attended by overseas suppliers. If these options do not provide the required plants, and a responsible overseas supplier can be identified, refer to the information below.



*Diplazium esculentum*, the Vegetable Fern, used as an edible crop in many areas of the world. Here on display at Belfast Botanic Gardens.

## Importing ferns

Importing ferns into the UK is possible, but it requires careful planning and a clear understanding of the legal and practical requirements. The process is complex, involving multiple agencies and changing factors. Government regulation and, critically, its interpretation can also change at any time. We will provide links to key sources of information, which should be checked regularly for updates. Not all stages of the process are straightforward and, while we aim to simplify it, there remains an element of uncertainty when importing any plant material.

The UK Government's Department for Environment, Food & Rural Affairs (Defra) is responsible for plant health and sets policy, while the implementation is handled by different regional agencies. In England and Wales, the Animal and Plant Health Agency (APHA) is tasked with enforcing plant health controls on imported plants and plant products. In Scotland, Science and Advice for Scottish Agriculture (SASA) handles these responsibilities. In Northern Ireland, it is the Department of Agriculture, Environment and Rural Affairs (DAERA), through its Plant and Tree Health Division.



Tom Bellamy, Curator of the National Collection of *Platycerium* and member of the EFG, donated this magnificent *Platycerium superbum* to RHS Garden Wisley. Here it is, growing behind the scenes.

There are five key elements to consider when importing ferns from overseas:

1. Risk categorisation
2. Protected species
3. Phytosanitary certification
4. Pre-notification
5. Inspections

It is important to understand all five, although not all points may apply to every import as documentation requirements depend on species, type of plant material and origin.

### Risk categorisation

Defra uses a system called the Border Target Operating Model (BTOM) to classify plant imports into four risk levels, depending on the commodity, species and country of origin:

- High-risk
- Medium-risk A
- Medium-risk B
- Low-risk

As we are concerned with material, comprising plants, rhizomes and spores, that are intended for planting and cultivation, Defra considers them all to be 'High-risk' when importing from any part of the world. We have sought clarification from Defra on this point, particularly regarding importing spores, as the wording on their website is difficult to interpret. However, Defra confirmed that the key point is that all plants intended to be planted are considered 'High-risk'. Defra has a strict definition of what it defines plants to be, which includes any part of a fern that can be grown or propagated.

The rules may be different when importing material for herbarium specimens.

Plant health controls apply to imports that are 'High-risk'. Therefore:

- Goods must be pre-notified via the Import of Products, Animals, Food and Feed System (IPAFFS)
- Goods must be accompanied by a Phytosanitary Certificate (PC)
- Goods will be subject to Sanitary and Phytosanitary (SPS) checks (documentary, identity and physical) at a Border Control Post (BCP) or Control Point (CP)



A collection of xeric ferns of a private collector. Plant societies should record skills required to maintain and propagate 'hard to keep' ferns.

Because classifications and requirements can change, importers should always check the UK Plant Health Portal before arranging shipment.

### **Northern Ireland**

The rules in Northern Ireland are different to Great Britain due to the Northern Ireland Protocol. Phytosanitary documentation is necessary when importing any plants from outside of the EU. Commercial importers need a Northern Ireland plant health label (NIPHL) when importing plants from Great Britain to Northern Ireland. Private growers will need to follow rules for importing into the EU, which includes obtaining a phytosanitary certificate. Importing ferns from the EU may not require the same level of phytosanitary controls, provided EU plant health requirements are met and the plants are for personal use.

Because classifications and requirements can change, importers should always check with DAERA before arranging shipment.

### **Restrictions on soil and growing medium**

Please note that strict controls apply to the import of soil and growing media. In general, the import of soil or growing medium into Great Britain is prohibited from most countries. Limited exceptions may apply to growing media composed entirely of inert materials such as pure peat or coco fibre, provided they are free from pests, diseases and contamination, and meet all relevant phytosanitary

requirements. These exceptions are typically restricted to imports originating from the EU, Liechtenstein or Switzerland. Importers should always verify current regulations before purchase, as requirements are subject to change.

### **Regulation on peat**

The UK is gradually phasing out the use of peat to protect peatlands and encourage sustainable alternatives. Government proposals had aimed to ban bagged peat for amateur gardeners by 2024 and for all professional horticultural use by 2030. Implementation has been delayed, and currently there is no national legislation enforcing a peat ban. Instead, the focus is on voluntary reductions by both the horticultural industry and the public.

The RHS has been leading the peat-free movement in the UK, and its impact is becoming increasingly visible. It is important to understand these rules when planning to exhibit or sell plants at RHS venues. Currently, exhibitors and designers are not permitted to use peat for mulching or dressing beds in RHS gardens, and this ban will be extended to include all peat products used by exhibitors at RHS shows. In spring 2025, the RHS decided to allow peat starter plants to continue being sold by exhibitors until 2028. Show Gardens, judged floral displays and trade stands must be peat-free by the end of 2025, with the exception of plants already potted in peat prior to 2026.



*Alsophila sinuata* is the only simple-fronded tree fern in the world. It is confined to a few localities within the southwestern forests of Sri Lanka. It has been declared an endangered species.

## Protected species

Many plant species have been over-collected in the wild for their beauty or rarity, resulting in population declines and, in some cases, local extinctions. These pressures are often compounded by habitat loss and degradation. CITES is an international agreement between over 180 countries, including the UK. In the UK, the APHA acts as the CITES Management Authority, ensuring that trade in wild plants and animals does not threaten their survival. APHA also issues the permits required to import and export CITES-listed species, including UK CITES Import Permits and CITES Export Permits.

CITES regulates the international movement of plants and animals through a system of permits and certificates issued by national authorities. Species are assigned different levels of protection (Appendices I, II and III) depending on how threatened they are. Appendix I includes the most threatened species and generally prohibits commercial trade. Appendix II covers species that may become threatened without controls, allowing trade subject to regulation. Appendix III includes species that are protected in at least one country, which has requested international cooperation to control trade. Trade in CITES-listed ferns is permitted only where the appropriate documentation is in place and, for wild-collected material, only where collection has been authorised and assessed as sustainable by the exporting country. Importantly, even artificially propagated ferns may, in some cases, require CITES documentation when crossing borders. The level of restriction depends on the Appendix in which the species is listed. Any Appendix I species traded within the UK require an Article 10 CITES certificate, also issued by APHA.

As the importer, there are legal responsibilities for ensuring that the correct CITES permits are in place before the ferns enter the UK. The exporter has to apply to their country's CITES Management Authority for a CITES export permit, and cannot legally ship plants without it. In addition, in the UK you will also need to apply for a UK CITES Import Permit issued by APHA. When the ferns arrive in the UK, you—or your courier or agent acting on your behalf—must present the CITES paperwork at a designated Border Control Post for plant health inspections. However, even if the exporter or courier handles the paperwork, the importer remains responsible for compliance.

Processing times for CITES permits vary depending on the country and the complexity of the application. While some permits may be issued within a few weeks, others can take longer, so this should be arranged well in advance of shipping. Detailed guidance and applications are available at <https://www.gov.uk/guidance/cites-imports-and-exports>.

## Species included

Only a relatively small proportion of ferns are currently listed under CITES, comprising several tree fern species. Where a species is listed, CITES controls apply regardless of whether the plants are wild-collected or artificially propagated, although requirements may differ.

When planning to import ferns, we recommend consulting the CITES database to find out if the species are restricted.

The list does include a few surprisingly common species in the hobby. Relevant genera include:

- *Alsophila*
- *Calochlaena*
- *Cibotium*
- *Cnemidaria*
- *Culcita*
- *Cyathea*
- *Cystodium*
- *Dicksonia*
- *Hemitelia*
- *Lophosoria*
- *Sphaeropteris*
- *Thyrsopteris*

In many cases, CITES listings for tree ferns include annotations that exempt spores and sometimes other non-propagative parts, but this must be confirmed for each species.

Although *Dicksonia spp.* are included in Appendix II of CITES, the listing applies only to populations from the Americas at this time. Species from other regions, including *Dicksonia antarctica* from Australia, are not CITES-listed. However, this does not mean they are unrestricted. These species are still subject to national legislation in their country of origin (for example, Australian export controls), and legal trade requires the appropriate permits and official documentation.

Always verify the current listing and annotations for any species on <https://speciesplus.net> before importing to confirm whether a permit is required.

### **CITES, UK–EU and EU**

Since the UK is no longer part of the EU, movements of CITES-listed species between the UK and the EU are treated as international trade and are subject to CITES controls. This means that relevant permits or certificates may be required even when moving plants between the UK and the EU. Even within the EU, under EU Wildlife trade regulations, a CITES-listed species cannot necessarily move freely between member states. Requirements vary depending on the species, its Appendix listing, and the source of the material. In particular, stricter controls apply to Appendix I species, while some Appendix II, artificially propagated plants may move with fewer restrictions, so checks should be made on a case-by-case basis.

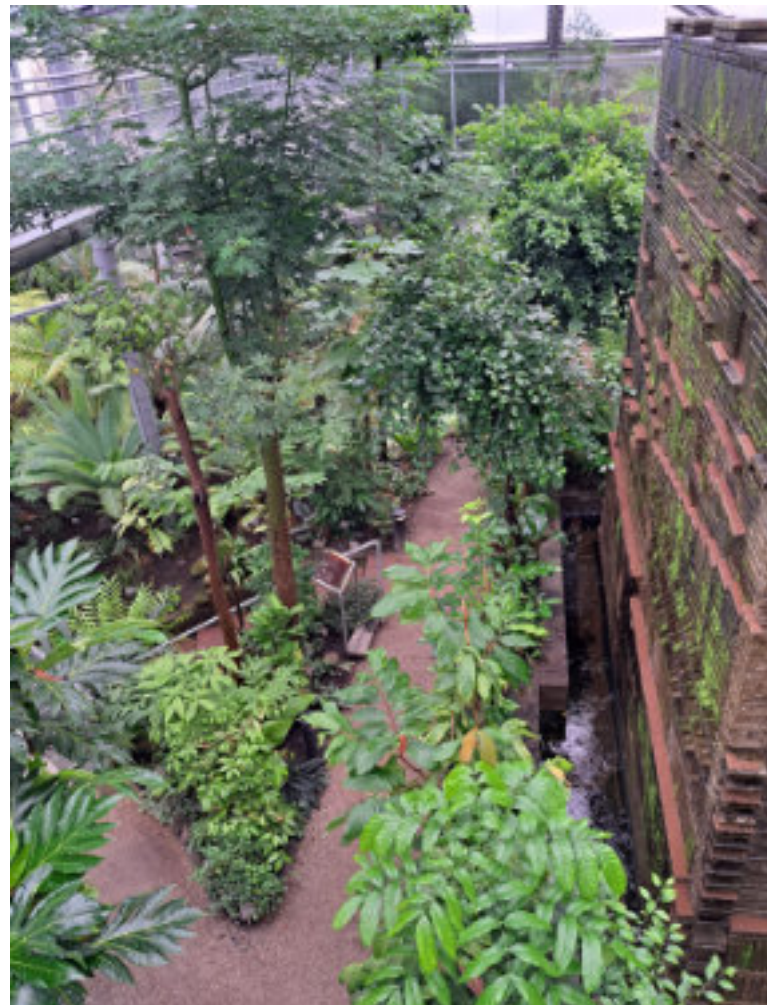
### **LEGISLATION**

CITES is an international agreement between governments that aims to ensure international trade in wild plants and animals does not threaten their survival. The UK signed and ratified CITES, becoming a participating nation in 1976. Its initial implementation was through the Endangered Species (Import & Export) Act 1976.

### **Phytosanitary certification**

Phytosanitary certification is separate from CITES and is required for all live plants entering the UK, whether wild-collected or artificially propagated. It is issued by the plant health authority in the exporting country.

The exporter (seller) is responsible for applying to their own country's plant health authority to obtain the certificate, which normally takes around one day, depending on the



The renovated Three-Climate Greenhouse at Hortus Botanicus Amsterdam. Many of Europe's botanic gardens are developing and refocussing their glasshouse collections.



Plant societies, like the EFG, are a great resource for sharing plant material. As members learn to propagate material, they will often share plants, thereby safeguarding stocks of rare taxa.

size of the shipment. An inspector checks the plants to ensure they are properly labelled and free from pests and diseases. If the plants meet the standards, the authority issues a phytosanitary certificate which accompanies the shipment.

Certificates are required for consignments classified as high-risk or medium-risk (categories A or B under UK plant health rules). A phytosanitary certificate confirms that the consignment has been officially inspected or tested, complies with the legal requirements for entry into Great Britain and is free from pests and diseases.

Note that phytosanitary certificates for import purposes must have been issued no more than 13 days before or after the date that the consignment left the country of export. However, there is no requirement for a consignment to arrive in Great Britain within 13 days of it leaving the country of export.

Check that the exporter has provided a phytosanitary certificate before the consignment arrives in Great Britain and get a scanned copy from the exporter. As part of the import notification process, upload this copy of the phytosanitary certificate to IPAFFS. It is possible to use electronic certificates (ePhyto) if importing from the EU.

If the paperwork is not in place, the consignment will be subject to delay and, as the importer, you will usually be contacted to provide the missing documents. Plants may be subject to physical checks and additional fees may be charged. If the consignment fails the checks, it may be destroyed or returned to the exporter. Note that if returned, you will now be considered the exporter and legally responsible for complying with export regulations.

### Pre-notification

The Import of Products, Animals, Food and Feed System (IPAFFS) is an online notification system, not a permit. It is a registration that notifies the authorities of the arrival of plants or other applicable items into the UK. You, or the company supplying the plants, must complete the registration online at least four working hours before the ferns arrive by air or ferry, or a day in advance for standard freight. Required documents, such as phytosanitary or CITES certificates, must be uploaded, and the Border Control Post where the consignment will be inspected must be selected. This declaration allows authorities to check and clear the import at the border.

When importing ferns intended for planting, you are classed as an importer and will need to register on IPAFFS. Even if a courier or postal service is handling the shipment, you, as the importer, remain legally responsible for ensuring IPAFFS pre-notification is completed correctly. While the system is tailored to professional operators, registration is mandatory even for private growers, botanic gardens or research purposes.

While the Defra guidance is clear that IPAFFS notification is required for relevant imports, users report that implementation in practice is not always consistent. Some consignments are processed via couriers or third-party agents without the importer directly completing IPAFFS procedures. Nevertheless, importers should always follow the official Defra guidance and recommended import procedures to ensure compliance.

## Inspections

All ferns entering the UK must arrive at a Border Control Post approved for plants. The consignment must include the documentation detailed above (as relevant to the shipment) along with clear labelling of the plants. The APHA staff inspect the plants for pests, diseases and correct documentation. If issues are found, the plants can be quarantined, rejected or destroyed. If all is in order, the plants are cleared and released for delivery.

Whether or not a fee is charged by the APHA often depends on the shipment type. Small personal imports may sometimes be exempt or incur minimal charges (always check the specific Border Control Post policy), whereas larger shipments and CITES Appendix I plants are almost always subject to fees. If using a courier or postal service, some fees are included in customs handling; others may be billed separately by APHA. It is worth checking with the supplier as to whether border inspection fees are included in the postage costs.

More details about border inspection fees can be found at: <https://planthealthportal.defra.gov.uk/trade/imports/imports-from-the-eu/import-fees/imports-fees-overview/>.

If the consignment is called to a Border Control Post for Sanitary and Phytosanitary checks, it will undergo three types of inspection:

1. Document check: Confirms that the information in the documentation is correct and that import requirements are met. This check is often carried out remotely before the consignment arrives in the UK.
2. Identity check: Ensures that the commodities' identification marks, stamps and other necessary product or package information match the declaration on the phytosanitary certificate or other documentation. In some cases, once the identity check at the Border Control Post is complete, the port health authority may determine that a physical inspection is not required.
3. Physical inspection: Ensures that the goods are free from pests and diseases that could be a biosecurity risk. This can include checks on the consignment packaging and means of transport, taking a sample of the product to look for pathogenic micro-organisms or illegal contaminants. The consignment may need to be unloaded from the vehicle and taken to the inspection building for physical inspection. Some physical inspections are randomised based on the assessed



The fern area in the Victoriahuset at the University of Oslo's Botanisk hage. This attractive display mainly features commercially available ferns, alongside a few more unusual species.

biosecurity risk of the consignment, so not every shipment will be fully unpacked or sampled, but all must be available for inspection if selected.

Consignments may also need to go through a customs check at the Border Control Post.

## **EORI numbers, tax and customs declarations**

An Economic Operators Registration and Identification (EORI) number is a unique identification code for businesses that import or export goods in the EU and the UK. It is used by customs authorities to track and register customs information, streamline the customs clearance process and prevent fraud. Businesses need an EORI to make customs declarations for goods moving between the UK and the EU.

Private growers importing for personal use generally do not need an EORI number. However, when importing a CITES-listed species, it may be classed as 'controlled goods,' and an EORI number could be required, even when not trading commercially. It is also worth noting that we have found couriers may arbitrarily insist upon an EORI number, even when the goods do not technically require one. If an EORI number is needed, it is easy to apply at <https://www.gov.uk/eori/apply-for-eori>. The process may take up to five days.

Customs duty and import VAT are payable on all imports of ferns and spores. Plants imported for research purposes may be eligible for relief from both customs duty and import VAT, provided specific conditions are met and the proper procedures are followed. This relief is primarily intended for non-commercial research or educational use.

## **UK plant passports**

EU plant passports are no longer recognised as an official label in Great Britain, although they remain valid in Northern Ireland. Traders, including those operating small or hobby businesses that sell plants online or supply other businesses, must use a UK plant passport to move plant material within Great Britain. A plant passport is not required when selling plants directly to customers in face-to-face transactions.

Check the current rules at: <https://www.gov.uk/guidance/issuing-plant-passports-to-trade-plants-in-great-britain>.

## **Invasive species banned under UK law**

Invasive plants are those that grow vigorously, spread rapidly and can out-compete other species. Invasive species can be native, non-native or cultivated. In the UK there are several pieces of legislation that are designed to prevent the introduction and spread of invasive species.



*Azolla filiculoides* smothering a reservoir in North Belfast, Northern Ireland. Likely an escapee from the aquatics trade, this species is one of three pteridophytes banned under UK law.

At present, this legislation affects three pteridophytes:

- *Lygodium japonicum*
- *Salvinia ×molesta*
- *Azolla filiculoides*

Two of these species, *Azolla filiculoides* and *Salvinia ×molesta* are floating aquatic ferns that can multiply rapidly and cause serious disruption to waterways. The GB Non-native Species Strategy reports that *Salvinia ×molesta* has been reported in a few sites in the UK, but has not been observed to persist over winter due to its sensitivity to frost. *Azolla filiculoides* has already become considerably problematic in a few parts of the UK. *Lygodium japonicum* is also now considered a threat. However, the EFG are not aware of *Lygodium japonicum* growing as an escapee anywhere in the UK. It has become invasive across the southeastern United States but it is generally not considered hardy by UK growers. Nevertheless, it is illegal to intentionally keep or cultivate these species without a special licence and exchange of plant material is forbidden. As the climate changes, it is likely that additional species will be added to this list. Penalties for illegal activity can range from a warning to prosecution and, in serious cases, imprisonment.

*Azolla sp.* have by and large disappeared from the trade in the UK. *Lygodium japonicum* was never readily available. *Salvinia ×molesta* may still appear in the trade, often being sold incorrectly as *Salvinia natans*. These two species are easily distinguished with careful observation and a

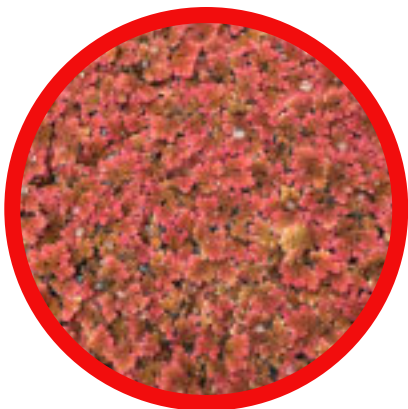
magnifying glass. However, *S. ×molesta* is part of a complex of species including *S. auriculata* and *S. biloba* and it is difficult to separate these species until they are mature with fertile fronds.

### LEGISLATION

In Scotland, the Wildlife and Natural Environment Act (Scotland) 2011 makes it an offence to plant any non-native species in the wild. Elsewhere in the UK it is an offence to plant or cause to grow in the wild any species listed on Schedule 9 of the Wildlife and Countryside Act 1981.

In April 2014, a ban on the sale of seven of the worst invasive water plants in the UK came into force. EU Regulation 1143/2014 on invasive alien species was retained in UK law following the UK leaving the EU. England and Wales, Northern Ireland, and Scotland have all retained the Regulation's list of invasive alien species. These species should not be planted or allowed to grow in the wild. They are banned from sale, and gardeners possessing them must take measures to control their spread.

The EU list forms the basis for the GB Non-Native Species Secretariat (NNS) Species of Special Concern list, which applies across Great Britain. This list may diverge from the EU list over time as species are reviewed, added or delisted accordingly.



*Azolla filiculoides*



*Lygodium japonicum*



*Salvinia ×molesta*

### Permits for special circumstances

Permits are available for moving or using listed invasive species under specific conditions:

- Research
- Ex situ conservation (conservation outside their natural habitat)
- Scientific or medicinal purposes

Permits are obtained by applying to APHA. In exceptional cases, permits may also be granted for other activities in the public interest, including social or economic reasons, under Article 35(1)(c) of the legislation.

### Genetic heritage and conservation: ethical considerations

The Convention on Biological Diversity (CBD) is concerned with the conservation of biodiversity and the fair and equitable sharing of benefits arising from the use of genetic resources. It supports the development of national strategies for the conservation and sustainable use of biological diversity. As a result, many countries have national laws that regulate the export of plant material.

When importing wild-sourced material, it is important to establish whether the ferns have been collected legally and

ethically. This often requires careful judgement on the part of the importer. In practice, plant health authorities in the exporting country are unlikely to issue a phytosanitary certificate for material collected directly from the wild, as they cannot verify the conditions under which it was produced.

Most plant material available to private growers originates from small nurseries or individual collectors. In many cases it is difficult to know the origin of this material, and it may not be possible to guarantee that stock has been maintained solely through propagation rather than supplemented through wild collection.

#### LEGISLATION

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity was adopted at the tenth meeting of the Conference of the Parties on 29 October 2010, in Nagoya, Japan. The UK implemented the Nagoya Protocol through the Nagoya Protocol (Compliance) Regulations 2015, which govern access to genetic resources in the UK.

### Practical considerations

Transporting plants is inherently risky and it is important to be realistic about the potential for things to go wrong. Delays, losses and plant mortality can all occur, and importing ferns involves both financial risk and the possibility of disappointment. It is also worth considering that an unusual or rarely offered species may be uncommon for good reason, including difficulty in cultivation, so losses should be anticipated.

Thorough research is essential before importing any plant material. It is important to understand the cultural requirements of the ferns being imported and ensure that suitable growing conditions are in place before the plants arrive. Early communication with the seller is important to confirm that all required documentation can be obtained in good time. Plants will not be released from Border Control or Customs without the correct paperwork, and missing or incorrect documentation can cause significant delays. Communication with overseas sellers may be limited by language barriers, and costs can escalate quickly once phytosanitary certification, courier fees and inspection charges are added to the initial purchase price.



An imported, healthy-looking *Asplenium* sp. Its bare roots are wrapped in damp sphagnum moss.

There is also a risk of receiving incorrectly identified plants. Ferns may be misidentified at source and the sellers may genuinely believe they are supplying the correct species. In other cases, incorrect naming may result from poor research or the continued use of inaccurate 'trade names' that refer to entirely different species rather than accepted synonyms. This issue can originate at any point in the supply chain, from wholesaler to retailer. Where accurate identification is important, it is advisable to discuss this with the seller before purchase.

Plants may be exposed to extreme temperatures during transit, so orders should be avoided during periods of severe heat or cold in either the UK or the exporting country. Delays in transit are common, particularly for long-distance shipments that pass through multiple inspection and handling stages. Even with careful planning, research and preparation, consignments can get lost or delayed for several weeks, and there is no guarantee that plants will survive such delays. Newly imported ferns often require several months to acclimatise before they establish, grow reliably and are suitable for display.

### Exporting ferns and spores

When sending plant material overseas, including spores, it is important to understand that exports are subject to regulation and are not automatically exempt. For all exports, regardless of destination, contact APHA to apply for a phytosanitary certificate, which is required for most plants and plant products.

Obtaining a phytosanitary certificate will involve a physical inspection of the plant material being exported and an inspection of the premises where they are being grown. There will be a charge for this service. You, as the exporter, are responsible for ensuring that the material meets the plant health requirements of the destination country, which can vary widely. It is also important to ensure that the recipient has any necessary permits or documentation in place to legally receive the material. Customs and tax rules may also apply; for example, exporting to the EU may require an EORI number.

### Considerations for exporting wild-collected plant material

In the UK, collecting wild spores for personal use is generally lawful, provided specific conditions under the Wildlife and Countryside Act 1981 are met. Collection should only take place where permission has been obtained



Lycopods hanging in the Fern House at Cambridge University Botanic Garden. Care has been taken to display representatives of a wide range of fern families.

from the landowner or relevant authority, or where collection is explicitly permitted. Do not collect from private land or gardens, council-maintained verges, parks or roundabouts unless permission has been granted.

- 1. Always obtain permission:** It is illegal to uproot any wild plant without the landowner's or occupier's permission. This includes all wild plants, regardless of where they are growing.

- 2. Do not uproot plants:** The law distinguishes between picking parts of a plant (such as leaves, flowers, fruit, spores and seeds) for personal use and uprooting the entire plant, which is an offence.
- 3. Collect in moderation and only for personal use:** The law allows picking for personal use, but not for commercial purposes (for example, selling seeds) unless there is explicit permission from the landowner. Take only what is needed, ensuring that sufficient material remains for natural regeneration and wildlife—as a guideline, follow the ‘one in twenty rule’ (BSBI, 2017).
- 4. Avoid protected sites:** Collection is strictly prohibited in protected areas, including Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and National Trust properties. Permission may be granted in certain cases for approved conservation or scientific projects.
- 5. Do not collect protected species:** It is an offence to intentionally pick, uproot, collect seed from or destroy plants listed on Schedule 8 of the Wildlife and Countryside Act 1981, regardless of location. This list includes rare and vulnerable species, such as certain orchids and ferns (see below).

If native fern spores are legally collected in the UK for personal use and there is a legitimate reason to export them, export regulations still apply, and the destination country’s phytosanitary requirements must be met.

UK ferns (and their spores) covered by Schedule 8 of the Wildlife and Countryside Act 1981 include:

- *Cystopteris dickieana*
- *Equisetum ramosissimum*
- *Ophioglossum lusitanicum*
- *Woodsia alpina*
- *Woodsia ilvensis*
- *Vandenboschia speciosa* (syn. *Trichomanes speciosum*)

Equivalent regulation in Northern Ireland covers these six species:

- *Cryptogramma crispera*
- *Diphasiastrum alpinum*
- *Gymnocarpium dryopteris*
- *Lycopodium clavatum*
- *Lycopodiella inundata*
- *Polystichum lonchitis*

A licence is required to collect any of these species or their spores. Collecting without a licence is illegal. Guidance on licensing can be found at: <https://www.gov.uk/guidance/wildlife-licences>.

### LEGISLATION

Across the UK, the protection of wild birds, animals, and plants is primarily governed by the Wildlife and Countryside Act 1981 (Great Britain) and the Wildlife (Northern Ireland) Order 1985. These are supplemented by regional Habitats Regulations (1994 in Scotland, 1995 in Northern Ireland, and 2017 in England and Wales), which provide strict legal safeguards for ‘European Protected Species’—such as *Vandenboschia speciosa*—and their essential habitats (also see p. 12).

Beyond the strictly protected species, additional legislation—including the NERC Act 2006 (England), the Environment (Wales) Act 2016, the Nature Conservation (Scotland) Act 2004, and the Wildlife and Natural Environment Act (NI) 2011—designates a wider list of ‘Priority Species’. While these do not always carry the same individual prohibitions as Schedule 8, they are subject to a statutory biodiversity duty. This requires public bodies to proactively consider these species in all planning and land management decisions to ensure their long-term conservation.



*Vandenboschia speciosa*



*Polystichum lonchitis*



*Cryptogramma crispera*



*Lycopodium clavatum*

# Resources, Frameworks and Guidance

These are major global and UK frameworks, guidance documents and official sources. They are listed as resources, not full references, and cover plant health, conservation, and legal frameworks relevant to tropical fern collections.

Animal and Plant Health Agency (APHA): <https://www.gov.uk/government/organisations/animal-and-plant-health-agency>

Border Target Operating Model (BTOM): <https://planthealthportal.defra.gov.uk/trade/imports/target-operating-model-tom/btom-risk-categorisations>

Botanic Gardens Conservation International (BGCI), Plant Conservation and the Sustainable Development Goals: [https://www.bgci.org/wp/wp-content/uploads/2019/04/Plant\\_Conservation\\_and\\_the\\_Sustainable\\_Development\\_Goals.pdf](https://www.bgci.org/wp/wp-content/uploads/2019/04/Plant_Conservation_and_the_Sustainable_Development_Goals.pdf)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): <https://cites.org/eng>

Convention on Biological Diversity (CBD), Nagoya Protocol: <https://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf>

Department of Agriculture, Environment and Rural Affairs (DAERA): <https://www.daera-ni.gov.uk/>

Department for Environment, Food & Rural Affairs (Defra): <https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs>

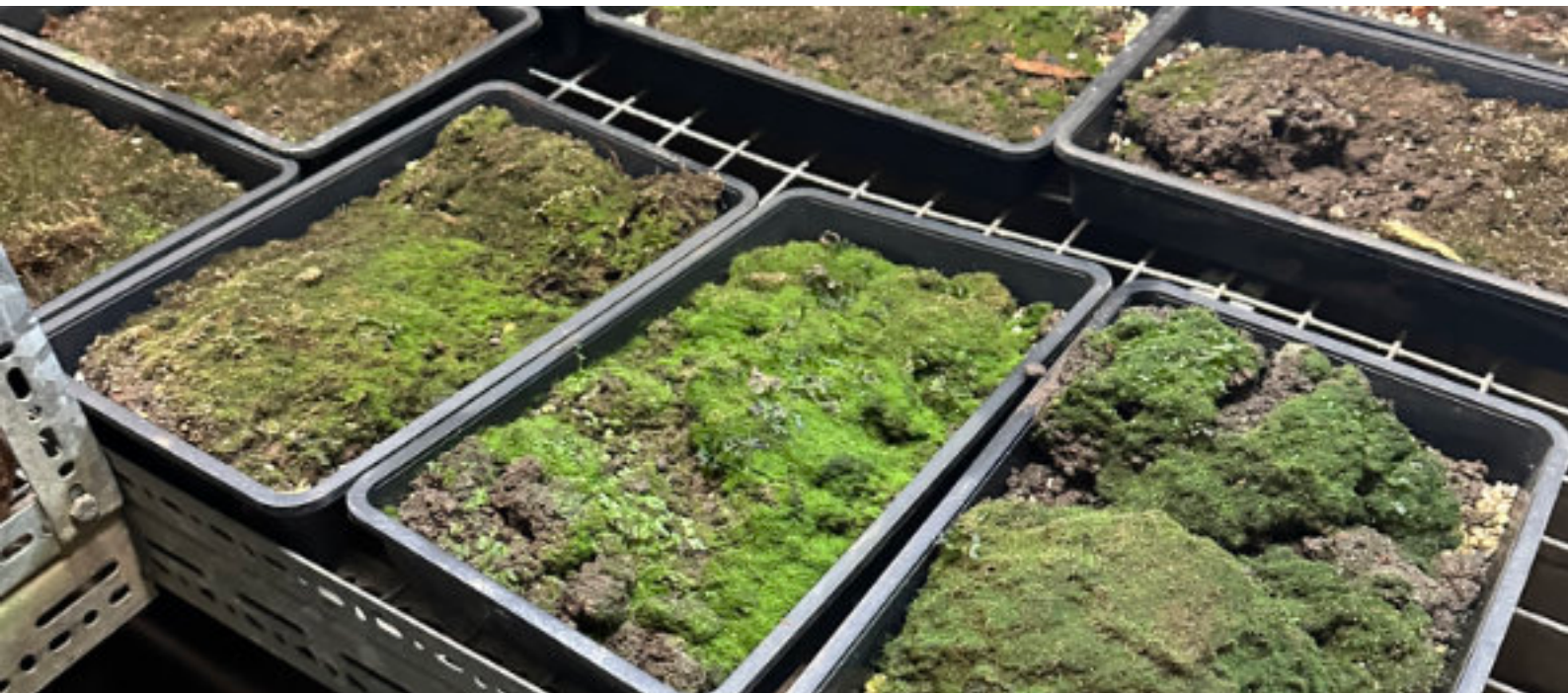
Great Britain Non-native Species Strategy (NNSS): <https://www.gov.uk/government/publications/the-great-britain-invasive-non-native-species-strategy>

Import of Products, Animals, Food and Feed System (IPAFFS): <https://www.gov.uk/guidance/import-of-products-animals-food-and-feed-system>

IUCN Red List of Threatened Species: <https://www.iucnredlist.org/>

Science & Advice for Scottish Agriculture (SASA): <https://www.sasa.gov.uk/>

Sustainable Development Solutions Network: <https://www.unsdsn.org/>



*Vandenboschia speciosa* gametophytes being cared for under license at Belfast Botanic Gardens. These were rescued during the renovation of the Tropical Ravine.

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A fern fossil displayed for educational interaction at the Ferns and Carnivorous Plants Show at RHS Garden Wisley.

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The Exotic Fern Group is a community for enthusiasts of tropical, subtropical and indoor ferns. We bring together individuals who share a passion for these unique plants, offering opportunities to connect, learn and grow together. Members enjoy regular newsletters, social visits to private fern collections and online presentations. We also organise trips to larger public fern collections. Members can also benefit from access to fern and spore swap schemes, to expand and develop their own collections.

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