

BEAUTIFUL IMPORTED ORNAMENTALS CAN BECOME VICIOUS INVASIVE SPECIES

Ornamental horticulture consists of floriculture and landscape (nursery business) horticulture, categorised into five main areas: herbaceous plants, woody plants, cut flowers, foliage plants, and bulbs. Each is concerned with the growing and marketing of plants and with the associated activities of flower arrangement and landscape design. The turf (grass) industry is also considered a part of ornamental horticulture.

Encyclopaedia Britannica

The growth in the ornamental horticulture industry has been stimulated by the rising interest in international plant shows and the easily-accessible home and gardening content featured in television programmes and on social media. The desire to own exotic ornamentals has increased the demand for non-native plants, without consideration of the harm that they can cause by introducing them into a new environment.

Some introduced ornamental plants that have escaped cultivation and established self-sustaining populations, have no discernible negative impacts in their new environment, except for the displacement of native species. Others become invasive. It is these invasive alien plant species (IAPS) that are a major threat to biological diversity. They disrupt local ecosystems and cause irreversible damage resulting in the decline or elimination of indigenous species through competition, predation, hybridisation and transmission of pathogens. IAPS also affect human and animal health and lead to negative economic impacts, causing direct damage to agriculture and food production.

Whether they are introduced for agriculture, agroforestry or as ornamentals, plants are among the most widespread invasive organisms globally (D'Antonio et al. 2004; Pyšek et al. 2012), and of these, ornamentals provide the most important pathway for invasive species (Kairo et al 2003, Turbelin. et al 2017). This is not surprising since trade in ornamental horticulture is largely built around commerce in alien plant species, their hybrids, cultivars and varieties. This has the potential to contribute to the acceleration of biological invasions (Seebens et al 2017).

The rising demand for exotic plants in the OECS and Barbados makes this a real threat and the management of IAPS is therefore critical.

Impact

The International Panel on Biodiversity and Ecosystem Services (IPBES) in its 2019 Global Assessment, highlighted the rapid decline of species and human ecosystems due to IAS activity. They noted that around one million plant and animal species are facing extinction and called for transformational change to combat the IAPS challenges.

IAPS are transported beyond their natural range via various pathways from one geographical location to another. The most common pathways are tourism, trade, transport and travel. While this movement may be unintentional, as contaminants or 'hitchhikers' on cargoes and transport vessels, the most invasive exotic plant species in the region were intentionally introduced (Niemiera and Von Holle, 2009, Waugh, 2009. Kairo et al., 2003).

High-tech, genetically engineered houseplant purifies the air

In November 2022, Inverse, an online magazine, featured an article on a Paris-based start-up that was engineering a Pothos (*Epipremnum aureum*) plant and its associated root microbiome to create a high-tech houseplant capable of doing the air-purifying work of up to 30 plants.

However, Pothos is characterised as being highly invasive in Hawaii and Sri Lanka and is considered a potential invader in South Africa (Moodley et.al, 2017). It is widely grown as an ornamental in much of the Caribbean, and is naturalized on Grenada and invasive on Barbados, Dominica, St. Vincent and the Grenadines.

<https://www.inverse.com/science/genetically-modified-houseplant-air-purifier>

In the OECS and Barbados, the ornamental horticulture industry is small and focused on nurseries, floriculture and landscaping services. Those involved range from hobbyists to commercial enterprises, including hotel developments from international chains, which may be allowed to import plants and plant materials as part of their concessions. The vulnerability of the region to the introduction of IAPS is linked to its heavy dependence on the tourism and commercial sectors.

Horticultural products, such as exotic plants and cut flowers, are imported from sources around the world. Colombia ranks in the top ten plant and plant material exporters. The United States of America (USA) is both a direct source and a transit for imports of these plants and plant materials. The proximity of the USA along with established trade relationships makes it easy for plant enthusiasts to import plants and plant material without an understanding or consideration of their invasive nature.

Turbelin et al (2017) found that 39% of the total invasive terrestrial plants were introduced through horticulture in Latin America and the Caribbean. Many invasive species were imported many years ago, with some species having a time lag of over 100 years. There are five main horticulture families in the OECS and Barbados, within which some species are known to be invasive:

Poaceae (e.g., Zoysia lawn grass), Bignoniaceae (e.g., African tulip), Commelinaceae (e.g., Wandering Jew plant), Fabaceae (e.g., Acacia), Arecaceae (e.g., Manilla palm),

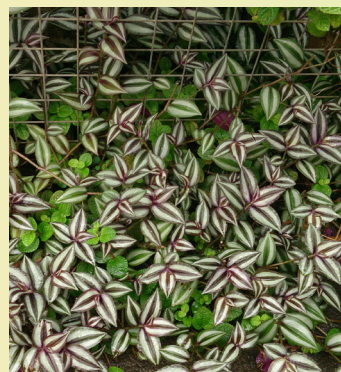
The pathway vector information provided by CABI for these families shows that 41 of 50 species were intentionally imported into the subregion, with 46% introduced as ornamentals, 19.5% as culinary/medicinal, and 9.8% as food and feed. Other categories include hedges, land stabilization, windbreaks, and multipurpose species.



Zoysia lawn grass
Photo credit: Show_ryu
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African tulip
Photo credit: Nativeplants garden
Licensed under CC BY-SA 4.0



Wandering Jew plant
Photo credit: Mokkie
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Acacia
Photo credit: Pharaoh han
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Wild parsnip - Photo credit: R. A. Nonenmacher, Licensed under CC BY-SA 4.0

Once established, IAPS can have high economic and ecological costs, causing direct damage to agriculture and food production and some species significantly affect the coastal ecosystem. Invasive species can infect humans with new diseases and serve as vectors for existing ones through bites, stings, allergens, or toxins.

- » **The Giant Hogweed's (*Heracleum mantegazzianum*)** bristly hairs can cause phyto-photodermatitis,
- » **Castor beans (*Ricinus communis*),** which is well established in the Caribbean islands, contain ricin, a toxic substance that can cause gastroenteritis, neurological, and ophthalmological lesions.
- » **Parthenium Weed (*Parthenium hysterophorus*)** causes respiratory problems and dermatitis,
- » **Lantana (*Lantana camara*)** is toxic to livestock.
- » The spines of the **Mesquite shrub (*Prosopis juliflora*)** injure people and livestock. (Boy and Witt 2016).

Environmental and public health damages in the USA can reach \$120 billion annually (Pimentel et al., 2001).

The management of IAPS in the OECS and Barbados is challenged by a lack of data for regulated trade. The proximity of countries to each other raises more risks as threats can come from a wider range of neighbouring countries. There is a high likelihood that IAPS are being spread between countries of the Greater Caribbean Region through both legal and illegal movement of plant propagules (Lemay et al., 2009). Illegal trade may involve many players and managing this requires a high level of diligence by regulators.

The e-commerce trade provides a potential avenue for the introduction of IAPS. The widespread use of online platforms has boosted illicit trade in orchids (Hinsley, 2018) and other exotic plants by allowing sellers to connect with specialist buyers across the world. This pathway is often unregulated.

A recent application by a company in a Caribbean Community (CARICOM) member country for importing a large quantity of **Weeping Lovegrass (*Eragrostis curvula*)** seeds from the USA was run through a rapid risk analysis and found to be very invasive. The threat was magnified because the request was accompanied by a Phytosanitary Certificate from the United States Department of Agriculture, attesting phytosanitary compliance. However, this did not address import requirements or present a statement of invasiveness.



Giant Hogweed
(*Heracleum mantegazzianum*)

Photo credit: Rosser1954
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Weeping Lovegrass
(*Eragrostis curvula*)

Photo credit:
USDA NRCS Tucson PMC



Mesquite Shrub
(*Prosopis juliflora*)

Photo credit:
Mohana hari balu
Licensed under CC0



Lantana (*Lantana camara*)

Photo credit: JamesDeMers
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What is Needed

In the Caribbean, the level of awareness of the IAS impacts on biodiversity, environment, livelihoods, food security and human health has increased over the last two decades, prompting national, regional and subregional action to address IAS threats. International organizations provide guidelines and programs for managing IAPS that shape the regional plant health landscape. Following the 1997 revision of the Text of the International Plant Protection Convention (IPPC), organizations like the CAB International, Food and Agriculture Organization of the United Nations (FAO), Inter- American Institute for Cooperation on Agriculture (IICA), in collaboration with CARICOM, launched national and regional capacity development programmes for IPPC implementation. Much emphasis was placed on modernizing and harmonizing the regulatory frameworks for consistency with the IPPC.

The challenges faced by the OECS and Barbados in preventing and managing IAPS, include inadequate technical capacity, limited human and other resources, and a lack of records and data. One result is that there is no list of specific target threats and the level of risk posed, for which the countries should conduct surveillance for early detection and prepare emergency responses. This is a major gap, since the subregion is heavily dependent on tourism and shipping trade, for which the regulatory control related to IAPS is still inadequate.

In exploring the ornamental horticulture trade as IAS pathways in the OECS and Barbados, Jones (2023) confirmed that IAPS already present in the Caribbean have not been effectively managed and suggested that these species be prioritized for the selection and application of management measures while imminent threats are subjected to exclusion or prevention measures.

Jones (2023) proposed a framework for the management of IAPS species already present. It includes:

- 1. Mainstream of IAPS in legislation.**
Review or establish phytosanitary regulations to specify responsibility for IAPS regulation and raise awareness of regulations and non-legal text.
- 2. Create an Area of Protection** from single island boundaries to the OECS and Barbados as a single entity in the context of IAPS exclusion and surveillance.
- 3. Strengthen and integrate the Caribbean Agricultural Health and Food Safety Agency (CAHFSA)** to act as custodians of information on IAPS and provide alerts based on offshore surveillance to the countries of the subregion.
- 4. Conduct a public awareness blitz** for industry and regulatory agencies.
- 5. Strengthen and integrate the University of the West Indies (UWI)** across the three campuses, to play a role in capacity building and awareness raising on IAPS and threats posed.
- 6. Implementing practical preventive measures** through PRA-enhanced capability,
- 7. Developing voluntary codes of conduct** for the management of IAPS.

Voluntary codes of conduct do not currently exist in the subregion. If developed, they can link all stakeholders in an integrated approach based on the principle of self-regulation and operate alongside legally binding instruments already in force in some countries.

Voluntary Codes of Conduct - adapted from the St Louis Declaration

Linking Ecology and Horticulture to Prevent Plant Invasions:

A Workshop, St. Louis, MO,
Dec 1-4, 2001. In Waugh (2009)

CODE OF CONDUCT FOR GOVERNMENTAL ENTITIES

Risk assessments by qualified personnel must be a prerequisite for all new plant introductions.

Collaborate with stakeholders in developing and promoting databases, early warning systems, monitoring, and other means of prevention of new invasive plant species.

Promote environmentally sound methods to control invasive plant species such as biological control.

Develop and promote the use of native and non-invasive plant species within all government units and to the public.

Sensitize the public to the harmful impacts of invasive plant species and mandate relevant government programmes to control invasive plants.

Foster regional and international cooperation to minimize the movement of invasive plants.

Enforce invasive plant species legislation at all levels.

CODE OF CONDUCT FOR NURSERY PROFESSIONALS

Ensure that invasiveness is properly assessed by governmental regulators before importing any new species. Note that hybrids that are not stable can revert to the original stock that are invasive.

Identify plants that could be suitable alternatives to invasive ones.

Develop and promote alternative plant material through plant selection and breeding.

Encourage all stakeholders to destroy species that are known to be invasive.

Follow all laws on importation and quarantine of plant materials.

Encourage customers to use, and garden writers to promote, non-invasive plants.

CODE OF CONDUCT FOR LANDSCAPE ARCHITECTS

Be aware of the invasiveness of each species that you use in landscaping ensuring all are low risks for invasiveness.

Identify and use non-invasive species that are aesthetically and horticulturally suitable alternatives to invasive species in your region.

Be aware of potential environmental impacts beyond the designed and managed area of the landscape plan (e.g., plants may spread to adjacent natural area or cropland).

Advocate for better laws and regulations and encourage nurseries and other suppliers to adhere to these.

Key Messages

1

The rise in home and gardening content on television programmes and social media and growing interest in international plant shows, is driving the expansion of the horticulture industry, and with it, an increasing risk of movement of plants with invasive characteristics.

4

The vulnerability of the region to the introduction of IAPS is linked to the heavy dependence on the commercial and tourist sectors.

2

The rising demand for exotic plants in the OECS and Barbados makes this a real threat and the management of IAPS is therefore critical.

5

The management of IAPS in the OECS and Barbados is challenged by deficiencies in data systems for regulated trade. The proximity of countries to each other raises further risks as threats can come from a wider range of neighbouring countries.

3

Once established, IAPS can have high costs to the economy, ecology and human and animal health.

6

Voluntary codes of conduct developed for the subregion present a self-regulated, integrated approach to IAPS management. Combined with improved surveillance at air and sea ports, it can be a very effective way to prevent the entry and spread of invasive alien plants.

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The full report is available at: <https://caribbeaninvasives.org>

For more information on the Project contact the Regional Project Coordinator,

Mr Naitram Ramnanan

✉: N.Ramnanan@cabi.org

Project : <https://caribbeaninvasives.org>

Project : [Caribbean Invasives](#)