Plant Health Centre
Scotland's Centre of Expertise

Scottish Government
Riaghaltas na h-Alba

GI Base 2.0: Database of Scotland's Green Infrastructure plants

Policy Summary

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1 Policy summary

1.1 Background

The roles that ornamental plants play in our towns and cities are documented in more detail and are better understood than ever before: we can categorise their benefits using the ecosystem services framework, quantify these services using natural capital accounting and then set policy targets and establish public payments based on natural capital delivery. However, the green infrastructure industry, which designs, plants and manages these habitats, has yet to see significant changes in the types of plants specified in response to increasing awareness of the risks of plant pests and invasive non-native species.

Further, there are numerous barriers to access data on ornamental planting and whilst many types of resources exist that attempt to collate data on plants in green infrastructure, there is an underlying problem that has yet to be articulated: that each of these resources assumes that species selection is a design challenge, whereas in practice, specification is part of a much greater procurement and management process that includes design, bringing together many different professional expertise and value systems.

There is currently no mechanism for integrating the data that are being accumulated on plant performance (e.g. ecological data such as traits or demography), distribution and abundance (i.e., what plants are actually specified by professionals and where these are planted), or the biosecurity risks associated with these plants (e.g. in the Defra Plant Health Risk Register). As such, a critical gap exists in our capacity to understand the cumulative impacts of localised decision-making when it comes to green infrastructure.

1.2 Key research question

Can we harness existing datasets and digital design workflows to improve plant selection and reduce the biosecurity risks presented by green infrastructure practices?

1.3 Research undertaken

This project collated existing information previously assembled in GIBase 1.0 (Watkins et al., 2022) and extended the findings with novel research:

- Step 1: Literature review of industry perspectives on the plant selection process
- Step 2: Extension of GIBase to cover c. 10% of all major developments undertaken in the past five years, including the distribution of over 675,000 plants. This allowed for species diversity to be assessed and in turn, create the potential for studying invasion pathways and critical risks.
- Step 3: Assessment of potentially invasive non-native species used in horticultural production to identify urban habitats at risk.
- Step 4: Development of a Cumulative Mitigated Risk Rating for plant genera and species. This was created by re-engineering the Plant Health Risk Register to extract plant records and sum the mitigated risk ratings of the pests associated with them.
- Step 5: Audience analysis of attitudes towards biosecurity risk in the Green Infrastructure supply chain.

1.4 Research outputs

The research undertaken in the five steps above allowed us to build new data sets and review their potential roles in the supply chain:

- GIBase 2.0: a dataset of the plants specified in green infrastructure projects across Scotland, including taxonomic names, locations, life form, and abundance.
- Cumulative mitigated risk ratings (CMRR) for the plants recorded in the Plant Health Risk Register, ordered by plant name.
- Relative risk ratings for each plant taxon, calculated by multiplying the abundance of plant records by the CMRR.
- A proposal for the integration of plant performance and biosecurity risk data into assets needed by green infrastructure sector for information standardisation.

1.5 Recommendations

- The evidence base that is used for decision making can be significantly improved:
    - Plant Health Risk Register maintained by Defra should be accessible in two formats, organised from the perspectives of pests and the plants that they are associated with, and then revised to fill in gaps in coverage.
    - Plant performance data that integrates plant physiology, biosecurity risk, ecosystem service delivery, climate fitness and aesthetic criteria should be standardised across the Green Infrastructure sectors.
- Within the design and procurement process, a suite of software-agnostic digital resources that organise these data should be agreed and maintained by an industry body.
- At a national level, the introduction of a planning condition that requires the submission of a Biosecurity Management Plan (e.g. for five years) before construction can start would be a relatively light touch means for embedding a cross-sector approach to managing plant health at landscape scales. The submitted plan should include:
    - The maintenance phase where any plant health or invasive species issues can be flagged and reported as they arise.
    - A responsible person checking plants as they arrive to make sure that they are the specified species and that they are healthy.
    - Maintaining the integrity of planting designs to prevent specified plants being swapped out at the time of planting due to supply chain issues. If plans are able to include a ranked list of suitable replacement species, this can also help limit the chance of an INNS species being used.
    - Standard definitions of provenance should be included to take into account local adaptation and the possibility of maladaptation of introduced provenances.
    - A template assessment to help developers evidence that their plan will deliver positive effects for biodiversity.
    - Consideration needs to be given to enforceability due to the differing legislation in England and Scotland.
- The above will require significant biosecurity and invasive species awareness raising and training for professionals so that plants aren't misidentified and plant health issues can be spotted and reported as soon as they develop. This could be along the

lines of existing guidance such as "be plant wise", but tailored to a professional audience.

- Key recommendations of the Plant Health Strategy for Scotland (e.g. “build on existing engagement mechanisms to reach all sectors and citizens” and “explore strengthening biosecure procurement… and potential to improve plant health awareness within industry supply chains”) should be followed to address the unique types of habitat fragmentation, disturbance and biological novelty that are associated with urban environments, and in turn, biosecurity risk.
- Collaboration between Scottish Government directorates (Rural and Environment Science and Analytical Services and the Planning, Architecture and Regeneration Directorate) on three areas:
    - Development of a requirement for a Biosecurity Risk Management Plan for major projects as a condition of Planning Approval.
    - Engagement with the construction and horticulture sectors, to secure cross-sector support for standardised data that can be used by all parties in supply chains and digital design workflows.
    - Review of the potential for using GIBase in risk forecasting and targeted engagement with the construction industry.
- Development of CPD materials specifically for Green Infrastructure professionals, raising awareness of the new data resources and capabilities of the digital assets.

1.6 Next steps

- Population of a suite of digital resources that demonstrate the feasibility of evidence-based plant selection in professional contexts.
- Plant Health Risk Register to be reviewed by Defra for consistency of nomenclature and data reporting across plant records.
- Review green infrastructure process maps (e.g. the RIBA Plan of Works) to ensure that biosecurity risk management is recognised as a critical component of the design process in major planning projects.
- Building on previous stakeholder analysis (e.g. Mitchell, Clements, Marzano and White, 2024), extend consultation with the parties in supply chains that are responsible for procurement and design management, to identify opportunities for simplifying contractual relationships and embedding improved decision-making in consultancy teams.

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