

Royal Botanic Garden Edinburgh

Strategy for Science (2004-2009)

Delivering biodiversity science to underpin conservation

29 November 2004



EXECUTIVE SUMMARY

The Royal Botanic Garden Edinburgh (RBGE) is an internationally renowned centre of excellence in plant biodiversity research. RBGE's remit is defined by the National Heritage (Scotland) Act, 1985; its mission is to **explore and explain the world of plants**.

Delivering biodiversity science to underpin conservation lays out the strategy for RBGE's scientific direction from 2004-2009.

The strategy incorporates recommendations from the 2003 Scottish Executive Environment and Rural Affairs Department (SEERAD) Research Organisation Assessment Exercise (ROAE), and is based on a new assessment of the drivers and policy relevance of RBGE's science, the establishment of a clear set of priorities in the light of this assessment, and a revision of the management and organisation of Science Division to deliver these priorities.

RBGE's science is driven by targets specified in national and international biodiversity policy (particularly the Convention on Biological Diversity (CBD), the Global Strategy for Plant Conservation (GSPC), the UK Biodiversity Action Plans (UKBAPs), the Scottish Biodiversity Strategy and the SEERAD Strategy for Agricultural, Biological and Related Research).

Responding to these policy drivers, RBGE will expand its scientific activities from its taxonomic focus to encompass conservation and evolution. The following major overarching strategic objectives have been identified:

- Conserving plant biodiversity in the face of global environmental change and mass extinction
- Provision of baseline taxonomic/botanical data as a foundation science
- Understanding the evolutionary processes that have given rise to the world's botanical diversity

The major scientific activities undertaken by RBGE towards meeting these objectives are (1) **Research**, (2) **Collections** and (3) **Knowledge Transfer**

(1) Research: Five cross cutting topics have been identified which reflect the research required to meet the strategic objectives:

- Describing the biodiversity of species and habitats within important ecosystems and contributing towards completion of the inventory of life on earth
- Evaluating the major threats to biodiversity and undertaking research to provide authoritative data to underpin and determine optimal conservation strategies
- Developing methodologies to synthesize biodiversity knowledge and transfer it to a broad range of technical and non-specialist end users
- Reconstructing phylogenetic histories of species to establish the patterns and processes responsible for the evolution of plant biodiversity

- Evaluating the conditions under which population divergence and speciation occurs

These cross cutting topics will be tackled via targeted, prioritised research in four programmes:

Programme 1: Major Floras

Aim: To undertake floristic studies of botanically important regions in Asia and develop innovative bioinformatics methods of dissemination of floristic information to a range of end-users, including other taxonomists, ecologists and conservationists, and especially national governments to assist them in meeting targets derived from the CBD.

Programme 2: Tropical Diversity

Aim: To describe biodiversity in the tropics concentrating on widely distributed and species-rich genera and high priority conservation areas, and to elucidate the evolutionary processes giving rise to this biodiversity.

Programme 3: Cryptogamic Plants and Fungi

Aim: To describe the biodiversity of cryptogamic plants and fungi, to elucidate the evolutionary processes giving rise to this biodiversity, and assess threats and devise strategies for conservation.

Programme 4: Genetics and Conservation

Aim: To elucidate the population genetic processes underlying the evolution of plant biodiversity in high conservation priority groups and to devise practical strategies to contribute towards their conservation.

In addition to delivery of research via these programmes, RBGE needs to ensure its internal and external collaborations are aligned to:

- Coordinate work on Scottish Biodiversity and the development of Scotland's biodiversity as a model system for conservation
- Develop an integrated approach to accessing RBGE scientific data and, wherever possible, migrating the underlying database technologies onto a common industry-standard platform
- Establish integrated approaches to evolutionary studies aimed at understanding the origins of species
- Integrate conservation assessments into taxonomic research

(2) Collections: RBGE's major collections are the herbarium, living plants, and the library. RBGE also has extensive collections of microscope slides, botanical images and silica dried plant tissue/DNA samples. In the context of the policy drivers and strategic objectives, the following collections-specific drivers have been identified:

- Maintenance and expansion of a globally important conservation resource of living plants

- Safeguarding and enhancing historical and cultural heritage collections of national and international importance
- Maintenance and expansion of a biodiversity resource for the international scientific community
- Curation and management of the collections underpinning RBGE's research

Responding to these collections drivers will require a combination of short-term (5-10year) research driven curation, long-term institutional curation, acquisitions, and efforts to widen access. In addition to the ongoing day-to-day activities associated with the running of a globally important collections base, the major strategic changes implemented over the next five years will be:

- Developing the framework for full electronic access to the collections
- Enhancing the conservation value of living collections
- Extending and reorganising the herbarium
- Ensuring fair access and benefit sharing

(3) Knowledge transfer:

In the context of the policy drivers and strategic objectives, RBGE recognises that:

- Conservationists require access to sound data and expertise on which to base conservation action
- The academic community requires access to taxonomic/botanical data and expertise, and an understanding of evolutionary processes
- There is a public demand for knowledge on plants, and a need for broader awareness of biodiversity issues to increase environmental responsibility
- Biodiversity scientists and conservationists need high quality training, yet there is a dearth of expertise in whole organism biology across the university sector
- Policy makers need advice in the development of scientifically sound and environmentally relevant policy

Responding to these drivers will require a combination of specialist and non-specialist dissemination of scientific data, professional training, and commitments to policy development. In delivering RBGE's Knowledge Transfer activities, the following major strategic changes are required:

- Full integration of knowledge transfer activities across RBGE, drawing on the strengths of the Science and Horticulture Divisions and building on the opportunity afforded by the Gateway development
- Enhancement of Information Technology infra-structure and utilisation at RBGE
- The development of a strategy for Intellectual Property Management
- The development of an End-user Forum and Feedback System to facilitate two-way dialogue on end-users scientific needs, delivery and output requirements, and their perceptions of RBGE's performance

- Enhancement of RBGE's Science Education programme to secure future funding for its world renowned MSc course, and its PhD programme, and to explore the potential for RBGE to play a major role in undergraduate teaching of botany in Scotland.

Scientific management to deliver this strategy

In delivering RBGE's science from 2004-2009 there will be a major change in how its science is managed. There will be a shift from a series of individual-based projects to managed, prioritised, coordinated and costed research programmes centred on strong research leaders. There will be a move from like-for-like staff replacements to targeted recruitment that supports the priorities identified in this strategy. There will also be an increased focus on the refinement and utilisation of relevant performance measures aimed at improving the institute's science. These will encompass descriptive research, analytical research, collections activities, and the assessment and servicing of end-user needs.