

Kew's Millennium Seed Bank

The Millennium Seed Bank Project has been described as one of the most significant international conservation initiatives ever undertaken. This world-wide collaboration aims to safeguard over 24,000 plant species from around the globe against extinction. It has already successfully assured the future of virtually all the UK's native flowering plants.

The bank is located in a specially designed building sited at Wakehurst Place in West Sussex – Kew's country garden. It was officially opened in November 2000 by HRH The Prince of Wales.

Why conserve plants?

Experts predict that, by the end of this century 50% of the world's plants will be condemned to extinction. Should this happen, many thousands of animals will disappear as their natural habitats vanish. The implications for the survival of the human race will be enormous.

Although only 3 species – wheat, rice and maize – provide 50% of all plant-derived food energy, around 30,000 species are used for food by people in different parts of the world. A quarter of the medicines used in the western world are plant derived and two thirds of the world's people use plants directly as a source of traditional remedies. Plants are also a vital source of fuel and shelter and in the context of ecosystems, plants provide various life-support services including climate regulation and the conservation of soil and water resources. The economic value of these services has been put at \$30-\$40 trillion per year.

Why seed banks?

Ideally, plants should be preserved in the wild, in the habitats where they naturally grow – in-situ conservation. Sadly, pressures on the environment are so great that this is not always possible. Banking seeds is an effective complementary strategy guaranteeing the

“Perhaps the most significant conservation initiative ever...”

SIR DAVID ATTENBOROUGH

“The Bank of England of the botanical world...”

HRH THE PRINCE OF WALES



The MSBP exhibition in the Orange Room: a resource for visitors of all ages

survival of individual species, by providing *ex situ* insurance.

Seed banks are a very efficient and cost effective means of preserving plant species diversity because seeds occupy such a small space and require relatively little attention. Many thousands of seeds may be stored for a species, each one representing a potential new plant.

UK native seeds

One of the first major goals achieved by the MSBP was the collection and banking of seed from virtually all the UK's 1400 native plants. The UK is the first country in the world to have seed samples from its entire flora in safe storage. Over 250 people from 37 different organisations, such as botanical and wildlife societies, took part in the enormous task of collecting seeds. Their efforts have ensured that seeds from all of the UK's 300 endangered wild plant species are now securely banked.

How seed banks work

Under the cold, dry conditions of a seed bank, seeds can survive for hundreds, possible thousands, of years depending on the species. Each batch of seeds that arrives is carefully dried and cleaned before going into storage at -20°C. After banking, the viability of seed collections is monitored periodically by germination tests.

In the future, scientists will be able to convert the stored seeds back into plants should they be needed for reintroduction, habitat restoration or sustainable use initiatives.



Dryland partnerships

The MSBP has now turned its attention to the world's drylands. Accounting for 40% of the global land area, the dry rangelands are home to over a billion people. They are also home to an enormous diversity of plant species, many of which are vital resources for local people. However, many important wild plant species are under threat in these regions, especially from loss of natural habitat due to land conversion and desertification.

A seed collecting and conservation programme lies at the core of each of the MSBP's country partnerships. MSBP partners harvest seeds from plants used by local people, from species that are considered to be threatened and from plants that grow nowhere else in the world. Each collection is divided in two: one half is stored in the country of origin and the other is brought to the MSB. Thus the MSBP provides a vital insurance policy, helping countries to fulfil their conservation priorities and international obligations. Formal partnerships already exist with Botswana, Burkina Faso, Chile, Egypt, Jordan, Kenya, Lebanon, Madagascar, Malawi, Mali, Mexico, Namibia, Saudi Arabia, South Africa, Western Australia, and the USA.

Apart from joint seed collecting a variety of capacity building opportunities are offered to partners including formal training. Research scientists from partner organisations can also take advantage of the MSBP's laboratories to focus on problems associated with storing seeds from their own regions and reciprocal visits of MSBP staff serve to enhance the sharing of skills and experience.

Understanding seed biology

The storage and germination of seeds of wild plants is often complex. Collaborative research and technology studies are therefore a crucial part of the MSBP. These inputs contribute to a clearer understanding of seed behaviour so that optimum conditions can be selected for storage and so that practical methods are available to turn conserved seeds into plants in the future. Techniques that will improve the handling, storage and use of seeds at community level are also being investigated. Findings are shared with partners and eventually disseminated to the wider scientific community via journals, books, and the www.

Using the seeds

The seeds held in the Millennium Seed bank could be used in the future as a source of material for habitat restoration, or to increase numbers of rare and endangered plants for reintroduction in the wild. They may also be used in scientific research to find new and sustainable ways in which plants can benefit society – such as new medical treatments, agricultural crops or materials for industry.

The seeds are made available to *bona fide* researchers, under the terms of legally binding agreements, which ensure that any benefits arising from their use will be shared with the country of origin.

Seeing 'behind the scenes'

An interactive public exhibition focuses on plant biodiversity and its conservation. An introductory film, outlining the importance of plants, sets the MSBP in context. A seed wall shows the incredible diversity of seeds – from tiny orchids to the huge double coconut. Visitors can watch seed research and processing in action through windows looking right into the heart of the Project's work. There is also a 'virtual' tour of the seed vault and interactive screens explaining every aspect of this on-going international conservation effort.

The building

The Wellcome Trust Millennium Building is sited adjacent to the 200 hectare (498 acre) Wakehurst Place estate which has been run by the Royal Botanic Gardens Kew since 1965. Architects Stanton Williams created a low-level building sympathetic to its position in an Area of Outstanding Natural Beauty.

In front of the building, eight raised parterre beds contain plants from various habitats under threat in the UK: shingle beach, cliff face, chalk downland, meadow, fens and marshes, hills and mountains, heathland, and cornfields.

Support

The total project cost, until 2009, is £80 million. The Millennium Commission is providing a National Lottery grant of some £30 million. The Project is also grateful to Orange plc, whose early commitment as

premier sponsor of the appeal was so crucial.

Recognising the enormous contribution that plants make to successful remedies, one of the world's largest medical research charities, The Wellcome Trust, pledged almost £10 million towards the building itself.

Much of the remaining cost will be sought from international funding agencies.



Support for the conservation of biodiversity from the National Trust helped turn this idea into reality. The ongoing support of the Department for Environment, Food and Rural Affairs ensures the sustainability of the programme.

How you can help

If you would like information on how to support the project, either personally or on behalf of a company or trust, please contact the Development office on **+44(0)20 8332 5919** or **5922** or e-mail **friends@kew.org**.

www.kew.org



Left to Right: Collecting in Lebanon, sacks awaiting dispatch, seed cleaning laboratory, the -20°C vault.