

Plants under pressure – a global assessment



The IUCN Sampled Red List Index for Plants

The Royal Botanic Gardens, Kew

The Royal Botanic Gardens, Kew, is the world's premier botanic garden and institute for the study of plant diversity, with unrivalled collections of living and preserved plant specimens, world-class research laboratories and a range of scientific and conservation projects globally. It is a non-departmental public body with exempt charitable status, and about half of Kew's running costs are provided by Defra (Department for Environment, Food and Rural Affairs). Over one million people visit Kew each year. The mission of the Royal Botanic Gardens, Kew is:

To inspire and deliver science-based plant conservation worldwide, enhancing the quality of life.

www.kew.org

The Natural History Museum

The Natural History Museum, London, is one of the world's great museums and the foremost resource for natural science. It is home to the largest and most important natural history collection in the world, with over 300 scientists studying 70 million specimens, ranging from microscopic slides to mammoth skeletons, minerals and meteorites. It is a non-departmental public body with exempt charitable status and speaks as a voice of authority on the natural world. It is one of the top visitor attractions in the UK, with more than four million visitors a year. Its vision is:

To advance our knowledge of the natural world, inspiring better care of our planet.

www.nhm.ac.uk

The International Union for Conservation of Nature

IUCN, the International Union for Conservation of Nature, is the world's oldest and largest global environmental network and home of the definitive international standard for species extinction risk – The IUCN Red List of Threatened Species™. It is a democratic membership union with more than 1,000 government and NGO member organisations, and almost 11,000 volunteer scientists in more than 160 countries. IUCN's vision is for:

A just world that values and conserves nature.

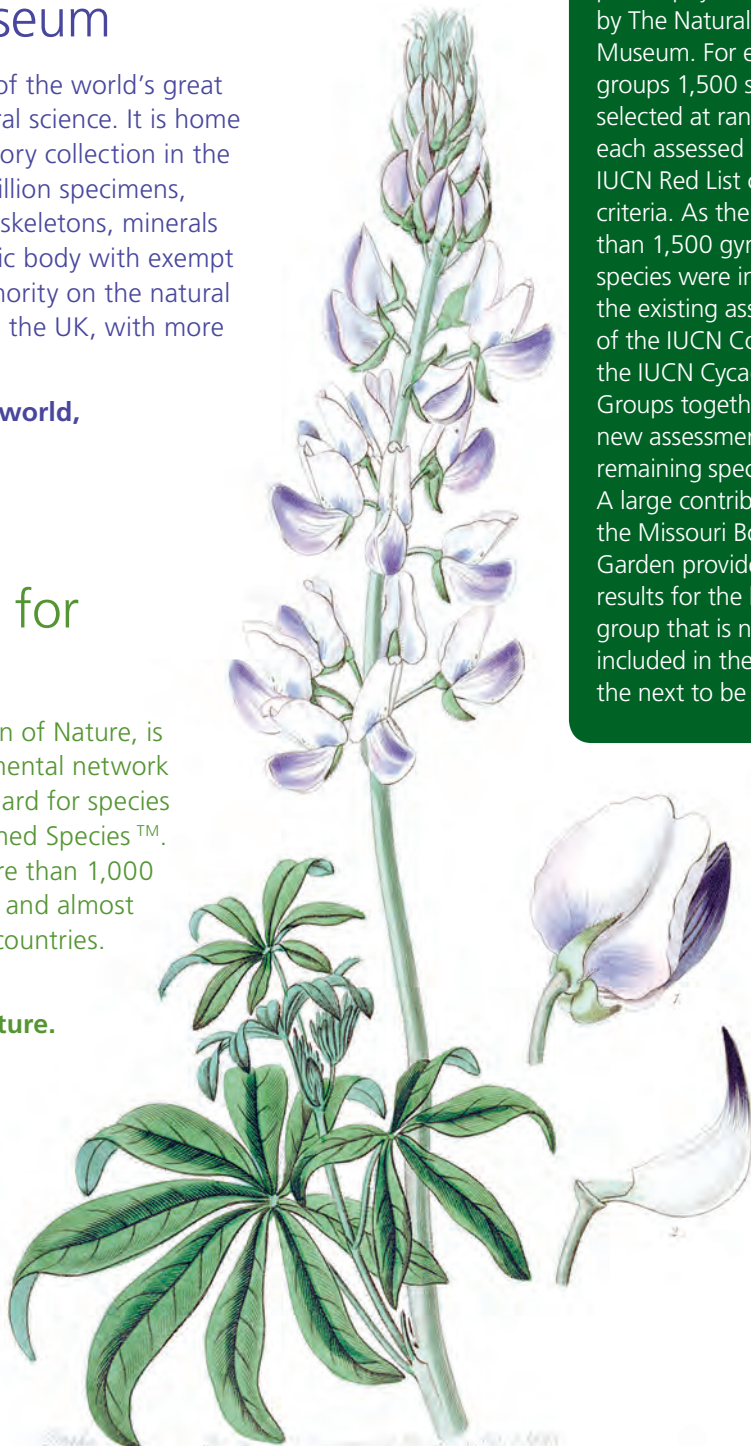
www.iucn.org

Front cover: Known only from specimens in Colombia and Venezuela, *Sobralia ruckeri* grows up to 3 metres tall with flowers of lustrous magenta and rose-purple. Relatively little is known about the population and threats to this striking orchid, and so it is classed as Data Deficient.

Inside cover: *Lupinus rivularis*, is classed as Near Threatened.

Who carried out the assessments?

The monocotyledons and legume groups were assessed by the Royal Botanic Gardens, Kew; the pteridophytes were assessed by The Natural History Museum. For each of these groups 1,500 species were selected at random and each assessed against the IUCN Red List categories and criteria. As there are fewer than 1,500 gymnosperms all species were included, using the existing assessments of the IUCN Conifer and the IUCN Cycad Specialist Groups together with new assessments for the remaining species (Gnetales). A large contribution from the Missouri Botanical Garden provided preliminary results for the bryophyte group that is not presently included in the Index but is the next to be assessed.



The IUCN Sampled Red List for Plants – the story so far

Every year some 2,000 new plant species are described and the biodiversity of many parts of the world, especially in the remotest regions, remains poorly known. In a collaborative effort between world-renowned scientific institutions, the IUCN Sampled Red List Index for Plants project gives, for the first time, an accurate view of how plants are threatened across the world. It represents the first phase of an ongoing project to monitor the status of the world's plants.

Key findings:

- One in five plants are threatened with extinction
- Tropical rainforest contains the highest number of threatened species
- Gymnosperms (the plant group including conifers and cycads) are the most threatened group
- About a third of plants are so poorly known that we still do not know whether or not they are threatened
- The impact of humanity far outweighs natural threats to plant species, accounting for 81% of threats
- The single greatest threat is conversion of natural habitats to agricultural use, directly impacting 33% of threatened species

Discover the state of plantlife worldwide

www.kew.org/plants-at-risk

The IUCN Red List Index – a barometer of life

The Red List Index is our 'barometer of life': it captures the status of life on Earth at a particular time. It can also tell us how this changes over time – whether things are improving or getting worse. The Red List Index measures the extinction risk of biodiversity – as pressures on plants continue to increase, so the needle moves on the barometer of life.

The IUCN Red List Index was initially based on vertebrates, and the Sampled Red List Index is an extension which includes less well-known groups of organisms such as invertebrates and plants.

From the 2010 baseline presented here, plants will continue to be monitored as part of the overall Red List Index of global biodiversity.

Five major groups of plants have been included in the Sampled Red List Index for Plants:

bryophytes
(mosses and liverworts)

pteridophytes
(ferns and allied species)

gymnosperms
(conifers, cycads and related species)

monocotyledons
(includes orchids, bulbs, palm trees and the grass family)

legumes
(the family of peas and beans)



What is the Sampled Red List Index?

The IUCN Red List evaluates the risk of extinction that a species faces, according to a set of rigorous criteria. It forms the world’s most authoritative and comprehensive catalogue of threatened species.

Each species is assessed to see if it is threatened with extinction. Based on these criteria, each species is assigned a category ranging from Critically Endangered (very close to extinction) to Least Concern (under no or very little risk of extinction), or Data Deficient if there is not enough information to assess the status of the species reliably.

The Problem:

Only about 4% (14,582) of the estimated 380,000 plant species are currently on the IUCN Red List, and the majority of those have been assessed because they were already thought to be threatened. This gives a skewed view of the overall conservation status of plants.

The Solution:

By assessing a randomly selected sample of all plant species we get a picture of the overall threat status for each major group (see page 5), without having to assess every species. A sample of 1,500 species per group gives a wide enough selection to be representative of all plants and lets us understand the overall picture. The result is the IUCN Sampled Red List Index.



From Darwin to Google: assessing if a plant is threatened with extinction

The best source of information on the location and range of a species is held in the world’s herbaria – scientific collections of preserved plant specimens.

The herbarium collections at the Royal Botanic Gardens, Kew contain some eight million plant and fungal specimens, and the Natural History Museum contains six million plant specimens. These specimens have been collected by thousands of botanists (including Charles Darwin) over hundreds of years, from all over the world. Using information about a species from botanical literature, from analysis using Geographical Information Systems (GIS), satellite images in Google Earth and scientific expert opinion, it is possible to assess a species’ conservation status and assign it a Red List category.

Compare the level of threat facing different plant groups www.kew.org/plant-groups-at-risk.



Paphiopedilum mastersianum
(Orchidaceae) – Monocotyledon

VULNERABLE

This orchid has only been recorded on three Moluccan Islands in Indonesia, and these remote islands have been subject to human disturbances such as agriculture and forest clearance. The orchid prefers steep slopes in moderate shade and, as such, is prone to disturbance from forest clearance and soil erosion.



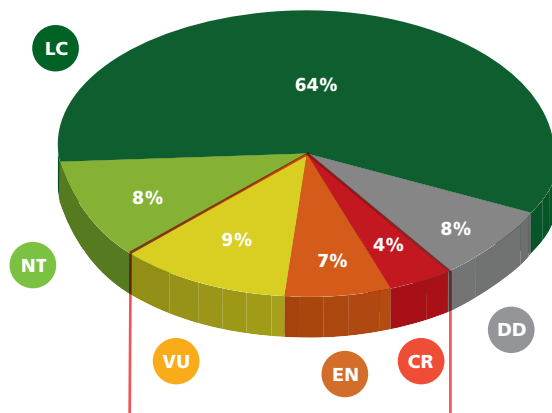
Vicia faba
(Leguminosae) – Legume

LEAST CONCERN

The exact origin of *Vicia faba*, the broad bean, is unknown, but it is believed to be native to North Africa and South West Asia. This legume has been introduced and naturalised worldwide, with a long tradition of cultivation.

Current status of plants

One in five of the world's plants are threatened with extinction.



A further 8% of species are classified as **Near Threatened**, which means they are not yet threatened but may become so without conservation actions.

Percentage of species threatened with extinction for the five major plant groups

20%

bryophytes

13%

pteridophytes

39%

gymnosperms

19%

monocotyledons

14%

legumes



Pressure on plants

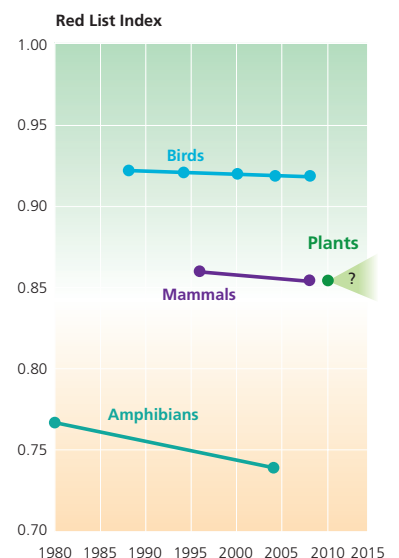
Plants are fundamental in providing ecosystem services – the benefits that people obtain from well-functioning ecosystems.

Plants absorb almost 20% of fossil fuel emissions. This hidden ecosystem service will be greatly affected by impending land-use change.

Clearing and burning of tropical forest also accounts for 20% of global carbon emissions.

Plants in comparison with other organisms

- Plants are more threatened than birds
- Plants are as threatened as mammals
- Plants are currently not as threatened as amphibians



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Zamia pygmaea

(Zamiaceae) – Gymnosperm

CRITICALLY ENDANGERED

This cycad is endemic to western Cuba and the Isla de la Juventud, and is found in dry brush, pine forests and areas of pure white sand. This plant is Critically Endangered, as its population is severely fragmented with just four subpopulations remaining. Due to its small population size it is considered that successful reproduction is limited.



LC

Asplenium hemionitis

(Aspleniaceae) – Pteridophyte

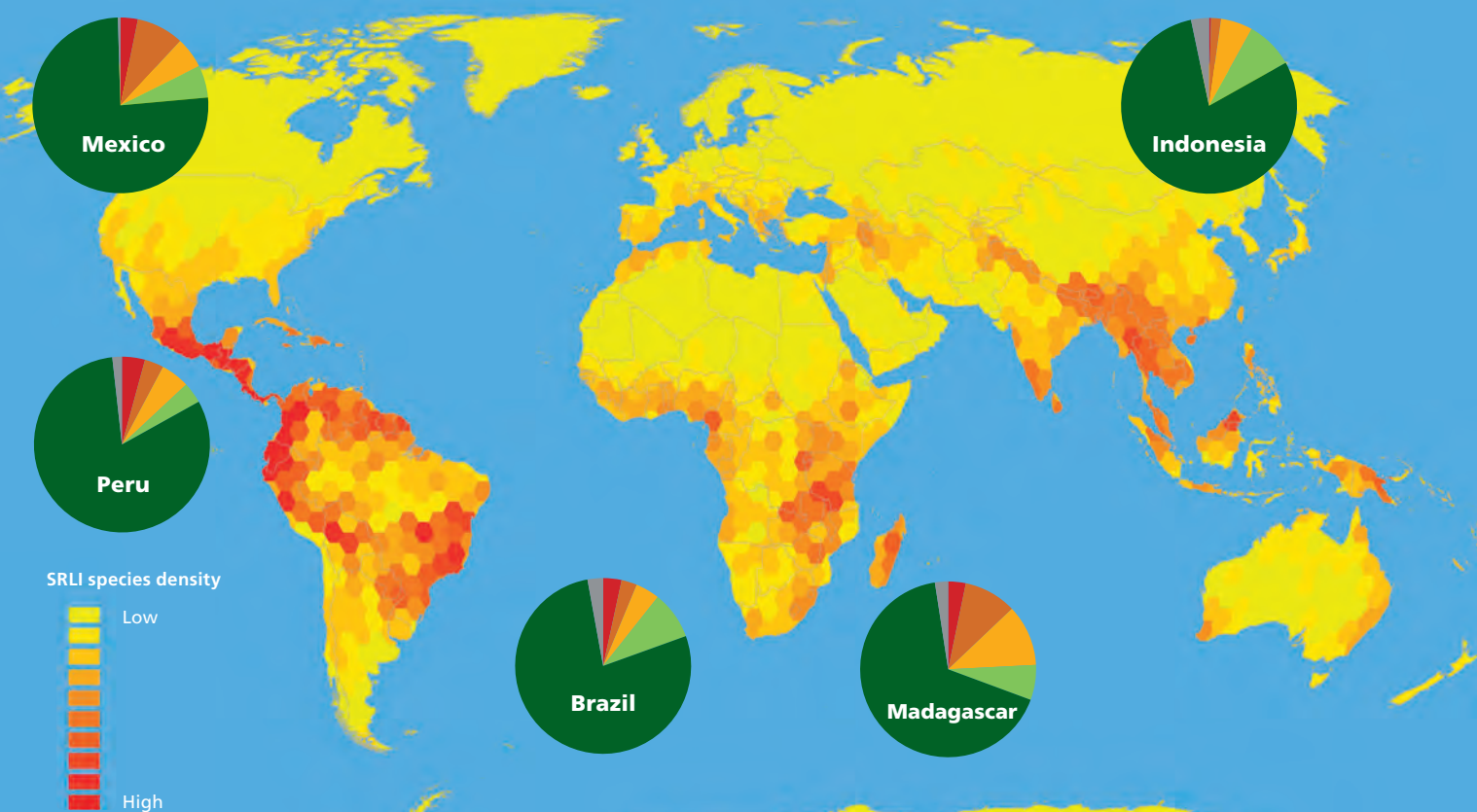
LEAST CONCERN

Asplenium hemionitis is found in Spain and Portugal, North Africa and the nearby islands of the Atlantic Ocean such as the Canaries, Cape Verde Islands and Madeira; it is found in damp crevices between rocks in temperate forest, or on rocky cliffs or stone walls, along stream banks or roadside ditches, and is not currently threatened with extinction.

Where do we go from here?

For Phase I of the Sampled Red List Index we collected information on the habitat, population, threats and many other aspects of each species in order to make a Red List assessment, including maps for each species from herbarium specimens, taxonomic publications and online resources.

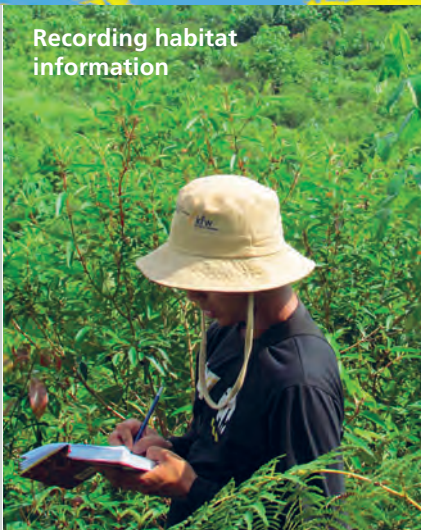
The map shown below combines data gathered during Phase I, highlighting levels of threat to plants in some of the tropical areas where plant diversity is greatest and the area which we will target for Phase II of the project. Species will be re-assessed in the field as part of an ongoing monitoring effort so threats to their survival can be understood, as well as the overall trend in the status of plants over time. Our work will provide an overall picture of changes to plants worldwide for the Convention on Biological Diversity "Aichi" Biodiversity Targets in 2020.



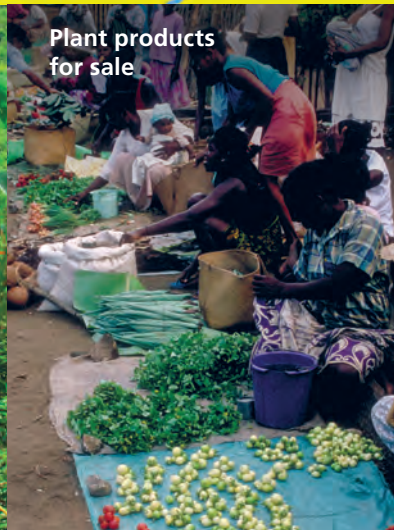
Specimen information



Recording habitat information



Plant products for sale



Native plant diversity



Safeguarding our future

This report provides the baseline against which future changes can be tracked – and it shows clearly that urgent action is needed if we are to avoid losing one in five of our plant species.

We now have a snapshot of the current status of plant diversity, but these species will need to be regularly re-assessed if we are to truly understand the changing status of the world's plants, and indeed global biodiversity overall. Targeted fieldwork will be essential to update our information, especially for those plants whose status is declining rapidly as their environment is changing.

For the second phase of the IUCN Sampled Red List Index for Plants, we will mobilise a global network of local botanists, botanic gardens and conservationists to establish an international, broad-based monitoring scheme. As the project also relies heavily on herbarium specimen data, many major natural history collections and governments also have a big role to play – all providing input that will be crucial for monitoring future trends in the status of global plant diversity.

We need your help and support if we are to coordinate such an extensive network of botanists and conservationists – please join us in working to ensure that one in five plant species are not lost, and help safeguard a sustainable and harmonious future for us and future generations.

For more information on supporting the work of the Sampled Red List Index for Plants, please contact:

Royal Botanic Gardens, Kew

friends@kew.org

Natural History Museum, London

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We need to redouble our efforts and recruit more people and resources to take action for plants before it is too late.

The world cannot afford to lose one in five of its plant species; we must all work together to conserve what we have.





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The Sampled Red List Index for Plants project was designed and undertaken as a contribution to work of: The Convention on Biological Diversity (CBD) and its Global Strategy for Plant Conservation; the Global Partnership for Plant Conservation; the Consortium of Scientific Partners to the CBD; the IUCN and its Red List; and the Biodiversity Indicators Partnership.

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Araucaria rulei – gymnosperm.
ENDANGERED

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