Conservation assessment and its application to the Zingiberales

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Conservation assessment

Objectives

Context (global and local)

Rare vs. endangered species (taxa)

Assessment: IUCN Red List

Categories, criteria and their application

Examples: *Heliconia* and *Zingiberales*

Conservation assessment: goals

Identify species (taxa) at risk of extinction

Establish priorities based on the likelihood of extirpation and possibilities for recovery

Determine trends and factors that threaten the species' existence

Design and implement appropriate strategies and actions to avoid or reverse the species' decline

Monitor the species' progress and recovery over time

CONTEXT – Convention on Biological Diversity: Nagoya, 2010

Signatories (193 nations): Afghanistan, Albania, Algeria, Angola, Antigua and Barbuda, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burma, Burundi, Cambodia, Cameroon, Canada, Cape Verde, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Democratic Republic of the Congo, Republic of the Congo, Cook Islands, Costa Rica, Côte d'Ivoire, Croatia, Cuba, Cyprus, Czech Republic, Denmark, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, European Union, Fiji, Finland, France, Gabon, The Gambia, Georgia, Germany, Ghana, Greece, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, North Korea, South Korea, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Libya, Liechtenstein, Lithuania, Luxembourg, Republic of Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, Mexico, Federated States of Micronesia, Moldova, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Niue, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Rwanda, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, San Marino, São Tomé and Príncipe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, Spain, Sri Lanka, Sudan, Suriname, Swaziland, Sweden, Switzerland, Syria, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, United Arab Emirates, United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe

Non-signatories: Abkhazia, Andorra, Azawad, ROC = Taiwan, Turkish Rep. of N. Cyprus, Kosovo, Nagorno-Karabakh, Palestine, Pridnestrovian Moldavian Rep., South Ossetia, Sahrawi, Somaliland, USA, Vatican

Strategic Plan for Biodiversity 2011-2020: Aichi Biodiversity Targets

Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

Target 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.

Target 4: By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

Strategic Plan for Biodiversity 2011-2020: Aichi Biodiversity Targets

Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use

Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced

Target 6: By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

Target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

Strategic Plan for Biodiversity 2011-2020: Aichi Biodiversity Targets

Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

Target 11: By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Strategic Plan for Biodiversity 2011-2020: Aichi Biodiversity Targets

Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services

Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

Strategic Plan for Biodiversity 2011-2020: Aichi Biodiversity Targets

Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building

Target 17: By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

Target 20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

Global Strategy for Plant Conservation: Targets 2011-2020

<u>Objective I: Plant diversity is well understood, documented and recognized</u>

<u>Target 1</u>: An online flora of all known plants. !

<u>Target 2</u>: An assessment of the conservation status of all known plant species, as far as possible, to guide conservation action. !!

<u>Target 3</u>: Information, research and associated outputs, and methods necessary to implement the Strategy developed and shared.

Global Strategy for Plant Conservation: Targets 2011-2020

Objective II: Plant diversity is urgently and effectively conserved

Target 4: At least 15 per cent of each ecological region or vegetation type secured through effective management and/or restoration.

Target 5: At least 75 per cent of the most important areas for plant diversity of each ecological region protected with effective management in place for conserving plants and their genetic diversity.

Target 6: At least 75 per cent of production lands in each sector managed sustainably, consistent with the conservation of plant diversity.

Target 7: At least 75 per cent of known threatened plant species conserved in situ.

Target 8: At least 75 per cent of threatened plant species in ex situ collections, preferably in the country of origin, and at least 20 per cent available for recovery and restoration programmes.

Target 9: 70 per cent of the genetic diversity of crops including their wild relatives and other socio-economically valuable plant species conserved, while respecting, preserving and maintaining associated indigenous and local knowledge.

Target 10: Effective management plans in place to prevent new biological invasions and to manage important areas for plant diversity that are invaded.

Global Strategy for Plant Conservation: Targets 2011-2020

Objective III: Plant diversity is used in a sustainable and equitable manner

Target 11: No species of wild flora endangered by international trade.

Target 12: All wild harvested plant-based products sourced sustainably.

Target 13: Indigenous and local knowledge innovations and practices associated with plant resources maintained or increased, as appropriate, to support customary use, sustainable livelihoods, local food security and health care.

Global Strategy for Plant Conservation: Targets 2011-2020

Objective IV: Education and awareness about plant diversity, its role in sustainable livelihoods and importance to all life on earth is promoted

Target 14: The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes.

Objective V: The capacities and public engagement necessary to implement the Strategy have been developed

Target 15: The number of trained people working with appropriate facilities sufficient according to national needs, to achieve the targets of this Strategy.

Target 16: Institutions, networks and partnerships for plant conservation established or strengthened at national, regional and international levels to achieve the targets of this Strategy.

Rare vs. endangered species

- **Limited distribution (endemism) and / or abundance, perhaps due to natural or biological factors: climate, substrate, etc.**

- **Stability over time vs. decline / fluctuations owing to natural and / or anthropogenic factors**
  - **Limited reproduction, self-incompatibility, low seed viability, poor seedling survival; hurricanes, fires …**
  - **Habitat destruction / alteration; introduction of exotic / invasive plants, animals, pathogens**

- **IUCN Categories and Criteria vs. USFWS, etc.**
  - **http://www.iucnredlist.org/**

IUCN Red List: Categories

- **EX (Extinct)**
- **EW (Extinct in the Wild)**
- **CR (Critically Endangered)**
- **EN (Endangered)**
- **VU (Vulnerable)**
- **NT (Near Threatened)**
- **LC (Least Concern)**
- **DD (Data Deficient)**
- **NE (Not Evaluated)**

IUCN Red List: Criteria – A-E

- **Limited abundance (number of mature individuals) – Criteria C and D**

- **Limited distribution (extent of occurrence – EOO vs. area of occupancy – AOO) – Criteria B1 and B2**

- **Fragmentation, decline or fluctuation**

- **Population reduction – Criterion A**
  - **Past, present or future**
  - **Observed, estimated, inferred or suspected**

- **"Quantitative Analysis" – Criterion E**

IUCN Red List: Criterion D

- **Very limited abundance (number of mature individuals) – <u>Very small or restricted populations</u>**

- **<u>CR</u>ITICALLY ENDANGERED: < 50 individuals**

- **<u>EN</u>DANGERED: < 250 individuals**

- **<u>VU</u>LNERABLE**
  - **VU D1: < 1,000 individuals**
  - **VU D2 – one of the following + plausible threat that could drive the species to CR or EX in a short time**
    - **Restricted AOO, typically < 20 km²**
    - **Restricted number of locations, typically < 5**

IUCN Red List: Criterion C

- **Limited abundance (number of mature individuals) + continuing decline (C1 or C2) – <u>Small population size and decline</u>**

- **<u>CR</u>ITICALLY ENDANGERED: < 250 individuals**

- **<u>EN</u>DANGERED: < 2,500 individuals**

- **<u>VU</u>LNERABLE : < 10,000 individuals**

IUCN Red List: Criteria B1 + B2

- **Limited distribution: extent of occurrence (EOO) or area of occupancy (AOO) + fragmentation and/or continuing decline and/or fluctuations – <u>Geographic range</u>**

- **<u>CR</u>ITICALLY ENDANGERED: EOO < 100 km² / AOO < 10 km²**

- **<u>EN</u>DANGERED: EOO < 5,000 km² / AOO < 500 km²**

- **<u>VU</u>LNERABLE : EOO < 20,000 km² / AOO < 2,000 km²**

Extent of occurrence (EOO)

Area of occupancy (AOO)

IUCN Red List: Application

- **Global vs. regional assessments**
- **Gather information: field, herbaria, literature, etc.**
- **Conduct assessment**
- **Submit assessment, documentation**
- **Review procedure, eventual publication online**
- **Revision "at least every five years" or as new information becomes available**
- **Strategies and actions for the conservation of biodiversity: habitats, species and germplasm**

1997 IUCN Red List of Threatened Plants (based on pre-1994 criteria)
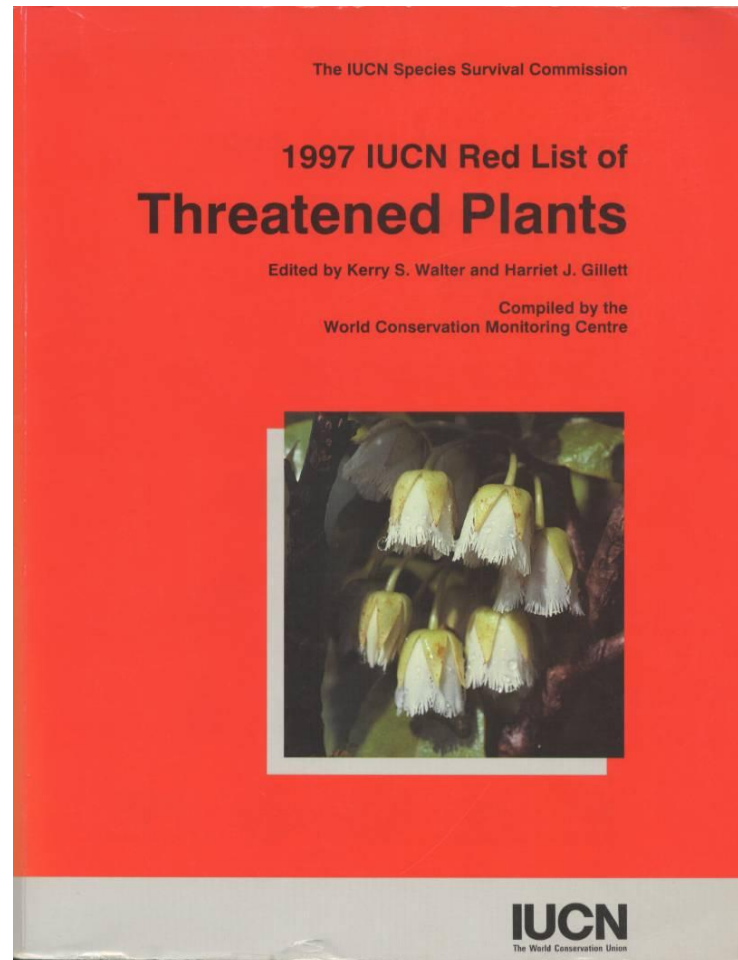
1997 IUCN Red List of Threatened Plants, based on pre-1994 criteria

- **Zingiberales – 8 families, 89 genera, 1,755 species**
  - **Musaceae – 2 genera, 42 species: 2 (4%) + 1 Ex**
  - **Strelitziaceae – 3 genera, 7 species: 2 (28%)**
  - **Lowiaceae – 1 genus, 6 species: 1 (16%)**
  - **Heliconiaceae – 1 genus, 100 species / taxa: 43 (43%)**
  - **Zingiberaceae – 47 genera, 1,000 species: 76 (7%) + 1 Ex**
  - **Costaceae – 4 genera, 150 species / taxa: 17 (11%)**
  - **Cannaceae – 1 genus, 50 species: 1 (2%)**
  - **Marantaceae – 30 genera, 400 species / taxa: 11 (2%)**
- **Overall – 153 threatened species / taxa (8.7%) = Ex/E + E + R + I, as well as 2 extinct species (0.1%) = Ex**

IUCN Red List of Threatened Species 2012.1, based on current criteria

- **Musaceae – not yet assessed**

- **Strelitziaceae – not yet assessed**

- **Lowiaceae – not yet assessed**

- **Heliconiaceae – 18 species of *Heliconia* (15 VU, 1 NT, 2 DD)**

- **Zingiberaceae – 7 genera, 58 species (1 CR, 5 EN, 8 VU, 4 NT, 32 LC, 8 DD)**

- **Costaceae – *Costus geothyrsus*: Vulnerable [A4c; D2], *C. zamoranus*: Vulnerable [B1ab(iii); D2]**

- **Cannaceae – not yet assessed**

- **Marantaceae – 6 genera, 26 species (2 CR, 9 EN, 9 VU, 6 NT)**

IUCN Red List of Threatened Species 2012.1, based on current criteria

- **Marantaceae –** *Calathea anulque*: **EN** [B1ab(iii)], *C. chimboracensis*: **EN** [A4c], *C. congesta*: **VU** [B1ab(iii)], *C. curaraya*: **VU** [D2], *C. dodsonii*: **CR** [A4c], *C. ecuadoriana*: **NT**, *C. gandersii*: **VU** [D2], *C. hagbergii*: **EN** [B1ab(iii)], *C. ischnosiphonoides*: **EN** [B1ab(iii)], *C. lanicaulis*: **VU** [B1ab(iii)], *C. latinotecta*: **VU** [A4c; D2], *C. libbyana*: **EN** [A2c; B1ab(iii)], *C. multicinta*: **VU** [A4c], *C. pallidicosta*: **NT**, *C. paucifolia*: **NT**, *C. petersenii*: **CR** [A4c], *C. pluriplicata*: **VU** [D2], *C. plurispicata*: **NT**, *C. roseobracteata*: **EN** [A4c], *C. utilis*: **NT**, *C. veitchiana*: **NT**, *Marantochloa mildbraedii*: **EN** [B2ab(iii)], *Monotagma rudanii*: **EN** [B1ab(iii)], *Sarcophrynium villosum*: **EN** [B2ab(iii)], *Stromanthe ramosissima*: **VU** [A4c], *Thalia pavonii*: **VU** [A4c; B1ab(iii)]

IUCN Red List of Threatened Species 2012.1, based on current criteria

- **Zingiberaceae 1 –** *Amomum calcaratum*: **VU** [D1], *A. calcicolum*: **NT,** *A. celsum*: **EN** [B1ab(iii)]**,** *A. chevalieri*: **DD,** *A. chinense*: **LC,** *A. chryseum*: **LC,** *A. dealbatum*: **DD,** *A. echinocarpum*: **DD,** *A. elephantorum*: **LC,** *A. gagnepainii*: **DD,** *A. glabrifolium*: **LC,** *A. glabrum*: **DD,** *A. longiligulare*: **LC,** *A. longipetiolatum*: **DD,** *A. micro-carpum*: **LC,** *A. odontocarpum*: **VU** [B2ab(iii)]**,** *A. pierreanum*: **LC,** *A. plicatum*: **LC,** *A. prionocarpum*: **LC,** *A. repoeense*: **LC,** *A. rubidum*: **LC,** *A. sericeum*: **DD,** *A. stephanocoleum*: **EN** [D]**,** *A. subcapitatum*: **LC,** *A. tenellum*: **LC,** *A. tomrey*: **LC,** *A. tsao-ko*: **NT,** *A. verum*: **DD,** *A. vespertilio*: **VU** [B1ab(iii)]**,** *A. villosum*: **LC**

IUCN Red List of Threatened Species 2012.1, based on current criteria

- **Zingiberaceae 2** – *Boesenbergia xiphostachya*: **LC**, *Curcuma candida*: **VU** [B1ab(iii,v)], *C. ecomata*: **LC**, *C. harmandii*: **LC**, *C. rhabdota*: **VU** [B2ab(iii,v)], *C. vitellina*: **CR** [C2a(i)], *Globba albiflora*: **LC**, *G. colpicola*: **EN** [B1ab(iii)], *G. flagellaris*: **VU** [B1ab(iii)+2ab(iii)], *G. fragilis*: **LC**, *G. pendula*: **LC**, *G. praecox*: **VU** [D1], *G. racemosa*: **LC**, *G. sessiliflora*: **LC**, *G. siamensis*: **LC**, *G. substrigosa*: **LC**, *G. winitii*: **LC**, *G. xantholeuca*: **LC**, *Renealmia aurantifera*: **LC**, *R. dolichocalyx*: **NT**, *R. oligotricha*: **VU** [A4c], *R. sessilifolia*: **NT**, *Siliquamomum oreodoxa*: **EN** [B1ab(iii)], *Zingiber junceum*: **LC**, *Z. monophyllum*: **EN** [B2ab(v)], *Z. neotruncatum*: **LC**, *Z. pellitum*: **LC**, *Z. thorelii*: **LC**

IUCN Red List of Threatened Species 2012.1, based on current criteria

- **Heliconia** – *H. berryi*: **VU** [D2], *H. brenneri*: **VU** [B1ab(iii)], *H. excelsa*: **VU** [D2], *H. flabellata*: **DD**, *H. fredberryana*: **VU** [D2], *H. gaiboriana*: **VU** [D2], *H. litana*: **VU** [D2], *H. lutheri*: **VU** [D2], *H. mark-iana*: **VU** [B1ab(iii)], *H. obscura*: **VU** [A4c], *H. paludigena*: **VU** [D2], *H. pardoi*: **VU** [D2], *H. peckenpaughii*: **VU** [D2], *H. peteriana*: **VU** [B1ab(iii)], *H. riopalenquensis*: **VU** [B1ab(iii)], *H. sclerotricha*: **NT**, *H. virginalis*: **VU** [B1ab(iii)], *H. willisiana*: **DD**

IUCN Red List of Threatened Species 2012.1, based on current criteria

- **Heliconiaceae – 18 species of *Heliconia* (15 VU, 1 NT, 2 DD)**

- **Zingiberaceae – 7 genera, 58 species (1 CR, 5 EN, 8 VU, 4 NT, 32 LC, 8 DD)**

- **Costaceae – 2 species of *Costus* (2 VU)**

- **Marantaceae – 6 genera, 26 species (2 CR, 9 EN, 9 VU, 6 NT)**

- **Overall – 104 species in 15 genera in 4 / 8 families assessed: 62 threatened species (60%) = CR + EN + VU + NT, <u>no</u> extinct species, as well as 42 "non-threatened species" (40%) = LC + DD**
  - **vs. 153 threatened species / taxa = Ex/E + E + R + I, as well as 2 extinct species = Ex**

Acknowledgments: PR & VI Plant Conservation Workshop, June '12

Thank you ... questions ?

Specific examples, if there is time

- http://www.iucnredlist.org/