

GLOBAL STRATEGY FOR PLANT CONSERVATION

DRAFT Stakeholder consultation on Target 2:

“A preliminary assessment of the conservation status of all known plant species, at national, regional and international levels”.

Report compiled by Dr Wendy Strahm, 20 September, 2003

Introduction

This document represents the outcome of a stakeholder consultation over the period of August-September 2003, facilitated by IUCN—the World Conservation Union, at the invitation of the Secretariat to the Convention on Biological Diversity. IUCN was asked to prepare a report on ways to achieve target 2 of the Global Strategy for Plant Conservation (hereafter called either the “Strategy” or “GSPC”), and the results of this consultation will contribute to a report to be sent to the CBD Secretariat for presentation at SBSTTA 9 from November 10-14, 2003.

Over 200 stakeholders were contacted by e-mail and invited to send their responses to four questions in order to compile base-line data on national, regional, and global plant conservation assessments. They were also asked to comment on the scope of activities of the target, draft sub-targets and milestones for the target, and the development of a series of indicators for monitoring progress.

This stakeholder consultation was then discussed at the IUCN/SSC Plant Conservation Committee, which took place from September 6-7 in Durban, South Africa. The results of this meeting and information received via email has been compiled and presented in this report. 67 people from 32 countries contributed to the consultation (see Appendix 6). However, given the short timeframe to collect this data, both the comments as well as the base-line information must be considered as draft. However the base-line will form a foundation for CBD parties to build upon (see Appendices 1-5).

The CBD Secretariat also asked all stakeholder consultations to consider the potential role of the Strategy to contributing to poverty alleviation and sustainable development, and the links with SBSTTA-9 and COP-7 main and substantive agenda items: mountain biodiversity, protected areas, technology transfer and MYPOW. However this consultation focused mainly on drawing out ideas on the scope of the target, compiling base-line data, and developing subtargets, milestones and indicators of success. This is because it seems clear that if the strategy is successful, that a more diverse and accessible plant biodiversity will

help people in their day-to-day lives. This issue has already been well-explained in the introduction to the GSPC and needs to be included in the report to SBSTTA-9.

Likewise the main link between this target and substantive items in SBSTTA-9 was not addressed. However plants form a significant part of mountain biodiversity, and through the plant assessment we will be able to determine how many mountain species are threatened. The link with protected areas is mainly through target 7 (“60% of the world's threatened [plant] species conserved *in situ*). However in order to achieve this target, we need to know which species are threatened, which is the link with target 2.

Scope of the target

The scope of the target was generally accepted as “all plant species”, which includes vascular plants, bryophytes, and possibly lichens. Only two comments on which groups to assess were received, and both suggested leaving out fungi. However another respondent stressed the need to better assess marine plants including marine algae and phytoplankton.

Concerning the level of plant biodiversity to assess, in general stakeholders wished to be able to assess all intraspecific plant taxa and not just all “species”, although one respondent thought that assessments should be made at the specific and subspecific level, but not at the varietal level. However other users assess plant biodiversity at finer levels, including the FAO which notes that they have “well developed programmes on the conservation, sustainable use and assessment of crop, grassland and forest genetic resources like the State of the World on Plant Genetic Resources for Food and Agriculture and the Forest Resources Assessment process” (web addresses provided in references). The Plant Genetic Resource Forum, a programme working on conservation assessments of crop wild relatives for Europe, also stressed the need to undertake conservation assessments at a population level. However for the global assessment it should be sufficient to just assess species and subspecies, while national assessments may include assessments at a finer level of genetic diversity. Therefore for the rest of this report when “species” are referred to, it will include assessments made at the subspecific level as well.

Taxonomic issues were also raised several times, and it was also stressed that the full scientific name for any assessment needed to be included to take into account changing taxonomic concepts. The Prometheus project (www.prometheusdb.org) has been working on this issue, and note that to really proof the work and provide an idea of taxon concept, then the classification used should also be referenced, i.e. the name of the flora used should also be cited alongside the taxon name. The reasoning behind this is that this information is essential if a third party is to decide on whether information linked to the same taxon name can be reliably combined.

The word “preliminary” also caused interesting discussion. This was interpreted in two ways. For those using the IUCN Categories and Criteria (IUCN, 2001), it was thought that all species should be assessed, and those where there was not sufficient information for evaluation should be classed as Data Deficient (DD) as defined in IUCN, 2001. However a majority group of respondents felt that given the large number of plant species that need to be evaluated, that there needed to be a sort of “first cut” into dividing all described plant species into two groups, i.e. “Not threatened” and either “Threatened” or “Potentially threatened”. This would then provide the first preliminary global plant conservation assessment. The IUCN evaluation system could be used on the “potentially threatened” group to refine the analysis. In addition, almost everyone indicated a strong need for increased resources to undertake these evaluations.

The “first cut” could be undertaken two ways. The first is using expert knowledge by in-country botanists, protected area managers, and botanic garden managers who could draft a rapid list of species which were common and those that which were rare and threatened. Often this information is known but not published in any formal Red List. The second way would be to use the many million herbarium specimens throughout the world. The Royal Botanic Gardens Kew (see Willis *et al.*, 2003) and Missouri Botanical Garden have been developing methods for identifying species that may be threatened, using data from herbarium specimens. Obviously if the species has only been collected once or from one locality, this would put it on the list of potentially threatened species. In addition, it is possible to map from specimens the species’ Area or Occupancy or Extent of Occurrence (for definitions see IUCN 2001), and make estimates of decline, which would greatly speed up the production of preliminary assessments. These maps could also be overlaid with vegetation maps to give an indication of potential distribution. If the Area or Extent of Occurrence falls below a certain threshold, these species would also fall in the list of potentially threatened species (mainly using IUCN Criteria B) that merit further investigation.

A number of respondents also drew reference to the “CAMP” (Conservation and Management Planning) process developed by the SSC Conservation Breeding Specialist Group. To date CAMPS for plants have taken place in India, Nepal, Cuba, Costa Rica, and Mexico, and the published results have been included in appendices 1-5. Other conservation assessment workshops (applying Red List criteria for national and regional assessments, and modeled on the CAMP process, are planned for late 2003/early 2004 for the Dominican Republic and Central America (Panama, Nicaragua, Honduras) in collaboration with the TRAMIL network, the Latin American Herbarium Network, CBSG, and the IUCN Regional Office for Meso-America. CAMPS provide a tool to undertake a more rapid assessment of plant conservation status in-country.

In order to achieve the global assessment part of this target, a standard evaluation process must be used, whereas national and sub-national

assessments may use evaluation systems deemed most suitable to that particular area. While national systems may well be more helpful in determining national plant conservation priorities, if countries wish to know the conservation status of their species elsewhere, then some common system must be used.

Almost all of the respondents undertaking plant conservation assessments said that they are now using the IUCN Red List Categories and Criteria (IUCN 2001), which will facilitate information exchange from one country to another. However a few countries, while recognising the need for a global system and accepting the IUCN Categories and Criteria, expressed the need for a different national system. For example, Germany uses a different system, noting that they “had a lot of discussions about the category system and it was decided to develop the German national system developed for the 1996 list (Korneck *et al.*, 1996) further, to ensure comparability with the predecessor list, which we felt is very important at a national scale (the 1996 list is the first one after the reunification, that would be the second one). However, this time the Federal Agency plans to develop an internet tool to collect basic data about populations sizes, decline etc. necessary for (any) assessment and to document these data. This will, at least in theory, make an assessment according to the IUCN categories possible, but, more important, those data could later on be used to produce a European Red List, a goal we also had at the last Planta Europa conference”. New Zealand uses a modified IUCN system which helps in their conservation prioritisation work, but again note that the data is available so that the IUCN system could also be applied for global assessments. South Africa uses the IUCN system, but has a proposal to modify the system for their national use in order to capture the old “Rare” species which sometimes are no longer categorised as threatened using the new IUCN system, as well as taking “a broader perspective on NT species which are OK now but which might become threatened in the future”. However all these respondents still expressed an interest in ensuring that any of their national endemic species are also assessed with the IUCN system for inclusion in the global IUCN Red List of Threatened Species. It should also be noted that IUCN has produced guidelines for using the IUCN Categories and Criteria (originally developed for global use) at regional, national and sub-national levels (for more information on these guidelines as well as the IUCN Red List Categories and Criteria see www.iucn.org/themes/ssc).

Two respondents noted that the IUCN global list is composed mostly of endemic species, and there is a problem in evaluating wide-spread but threatened species. A suggestion was made to encourage all national authorities to connect their Red Lists with checklists so the full distribution as well as if the species is or is not threatened in that country is known, which would then help with the global evaluation.

It was suggested that training and other capacity building in conservation assessment and management planning be directed particularly towards the challenges for local knowledge and management of economically/culturally

important plant species. Another respondent added that in addition to plants in trade, that all endemic and phylogenetically unique species should be the first to be assessed. Someone else thought that Red List workshops would not be useful until more information on taxonomy, distribution, demography and habitat conditions of species were known, although others have been able to undertake many assessments using available information.

Therefore it is recommended that the scope of the target includes evaluation of all species and sub-species of vascular and non-vascular plants. The preliminary assessment should be undertaken in two ways: first dividing all species into “threatened” and “potentially threatened” lists (using specialist knowledge, herbarium specimens and tools such as CAMPS), and then undertaking evaluations using the IUCN Categories and Criteria for as many of these “potentially threatened” species as possible. Plant groups to be prioritised for assessment should include those of economic and cultural importance, endemics, and phylogenetically unique species.

Existing base-line data

A literature review and consultation with stakeholders has resulted in a compilation of all national and regional plant conservation assessments (see appendices 1-5). Where known, the conservation assessment system used has been noted, although this tabulation is still incomplete. This review has been carried out on a country basis using the UN list of countries, divided into regions recognised by the UN for statistical purposes. Recognising that the political cut is not always along the most logical botanical regions. For example, the countries included in the southern African plant Red Lists (Golding, 2002) fall in Southern, Middle and Eastern Africa in the UN system.

Note that a bibliography of Red data Books and Threatened Plants Lists was compiled in 1981 (Jarvis *et al.*, 1981), a review of plant conservation for all countries covered in “Plants in Danger—what do we know? (Davis *et al.*, 1986), and the most complete plant conservation bibliography is included in the reference list of the 1997 IUCN Red List of Threatened Plants (Walter & Gillett, 1998). In this report only the most recent references per country on plant Red Data Books and Red Data Lists have been included. Earlier references are available in the aforementioned publications.

An analysis of the existing global plant Red Lists has also been provided.

National plant Red List assessments

Although this baseline data is still being compiled, a very preliminary analysis may be made per region of countries with some sort of plant conservation assessment and countries where very little or nothing has been done in terms of

identifying plant species at risk (see table 1 and Appendices 1-5). At least half of all countries have some sort of plant Red List at varying levels of completeness.

Table 1. Preliminary comparison of countries and plant Red Lists.

Region	With Red Lists	Total countries	% with Red Lists
Europe	38	42	91%
Americas			
• North America	3	4	75%
• Latin America and Caribbean	9	23	39%
• South America	8	14	57%
Asia			
• Western Asia	10	18	56%
• South Central Asia	8	14	57%
• Eastern Asia	4	6	66%
• South-eastern Asia	4	11	36%
Oceania	4	24	17%
Africa			
• Northern Africa	4	7	57%
• Eastern Africa	9	19	47%
• Southern Africa	5	5	100%
• Central Africa	2	9	22%
• Western Africa	2	17	12%
TOTAL:	110	213	52%

Europe is just about entirely covered (the 4 countries for which no Red Lists were noted are just very small countries (San Marino, Monaco, Andorra), or else very new countries (Former Yugoslav Republic of Macedonia). However these countries probably have plant conservation assessments done, possible in another country's assessment. Likewise North America may be considered as well underway through the work of Natureserve and the Heritage Centres; only Greenland does not seem to have a plant Red List although again any threatened plant species in Greenland may well be included in other assessments.

South America is undertaking some major plant assessment projects that should be used as a model throughout the world. The Red List of Ecuador (Valencia *et al.*, 2000) that assessed all 4000 endemic vascular plant species is a milestone, and this work is currently underway for Peru (Blanca, *in litt.*) and Colombia (Calderón *et al.*, 2002). Brazil and Argentina also have a number of subnational Red Lists, although no references to national Red Lists were sent in although they may exist. Hence work in that continent, while there is still much more to be done, particularly in the Amazon, is well underway. Latin America and the Caribbean seem to be further behind, mainly due to all the many Caribbean nations that have not yet undertaken plant conservation assessments.

Asia is particularly weak in plant assessments in south-eastern Asia, due to the tremendous amount of plant diversity in Indonesia, Malaysia and Papua New Guinea which still remains mostly undocumented. This area should be a priority in plant assessment work. Likewise the Pacific Islands in Oceania, apart from good assessments in Australia, New Zealand, and New Caledonia, needs much more work.

Africa remains perhaps the least assessed region, although thanks to the SABONET work in Southern Africa it does not look too bad in this survey. However it must be remembered that the Southern African Red Lists (Golding, 2002) are only preliminary, and much more work remains in this part of the world (although the work in South Africa is on a par with Europe and North America). Central and Western Africa in particular need much more work, but Eastern and Northern Africa are also high priority.

In summary, more and better conservation assessments are needed world-wide, but from this analysis, particular emphasis on training and capacity-building for plant conservation assessments need to be taken in Western and Central Africa, Oceania, South-eastern Asia, and the Caribbean. And while national Red Lists for all European countries are well-advanced, there still does not exist a European Red List, a major gap for identifying globally threatened species.

Global plant Red List assessments

The first major analysis of the conservation status of the world's vascular plants was published in the 1997 IUCN Red List of Threatened Plants (Walter & Gillett, 1998). This was the culmination of over 20 years of work, which included a painstaking compilation of literature that gave some indication of threat to a plant taxon, whether in a Red Data Book, a flora or checklist, or a botanical monograph or other paper, as well as consultation with experts to correct information and add new data. At the same time, major regional conservation assessments were being undertaken. In North America, the Caribbean and parts of South and Central America the Nature Conservancy were developing their Natural Heritage Central Database (The Nature Conservancy, 1996), which contributed 11,000 taxa to the IUCN list. Wildlife Australia supplied data, published in Briggs and Leigh (1996), for some 5,000 plant taxa (2414 which were included in the Red List). The National Botanical Institute (NBI) of South Africa also contributed some 3,435 taxa (2310 which were included in the 1997 Red List) from Namibia, Botswana, Swaziland, Lesotho, and South Africa, of which the preliminary results were published in 1996 (Hilton-Taylor, 1996). While these major regional assessments strongly biased the global assessment to these three regions, at the same time they provided more and better data than had been collected at a global scale.

The plant taxa included in the 1997 IUCN Red List were assessed using the “pre-1994” IUCN categories of threat (IUCN, 1981). Both the Nature Conservancy and Wildlife Australia used different system for evaluating threat, but these were “converted” to the IUCN categories (see Walter and Gillett 1998) and merged with the IUCN Red List work cited above.

At the same time that this massive compilation of threatened plant data was being undertaken, work was underway on improving the IUCN categories of threat, which had been used in Red Data Books and Red Lists for some 30 years. From a symposium in 1984 (Fitter and Fitter, 1987), proposals for improving the evaluation process were made, and after many workshops and a huge consultation, a major revision to the IUCN Red List Categories and Criteria was published (IUCN, 1994). The aims of the new system were to provide an objective system for classifying species according to their extinction risk, which could be applied consistently by different people, as well as to give people using threatened species lists a better understanding of how individual species were classified (IUCN, 1994).

However as the 1997 IUCN Red List of Threatened Plants had been compiled using the “pre-1994” categories, it was still felt that this data needed to be published, with the recognition that while some species assessed as threatened using the “pre-1994” categories may not be recognised as threatened using the new criteria, at the same time there were still many more species that had not been able to be included in the global list as information on their conservation status throughout their range was not available.

The result was that a list of 35,291 taxa (an estimated 31,000 species if the intraspecific taxa are left out) were identified as globally threatened to some degree (see table 2). This information was published and is also available on a searchable database at www.unep-wcmc.org. Note that this threatened species data, with some updates, is still used in global “report cards” such as the World Resources Institute reports (WRI, 2001).

However since 1994, IUCN has been using the revised IUCN Red List Categories and Criteria for all new global plant conservation assessments. The new IUCN criteria were first published in 1994, but after publication a criteria review process was undertaken, which resulted in some modifications to the criteria (IUCN, 2001). These criteria are not expected to be changed in the near future in order to give some stability to the assessment procedure.

Once IUCN adopted its “new” categories and criteria, it was decided to incorporate all plant and animal data together in the IUCN Red List of Threatened Species, which is updated annually and available at www.redlist.org. This meant that plant evaluations basically had to start all over, as the “old” categories cannot be converted to “new” without analysing the data available.

The first major evaluation to use the “new” IUCN criteria (IUCN, 1994) was the joint WCMC/SSC Conservation and Sustainable Use of Tree programme, led by Sara Oldfield, which documented over 7300 tree species as globally threatened. This data was published in “the world list of threatened trees” (Oldfield *et al.*, 1998) and all the data included here has since been incorporated in the IUCN Red List, and is being regularly updated.

Other major published plant evaluations using the “new” IUCN criteria include national plant Red Lists for southern Africa (Golding, 2002), Spain (Lozano, 2000), Ecuador (Valencia *et al.*, 2000), Colombia (Calderón *et al.*, 2002), New Caledonia (Jaffré *et al.*, 1998), Mt Cameroon (Cable & Cheek, 1998; Cheek *et al.*, 2000), China (Qin *et al.*, in prep.), Turkey (Ekým *et al.*, 2000) and others. All the endemic species assessed in these publications either have or are in the process of being incorporated in the IUCN Red List of Threatened Species. Taxonomic evaluations include the conifers (Farjon & Page, 1999) and cycads (Donaldson, 2003). In addition, at least at RBG Kew, RBG Edinburgh, Missouri Botanical Garden and probably elsewhere, staff are being actively encouraged and trained to including a conservation assessment with all newly described species and flora accounts. Kew are currently producing about 200 plant conservation assessments/year. Some staff from the Museum national d’histoire naturelle in Paris also report including conservation assessments in their taxonomic treatments, and this should become common policy throughout the botanical community.

In summary, two global Red Lists for plants currently exist, the 1997 list using the “old” IUCN Categories and progressively becoming out-dated, but with about four times as many species as the 2002 IUCN Red List of Threatened Species, which uses the “new” IUCN Categories and Criteria and is being actively updated. However it must be noted that several thousand more plant evaluations will be included in the 2003 IUCN Red List, although there is still a long way to go before all the 35,000 taxa listed in the 1997 Red List are re-evaluated with the current IUCN criteria. This must be seen as a priority in order to provide a better global base-line.

Table 2. Number of species and taxa identified as globally threatened.

Categories (1981)	1997 taxa	Categories (1994, 2001)	2002 taxa	2002 species
Ex	396	EX	76	70
Ex/E	400	EW	20	19
E	6,945	CR	1120	1024
V	8,380	EN	1398	1255
R	14,991	VU	3805	3351
I	4,179	LR/cd	260	244
		LR/nt or NT	809	721
		DD	411	379

Total:	35,291		7,899	6,688
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Sub-targets towards achieving this target

Some input into the draft sub-targets developed at the Cartagena meeting in October 2002 during the stake-holder consultation was received, although since it was not possible to circulate all the ideas received back to the group, more work is still needed.

One point made was that instead of workshops, e-mail consultation needs to be used. However other respondents liked the idea of workshops where a lot of information can be shared in a small, focussed amount of time, so it is suggested that a mixture of these two methods be used. Another respondent suggested that plant conservation assessment workshops would not be useful until additional taxonomic and field knowledge was acquired.

Therefore the following subtargets to achieve target 2 should still only be considered preliminary as they have not received the necessary debate, but the ideas received are as follows:

1. A simple document on "how to use the IUCN Red List Categories and Criteria" produced and distributed to all undertaking plant conservation assessments by 2003.
2. A status report on all national Red Lists and taxonomic Red Lists (a sort of "matrix") available by 2003.
3. Agreement by all institutions that all newly described species should be given a conservation assessment (through the International Association of Plant Taxonomists, by 2004). A proposal to amend the Code of Botanical Nomenclature at the next International Botanical Congress in Vienna in 2006 was also suggested in this context.
4. Inclusion in all capacity-building projects on plants, instruction on how to undertake plant conservation assessments (by 2004).
5. Establishment by 2005 of a formal mechanism at national level for the provision of taxonomic expertise to those undertaking conservation assessments.
6. Re-evaluation of all species included in the 1997 Red List and the 1998 - World List of Threatened Trees using the 2001 IUCN Criteria by 2006.
7. Regional Red List training workshops to cover all countries without a national Red List by 2006.
8. Review of progress at International Botanical Congress in Vienna in 2006.
9. All IUCN/SSC Plant Specialist Groups to maintain a working Red List for their groups by 2007.
10. Every country to have a working national Red List by 2008 available on the Web and in printed form.
11. All country endemic species assessed using IUCN Criteria by 2008.

12. Regional workshops and e-mail discussion groups to harmonise the conservation status of all non-national regional endemics completed by 2009.
13. Preliminary global consolidation by 2009.

Indicators for monitoring progress

Until the sub-targets are agreed upon, it is not possible to develop indicators for each sub-targets. However in most cases indicators are just the logical completion of the sub-targets, and will not be difficult to develop once the sub-targets are agreed.

Recommendations

Although this consultation on target 2 is still preliminary, it should feed into the deliberations taken at the expert liaison group meeting in Ireland from October 6-7, which will develop the GSPC report to SBSTTA-9.

The following recommendations to achieve success for target 2 may be distilled as:

1. More funding (for this and most of the other recommendations) is needed in order to undertake plant conservation assessments, using available knowledge, at a national, regional and global scale.
2. Increased research on pulling together additional information needed for conservation assessments also needs to be undertaken. This includes the production of accepted species checklists to form a taxonomic backbone for the assessment work.
3. National taxonomic authorities need to be identified in order to help with the plant conservation assessment process, especially as the concentration of botanists tends to be northern temperate and the need is further south.
4. All newly described species and flora accounts must include a conservation assessment for each taxon. All staff in botanical institutions (such as being undertaken at RBG Kew) need to be actively encouraged and trained towards producing assessments.
5. More training in the plant conservation assessment process is needed, with all countries not yet engaged in plant conservation assessment to receive training. In particular emphasis on training and capacity-building for plant conservation assessments needs to be put in Western and Central Africa, Oceania, South-eastern Asia, and the Caribbean. Easy-to-use tools on how to undertake plant conservation assessments are needed, as well as taxonomic support.

6. A “first cut” preliminary Red List of potentially threatened and non-threatened species needs to be established, and these species then assessed using the IUCN criteria as resources allow.
7. All species in the 1997 IUCN Red List of Threatened Plants need to be reassessed with the “new” IUCN Criteria and Categories, so that only one global threatened species list is used.
8. More national Red Data books need to be published, and all endemic species included in the global Red List.
9. Major herbaria, repositories of an enormous amount of plant conservation information, need to be brought fully into this process.
10. The results of this plant conservation assessment need to be freely accessible to all who wish to use it.

References

Briggs, J.D. & Leigh, J.H. (1996). Rare or threatened Australian plants. Melbourne, Australia: CSIRO Publications.

Calderón, E., Galeano, G. & García, N. (eds.) (2002). *Libro Rojo de Plantas Fanerógamas de Colombia. Volumen 1: Chrysobalanaceae, Dichapetalaceae y Lecythydaceae*. La serie Libros Rojos de Especies Amenazadas de Colombia. Bogotá, Colombia. Instituto Alexander von Humboldt, Instituto de Ciencias Naturales-Universidad Nacional de Colombia, Ministerio del Medio Ambiente. Also available at www.humboldt.org.co. 218 pp.

CBD (2002). Decision VI/9. Global Strategy for Plant Conservation. In annex 1 of UNEP/CBD/COP/6/20 document: *Decisions adopted by the Conference of the Parties to the Convention on Biological Diversity at its sixth meeting*. The Hague, 7-19 April, 2002. pp 142-154. (see <http://www.biodiv.org/decisions/default.asp?lg=0&m=cop-06&d=09>).

Cable and Cheek, M. (1998). *The plants of Mt Cameroon. A conservation checklist*. Royal Botanic Gardens, Kew. UK.

Cheek, M., Onana, J-M., & Pollard, B.J. (eds.) (2000). *The plants of Mount Oku and the Ijim Ridge, Cameroon. A conservation checklist*. Royal Botanic Gardens, Kew. UK. 211 pp.

Davis, S.D., Droop, S.J.M., Gregerson, P., Henson, L., Leon, C., Villa-Lobos, J.L., Syngé, H., & Zantovska, J. (1986). *Plants in Danger, What do we know?* IUCN, Gland, Switzerland, and Cambridge, U.K. (461 pp.)

Donaldson, J. (ed.). (2003). *Cycads. Status Survey and Conservation Action Plan.* IUCN/SSC Cycad Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 88 pp.

Ekým, T. *et al.* (2000). *Türkiye Bitkileri Kırmızı Kitabı (Egrelti ve Tohumlu bitkiler)/Red Data Book of Turkish Plants (Pteridophyta and Spermatophyta).* Turkish Association for the conservation of Nature, Ankara. pp. 246.

FAO State of the World on Plant Genetic Resources for Food and Agriculture, see: http://www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPS/Pgrfa/wrlmap_e.htm

FAO Forest Resources Assessment (FRA), see: <http://www.fao.org/forestry/foris/webview/forestry2/index.jsp?siteId=101&langId=1>

Farjon, A. & Page, C.N. (compilers). (1999). *Conifers. Status Survey and Conservation Action Plan.* IUCN/SSC Conifer Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 121 pp.

Fitter, R. and Fitter, M. (eds.). (1987), *The Road to Extinction.* IUCN, Gland, Switzerland and Cambridge, UK. 121 pp.

Golding, Janice (ed.). (2002). *Southern African Plant Red Data Lists.* Southern African Botanical Diversity Network Report Series No. 14. SABONET, Pretoria. pp. 237.

Henifin, M.S. *et al.* (1981). Guidelines for the preparation of status reports on rare or endangered plant species. In: Morse, L.E. and M.S. Henifin (eds.). *Rare Plant Conservation: Geographical Data Organization.* New York Botanical Garden, N.Y.

Hilton-Taylor, C. (1996). Red Data List of southern African plants. *Strelitzia* 4. National Botanical Institute, Pretoria. 117 pp.

IUCN (c.1981). *The IUCN Red Data Book Categories.* Threatened Plants Committee. pp.

IUCN (1994). *IUCN Red List Categories and Criteria: Version 2.3.* IUCN Species Survival Commission, IUCN, Gland, Switzerland and Cambridge, UK. 21 pp.

IUCN (2001). *IUCN Red List Categories and Criteria: Version 3.1*. IUCN Species Survival Commission, IUCN, Gland, Switzerland and Cambridge, UK. ii + 30 pp.

IUCN (2002). *2002 IUCN Red List of Threatened Species*. www.redlist.org.

Jaffré, T., Bouchet, P., & Veillon, J.-M. (1998). Threatened plants of New Caledonia: Is the system of protected areas adequate? Appendix: Threatened species of the endemic flora of New Caledonia. *Biodiversity and Conservation* 7:109-135.

Jarvis, C., Leon, C., & Oldfield, S. (1981). Appendix II. Bibliography of Red Data Books and Threatened Plants Lists. In Synge, H. (Ed.) *Biological Aspects of Rare Plant Conservation*, pp. 513-29. Wiley, Chichester, UK.

Korneck, D., Schnittler, M., & Vollmer, I. (1996). Rote Listen und Florenlisten gefährdeter Pflanzen in Deutschland: Florenliste und Rote Liste der Farn- und Blütenpflanzen (Pteridophyta et Spermatophyta). *Schr.R. Vegetationskunde* 28: 21-187.

Lozano, F.D. (ed.) (2000). *Lista Roja de la Flora Vasculare Española. Red List of Spanish Vascular Flora*. Conservación Vegetal. Boletín de la Comisión de Flora del Comité Español de la Unión Mundial para la Conservación Naturaleza, 6: 39 pp. Madrid.

Oldfield, S., Lusty, C. & MacKinven, A. (1998). The world list of threatened trees. World Conservation Press, Cambridge, UK. 649 pp.

Qin, H.N. *et al.* (in prep). Plants of the Chinese Region. Status Survey and Conservation Action Plan. IUCN/SSC China Plant Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK.

The Nature Conservancy. (1996). Natural Heritage Central Database. (Status and distribution data on North American plants, developed in collaboration with the Association for Biodiversity Information, U.S. and Canadian Natural Heritage Programs and Conservation Data Centers, and North Carolina Botanical Garden Biota of North America Program.). Data provided to the 1997 IUCN Red List of Threatened Plants (see Walter and Gillett, 1998).

Walter, K.S. & Gillett, H.J (eds.). (1998). *1997 IUCN Red List of Threatened Plants*. Compiled by the World conservation Monitoring centre. IUCN—The World Conservation Union, Gland, Switzerland and Cambridge, UK. lxiv + 862 pp. Searchable database (although truncated at 100 hits) available at <http://www.unep-wcmc.org>

Willis, F., Moat, J. & Paton, A. (2003). Defining a role for herbarium data in Red List assessments: A case study of *Plectranthus* from East and Southern Tropical Africa. *Biodiversity and Conservation*. 12(7): 1537-1552.

World Resources Institute (2000). *World Resources 2000-2001: People and Ecosystems: The Fraying Web of Life*. United Nations Development Programme, United Nations Environment Programme, World Bank, World Resources Institute, Washington, D.C. 389 pp.