CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

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Eighth Meeting of the Conference of the Parties

Kyoto (Japan), 2 to 13 March 1992

Interpretation and Implementation of the Convention

Trade in Plant Specimens

IMPROVING IMPLEMENTATION OF THE CONVENTION FOR PLANTS

This document has been prepared by the CITES Secretariat at the request of the Plants Committee.

1. Introduction

Although plant species have been listed in the CITES appendices since the very beginning, and there are more plant than animal species covered by the Convention, the implementation of CITES for plants is still of minor importance to many Parties to the Convention. This is partially because knowledge about plant trade and its related problems has been very limited for most of the Parties. The situation has improved, in particular since the Plants Officer joined the professional staff of the Secretariat in March 1990. In particular, the Plant Seminars held in the various regions (Latin America, 2-3 July 1990, Caracas, Venezuela; Africa, 15 April 1991, Zomba, Malawi; Asia & Oceania, 21-24 May 1991, Cisarua, Indonesia; Europe, 5-7 November 1991, Leiden, the Netherlands) have contributed much to this result.

The many activities carried out by the Plant Working Group (1984-1987) and the Plants Committee (1987-present) also contributed to these improvements.

In 1973, when the text of the Convention was drafted, more thought was given to the elements of the animal trade than to those of the plant trade, and one certainly could not have foreseen many of the new technical developments that have since taken place in the plant trade. The shortcomings of the Convention also apply to some of the Resolutions adopted in meetings of the Conference of the Parties.

Finally, the close attention the plant trade is receiving from the Secretariat has resulted in the detection of bottle-necks in the implementation of CITES for plants (both wild-collected and artificially propagated), which need adequate solutions.

2. Trade in Artificially Propagated Plants

The CITES Plant Working Group and Plants Committee have always promoted the artificial propagation of any plant species listed in the appendices. It is evident that when artificially propagated specimens of a species are abundantly available for the commercial and specialist trade, the pressure on the wild populations will decrease or even disappear. Thus, the trade in artificially propagated specimens can form a valuable contribution to the survival of the wild specimens, in particular for those species listed in Appendix I. It has, therefore, been considered of importance to facilitate the trade in artificially propagated plants as much as possible (Resolutions Conf. 4.24 and 5.14).

In addition to the fact that, under the current text of the Convention, the trade in artificially propagated plants can not be excluded completely from CITES control, there is also a proven risk that wild-collected plants can be mixed with artificially propagated ones, in order to smuggle the unnoticed. Excluding artificially propagated plants from control can therefore not be considered. However, trade-control-facilitating mechanisms should be sought.

2.a Definition of "Artificially Propagated"

Resolution Conf. 2.12 provides to the Parties definitions of "bred in captivity" and of "artificially propagated".

In general the definition of "artificial propagation" of plants is adequate, and does not provide problems for the specialist familiar with this subject. However, one sentence in the definition is not sufficiently clear in its intent. Furthermore, two forms of artificial propagation are not mentioned in this Resolution, and this has caused some misunderstandings.

i) The definition in Resolution Conf 2.12, recommendation c), refers to the stock needed for propagation as "the artificially propagated stock...".

The apparent intention of this recommendation was to indicate that, once a parental stock is established for the purpose of production of seeds, cuttings etc., the stock should be maintained (preferably) in the same quantity of individual plants, irrespective of whether these plants are from wild-collected or artificially propagated origin.

But the present text of the Resolution does not clearly say this. The original intention of recommendation c) would be better expressed if, instead of referring to "the artificially propagated stock" it referred to "...the parental stock used for artificial propagation" using a phrase equivalent to that used in recommendation b) for animals.

A similar amendment should then be made in paragraph c. ii) replacing the words "artificially propagated" by "parental" to read "managed in a manner designed to maintain the parental stock indefinitely".

In this sentence, however, the use of the word 'indefinitely' may be superfluous with regard to Appendix-II species, for which trade in wild-taken specimens is still allowed. The parental stock can easily be replaced or supplemented by legally acquired wild- collected plants.

Therefore it is suggested this part be amended as follows:

> "in the case of Appendix-I species, be managed in a manner designed to maintain the parental stock indefinitely".

ii) Grafts

In cactus cultivation, it is a common practice to use grafting techniques. There are species which are difficult to cultivate: they grow very slowly, and are often sensitive to excessive moisture in the soil, which frequently causes rot in the roots. These problem-plants are grafted onto sturdy, fast-growing root-stocks, which transfer their vigour to the grafted plant. This technique is also used to make seedlings grow much faster than they would have done on their own roots. Grafting is furthermore essential for mutations such as the interesting red or yellow forms of Gymnocalycium mihanovichii, which can not grow on their own. As root-stocks, rooted cuttings are taken from plants of species of various genera including Hylocereus, Myrtillocactus, Echinopsis (Trichocereus) and Harrisia (Eriocereus). These stocks are often specially selected clones, and virtually always of artificially propagated origin.

This is not always the case with the 'head', the scion. Wild-collected plants, which are sometimes susceptible to bacterial infections in the roots, are often grafted onto these root-stocks to avoid these problems.

Although this technique of cultivation is frequently used, grafted plants can only be regarded as **artificially propagated** if both **root and scion** are artificially propagated. Wild- collected cacti grafted onto artificially propagated root-stocks are to be regarded as WILD.

iii) Division

Although 'division' can be regarded as a form of cutting (cutting = taking a shoot or branch, to be rooted and grown as an individual plant; division = dividing the plant into several individuals) the absence of the term in the definition of "artificially propagated" has given cause to doubt the acceptability of this technique as a means of artificial propagation in the context of CITES.

An amended definition of "artificially propagated" is presented in the Annex.

2.b Flasked Seedlings of Orchids

One of the most common techniques for the propagation of orchids is the use of sterile flasks. This technique is as follows:

> Ripe, but not yet opened green pods are sterilized on the outside. The seeds inside the fruits are free of any bacterial contamination. Under controlled, sterile conditions the pods are opened and the seeds placed in a flask containing a specially developed nutritious fluid or solid substrate. The nutrients in the substrate replace the fungi the orchid seeds otherwise need to acquire the necessary natural substances for growth. Unlike seeds of many other families, the orchid seed does not carry any reserves for growth after the initial germination.

Since the ripening of the pods must be monitored carefully and the fruits need to be harvested at the appropriate time, wild-collected fruits of orchids are virtually never used for this purpose. There is, therefore, no threat that natural populations will be depleted of their seeds.

The control of the international movement of flasked seedlings of orchids, therefore, is not relevant to the protection of the natural populations of orchid species. Control efforts could better be directed to other elements of the international plant trade.

Therefore it would be better to exempt all flasked seedlings of orchids from the requirements of the Convention.

In the case of species listed in Appendix II or III, and hybrids thereof, this exemption was made possible with the adoption of an amendment to Appendix II at the fifth meeting of the Conference of the Parties and of Resolution Conf. 6.18. The decisions appear in the 'Interpretation' section of Appendices I and II and of Appendix III. This means that flasked seedlings are not covered by the Convention for the duration of their stay in the flask.

2.c Artificially Propagated Hybrids of Appendix-I Species of Orchids

The orchid genera Cattleya, Laelia, Oncidium, Odontoglossum (all American, Appendix II), Cymbidium, Dendrobium, Phalaenopsis, Pleione, Vanda (Asian and Australian, Appendix II) and Paphiopedilum (Asian, Appendix I) form the main taxa in the high-volume industry of orchid hybridization.

Initially, mainly species were hybridized. Later, more and more of the resulting hybrids were used to create new hybrids. When a new species was discovered, it was almost immediately used to start a new line of hybrids and, after several years, the hybrid producer would lose interest in the original species, or keep only a few specimens for later use. The producers of hybrids are, in general, not involved in the high-volume trade in wild-collected specimens. These hybrids play virtually no role in the protection of the species they once were derived from, other than taking the attention away from the wild-collected species. Hybrids, even the primary ones, also rarely play a role in the conservation of genetic diversity for the benefit of wild species. Many of the primary hybrids are of importance for commercial trade and are, therefore, conserved. A strict control of the trade, as in the case of flasked seedlings, would put an unjustified burden on the implementation of CITES and would not contribute to the aims of the Convention as expressed in its Preamble.

At present, the only possibility for facilitating trade in specimens of species in Appendix I that are artificially propagated for commercial purposes, is that they may be deemed to be specimens of species included in Appendix II (Article VII, paragraph 4).

The intentions of document Doc. 6.32 were very clearly formulated in paragraph 1: "... that regulation could be simplified for artificially propagated hybrids of most plants listed in Appendix I by fully treating most of the hybrids as if they were in Appendix II."

Trade in plants of hybrids of unannotated Appendix-I species has been further facilitated with the use of certificates of artificial propagation (Resolution Conf. 6.19). Unfortunately the wording of Resolution Conf. 6.19 does not clearly express the intention that was evident in document Doc. 6.32. As a result, the exemptions for artificially propagated specimens of species in Appendix II do not apply to hybrids of unannotated Appendix-I species. This means that flasked seedlings and cut flowers of hybrids of species in Appendix I must be traded with an export permit; an illogical situation.

The logical conclusion of the adoption of Resolution Conf. 6.19 is that the hybrids of unannotated species in Appendix I are not just treated as specimens of species included in Appendix II, but that they should be "regarded as included in Appendix II".

If this interpretation were acceptable to the Parties, it would mean that all cut flowers, seeds and flasked seedlings of hybrids of unannotated Appendix-I species would be exempted from the provisions of the Convention.

However, one should be aware of the following consequence regarding flasked seedlings:

> It will no longer be possible to recognize if flasked seedlings belong to an Appendix-I species or to an Appendix-I hybrid.

Consequently, flasked seedlings of Appendix-I species should be regarded as 'not readily recognizable parts and derivatives' and be exempt from CITES controls.

As has been argued before, the control of flasked seedlings is of no relevance to the survival of the species in the wild, and exemption of ALL flasked seedlings would only stimulate the propagation of the species concerned and help in reducing the collecting pressure on the wild populations.

This point is also dealt with in the annexed draft resolution.

In the text of the original draft for Resolution Conf. 6.19 a preliminary paragraph in the operative part was included which was absent from the adopted version: "... to annotate the plant species or other taxon listed in Appendix I if compliance with Resolution Conf. 2.13, decision c), is required for artificially propagated plants". Without this text, the reference to **unannotated** and **annotated** is not very clear.

For the purpose of clarification, this text is re-introduced in the draft resolution presented in the Annex.

DRAFT RESOLUTION OF THE CONFERENCE OF THE PARTIES

Improving the Regulation of Trade in Plants

BEING AWARE that the Convention provides measures for international co-operation for the protection of certain species of wild plants against over-exploitation through international trade;

BEING AWARE that the original text of the Convention and several of the Resolutions of the Conference of the Parties on plants may not or could not have been drafted in the light of modern developments in plant propagation and of the trade in artificially propagated plants;

RECALLING the many specific problems the Parties to the Convention have faced and still face in implementing the Convention for plants;

RECOGNIZING that there are aspects of the plant trade and plant biology that are not considered analogous to those for animals, and that a different approach for plants is sometimes necessary;

NOTING that Resolution Conf. 2.12, adopted at the second meeting of the Conference of the Parties (San José, 1979), does not mention all forms of artificial propagation;

OBSERVING that artificial hybridization is readily and often accomplished in some plant groups and that the resulting hybrids and their progeny may be extensively traded;

AWARE of the charge in the Summary Report of the CITES Plant Working Group (document Doc. TEC. 1.11) to improve and simplify the regulation of trade in artificially propagated plants;

RECOGNIZING the guidance of Resolution Conf. 2.13, adopted at the second meeting of the Conference of the Parties (San José, 1979), in regulating the trade in hybrids under the Convention;

NOTING that the intentions of document Doc. 6.23 were not fully reflected in the wording of Resolution Conf. 6.19, adopted at the sixth meeting of the Conference of the Parties (Ottawa, 1987);

RECOGNIZING that the control of the trade in flasked seedlings of orchids is not relevant to the protection of the natural populations of orchid species, and may even be detrimental to it;

CONSIDERING that uniform implementation of the provisions of the Convention is necessary for it to function well;

THE CONFERENCE OF THE PARTIES TO THE CONVENTION

DETERMINES

a) that with regard to the definition of "artificially propagated":

   i) the term "artificially propagated" should be interpreted to refer only to plants grown from seeds, cuttings, divisions, callus tissues or other plant tissues, spores or other propagules under controlled conditions;

      "Under controlled conditions" means in a non-natural environment that is intensively manipulated by human intervention for the purpose of producing selected species or hybrids. General characteristics of controlled conditions may include but are not limited to tillage, fertilization, weed control, irrigation, or nursery operations such as potting, bedding, or protection from weather;

   ii) the parental stock used for artificial propagation must be:

      A) established and maintained in a manner not detrimental to the survival of the species in the wild; and

B) in the case of Appendix-I species, managed in a manner designed to maintain this parental stock indefinitely; and

iii) grafted plants may only be recognized as artificially propagated when both the root- stock and the graft have been artificially propagated;

b) that, with regard to artificially propagated hybrids of Appendix-I species, the application of Resolution Conf. 2.13, decision c), be restricted in such a way that:

i) plant species or other taxa listed in Appendix I be annotated (in accordance with Article XV) if compliance with Resolution Conf. 2.13, decision c), is required for artificially propagated hybrids, in order that the provisions of the most restrictive appendix shall apply;

ii) if a plant species or other taxon listed in Appendix I is annotated, an export permit (or re-export certificate) is required for trade in specimens of all artificially propagated hybrids derived from it; but

iii) artificially propagated hybrids derived from one or more unannotated Appendix-I species or other taxa are regarded as being included in Appendix II and entitled therefore to all exemptions applicable to artificially propagated specimens of species listed in Appendix II; and

c) that flasked seedlings of orchid species listed in Appendix I be regarded as not readily recognizable because of their similarity to the flasked seedlings of hybrids of the same species, and therefore be exempted from CITES control; and

DECIDES that the Resolutions, or parts thereof, listed hereunder be repealed:

a) Resolution Conf. 2.12 (San José, 1979) - Specimens Bred in Captivity or Artificially Propagated - recommendation c); and

b) Resolution Conf. 6.19 (Ottawa, 1987) - Additional Considerations for Artificially Propagated Hybrids of Appendix-I Plants.

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Eighth Meeting of the Conference of the Parties

Kyoto (Japan), 2 to 13 March 1992

Interpretation and Implementation of the Convention

Trade in Plant Specimens

NAMES OF CITES PLANTS IN TRADE

This document has been prepared by the CITES Secretariat at the request of the Nomenclature Committee.

1. General Nomenclature

Background

a) On the advice of the Plant Working Group, after its first meeting in Tucson (Arizona, USA) in 1984, the Parties adopted the *Dictionary of Flowering Plants and Ferns* ed. 8 (Willis, J.C., revised by Airy Shaw, 1973) as the standard reference for the generic nomenclature of plants.

b) In Resolution Conf 5.14 it was recommended that lists of standard names to be developed would, as necessary, supersede the overall generic standard of Willis' Dictionary.

c) During discussions in the Plants Committee (7th meeting of the Conference of the Parties, Lausanne, 1989), it was agreed that *The Plant Book* (D.J. Mabberley, 1989, Cambridge University Press) was a more easily accessible primary reference book for generic nomenclature for plants. This book forms a more recent reflection of modern nomenclature. It gives more information about the individual genera, in particular about the more commonly used species. It is also devoid of all the synonyms which are no longer in use and which are relevant only to taxonomists.

d) The recently finalized Checklist of names of Cactaceae (preparation of which was recommended by the Parties in Resolution Conf. 6.20) will be regarded, after adoption at the 8th meeting of the Conference of the Parties, as the primary standardized nomenclatorial reference to the species of Cactaceae which most frequently appear in international trade.

e) In 1990, a comprehensive survey was published by Stevenson and co-authors on the nomenclature of Cycads (including Cycadaceae, Zamiaceae and Stangeriaceae).

All these elements are brought together in the draft resolution presented in Annex 1.

2. Standard Names for Orchids

Background

a) The largest taxon listed in the appendices is the family Orchidaceae, with about 800 genera and at least 17,500 species. Of these, not all enter trade. A number of the largest genera, and many smaller genera with showy flowers are, however, frequently traded. For these, a standardized checklist including the range States is needed. Such a list would help to put an end to re-exports authorized as exports from countries where the species do not occur. These re-exports can not now be controlled because of the lack of easily accessible information.

b) A study of significant trade of Appendix II plants has just been completed. This study provides a good overview of the species of orchids in trade. From this list a selection will be made of the most commonly traded genera to be dealt with, as well as a priority list of those for which a standardized names are needed most urgently. For the first phase the checklist should cover not more than 4000 species. For details, reference is made to the report of the Plants Significant Trade Study Group.

c) The work of compiling the checklist will involve consulting many taxonomic institutions, and perhaps several databases covering different regions of the world. It will require co-ordination which could best be carried out by the Plants Officer of the CITES Secretariat in collaboration with the Nomenclature Committee. This would avoid the need to appoint and finance a co-ordinator.

d) Part of the information required is readily available in the form of recent taxonomic publications. More time may be required to gather information from regions or countries that have not been the subject of recent scientific studies. It is, therefore, very difficult to indicate exactly how much time will have to be spent on the project. Since the completion of this standardized checklist for orchids will certainly extend over several meetings of the Conferences of the Parties, and will also require regular updating, the attached draft resolution (Annex 1) will only address the period between the eighth and the ninth meetings of the Conference of the Parties. At the ninth meeting of the Conference of the Parties, a new draft resolution will be presented to cover the remaining period of the project.

A draft resolution concerning standardized names for orchids is presented in Annex 2.

DRAFT RESOLUTION OF THE CONFERENCE OF THE PARTIES

Standard Nomenclature for Plants Listed in the Appendices

RECOGNIZING the principles and procedures established by Resolution Conf. 4.23, adopted at the fourth meeting of the Conference of the Parties (Gaborone, 1983), regarding the use of standard names and the development of standard references if necessary;

NOTING the recommendation in Resolution Conf. 5.14, paragraph c), adopted at the fifth meeting of the Conference of the Parties (Buenos Aires, 1985), to the CITES Nomenclature Committee regarding the development of a list of standard names for plants included in the appendices together with a list of common synonyms;

NOTING the wish of the Parties, expressed in Resolution Conf. 6.20 adopted at the sixth meeting of the Conference of the Parties (Ottawa, 1987) that a standard nomenclatorial reference for the Cactaceae be developed;

AWARE that it is not possible at present to indicate one standard reference for the names of all the plants in the CITES appendices;

THE CONFERENCE OF THE PARTIES TO THE CONVENTION

DECIDES

a) to adopt the Checklist of names of Cactaceae as the standard nomenclatorial reference for this family;

b) to adopt *A World list of Cycads* (D.W. Stevenson, R. Osborne & J. Hendricks, Memoirs of the New York Botanical Gardens 57: 200-206, 1990) as the standard nomenclatorial reference for the Cycadaceae, Stangeriaceae and Zamiaceae; and

c) to use:

   i) *The Plant Book* (D.J. Mabberley, 1990, Cambridge University Press rev. ed.) as the standard for the generic names of all other CITES Plants; and

   ii) the *Dictionary of Flowering Plants* (Willis, J.C., revised by Airy Shaw, 1973, Cambridge University Press) as a reference for generic synonyms not mentioned in *The Plant Book*;

DIRECTS

a) the Secretariat to provide each Party, if finances are available, with two copies of the publications mentioned under a) and b) above; and

b) the Nomenclature Committee to prepare a revision of this Resolution, if appropriate, for consideration at the ninth meeting of the Conference of the Parties; and

RECOMMENDS to the Parties not to issue export permits or re-export certificates which are not in accordance with above-mentioned references.

DRAFT RESOLUTION OF THE CONFERENCE OF THE PARTIES

Standard Names for Orchidaceae

RECOGNIZING the principles and procedures established by Resolution Conf. 4.23, adopted at the fourth meeting of the Conference of the Parties (Gaborone, 1983), regarding the use of standard names and development of standard references if necessary;

NOTING the recommendation in Resolution Conf. 5.14, paragraph c), adopted at the fifth meeting of the Conference of the Parties (Buenos Aires, 1985), to the CITES Nomenclature Committee regarding the development of a list of standard names for plants included in the appendices together with a list of their synonyms;

OBSERVING that Resolution Conf. 5.14, paragraph b), confirms the need to maintain the higher taxon listing of the family Orchidaceae in Appendix II;

AWARE that the names of the genera and species of Orchidaceae are in need of standardization and that the current lack of a standard reference with adequate information decreases the effectiveness of the implementation of CITES in conserving the many threatened orchid species that are listed in Appendix II;

THE CONFERENCE OF THE PARTIES TO THE CONVENTION

RECOMMENDS

a) that the Nomenclature Committee prepare a standardized nomenclatorial reference for Orchidaceae including, to the maximum extent possible, information to the level of the species, subspecies and botanical variety, with full synonymy and the countries of distribution of the recognized taxa;

b) that the priority of taxa to be dealt be the ones most common in trade as identified by the Plants Significant Trade Study;

c) that the Secretariat, on behalf of the Nomenclature Committee, co-ordinate the input needed from scientific institutions, monitor the progress of the work, and report annually to the Nomenclature Committee;

d) that once prepared and found acceptable by the Nomenclature Committee, the reference (or regionally orientated parts thereof) be presented to the Conference of the Parties for adoption as the standardized nomenclatorial reference for Orchidaceae; and

e) that updated versions of the reference be reviewed and accepted in conjunction with each meeting of the Conference of the Parties;

DECIDES that USD 40,000 a year from the CITES Trust Fund budget, from 1993, be assigned to the development and eventual publication of the standard nomenclatorial reference for Orchidaceae; and

APPEALS for additional funds for the Nomenclature Committee from Parties and interested individuals and organizations to develop the standard nomenclatorial reference for Orchidaceae and for its publication.

Doc. 8.31

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

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Eighth Meeting of the Conference of the Parties
Kyoto (Japan), 2 March to 13 March 1992

Interpretation and Implementation of the Convention

Significant Trade in Appendix-II Species

PLANTS

The attached document is submitted for consideration to the Conference of the Parties, which should take decisions on the proposed recommendations it contains.

REVIEW OF SIGNIFICANT TRADE IN SPECIES OF PLANTS INCLUDED IN APPENDIX II OF CITES

1983-1989

Report prepared for the 8th meeting of the Conference of the Parties

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INTRODUCTION

This report presents a preliminary analysis of the statistical information on trade in species of plants included in Appendix II of CITES. The main aim of this review is to improve the implementation of the Convention by identifying those Appendix-II plant species which are traded at levels detrimental to the survival of populations in the wild and determining the main countries involved in the wild plant trade. The statistical information available for the study results from the computerisation of data in CITES annual reports which is routinely carried out by the Wildlife Trade Monitoring Unit (WTMU) of the World Conservation Monitoring Centre (WCMC) under contract to the CITES Secretariat. By calculating the combined data on plant imports and exports, various data tables have been prepared and reviewed for this report.

Eight data tables were prepared for review by experts at a Workshop held at the Royal Botanic Gardens, Kew on 8-9 September 1991. The study and Workshop were sponsored by the EC and the Conservation Treaty Support Fund. A list of participants at this Workshop is given in Annex 3.

It is hoped that the expert analysis of the statistical information on Appendix II plants will contribute to a strategy for conservation of species included in the Appendix which will include further research, regular trade monitoring and immediate remedial action where necessary. Recommendations for consideration at the 8th meeting of the Conference of the Parties are presented, for subsequent action by the Plants Committee.

A series of data tables were prepared for review at the workshop:

Data Table 1. World net trade volumes of all species in Appendix II from 1983 to 1989. Essentially a reference table giving the average annual level of trade for every Appendix-II plant species included in CITES annual reports for the seven year period.

Data Table 2. Trade in the species with the highest average trade volumes. Species with an annual average trade of over 1,000.

Data Table 3. Trends in trade volume for the major Appendix-II plant groups giving total quantities in trade for each year and, for live plants, the percentage reported as propagated.

Data Table 4. Sources of trade. For each major plant group, the average annual trade from each country of origin was given. For live plants, the total trade declared as artificially propagated was expressed as a percentage of the total live trade.

Data Table 5. Total net plant trade for all plant groups combined, for each reported source country over the period 1983-89.

Data Table 6. Detailed analysis of major source countries. For each of the six main source countries with an annual average net trade of over one million plants, the net annual trade in each plant taxon was given. For live plants only the total net imports reported as artificially propagated was also given.

These six data tables comprised 295 pages and therefore are not included in this report, but they presented the workshop with a wealth of information compiled in a form not previously available for analysis. At an early stage in the planning of the Significant Plant Trade study it was decided that a broad overview of the data for the entire range of plants in Appendix II of CITES should be carried out initially to assess the value of the statistics for monitoring trade in plant species. This would allow an approach to be developed for more detailed follow-up work. In reviewing the data some general observations can be made as are presented in the next section of the report. More specific brief analyses of the data are then presented to show the type of use that can be made of the statistical information.

With trade data presented for thousands of species and a wide range of countries in the CITES statistics, the preliminary review is, by necessity, highly selective. The review has concentrated on four of the main groups traded as live plants; cacti, orchids, succulents and cycads. It has not looked specifically at the *Cyclamen* trade, although in terms of number of live plants traded this is the second major group after cacti. The *Cyclamen* trade is comparatively well-known, following various studies, and measures to regulate the trade at appropriate levels are already in progress. Statistics for the other plant groups on Appendix II were considered briefly at the Workshop.

When looking at the trade figures there is a tendency to focus on the highest trade volumes, although these do not, of course, necessarily reflect the biggest conservation problems. In selecting taxa for closer attention, the ten most heavily traded genera of cacti and orchids were identified. Levels of trade in all species of these genera, for each year by source country were prepared including data on several cacti genera which are known to be subject to significant collecting pressure and also on the genus *Euphorbia*. A further table provided information on levels of trade in Appendix-II cycads.

GENERAL OBSERVATIONS

The data tables presented comprehensive set of data on the CITES Appendix-II plant trade but considerable caution obviously needs to be used in interpreting the data. The accuracy of the information depends on the standard of reporting by Parties to CITES which, for plants, is acknowledged to be generally very poor. The extent to which Parties report information on plant trade in CITES annual reports is summarised in Annex 1. This shows which Parties have incorporated plant information in their annual reports, in which years, and whether reporting is at the level of family, genus or species. It should be noted that where the annotation indicates that information is presented at species level, this does not necessarily mean that reporting is comprehensive for all plants in trade. Some Parties report at species level for the most important plant commodities and scarcely at all for other taxa. Annex 1 also shows which Parties indicate trade in artificially propagated plants in their annual reports. 28 Parties reported plant imports during the years 1983-1989, and 55 Parties reported plant exports at least for some of the years during this period.

Some of the main problems which limit the value of CITES statistics in monitoring trade in Appendix-II plants are as follows:

1. Lack of Reporting Plant Trade

   The major problem is that certain Parties do not report the CITES plant trade at all. This is particularly important for countries such as Thailand, with a high volume of trade. It is also a problem for the majority of other countries which do not report fully on the plant trade. The CITES plant trade data compiled for Hong Kong, for example, related only to ginseng *Panax quinquefolius* until 1989 when some re-export data for orchids were compiled. Additional information on levels of plant exports can be obtained by looking at the statistics of the importing countries but this method inevitably does not capture all the transactions. A proportion of the trade will, of course, always be hidden, where traders remain unaware of the CITES controls or deliberately set out to avoid them.

2. Trade with Non-Parties

   Some of the main source countries for Appendix II plants are not Parties to CITES, for example Republic of Korea and Turkey. Another source country, Dominican Republic, became a Party during the period for which trade statistics are being reviewed.

3. Reporting at an Inappropriate Level

   As can be seen from Annex 1, many countries continue to report trade at family or genus level. It is therefore impossible to determine the species involved in trade, the numbers of each traded and the likely impact of trade on wild populations. Japan, a major source country for CITES plants in international trade, has reported all plant exports at family level during the period 1983-1989. Taking the combined import and export figures as prepared for this study, 94% of the recorded Japanese trade in live orchid plants and 86% of the recorded cactus trade is reported at family level.

4. Misidentification of Species

   Both deliberate and unwitting misidentification and labelling of species are known to occur. This cannot of course be detected from the CITES trade statistics although some anomalous names may be apparent to experts.

5. Nomenclature

   The names used in TAXATAB, the computerised list of CITES taxa used in the WCMC CITES Database, are partly based on those given in the annual reports to CITES. These names, being those used for plants in trade, do not necessarily correspond with those for botanically valid species. Some of the species names recorded in the trade statistics may in fact be synonyms and for this reason more species names may appear in the statistics for a particular genus than the number of currently accepted species. The species names recorded in TAXATAB also may not fully correspond with the names used in other databases, for example, the Species Database of WCMC.

6. Methods of Reporting

   The figures given in CITES Annual Reports may not reflect the actual numbers of plants in trade because of the methods of reporting. Often figures are based on licences issued or applied for, rather than on actual transactions.

7. Trade in Artificially Propagated Plants

Some countries have routinely allowed the export of wild plants claimed to be artificially propagated and recorded as such on export permits. This may result either from lack of nursery inspection, lack of inspection of actual plants exported or failure to follow the CITES definition of artificial propagation. Countries which have routinely exported wild plants as propagated material include Brazil, the Philippines, Thailand (until 1987) in the export of orchids, and Madagascar (until 1987) in the export of succulents. Inspections in importing countries revealed these discrepancies but in most cases importing countries are likely to accept the documentation without looking at the actual plants in trade.

In some cases plants may be artificially propagated but this information is not recorded in the CITES documentation or within CITES annual reports. It is possible, for example, that the low proportion of artificially propagated plants reported to be exported from Dominican Republic reflects lack of information on the source of the plants. There are also various examples of species which are not reported as artificially propagated plants in trade even though they are only known in horticulture, for example the cactus *Cereus peruvianus*. The range of plants artificially propagated in trade varies over time. The number of *Pachypodium* spp. in commercial cultivation has, for example, increased considerably in recent years.

Bearing in mind the deficiencies in the data, it is nevertheless of value in identifying the species which are in trade, the extent to which they are traded, and the sources of species in trade. If routinely reviewed it may also be possible to detect trends in the trade, such as new species entering the trade, or changes in level of propagation. The statistics are particularly valuable when they can be considered in relation to other types of information.

In assessing the veracity of reported trade and in particular the levels of trade in propagated plants it is important to have background knowledge of the nursery trade in the source countries. Readily available information on plant nurseries has been consulted in the preliminary review, for example, from published reports, but this is limited for most countries. It would be extremely useful to have a directory of nurseries in the main source countries with summaries of the type and numbers of CITES plants produced. This would be a useful tool in the implementation of CITES controls both for those countries which issue import licences and to assist in the checking of export documentation.

In assessing the impact of levels of trade on wild populations of Appendix-II plant species, so that appropriate control measures can be implemented, a knowledge of the status in the wild is essential. As far as possible such information has been considered for the heavily traded species in the preliminary review, in particular for cacti, succulents and cycads. The information considered has mainly been provided by the Species Unit of WCMC and consists of IUCN conservation categories where known. In some cases the categories were updated by experts at the Workshop, as indicated in the report. Definitions of the IUCN conservation categories are given in Annex 2.

For some plant groups, or especially for those within certain countries, knowledge of conservation status is scarce. The CITES trade statistics can be used to identify those heavily traded genera and species for which conservation status information should be sought as a matter of priority.

Expert appraisal of the figures has been particularly valuable in the first instance in identifying any immediate areas of conservation concern, for example heavily traded species known to be at risk in the wild. It will also be useful to circulate selected Data Tables more widely for consideration for example by national CITES Authorities, SSC plant Specialist Groups and trade associations.

SOURCE COUNTRIES

The countries with the highest annual average trade volumes in CITES Appendix-II plants, all trading in over one million plants per year, are as follows:

Reported Country of Origin	Annual Average Trade Volume
Netherlands	14,157,241
Japan	7,795,470
Thailand	2,334,853
Brazil	1,740,941
Turkey	1,430,628
Dominican Republic	1,273,606

Brief notes on these countries are given below. A further seven source countries have an annual average trade of over 100,000 CITES Appendix-II plants. These are in order of decreasing trade volume: [Taiwan], Canada, South Korea, USA, Spain, UK and Madagascar. It is interesting to note that several of these major source countries are not Parties to CITES e.g. Turkey and South Korea. The extent to which the countries mentioned above include information on exports of Appendix-II plants within their annual reports to CITES can be seen in Annex 1. Obviously all Parties which have such a high volume CITES plant trade should be encouraged to implement the provisions of CITES rigorously for plants. This is particularly the case for countries with a significant trade in indigenous species such as Thailand and Madagascar, but the role of major trading countries as importers or re-exporters of wild collected plants should also not be overlooked.

1. Netherlands

The Netherlands is the world's largest exporter of pot plants and cut flowers, and it is therefore not surprising to see that it is the major source of CITES Appendix-II plants in world trade. According to the CITES reported trade the Netherlands is the largest source of cacti in international trade, the second largest source of succulents and also of Cyclamen, the fourth largest supplier of orchids and the third of cycads.

The average annual volume of plants originating in the Netherlands in all the major groups is given below together with the percentage reported to be artifically propagated.

Plant Group	Average Annual Number in Trade	% Plants Artificially Propagated
Cacti	6,617,532	100
Succulents	729,321	100
Cycads	66,574	100
Orchids	554,681	100
Cyclamen	5,670,314	100 *
Insect. plants	3,355	100
Palms	487,423	100
Timber species	28,064	100 **

* The Netherlands is known to have been a major re-exporter of wild-collected Turkish *Cyclamen* and to have re-exported wild cacti, but these were reported to have originated elsewhere and therefore did not appear in the tabulations prepared for this study. Wild-collected rare species of cacti, succulents and orchids are still available in trade, however, and some are re-exported (M.Jenkins, pers. comm. August 1991). It is probable that these plants are reported as artificially propagated because there is hardly any reporting of re-exports of wild plants. It should also be noted that 31% of the export trade in cacti from the Netherlands is reported at family level, which clearly prevents a complete analysis of the trade.

** The figures given above for timber species refer to *Araucaria araucana* which is nursery grown in the Netherlands as a pot plant.

2. Japan

The CITES reported trade statistics show Japan to be the second major source of CITES Appendix-II plants in world trade. Like the Netherlands, Japan is a major exporter for a range of CITES plant groups: it is the largest source of cycads, second of cacti and third major source of both orchids and succulents. The levels of trade in each group and percentage reported to be propagated are:

Plant Group	Average Annual Number in Trade	% Plants Artificially Propagated
Cacti	5,857,268	61
Succulents	295,745	95
Tree ferns	1,715	0
Cycads	789,061	45
Orchids 850,909	64	
Roots	343,354	
Cyclamen	3	100
Palms	758	0

The relatively low percentage of plants reported to be propagated is noteworthy. The CITES plant groups represented by indigenous species are tree ferns (6 species including those in the Ryukyu islands), cycads (1 species), and orchids. The majority of Japanese exports of cycads are reported at family level, or for the species *Cycas revoluta*. According to Gilbert (1984) artificial propagation of this native Japanese species is well-established within the country and it is exported around the world. The species 'may be the only cycad currently being propagated in sufficient numbers to supply a thriving market'. At family level exports of cycads are reported to be all propagated in some years and for other years none is reported to be propagated. This would appear to reflect an anomaly in reporting. At the species level, for each year with a reported trade, there is a combination of apparent trade in propagated and non-propagated plants.

Japan has a rich indigenous orchid flora. The native orchids have suffered from commercial collecting pressures and, of over 70 orchid taxa included in the Japanese Plant Red Data list, 50 are recorded as threatened by commercial collecting. Most of these species are available from Japanese specialist nurseries and some are exported (Oldfield, 1989). Japan also both imports and re-exports wild orchids from other countries. The trade in wild-collected *Paphiopedilum* has, for example, been discussed by Kazuko Yokoi and Milliken (1991).

94% of the recorded trade in live orchid plants originating in Japan for 1983-1989 is reported at family level. Of the trade reported in this way, 66% of the plants are reported to be artificially propagated. The figures suggest a high volume trade in wild plants reported as Orchidaceae. Given the extent to which rare orchid species are known to be involved in Japanese trade this standard of reporting is a major cause for concern. At generic level *Dendrobium* is the most heavily traded genus according to the CITES statistics, followed by *Bletilla, Cymbidium, Phalaenopsis* and *Cattleya.* At species level the number of reported plants in trade is generally low. There are several noteworthy exceptions, for example, *Bletilla striata* and *Pecteilis radiata. B. striata* is threatened in the wild in Japan but is commercially propagated within the country. *P. radiata* is also commercially propagated.

The main group of CITES plants exported by Japan is the Cactaceae. With average annual exports approaching six million plants, it is suprising that the figure for the proportion of propagated plants is not higher than 61.37%. Japan is known to import significant numbers of wild-collected cacti for its domestic market, and may re-export some of these within the region, but the export trade is likely to be predominantly in artificially propagated plants. As with orchids, a high proportion of the recorded trade in cacti is reported at family level – 86% of the trade. The most heavily traded single species is *Gymnocalycium mihanovichii*, accounting for over 10% of the total number of cacti originating in Japan. 71.8% of the plants of this species exported by Japan are reported as artificially propagated. As all the plants are in fact artificially produced this figure gives an indication of the need for caution in interpreting the trade statistics.

The export of succulent plants from Japan consists almost entirely of artificially propagated *Aloe* and *Euphorbia* species. 94% of the trade is reported to be in propagated plants.

Given the poor standard of reporting of the Japanese plant export trade, Japan's dominance as a source of CITES Appendix-II plants and the extent to which wild plants, particularly orchids, are known to be imported and re-exported, a closer look at the Japanese trade is desirable. This should include more thorough analysis of CITES data, comparison of the species listed in trade statistics with their status in the wild, a closer look at the countries of origin and of export.

As the statistics do not provide an adequate picture of the trade, improved reporting is urgently needed, and more information should be collected from other sources, for example from nursery surveys and plant societies.

3. Thailand

Thai trade in CITES Appendix-II plants consists almost entirely of orchids and CITES statistics reflect Thailand's position as the centre of the world's orchid trade. Thailand's annual reports to CITES do not include details of plant exports. The information derived from the CITES statistics reported by importing countries, as presented in Data Table 6, is, therefore, very valuable in showing both the range and numbers of species involved in the trade and the numbers reported to be propagated.

The average annual number of orchids imported from Thailand according to CITES statistics is 2,334,468. This compares with the figure for total exports given by the Royal Forest Department from 1986 to 1988 of 3 to 6 million live plants (Luxmoore, 1989). The proportion reported to be propagated is 82.49%. Thailand does have major production of orchid hybrids and species, as well as bulk production of cut flowers, using modern propagation techniques but at the same time there is a huge trade in both native and imported wild orchids.

The most heavily traded genus exported from Thailand is *Dendrobium*. Trade reported at generic level for this genus accounts for 67% of the total orchid exports for the country. Some further notes on trade in Thai species of this genus are given below.

The impact of orchid collection within Thailand has been highly detrimental. Some species have been virtually eradicated even within National Parks where collection is banned. There is no legal protection for native orchids and the only form of protection is presence within the National Park system. Increasing prices reflect the increased scarcity of desirable species which are sold both within Thailand and exported (Luxmoore, 1989). The conservation status of orchid species within Thailand is scarcely known. There is no comprehensive threatened plant list published for the country although orchid checklists with distributions have been prepared which could form the basis for Red Data lists.

The Thai orchid trade also has a significant impact on the wild orchid populations of other countries in the region. Large numbers of wild-collected plants are imported from Myanmar, Lao PDR and Cambodia, many for re-export (Luxmoore, 1989). These imports are apparently without control by the Thai CITES Authorities. The main centre for the trade is the Bangkok Flower Market, where many exporters replenish their stock.

Thai export controls for the orchid trade are presently inadequate. The statistics provided to CITES by importing countries can be used to make a strong case for improving the controls. As a first step the list of orchids exported from Thailand, as compiled from CITES import reports should be annotated to show which species are native to the country and communicated to the Thai Authorities. Information should be sought on the rarity of these species, both from experts within the country and elsewhere, and used as a basis for determining appropriate levels of control under CITES.

In view of Thailand's poor record on implementation of CITES, the Standing Committee recommended a ban on all trade in flora and fauna from the country in April 1991. Urgent steps should now be taken to bring the orchid trade under control.

4. Brazil

According to CITES reported trade, Brazil is the third largest source country for cacti. It also exports significant numbers of orchids. The average annual number of plants exported in the main CITES groups is given below, together with the percentage reported to be propagated:

Plant Group	Average Annual Number in Trade	% Plants Artificially Propagated
Cacti	1,669,508	89
Succulents	5,982	59
Tree ferns	1,961	18
Cycads	1,086	100
Orchids	62,404	48

All the above groups are represented in the Brazilian flora. The extent to which collecting pressures threaten native CITES species is uncertain but collecting has certainly led to the loss of wild orchid and cactus populations. Within Brazil there are major nurseries involved in commercial propagatation of cacti and orchids but there is also a significant export trade in wild-collected plants.

There are several large cactus nurseries in Brazil which have been involved in the wholesale export of propagated cacti to European nurseries. In addition one Brazilian cactus nursery has been involved in the export of wild plants claimed to be artificially propagated. Two consignments consisting of native species of *Discocactus, Melocactus* and *Uebelmannia* were seized in the Netherlands in 1985 and 1986 and led to an investigation by the Dutch CITES Authorities. CITES export permits for artificially propagated plants had been issued in each case. Since 1985 the reported trade in *Discocactus* and *Uebelmannia* from Brazil has virtually ceased. The main nursery involved in the trade in wild cacti is said to be concentrating on the export of seed. The extent of seed collection is, in itself, leading to some concern.

The levels of trade in native species of *Melocactus* recorded in the CITES statistics are noteworthy as are the levels of trade in *Copiapoa*, a genus endemic to Chile which has been considered difficult to propagate. Overall 35% of the cactus trade reported in CITES statistics is recorded at family level.

There has been a major problem with the export of wild orchids, claimed to be artificially propagated, from Brazil. Under national legislation it is illegal to collect wild orchids without a permit and collection permits are rarely, if ever, issued. The export of wild-collected orchids is not allowed. A number of confiscations over recent years have, however, shown that many wild orchids have been exported with documents for propagated plants. As a result the Brazilian CITES Authorities stopped issuing licences to several firms which carried out no propagation.

Certain Brazilian orchid species are specially protected under national legislation. These are: *Cattleya aclandiae, C. jongheana, C. schilleriana, Laelia grandis, L. purpurata, L. tenebrosa* and *L. xanthina*. With the exception of *C. jongheana* and *L. grandis,* trade in these species is recorded in the CITES statistics, not all reported trade being in artificially propagated plants.

Certain aspects of the Brazilian export trade would benefit from further study. Details of the cactus trade would be of interest including a study of the nurseries and also an investigation of the extent to which Brazil re-exports plants from other South American countries. It would also be desirable to encourage the collection of data on the conservation status of Brazilian orchid species particularly those which are internationally popular.

5. Turkey

Turkey is the fifth largest source of CITES Appendix-II plants in international trade. The trade is dominated by export of *Cyclamen* with the only other transactions being 8 shipments of Orchidaceae, recorded in the CITES trade data for the period 1983-1989. The annual average export of *Cyclamen* from Turkey is 1,430,628. The figures for the Turkish *Cyclamen* trade are based entirely on reported import statistics as Turkey is not a member of CITES.

Turkey is the main source of wild-collected *Cyclamen* in international trade. Steps are being taken to develop commercial propagation for the export market. In the meantime a quota is in operation for the export of wild tubers which will be reviewed on an annual basis. No further action appears to be necessary for Turkish *Cyclamen* in relation to the Significant Plant Trade study.

There is known to be a major trade, both within Turkey and for the export market, in orchid tubers for Salep used in cooking and for medicinal purposes. This has had a serious impact on wild populations of *Ophrys, Orchis* and *Serapias* and there is a need for further investigation of the trade. The shipments reported in the CITES statistics were imported by Switzerland. Other countries of import include Cyprus, Germany and Greece.

6. Dominican Republic

According to CITES statistics, Dominican Republic is the leading source of succulents in international trade, the second main source of cycads and also a major supplier of cacti. The annual average number of plants in the main CITES groups together with the percentage reported to be artificially propagated is as follows:

Plant Group	Average Annual Number in Trade	% Plants Artificially Propagated
Cacti	327,062	9
Succulents	871,124	5
Cycads	74,948	6
Orchids	117	2
Palms	354	100

The figures appear to indicate a high volume trade in wild-collected cacti, succulents and cycads. Concern has been expressed previously about the level of exports of cycads from the Dominican Republic to the US. It was assumed that the trade was in the indigenous *Zamia debilis* (= *Z. pumila*) and that levels of trade could not be sustained because, "the plants are also the target of eradication programmes by ranching concerns" (Gilbert, 1984). According to Zanoni, 1982, the native cycad species, "guayiga is not cultivated commercially for either houseplants or landscaping. The few plants sold for decorating are pulled out of the ground ... and hawked on the streets by vendors much like the native palm *Coccothrinax argentea*, bromeliads, ferns and several native orchids".

Looking at all reported CITES trade involving the Dominican Republic the actual cycad species reported to be in trade are *Cycas normanbyana, C. revoluta, Dioon edule, Zamia floridana* and *Z. furfuracea*. It is thought unlikely that the two Australian species, *Cycas furfuracea* and *C. normanbyana* are propagated artificially in Dominican Republic and the possibility of laundering must be considered (C. Giddy, pers. comm., 1991). The reported export of 25,750 plants of *D. edule* from Dominican Republic in 1986 must also be viewed with concern. This figure is likely to represent re-exported wild-collected plants from Mexico. *D. edule* is an extremely slow-growing species in cultivation. (C. Giddy, pers. comm., 1991).

Smuggling of wild-collected cycads from the Dominican Republic is known to occur and a recent case of this was reported at the Workshop. Inspection of a very large mixed consignment of horticultural plants carried out at Miami revealed wild cycads concealed beneath *Dracena* canes. It is apparent that Mexican wild-collected cycads, together with non-CITES succulents such as *Beaucarnea* are entering the USA via Dominican Republic. Large quantities of such plants can be seen at a Miami nursery which has a branch in the Dominican Republic. This branch is the only nursery in the country and is responsible for all CITES reported plant exports to the USA.

The succulents reported to be exported by the Dominican Republic, within the CITES statistics, appear to be all commonly cultivated species of *Euphorbia* and *Aloe*. The cacti reported to be in trade are a more interesting mixture of species. Some are common in commercial cultivation such as *Echinocactus grusonii* and *Cereus peruvianus*, the single most heavily traded cactus species from Dominican Republic, together with small quantities of indigenous species including *Opuntia antillana, Harrisia divaricata,* and *Melocactus lemairei* which are endemic to Hispaniola. These indigenous species are unlikely to be of significant interest to collectors.

It would seem that there is wholesale propagation of certain CITES Appendix-II plants in the Dominican Republic and that the trade has not been recorded to be in propagated material. Most of the recorded plant trade consists of exports to the US and the statistics are based almost entirely on US import figures because Dominican Republic only became a Party to CITES in 1987. Clearly, accurate reporting of the plant export trade should be encouraged. At the same time, because of concern about laundering of plant material through the Dominican Republic, routine checks of plant consignments entering the US should be carried out.

PLANT GROUPS

1. Cactaceae

Cacti are the most heavily traded group of plants recorded in CITES trade statistics. The average total number of cacti recorded in annual trade is 13,997,047. It is difficult to assess to what extent the CITES statistics reflect the actual total world trade in cacti. Some idea of the huge potential for world trade can be seen by looking at production figures for some of the major nurseries. One wholesale nursery in the Netherlands, for example, trades over 18 million cacti

annually, which is probably mainly taken up by the European market. In the USA total cactus production has been estimated at between 10-50 million annually, with over 20 million produced in nurseries of Vista, California alone (Fuller, 1987).

In 1983 only 5.4% of the cacti recorded in CITES statistics were reported as artificially propagated. This figure rose to 96% in 1984 suggesting a different method of reporting rather than a huge increase in artificial propagation. The average percentage artificially propagated over the seven year period is 80% which may be a reasonable reflection of the actual situation. Based on the current nursery survey being carried out for TRAFFIC Europe, however, this proportion may be an underestimate. Within Europe less than 1% of cacti on sale are wild-collected (M. Jenkins, pers. comm. August 1991).

If around 20% of the huge world trade in cacti is in wild plants this does give some grounds for concern especially as there is inevitably additional unreported trade in wild plants. On the whole the most heavily traded species of cacti appear to be those which are readily propagated, and not difficult or slow-growing genera. It is difficult to generalise, however, because even in the most popularly cultivated genera, such as *Mammillaria*, there are several species which are subject to collecting pressures in the wild.

The countries with the highest levels of trade in cacti are as follows:

Reported Country of Origin	Average Annual Trade	Average Artificial Propagation in Trade	% Artificial Propagation
Netherlands	6,617,532	6,611,595	100
Japan	5,857,268	3,594,353	61
Brazil	1,669,508	1,493,743	89
South Korea	621,682	563,741	91
Canada	607,276	596,333	98
Spain	466,996	446,151	96
Dominican Republic	327,062	29,801	9

There are several other countries which trade in over 10,000 cacti annually. Five of the fourteen countries with an annual trade of over 10,000 cacti are within the EEC. In addition to Brazil, Canada and Dominican Republic, the only other country with indigenous cacti which has a large recorded cactus trade is Mexico. The average annual number of cacti reported to be exported by Mexico is 50,168. Of these, less than one percent are reported to be propagated. As the export of wild-collected cacti from Mexico has theoretically been banned for the past 50 years and many of the horticulturally desirable species are threatened in the wild this scale of trade is obviously alarming.

The trade in cacti from the Netherlands and Japan is briefly discussed in the source countries section. The high level of trade in cacti from other major exporters, South Korea, Canada and Spain (mainly from Canary Islands) is predominantly in artificially propagated cacti produced within these countries, as reflected in the statistics, and does not give rise to any concern. The export of cacti from Brazil is different in that both artificially propagated specimens of indigenous and non-indigenous species are traded together with wild-collected plants.

Details of the Brazilian cactus nurseries are not currently known, but there are several major nurseries in the south of the country which are thought to deal entirely in artificially propagated plants. One nursery exports around five million cacti annually to a wholesale firm in the Netherlands. The Brazilian trade in Cactaceae is, therefore, clearly under-reported.

Some Brazilian cacti are relatively difficult to propagate and are still sought after as wild specimens. There is concern about levels of trade in wild-collected plants of genera such as *Uebelmannia* and *Discocactus*, together with some species of *Melocactus*, which has led to the decision by Brazil that these taxa be proposed for transfer to Appendix I of CITES. There is also the possibility that wild-collected plants of the genus *Notocactus* are being exported in small quantities by Brazil.

It would appear that there is substantial under-reporting of cacti exports from other South American countries. The annual average reported trade for Peru, for example, is 1,037 plants, 55% of which are reported to be artificially propagated. There is an internationally known cactus nursery within the country which has exported wild-collected plants of both indigenous and non-indigenous cacti, in contravention of CITES, during the past ten years.

Notes on Highly Traded Appendix-II Cacti Genera

The brief notes given below are on the ten most heavily traded cactus genera in decreasing order of levels of trade.

a) *Mammillaria*

This is one of the largest genera in the Cactaceae with around 150 valid species and many other names in horticultural use. The centre of distribution for *Mammillaria* is Mexico and many species are confined to small areas within the country. The genus is very commonly cultivated. It has, however, been reported that wild populations are exploited to fill the commercial demand for large specimens and that commercial collection is a threat to the survival of certain species (McCarthy, 1987). It is possible that small quantities of the rarer species exported by the USA may be in wild plants.

Because of the strong collector interest in *Mammillaria* spp. newly described species are vulnerable to collection. Several new species are described each year in Europe, possibly as a result of illegal export of field-collected material. Publication of locality details with description of new species attracts collectors and puts the plants at risk.

Heavily Traded Species	Status in Wild
M. bombycina	mass-produced, recently rediscovered in the wild
M. hahniana	I, Mexico
M. elongata	nt, Mexico
M. decipiens	nt, Mexico
M. magnimamma	nt, Mexico
M. spinossisma	nt, Mexico
M. dixanthocentron	V, Mexico
M. bocasana	nt, Mexico. numerous cultivated forms
M. candida	nt, Mexico
M. albilanata	nt, Mexico
M. karwinskiana	nt, Mexico
M. microhelia	R, Mexico
M. zeilmanniana	mass-produced, recently rediscovered in wild
M. geminispina	nt, Mexico, formerly heavily collected
M. pennispinosa	R, Mexico
M. guerreronis	R, Mexico
M. haageana	nt, Mexico

Trade in the majority of these species is unlikely to be of concern because the level of propagation will support the mass trade. The species which warrant closer attention are, however, *M. dixathocentron* which is slow-growing in cultivation and Vulnerable in the wild, and *M. guerreronis* which is sought after but not common in cultivation (N. Taylor, pers. comm. August, 1991).

b) *Gymnocalycium*

About 50 weakly-defined species occurring in Bolivia, S. Brazil, Argentina, Paraguay and Uruguay. Very little serious taxonomic fieldwork has been carried out for this group.

There are many cultivated ornamentals in the genus and there is quite a strong collector interest particularly in Austria. The reported trade is dominated by *G. mihanovichii* which is the most heavily traded cactus species as recorded in CITES statistics. There are at least a dozen forms and varieties of this species, most of which have red mutant forms which are widely cultivated. In cultivation these are grown by grafting onto stock plants and they are propagated easily by offshoots. Only one other species, *G. baldianum* is traded at reported quantities of over 1,000 plants annually but over 70 other species names are recorded in CITES trade statistics in small quantities.

There is no information on the status of species in the wild currently recorded in the WCMC database. Although a few wild plants have been seen in the European trade, levels of international trade in plants of this genus do not appear to be a cause for concern. Limited field collection of the rarer species for specialist collectors may however be damaging wild populations.

c) *Opuntia*

The largest genus in the Cactaceae with around 200 species, occurring in S. Canada, USA, Caribbean, Central and South America and Galapagos.

The genus is very easy in cultivation and commercial collection for horticulture is unlikely to be a significant threat. *Opuntia* spp. are however dug from the wild for landscaping in South-western USA (Lyons, 1987). Conservation categories for some Mexican species are recorded in the WCMC database, and there are a few categories recorded for species in other areas.

Heavily Traded Species	Conservation Status
O. leucotricha	nt, Mexico
O. microdasys	nt, Mexico (one var. is V)
O. romana	
O. pilifera	nt, Mexico
O. azurea	nt, Mexico
O. italiana	
O. violacea	
O. aciculata	
O. papyrancanthus	

It is unlikely that any of the species listed above are collected from the wild for trade and if so, not to the detriment of the wild populations. A total of 120 species names are recorded in trade in the CITES statistics.

d) *Echinopsis*

A South American genus, with more than 500 described species, which has never been subject to a critical revision, occurring in the Andes, mainly in Bolivia. There is a lack of basic taxonomic information for *Echinopsis*. Field surveys of the group in Bolivia and the other range states would be desirable. The region of southern Bolivia and north Argentina has the greatest diversity of small globular cacti after Mexico and they are subject to quite a strong demand from collectors.

The conservation status of one species, *E. fulvilana*, is recorded in the WCMC database as Vulnerable in Chile. This species is not recorded in the CITES trade statistics. A total of 93 species names are recorded in the trade statistics.

Heavily Traded Species	Notes
E. bridgesii	of cultivated origin
E. formosa	
E. ancistrophora	
E. rauschii	
E. haematantha	
E. calochlora	
E. chamaecereus	widely cultivated "peanut cactus"

Of these species it is possible that plants known as *E. formosa* are traded as wild plants but the others are unlikely to be so (N. Taylor, pers. comm. August, 1991). The genus is easy in cultivation.

e) *Epiphyllum*

15 species, Central and South America and Caribbean (Hunt and Taylor, 1990). There are countless hybrids in cultivation both inter-specific and inter-generic obtained by crossing with genera such as *Nopalxochia* and *Disocactus.*

18 species names are recorded in the CITES trade statistics but no individual species is recorded as highly traded. Overall the trade is probably under-recorded.

Four Mexican species have threatened categories recorded in the WCMC database. Small quantities of these plants have been recorded in trade. It is unlikely, however, that levels of trade in this genus give grounds for conservation concern.

f) *Notocactus*

About 25 species have been described in this genus occurring in Brazil, Uruguay and Argentina. It is now included in the genus *Parodia*.

Easy to grow, most flower whilst still small plants.

There is no information on the conservation status of *Notocactus* spp. currently recorded in the WCMC database. The taxonomy of the genus is poorly understood and in need of revision. There is little knowledge of individual species in the wild. It is likely, however, that species are under threat in their natural habitats in Southern Brazil and Uruguay where very limited natural habitat remains and the plants are growing on rocky islands amongst cultivated land (N. Taylor, pers. comm. August, 1991). These rocky locations are used for building sites for villages.

48 species names are recorded in the CITES trade statistics.

Heavily Traded Species	
N. scopa	*N. ottonis*
N. leninghausii	*N. mammulosus*
N. haselbergii	*N. crassigibbus*
N. magnificus	*N. buiningii*
N. succineus	*N. herteri*

These species are all commonly cultivated and levels of trade in them is unlikely to be a cause of concern. There is, however, great interest in the genus at present centered on collectors in the Netherlands, Czechoslovakia and Germany, and a significant trade in habitat-collected plants is suspected. It is probable that these are taken out in hand luggage during collecting trips. Very little overt trade in wild *Notocactus* plants has been seen in the current European nursery survey (M. Jenkins, pers. comm. August 1991).

g) *Cereus*

30 species, Caribbean and South America (Hunt and Taylor, 1990).

16 species names are recorded in CITES trade statistics.

WCMC has records of threatened categories for nine species from the USA and the Caribbean. None of these has been recorded in the CITES statistics.

Heavily Traded Species	Notes
C. peruvianus	a cultivar
C. azureus	
C. forbesii	

It is unlikely that any of these species are traded as wild plants and it is not thought that commercial trade poses any threat to the genus as a whole.

h) *Cleistocactus*

64 species; W. South America, S. Brazil and N. Argentina (Hunt and Taylor, 1990).

28 species names are recorded in CITES trade statistics. None of the species is individually recorded as being heavily traded.

There is no information on the conservation status of *Cleistocactus* spp. within the WCMC species database.

It is not thought that levels of trade pose a threat to any species in the genus.

i) *Ferocactus*

23 species, Mexico and SW US (Hunt and Taylor, 1990).

Collection from the wild for trade has been a problem with this genus, for example for landscaping. Some species are seriously threatened by commercial exploitation (McCarthy, 1986). There have been claims of removal of wild Mexican populations by Japanese collectors. The demand for large wild-collected *Ferocactus* apparently remains and wild-collected plants are seen in Europe. Large artificially propagated specimens from the Canary Islands and Morocco are also in trade.

Heavily Traded Species	Conservation Status
F. pilosus	V*, Mexico
F. latispinus	V*, Mexico
F. hamatacanthus	nt, Mexico
F. peninsulae	V*, Mexico

* D. Hunt, pers. comm. September 1991.

Trade in these species is likely to be in propagated specimens but trade may also pose a threat to wild populations. All species of the genus are of interest to collectors and other species such as *F. chrysacanthus* and *F. gracilis* may also be subject to commercial collecting pressures.

A total of 26 species names are recorded in the CITES trade statistics.

j) *Echinocactus*

5 species, Mexico and USA. The genus is well known in cultivation. There has, however, been a considerable trade in wild-collected specimens, for example imported into Japan via the Netherlands and USA (Milliken, Yokoi and Matsumura, 1987).

Heavily Traded Species	Conservation Status
E. grusonii	E, Mexico. Well established in commercial cult.
E. horizonthalonius	widespread sp., one var. is E/V in Mexico

Six species names are recorded in CITES trade statistics.

Notes on Other Cacti Genera in Trade

Ariocarpus – There has been concern about the effects of trade on this genus because the plants are slow-growing, relatively difficult in cultivation, and collection from the wild continues to supply the market. Certain species are included in Appendix I of CITES and a proposal to transfer the remaining species to Appendix I will be considered at the 8th meeting of the Conference of the Parties. The reported trade figures for *A. kotschoubeyanus* exported by Mexico are noteworthy and the figure of 42,727 for 1989 appears excessively high. International trade in the genus is known to be unreported. Austria, for example, has been the source of wild specimens of *Ariocarpus* on sale in Italy, but does not report in detail on its plant trade.

Astrophytum – The relatively high levels of trade in *Astrophytum* are not of concern because plants of the genus are widely propagated. Reporting at generic level is, however, undesirable because of the possibility that this can mask the trade in *A. asterias*, an Appendix-I species. There is not currently a strong demand for *A. asterias* from the wild.

Copiapoa – There is still a demand for wild-collected plants of *Copiapoa* in European countries such as Germany but the species recorded in CITES trade statistics are likely to be artificially propagated. Chile has requested a population study for *Copiapoa* because of the strong pressures on the habitats of wild populations.

Coryphantha – The relatively high levels of reported trade in *C. sulcata* are noteworthy. The species is native to the US but is apparently being propagated for export in Brazil.

Discocactus – The genus is very popular with collectors and wild-collected plants are still available. There are also pressures on the natural habitats of the species. *D. horstii* is thought to be on the verge of extinction because of heavy commercial collection in the 1970s. There is a proposal to transfer the genus to Appendix I of CITES for consideration at the 8th meeting of the Conference of the Parties.

Echinocereus – The reported trade levels give no apparent cause for concern.

Epithelantha micromeris – A population survey is needed to determine the status of this species in the wild. There is concern about populations in Texas and also in Mexico. It can be grown easily and seed-raised plants are generally seen in European nurseries. Wild-collected plants are, however, also available in trade. The species may be a candidate for Appendix-I listing.

Espostoa – There is a large reported trade at generic level for this genus of Peruvian cacti. Plants are very easily raised from seed and seedling plants are popular.

Harrisia – Plant material of this genus is mainly traded as grafting stocks but this is not reflected in the CITES trade statistics due to inadequate reporting.

Melocactus – This genus, found in Central and South America and the Caribbean, has been subject to collecting pressures for international trade. The Brazilian species are, for example, likely to be collected from the wild and some are now threatened with extinction. There is a proposal to transfer four Brazilian species to Appendix I of CITES for consideration at the 8th meeting of the Conference of the Parties. Some of the Cuban species have very small remaining populations in the wild. This is the case, for example, with *M. matucanus*, which is also grown from seed on the Canary Islands. The levels of trade in *M. oreas* may be a cause of concern

Micranthocereus – This is a Brazilian endemic genus. The plants in trade are likely to be field-collected. *M. auriazureus*, the most heavily traded species recorded in CITES statistics is now very rare in the wild.

Myrtillocactus – Plants are grown in large quantities from seed and are sold as seedlings.

Neobuxbaumia – Plants of this genus are usually grown from seed.

Neolloydia – The trade may be in field-collected or seed-raised plants. The high level of trade in *N. knuthiana* recorded for 1984 and 1985 is noteworthy.

Neoporteria – This genus is of limited interest for collector trade. It is endemic to Chile. Plants in international trade were previously supplied via Peru but are now mostly traded as seedlings. The high volume trade for *N. nidus* reflects the attractive appearance of this species, whereas the quantities recorded for *N. horridus* appear unexpectedly high.

Oreocereus – Plants of this genus are attractive as seedlings. The levels reported in CITES trade statistics do not give cause for concern.

Ortegocactus macdougallii – This species has a very restricted range in Mexico and even the very low levels of reported trade would cause concern if the plants were wild-collected. Plants are, however, widely propagated using grafting techniques.

Parodia – The taxonomy of this genus is uncertain and is currently being revised.

Pediocactus – All the species of this genus are in Appendix I, with the exception of *P. simpsonii*, a species which has quite a wide distribution. Reporting to generic level is inadequate and may conceal trade in Appendix-I species. Plants of the rare species, *P. bradyi* and *P. knowltonii* are still being lost from the wild.

Pilosocereus – A South American genus with many species occurring in Brazil. The species are tree-like and if traded from the wild would be as off-cuts. Some species are popular as seedlings and most trade is in artificially propagated specimens.

Pseudorhipsalis – The level of trade reported in 1988 is unexpectedly high as there is little collector interest in this genus.

Rebutia – This genus, including *Sulcorebutia*, is quite popular with collectors. Plants in trade are predominantly seed-grown. There are a lack of field data and no information on the status of species in the wild. There is not thought to be much field-collection now, for example of choice Bolivian species, but there have been confiscations of wild plants in the Netherlands. The extent of smuggling for collectors is unknown but is likely to occur.

Sclerocactus – Wild-collection of species in this genus, including Appendix-I species, still occurs.

Stenocactus – Plants are easy to grow from seed and the levels of reported trade are unlikely to be a cause for concern.

Thelocactus – The levels of reported trade for this genus are suprisingly high. *Thelocactus* is native to the southern USA and Mexico. All the reported trade is in artificially propagated plants from Brazil. Trade in wild plants has been a problem but seedlings are widely available.

Uebelmannia – This genus is endemic to Brazil. It has been subject to collecting pressures and all the species reported in the CITES trade statistics have very restricted distributions. Populations are also being depleted by agriculture. There is a proposal to transfer the genus to Appendix I of CITES for consideration at the 8th meeting of the Conference of the Parties.

2. Orchids

The average number of plants traded annually as recorded in the CITES statistics is 4,996,508. The average percentage recorded as artificially propagated is 80%. These figures clearly indicate that there is a high volume of wild-collected orchids in international trade.

The major sources of live orchids, and roots, where recorded separately, in international trade are as follows:

Reported Country of Origin	Average Annual Trade	Average Artificial Propagation in Trade	% Artificial Propagation
Thailand	2,334,468	1,925,740	82
[Taiwan]	852,772	655,263	77
roots	69,406		
Japan	850,909	544,307	64
roots	343,354		
Netherlands	554,681	553,666	100
USA	248,586	166,645	67
UK	157,025	154,828	96
China	156,132	24,405	16

The extent to which propagation is likely to occur within these countries varies considerably. There is not thought to be significant commercial production of any orchids in China with the exception of *Cymbidium* spp. Large modern nurseries producing orchids as cut flowers and pot plants for the international market do exist in Thailand and Taiwan but the percentage for artificially propagated orchids given above for Thailand is thought to be inflated. In contrast, the percentage of artificially propagated plants for the USA, given above, appears low. The only native USA species which is likely to be exported in bulk is *Cypripedium acaule.*

A further 14 countries export over 10,000 orchid specimens annually. Some of these are noteworthy for the low percentage of artificially propagated plants in trade. Examples of such countries which have a relatively high trade in orchids, for which less than 50% are recorded as artificially propagated, are Brazil, Guatemala, Mexico, Peru and Singapore. The commercial export of wild orchids from Mexico has theoretically been banned for the past 50 years. Peru, also, has a ban on the export of wild orchids which has been recently introduced.

For other countries the numbers of orchids recorded in trade are clearly under-recorded if reported at all. This is the case, for example, with Hong Kong which only has an annual average export of 1,458 orchids recorded in the CITES statistics. Hong Kong is one of the main centres for the international trade in wild-collected orchids, but wild plants have been accepted as artificially propagated by the CITES authorities and excluded from trade recording. The smuggling of wild-collected orchids from mainland China through Hong Kong is a major problem and the lack of

reporting by Hong Kong hinders international implementation of CITES controls for these plants. Hong Kong is, for example, recognised as a major supplier to Taiwan of *Paphiopedilum* orchids from mainland China which are re-exported to Japan (Kazuko Yokoi and Milliken, 1991).

Significant numbers of orchids are also undoubtedly misdeclared as artificially propagated when they are in reality wild-collected. It is not, of course, possible to detect this from the CITES trade statistics but a knowledge of the nursery capacity in source countries would help in assessing the accuracy of reported trade.

Concern about the export of orchid tubers from Turkey for the production of Salep was raised at the Workshop. This is briefly discussed above.

Notes on Highly Traded Appendix-II Orchid Genera

The brief notes below are given on the ten most heavily traded Appendix-II orchid genera in decreasing order of levels of trade. Although *Paphiopedilum* is one of the most heavily traded genera it is not included here because of its transfer to Appendix I of CITES at the seventh meeting of the Conference of the Parties in October, 1989. It is interesting to note that the trade in some of the most heavily traded genera is predominantly reported at generic level, for example, for *Cattleya, Cymbidium, Odontoglossum, Phalaenopsis* and *Vanda.* These are amongst the most commonly hybridised genera, but species are also sought after in trade.

a) *Dendrobium*

There are over 1,000 species (second largest genus in the family) with a distribution from Asia to Australia and the Pacific.

There is a collecting interest in this genus because growing is relatively easy in cool temperate regions. About 80 species are reputedly in cultivation in Europe. Propagation is mainly by division of old plants, by small pseudobulbs and by plantlets produced on the stems. There is a big trade in hybrids, cut flowers and flasked seedlings.

Trade in wild-collected plants also occurs. Collection of native species in Nepal has taken place for export to Japan (Bailes, 1985). Thai nurseries also deal in wild-collected plants, both native species and plants collected in Myanmar and Lao PDR. It can be assumed that virtually all *Dendrobium* plants exported by Thailand are wild-collected. The same is likely to be true for Indonesia and the Philippines.

CITES import statistics for 1983-1989 record over 350 species names.

Heavily Traded Species	
D. aggregatum	*D. miyakei*
D. chrysotoxum	*D. aphyllum*
D. formosum	*D. densiflorum*
D. falconeri	*D. bellatulum*
D. thyrsiflorum	*D. somai*
D. farmeri	*D. unicum*
D. nobile	*D. fimbriatum*
D. parishii	*D. senile*
D. clavatum	*D. harveyanum*
D. scabrilingue	*D. draconis*

Most of these species are available as seed-raised plants in small quantities but not all at levels to sustain international demand. Overall the number of plants actually reported to be in trade appears to be low. The three main countries of export for these heavily traded species are India, Thailand and [Taiwan]. All the specimens recorded in trade from India and Taiwan are claimed as artificially propagated, whereas for Thailand the majority of plants are not reported to be propagated. For Thai native species the average annual quantity in trade together with the percentage propagated is given below.

Species	Wild Plants in Local Trade	Average Number in Annual Trade	% Artificial Propagation
D. aphyllum		740	11
D. bellatulum	#	1,526	19
D. chrysotoxum	#	5,110	25
D. densiflorum	*	777	30
D. draconis	#	985	13
D. falconeri		246	14
D. farmeri	#	2,396	18
D. fimbriatum		464	16
D. harveyanum		1,022	14
D. nobile		812	90
D. parishii		1,960	45
D. scabrilingue	#	1,779	11
D. senile	#	1,160	30
D. thyrsiflorum	#	2,959	27
D. unicum	#	1,175	4

Wild-collected specimens seen on sale at Bangkok weekend market 23.9.89 (Luxmoore, 1989).
* Doubtfully native (Seidenfaden, 1985).

As new populations of *Dendrobium* species are discovered the plants are stripped for the international market. This has happened, for example, with *D. harveyanum*, a very attractive species with fringe petals, which occurs in Thailand and Myanmar. Until the recent discovery of a new population, this species had not been seen in trade for about a hundred years. Although there is concern about Thai species of *Dendrobium*, this does not extend to the whole genus.

b) *Phalaenopsis*

40 species, Himalayas to Australia.

Phalaenopsis are quick and easy to propagate from seed and large, saleable pot plants can be produced in less than two years. A wide variety of hybrids are traded. Selected clones are grown by micropropagation methods. In addition to live plants, CITES statistics record trade in flasks, flowers and pieces.

Although some Indonesian nurseries have good, large-scale artificial propagation, others deal in wild-collected species despite the fact that export of wild orchids is forbidden. Some species are endangered in the wild such as *P. gigantea, P. javanica* and *P. violacea*in Malaysia and some of the Philippine species. (P. Cribb, pers. comm. August, 1991). *P. aphrodite* is threatened in the wild in China (see below). Newly discovered colonies of *Phalaenopsis* in the wild are particularly vulnerable to commercial collection.

CITES import statistics for 1983-1989 record 42 species names.

Heavily Traded Species	Notes
P. amabilis	
P. aphrodite	included in China Plant RDB (Fu Li-kuo; 1991)
P. schilleriana	

According to the CITES statistics, Taiwan is the main source of *P. amabilis* and *P. aphrodite*, with all the plants reported to be artificially propagated. There is very large scale production of *Phalaenopsis* in Taiwan. The Philippines is the main source of *P. schilleriana* with 93% doubtfully recorded as propagated.

c) *Cymbidium*

44 species, tropical Asia to Australia.

Cymbidium orchids are the most important commercial orchids. They are probably the easiest cool-house orchids to grow. Few species are in cultivation as most growers prefer hybrids. The commercially important hybrids are derived from only a few species. *Cymbidiums* are widely cultivated for cut-flowers especially for button-holes and they are becoming increasingly important as pot plants. The Netherlands is the world's largest producer of *Cymbidium*, with a crop area of 189 ha in 1985 and export of 51.4 million stems in 1986. Imports in 1986 were 25.3 million stems (ITC, 1987).

Collection of wild plants in Nepal for export to Japan is known to take place and could severely affect remaining populations (Bailes, 1985). There is also a significant trade in wild plants within China, but these are unlikely to be exported.

In addition to live plants, CITES statistics record trade in flowers, cultures, bags and cartons.

CITES import statistics for 1983-1989 record 36 species names.

Heavily Traded Species	
C. goeringii	*C. aloifolium*
C. kanran	*C. hookerianum*
C. ensifolium	*C. cyperifolium*
C. sinense	*C. dayanum*
C. faberi	*C. eburneum*

These species all have a widespread distribution and some such as *C. goeringii*, *C. ensifolium* and *C. sinense* have been cultivated in Japan and China for centuries.

d) *Oncidium*

There are around 600 species, tropical America to temperate S. America. Over 100 species have been in cultivation. Propagation is by seed, division or the removal of back bulbs from mature plants.

Trade as flowers recorded in CITES statistics.

CITES import statistics for 1983-1989 record over 250 species names.

Heavily Traded Species	Notes
O. sphacelatum	
O. splendidum	
O. goldianum	this is a hybrid
O. cavendishianum	
O. cebolleta	

It is likely that small quantities of certain species are wild-collected for international trade.

e) *Pleione*

There are 17 species. The genus has a widespread distribution from central Nepal eastwards to Taiwan and from central China south to SE Myanmar, northern Thailand and Lao PDR (Cribb and Butterfield, 1988).

Terrestrial orchids which are almost hardy. On the whole they are easy plants to cultivate and they have been popularly called "window-sill" orchids. Pleiones propagate readily by vegetative means and can also be raised fairly readily from seed. There are many different cultivars, the majority of them named cultivars of *P. formosana*, which is by far the commonest species in cultivation and very easy to grow. There is also a wide range of hybrids.

There has been a recent remarkable resurgence of interest in the genus. This has been partly due to the introduction of fresh material from the wild such as *P. scopularum* which was introduced into cultivation from China in late 1985 or early 1986, and *P. coronaria* recently described from Nepal. The latter species has a limited distribution in central Nepal and may be endangered by deforestation. Large quantities of the species have been

offered in trade. New clones of *P. bulbocodioides, P. forrestii, P. speciosa* and *P. yunnanensis* have also recently appeared in cultivation (Cribb and Butterfield, 1988).

There has been concern about the export of wild-collected *Pleione* from Japan, both native plants and plants re-exported from Taiwan. This trade has now been replaced by cultivated plants produced mainly in western Japan (Oldfield, 1989). *P. formosana* is commercially propagated in Taiwan. Wild populations are legally protected within the country. Collection of wild plants in Nepal for export to Japan is known to take place (Bailes, 1985). There is a continuing trade in wild-collected specimens from China, where populations of *P. yunnanensis* and *P. forrestii* have been stripped from the wild. Large quantities of Chinese plants are traded through Hong Kong, Japan and also Germany. The export of Chinese plants may be a temporary trade until the species are established in commercial cultivation.

The trade, in recorded CITES statistics, is dominated by *P. formosana.* A bigger trade in this species is recorded than in *Pleione* spp. 12 species names are recorded in CITES import statistics for 1983-1989. There have been instances of mis-declaration of wild plants as artificially propagated in trade consignments.

Other Heavily Traded Species

P. maculata
P. bulbocodioides
P. yunnanensis
P. hookeriana
P. praecox
P. humilis

f) *Vanda*

35 species, Himalayas to Malaysia.

There are a large number of *Vanda* hybrids in trade, including intergeneric hybrids. Selected clones are grown by micropropagation methods. The genus is not popular in Europe and N. America because the plants need high light intensities. Wild-collected plants are available in nurseries in Indonesia and Thailand.

30 species are recorded in CITES import statistics for 1983-1989 but no species are traded at an average of over 1'000 plants a year.

g) *Bletilla*

10 species, temperate E. Asia.

The trade is dominated by *Bletilla striata* which has been propagated worldwide for many years. Recorded trade in this species is larger than that for *Bletilla* spp., both in the form of roots and live plants.

B. striata is now considered to be threatened throughout Japan and Endangered or Vulnerable at a local level. Commercial collection, collecting for medicinal uses and habitat destruction have been the main threats to this species. It is propagated commercially in Japan. *B. striata* also occurs in China (including Taiwan), Lao PDR and Viet Nam.

Other Heavily Traded Species

B. yunnanensis
B. ochracea
B. formosana

Large quantities of *B. yunannensis* are known to have been imported to Japan from China as wild-collected plants.

h) *Cattleya*

30 species, central and South America.

Widely cultivated and hybridised, used for cut flowers and button-holes.

46 species are recorded in CITES import statistics for 1983-1989 but no species are traded at an average of over 1,000 plants a year. The reported trade statistics appear to be low.

There is a large domestic trade in *Cattleya* spp. within Latin American countries. Coastal forest species of Brazil are now very rare. Articles in US orchid publications have given the localities of rare species. Selected clones of these are now propagated commercially but recently described species, such as *C. araguaiensis*, remain vulnerable to collecting pressures.

Two commercial nurseries in Brazil are producing flasked plants.

i) *Odontoglossum*

A tropical American genus with around 300 validly published binomials, *Odontoglossum* has now been split into ten genera. 77 species names are recorded in CITES imports for 1983-1989 but no species are traded at an average of over 1,000 plants a year.

There is a large domestic trade in *Odontoglossum* within Mexico, especially for church decoration. Mexico is also the biggest source of wild plants in international trade. Some Mexican species are now very rare. It is suspected that wild plants are exported to Caribbean countries for onward trade. Guatemala has previously proposed that several species of *Lemboglossum*, a genus split from *Odontoglossum*, i.e. *L. uroskinneri* and *L. majale*, be transferred to Appendix I. Following publication of the recent monograph on *Odontoglossum*, plants of this group are likely to become more popular in trade.

j) *Cypripedium*

c. 35 species, north temperate.

There has been considerable concern about trade in this genus of temperate, terrestrial orchids which are generally difficult to propagate artificially. They are also difficult to maintain in cultivation and so there is a continuing demand for wild plants. Techniques for growing from seed are, however, becoming established and are used by some German and US nurseries. The horticultural interest is mainly from alpine plant growers. There is also a large trade in *Cypripedium* for medicinal purposes.

The main sources of *Cypripedium* in international trade are China, Japan and the USA. Most of the plants in trade from Japan are now propagated. Six taxa of *Cypripedium* are included in the Japanese Plant Red Data list, five of which are threatened by overcollecting. Some of these taxa are widely available from Japanese nurseries and a number are exported. *C. calceolus* is Endangered in Japan and threatened throughout Europe. There is some limited commercial propagation in Germany.

Commercial collection of *Cypripedium* takes place in the USA and wild plants of *C. calceolus* and *C. reginae* were exported until the early 1980s. Canada has also exported *Cypripedium* to Europe. *C. acaule* is the main species in US trade. A recent conviction for smuggling plants into the UK, in contravention of CITES, involved the import of *Cypripedium* from the US by a specialist bulb nurseryman.

The main source of wild-collected plants in trade is China, which has about 25 native species. Wild plants of *C. flavum, C. macranthum* and *C. margaritaceum* are exported. In 1987, 10,000 wild plants of *C. calceolus* were reported to be exported from China to Japan, but this trade probably refers to *C. flavum.* In 1983 and 1984 around 30,000 wild plants of *C. flavum* were collected in NW Yunnan for export purposes but an export licence was refused (Anon., 1991). Collection and export of *Cypripedium* has taken place in Nepal, principally for Japan, and commercial collection could seriously affect remaining populations (Bailes, 1985).

16 species are recorded in CITES import statistics for 1983-1989. According to these statistics, *C. macranthum* is the most heavily traded species in the genus.

Other Heavily Traded Species	Notes
C. japonicum	
C. calceolus	
C. acaule	as roots
C. debile	

According to CITES statistics Taiwan is the major source of *C. macranthum*. The average annual export figure is 19,322. Since 1986 all reported trade is recorded as artificially propagated plants. Export of 48,000 specimens from the Republic of Korea is recorded for 1989 with no indication that these are artificially propagated. Average annual export for the same species from India is 280, all recorded as propagated.

Taiwan is also recorded as the major source of *C. japonicum*, the second most heavily traded species in the genus. The average annual export figure is 22,731. Again since 1986 all reported trade from Taiwan is recorded as artificially propagated. Exports from Japan appear to fluctuate with an annual average export figure of 207, 95% of which are reported to be propagated.

The major source of *C. calceolus* is recorded as China, with the single consignment of 10,000 as mentioned above. Austria is the second main source with an average annual export of 420 live plants, all recorded as artificially propagated.

Trade in 8,550 roots of *C. acaule* is recorded in 1983 but the trade recorded as live plants for the period 1983-1989 is low, with the major exporter being the USA.

The countries of export for *C. debile* are Japan and [Taiwan], all recorded as artificially propagated except for the 1987 export of 20 specimens from Japan.

One species recorded in the CITES trade statistics, *C. irapeanum* has a very localised distribution in Mexico. It may be a candidate for Appendix-I listing.

Notes on Other Orchid Genera in Trade

Angraecum – The CITES reported trade is probably mainly in wild plants. No commercial propagation is carried out in Madagascar, but plants are produced in Californian and European nurseries.

Anoectochilus – It is likely that most of the plants in trade are wild-collected.

Arundina graminifolia – This species is very common in the wild and in cultivation.

Ascocentrum – The genus is widely propagated but the trade may also include wild plants.

Bulbophyllum – Plants in trade are likely to be wild-collected.

Calanthe – Plants are now propagated in large quantities but some wild-collection is still likely to occur. The genus has been popular with collectors in Japan and native taxa have been over-collected in recent years.

Campylocentrum – Plants in trade of this tropical American genus are likely to be wild-collected.

Coelogyne – Probably all the plants in trade are wild-collected. The genus occurs in China, Southeast Asia and the Pacific.

Disa – The numbers reported in trade appear to be low.

Diuris – A genus of Australian terrestrial orchids which is now being propagated.

Dracula – Trade in this genus is significantly under-reported in the CITES statistics, both in terms of the numbers of species involved in trade and the quantities traded. The genus is popular with collectors. Peru has been exporting wild plants.

Gastrochilus – The large numbers of plants in trade are likely to be wild-collected specimens.

Habenaria – Some of the species in this genus are wild-collected for trade. *H. rhodocheila* is, for example, collected in Thailand. The species has a widespread distribution and is locally abundant.

Holcoglossum quasipinifolium – This species is exported from Taiwan. It is monopodial and can be propagated vegetatively by division, but the quantities reported in trade give rise to some cause for concern.

Laelia – Species of this tropical American genus are difficult to grow and to maintain in cultivation. Rupicolous species from Brazil are of especial concern because they are narrowly defined species restricted to particular outcrops. Wild-collected specimens are often seen in trade. Species in this group which are reported in international trade according to the CITES statistics include *L. bahiensis, L. blumenscheinii, L. bradei, L endsfeldzii, L. flava, L. ghillanyi, L. kettieana* and *L. milleri*, which is already thought to be extinct in the wild. More information is needed from Brazil on the status in the wild of these species and the extent to which they are being propagated.

Lycaste – Large consignments have been exported from Guatemala and it is unlikely that these are propagated plants. Recently strict export controls have, however, been introduced and the trade in wild plants has ceased as a result.

Masdevallia – There is quite a lot of commercial propagation of this genus, particularly in the USA, with species and hybrids grown from seed. The CITES statistics do not appear to reflect the true size of the trade. Plants exported by certain countries, for example Colombia and Peru, which is exporting Ecuadorian species, are likely to be wild-collected.

Paraphalaenopsis – Plants in trade are mostly wild-collected.

Pleurothallis – There is very little propagation of plants in this genus, although propagation can be carried out by division. The genus is not popular and the low level of reported trade is likely to be accurate.

Renanthera – Export of the endangered species *R. bella* is known to have taken place from Borneo to Singapore during the past seven years but this is not recorded in the CITES statistics.

Rossioglossum – Trade statistics for *R. grande* are noteworthy. This spectacular species is collected from the wild in Guatemala and Mexico.

Schoenorchis – S. fragans is wild-collected in Taiwan. It is used medicinally.

Sophronitis – The high level of exported specimens from Brazil is noteworthy. It is doubtful whether these are artificially propagated and information on the extent of propagation in Brazil would be useful. Artificial propagation takes place in Japan.

Thrixspermum – Large quantities are being exported from Taiwan, possibly for medicinal purposes.

3. Succulents

The average number of succulent plants traded annually as recorded in the CITES statistics is 2,248,464 and the percentage of which is reported as artificially propagated is 57%. The major sources of live succulents in international trade are as follows:

Reported Country of Origin	Average Annual Trade	Average Artificial Propagation in Trade	% Artificial Propagation
Dominican Republic	871,124	39,668	5
Netherlands	729,321	727,218	100
Japan	295,745	280,636	95
Madagascar	134,894	15,941	12
USA	130,883	130,972	100

The lack of artificial propagation carried out by Malagasy nurseries accounts for the low proportion of reported trade in propagated plants from the country. Madagascar now accurately reports trade in wild plants whereas these were previously claimed to be artificially propagated. The majority of succulents exported by Dominican Republic are commonly cultivated species and the low proportion of reported propagation would appear to reflect inaccurate reporting.

Notes on Highly Traded Appendix-II Succulent Genera

a) *Euphorbia*

c. 700 species, occurring in Africa, Madagascar, India, Sri Lanka, the Canary Islands and America.

Propagation of succulent *Euphorbia* spp. is from seed, which is generally not freely available, cuttings or grafting. Some succulent species are well-established in cultivation and are widely sold as house plants in supermarkets and garden centres. *E. milii* (a spiny shrub known as Crown of thorns) and *E. trigona* are, for example, commonly propagated on a commercial scale in Denmark, Netherlands and elsewhere. *E. ingens* is propagated on a large scale in the Canary Islands and *E. obesa* in Japan. *E. lactea* and *E. acrurensis* are also both widely propagated for sale as pot plants.

Other species have been routinely collected from the wild both for the specialist and more general market and trade in some species remains predominantly in wild-collected plants. Most of the rare species are slow growing and difficult to propagate.

Heavily Traded Species	Conservation Status
E. trigona	
E. lactea	
*E. lophogona*K, Madagascar	
E. milii	K, Madagascar, 8 of the 12 varieties are raised in cultivation
E. ingens	nt, Malawi, Zimbabwe and South Africa
E. grandicornis	var. *grandicornis* – nt in Southern Africa (V/R Zimbabwe) var. *sejuncta* – ?, Mozambique
E. acrurensis	synonym of *E. abyssinica*, well established in cultivation
E. cap-saintemariensis	K, Madagascar
* *E. tulearensis*	I, Madagascar
* *E. cylindrifolia*	K, Madagascar (ssp. *tuberifera I*).
E. allaudii	K, Madagascar
E. enterophora	K, Madagascar
E. mammillaris	nt, South Africa
* *E. decaryi*	I, Madagascar

* transferred to Appendix I in 1989.

Concern about the level of exports of Madagascan *Euphorbia* spp., initially claimed to be artificially propagated, led to the transfer of 9 species to Appendix I of CITES in 1989.

The depletion of natural populations of succulent *Euphorbia* species has also been noted in South Africa (Fourie, 1984).

The conservation status of succulent *Euphorbia* spp. is recorded in the WCMC species database. The status of most Madagascan species remains uncertain (IUCN category K), however, including heavily traded species.

On the whole there does not seem to be a problem with levels of trade in the genus, except for Madagascan exports. The trade in South African species also appears to need careful monitoring. All *Euphorbia* plants exported by South Africa are reported to be artificially propagated, although there have been instances of wild plants occurring in trade. Wild-collected South African specimens have for example been seen in quantity in Italy. A consignment of *E. stellata* was exported in 1989, mistakenly documented as artificially propagated. *E. stellata* is a slow-growing species sold as a caudiciform plant.

b) *Pachypodium*

13 species of Madagascar, S. and S.W. Africa.

Two species *P. lamerei* and *P. geayi* are widely propagated and are readily available in trade. *P. lamerei* is the most heavily traded species recorded in the CITES trade statistics. Other species which are now quite widely propagated are *P. namaquanum, P. brevicaule, P. bispinosum* and *P. decaryi*.

Wild collected plants continue to be reported in international trade. There has been particular concern about the levels of trade in Malagasy species, initially claimed to be artificially propagated in CITES documentation. This led to the transfer of three species from Appendix II to Appendix I of CITES in 1989.

Other Heavily Traded Species	
* *P. brevicaule* *P. bispinosum*	V, Madagascar

* transferred to Appendix I in 1989.

A consignment of 3,050 plants of *P. bispinosum* was exported by South Africa in 1989, incorrectly reported as artificially propagated. Wild populations are under threat because of drought conditions and grazing which limit regeneration. Plants are in demand by collectors of caudiciform species.

c) *Ceropegia*

160 species, Old World with one reaching Australia.

Many species are cultivated ornamentals, but only one species, *C. woodii*, is frequent in commercial cultivation. It is propagated on a large scale in the Netherlands and elsewhere using stem segments. *C. woodii* is the most heavily traded species of the genus recorded in CITES trade statistics.

Other Heavily Traded Species	
C. armandii *C. volubilis*	E*, Madagascar

* S. Carter, pers. comm. September, 1991.

d) *Aloe*

c 360 species, tropical and especially S. Africa, Madagascar, Arabia.

Trade in products from *Aloe* spp. is more significant than trade in live plants, as recorded in the CITES trade statistics. The trade is mainly in extracts of *A. ferox* for medicinal use and there is also a significant level of trade in timber, leaves and flowers of *A. ferox*. There is also a significant level of trade in derivatives of *A. vera*. At present the USA is the only country recording imports of *Aloe* products in CITES annual reports. EEC countries do not consider *Aloe* products to be readily recognisable and do not control or report the trade. The collection of extracts is having an adverse effect on some species and an investigation of the international trade may be necessary.

Aloe spp. can be propagated by seed, offshoots and stem cuttings. They are propagated commercially as houseplants in EEC countries and elsewhere, with a smaller level of production than other CITES succulent species such as *Euphorbia* and *Pachypodium*. There are collecting pressures on some of the rarer species, for example in Madagascar, for the specialist market.

Heavily Traded Live Plants
A. vera
A. ferox
A. arborescens
A. mitriformis

4. Cycads

The average number of plants of Cycadaceae and Zamiaceae traded annually as recorded in the CITES statistics is 1,035,102 with 50% reported to be artificially propagated. As well as trade in live plants, there is also a major international trade in cycad seeds recorded in the CITES statistics.

Reporting at family and generic level hinders full analysis of the trade data. During the period of review a total of 355,687 live plants are recorded under Zamiaceae. Three genera in the family are listed on Appendix I of CITES and trade in wild collected plants of these may be hidden by recording such exports as Zamiaceae. Different units of recording also limit the use which can be made of trade data. A total of 6,970,469 live plants of Cycadaceae are reported in trade from 1983-1989. In addition trade at family level is reported in terms of bags, kg, shipments and roots.

The major source countries for cycads in international trade are:

Reported Country of Origin	Average Annual Trade	Average Artificial Propagation in Trade	% Artificial Propagation
Japan	789,061	356,267	45
Dominican Republic	74,948	4,200	5
Netherlands	66,574	66,574	100
Australia	49,021	48,718	99
[Taiwan]	34,164	34,162	100
Israel	27,280	26,600	98
Mexico	11,986	214	2
USA	11,255	11,255	100

Other countries which have an annual average trade of over 1,000 plants are South Africa, Spain and Brazil. All Spain and Brazil's recorded cycad trade is reported to be in propagated plants and for South Africa the percentage reported as propagated is 95%.

Of the above countries, the high level of trade and small percentage of propagated plants for Dominican Republic and Mexico gives rise to concern. The export of cycads from Dominican Republic has already been briefly discussed. Doubts remain about the true identity of species and the source of plant material in trade.

The export of cycads from Mexico is particularly worrying. There have been reports in the past of whole populations of newly described species being removed for export. The survival of species in the wild is directly threatened by the export trade. *Zamia furfuracea* is, for example, reported to have been so overcollected in Mexico that it is now near endangered (Osborne, 1990). This species has been imported to the USA in bulk for the landscaping industry but does not show up as a heavily traded species in the CITES statistics for 1983-1989.

The high percentage of plants reported to be artificially propagated in Australia and Taiwan probably does not reflect the true situation. Australia has 11 species of *Cycas*, two species of *Bowenia*, two of *Lepidozamia* and 18 species of *Macrozamia*. Wild collection of cycads takes place both for local landscaping and for the export market. A container-load of Australian cycads was intercepted and detained owing to lack of documentation on arrival at Nice, France in 1988/9 (C. Giddy, pers. comm. 1991).

The Australian *Cycas* spp. are widespread and abundant. At present they are not threatened by overcollection or by any threat to the habitat. No commercial nurseries are known to grow *Cycas* in Australia because of their local abundance. The cycad species which are artificially propagated at commercial nurseries within the country are mainly *Cycas revoluta* and *Encephalartos* spp. (C. Giddy, pers. comm., 1991). Further comments on heavily traded Australian cycads are given below.

Large quantities of wild collected cycads in trade have been photographed in Taiwan. The level of trade in cycads from Taiwan was noted by experts at the Workshop to be suprisingly large and worthy of further investigation. All recorded trade at species level is in *Cycas revoluta*, a species which is not indigenous. The one cycad which occurs naturally in Taiwan is *C. taiwaniana*. Within Taiwan the species is Endangered, occuring at two sites within National Parks. The species is not grown commercially in Taiwan. Illegal collection of seed is said to occur for sale to exporters in Taipei (C. Giddy, pers. comm., 1991.).

The annual average levels of reported trade for the most heavily traded cycad species are as follows:

Species	Average Number in Annual Trade	Conservation Status
Cycas revoluta	197,396	China, Japan, nt
Zamia floridana #	21,248	USA, V
Bowenia serrulata	20,966	Australia, nt
Zamia pumila	6,640	Caribbean, ?
Lepidozamia peroffskyana	6,512	Australia, nt
Dioon edule	5,762	Mexico V
Macrozamia moorei	2,239	Australia, nt
Zamia loddigesii	1,910	Central America, nt
Dioon spinulosum	1,584	Mexico, I
Ceratozamia mexicana *	1,512	Mexico, V

* Transferred to CITES Appendix I in 1985.

\# This is treated as a synonym of *Z. integrifolia* by Stevenson *et al.* (1990). It has also been considered to be a synonym of *Z. pumila*. The nomenclature of the these three closely related taxa has been confusing during the period of review.

Cycas revoluta is widely propagated and the levels of trade do not give cause for concern. In contrast the heavy trade in *Dioon* spp., which are wild-collected in Mexico, is likely to be detrimental and Appendix I listing for the genus should be considered. The genus has ten species occuring in Mexico and Honduras. A number of new species have been described for this genus, which have restricted natural populations. The rarest species which are subject to the highest collector pressure include *D. mejiae, D. caputoi, D. califanoi, D. rzedowski* and *D. holmgreni*. Reported trade in these species is small but it is possible that reporting at generic level or under other names may mask the true scale of the trade. According to A. Vovides, (pers. comm. September, 1991), *Dioon spinulosum* is Endangered and the reported export of 10,000 plants from Mexico in 1986 is unlikely.

Experts at the Workshop also expressed concern about the levels of trade in several Australian species included in the table above. *Bowenia serrulata*, for example, has a fairly restricted distribution in one area of State Forest near Byfleet in Queensland. The area where it occurs has been declared a National Park. Collection of plants is known to have depleted the natural population. The species is not a popular plant in nurseries and commercial propagation is limited. The level of exports recorded in 1987 as 146,761 must be viewed with concern (C. Giddy, pers. comm., September, 1991.)

Lepidozamia peroffskyana is another Australian cycad which is not commonly propagated by commercial nurseries. It is relatively abundant in the wild. The relatively high average annual trade results from a large quantity of reported trade in 1986. This could possibly be a reporting error and refer to seed.

The level of trade in *Macrozamia moorei* should also be investigated. This species has been wild-collected for resort landscaping and may also be collected from the wild for export (C. Giddy, pers. comm., 1991).

In addition to the species traded in relatively high amounts which may be detrimental, experts at the Workshop also considered that levels of trade in some other cycads, notably *Zamia* species, could be damaging natural populations. In 1987, 4,600 plants of *Z. fischeri* were recorded in trade. This Mexican species has several forms, including dwarf forms which are sought after by collectors. It is easily raised from seed in cultivation and trade in wild plants is unnecesary. Also in 1987, 13,373 plants of the Mexican species *Z. loddigesii* were reported in trade. This figure requires further investigation.

Z. lecointei is a rare species occurring in southern Venezuela and the region of the Rio Erepecuru in northern Brazil. Its conservation status is unknown. 41 live plants were reported in trade in 1988, exported by Venezuela. *Z. pseudoparasitica* is an extremely rare species occuring in Panama which has been subject to severe collector pressure in the past. The export of 125 plants in a single year (1983) is cause for concern in relation to its total numbers in the wild.

5. Tree Ferns

The reported trade in tree ferns of the families Cyatheaceae and Dicksoniaceae as live plants is fairly small, with the trade dominated by timber and other products. This would be expected as the exploitation of tree ferns is mainly for the fibrous stem material used as a growth medium in horticulture. The main countries of origin for live plants are as follows:

Reported Country of Origin	Average Annual Number in Trade	% Artificial Propagation
[Taiwan]	5,040	
Japan	1,715	0
Australia	1,293	68
Brazil	1,086	100

The percentages claimed to be propagated, as given above, are of dubious accuracy. The small quantities involved are probably grown as pot plants. This is certainly the case with exports from Australia which are plants of *Dicksonia antarctica*.

The main source of tree fern "timber" as recorded in the CITES statistics is [Taiwan]. Average annual quantities reported in trade for various units are: 234 timber, 2,795 bags of timber, 8,805 cartons of timber, 112,417 kg of timber, 446,059 pieces of timber, 25,278 sets of timber, 102,412 unspecified kg, and 9,058 unspecified pieces. The level is trade appears to be high but given present information it is impossible to determine whether the trade is detrimental to wild populations. Information on the conservation status of *Cycas* is currently lacking. Several species of *Cibotium* in the family Dicksoniaceae are however recorded as vulnerable by WCMC.

CITES statistics suggest that overall the trade in tree ferns may have declined but this could be due to the lack of recent information received. It is currently difficult to interpret the data on tree fern trade because reporting is not in sufficient detail. Information is scarcely reported at species level. This may be partly because the trade in tree fern products is not species specific. The main threat to tree ferns in the wild is likely to be destruction of their forest habitats. Over-exploitation may be a problem in certain areas but CITES statistics do not currently provide an accurate reflection of this.

6. Other Plant Species

Trade data for other plant species in Appendix II of CITES were not reviewed in detail by experts at the Workshop but some comments were provided as summarised below.

Cephalotus follicularis – The average annual trade in this Australian insectivorous species is small, 233 specimens, and it was suggested at the Workshop that this species might be a candidate for removal from Appendix II.

Nepenthes – The reported trade in plants of this genus is not significantly high. At generic level, the average annual number of live plants reported in trade is 1,168. At species level, all average annual figures are less than 100. A company based in Brunei Darussalam was formerly trading these plants but it has now ceased.

Sarracenia – The species with the highest reported level of trade in this genus is *S. leucophylla*. An average annual trade of 15,560 live plants and 32,004 "pieces" is reported. The biggest collection problem for wild plants of the genus is internal trade within the USA (Marshall, pers. comm., 1991).

Panax quinquefolius – Roots of this species are wild-collected in Canada and USA for the export trade. The level of trade is high, with an annual average of 25,044 roots, and continued monitoring is clearly necessary. The level is trade is not currently considered excessive however (Marshall pers. comm., 1991).

Araucaria araucana – This species which yields valuable timber is mainly traded as artificially propagated pot plants as recorded in the CITES statistics.

In 1986, a high level of trade in *Guaiacum sanctum* was noted, representing import of timber to Japan from Mexico.

RECOMMENDATIONS

On the basis of the preliminary review of the CITES statistics and discussions at the Significant Plant Trade Workshop the following recommendations are made for further action in relation to trade in **Appendix-II plants**.

General Recommendations – Plant Trade Reporting, Use of Statistics and Other Information on Appendix-II Plants

1. The CITES trade statistics for 1983-1989 show the continuing poor quality of reporting for the Appendix-II plant trade. Attention should be drawn to this at the eighth meeting of the Conference of the Parties. All countries should be urged to report trade at species level and to prevent delays in reporting. Parties which do not report the plant trade at all should be encouraged to do so through the provision of technical and financial assistance to set up reporting systems.

2. Parties should commit themselves to carry out routine checks of CITES plant material in trade in order to improve enforcement, avoid exporting wild plants misreported as artificially propagated and also improve the accuracy of information in annual reports.

3. Information on levels of trade, based on annual reports and other data, should be prepared and circulated on a regular basis at intervals corresponding with the meetings of the Conference of the Parties. Data should be compiled on annual levels of trade in each taxon for the current and previous five years with information on levels of trade in propagated specimens also reported. An overview document should also be prepared. This recommendation is in accordance with Resolution Conf. 3.10 on the Review and Harmonization of Annual Reports.

4. The information already compiled on levels of trade in particular plant groups should be made available for review by the SSC plant Specialist Groups. Review of the data on a routine basis should be considered. As far as possible, trade data should be correlated with conservation status information for expert review.

5. Information on nurseries involved in the CITES export trade in the major source countries should be compiled and a directory published. Management authorities should supply this information to the CITES Secretariat in order to facilitate implementation of CITES for plants.

6. Information on the distribution and conservation status of heavily traded CITES Appendix-II plants should be assembled into a readily accessible database linked to the WCMC trade database.

    a) Steps are already being taken to ensure that the cacti recorded in CITES trade from 1983-1989 are included in the CITES cactus checklist of standard names which includes distribution and conservation data.

    b) The need to develop a standard nomenclature for orchids for CITES purposes has been acknowledged. The most commonly traded genera of orchids, as revealed by the Significant Plant Trade study, and those likely to be adversely affected by trade should be treated first in preparing the standard nomenclature. Priority genera for attention are:

        Aerangia, Angraecum, Ascocentrum, Bletilla, Brassovola, Calanthe, Catasetum, Cattleya, Coelogyne, Comparettia, Cymbidium, Cypripedium, Dendrobium, Disa, Dracula, Encyclia, Epipendrum, Laelia, Lycaste, Masdevallia, Miltonia, Miltoniopsis, Odontoglossum, Ondicidium, Paphilopedilum, Paraphalaenopsis, Phalaenopsis, Phragmipedium, Renanthera, Rhynchostylis, Rossioglossum, Sophronotis, Vanda and *Vandopsis.*

    c) The development of appropriate checklists for other Appendix-II plant groups is also necessary and their preparation should be coordinated, by the CITES Secretariat, with other international initiatives such as the IUBS World Checklist of Vascular Plants.

Country-specific Recommendations

The data on plant trade for 1983-1989 highlight major source countries where certain aspects of the trade warrant concern. Specific recommendations are given for action.

7. Japan is the second major source country for the CITES Appendix-II plant trade. Although detailed information on imports is provided within annual reports, insufficient detail is provided within CITES statistics on the plants exported. Japan should be urged to improve its reporting of the plant trade. A more detailed analysis of the existing trade data should also be carried out. This should include a review of levels of trade in indigenous plants, in particular orchid

species, and the extent to which these are commercially propagated, together with a closer look at Japan's role in the re-export of wild-collected plants.

8. A survey of the Thai orchid trade should be carried out. This should include a review of the species reported in trade, their distribution and, as far as possible, conservation status. It should also investigate existing trade patterns and trading operations in Thailand. In the light of the general trade ban with Thailand, recommended by the CITES Standing Committee, the Thai Government should be urged to develop measures to implement the Convention for plants. Assistance should be provided to develop measures to protect native orchids, develop a nursery registration system, regulate internal trade, control imports from neighbouring countries, and regulate exports and re-exports at appropriate levels.

9. More information is needed on high volume CITES plant trade from Taiwan. An analysis of the reported trade, paying particular attention to trading partners, should be carried out.

10. Brazil is the leading exporter of CITES plants in South America and certain aspects of the trade continue to cause concern. Brazil should ensure that its national legislation is fully and effectively implemented.

    A study of the Brazilian cactus trade should be commissioned in the context of a broader South American cactus trade study. It is apparent that other South American countries are under-reporting the trade.

    A study of the conservation status, levels of collection, artificial propagation and trade in the Brazilian species of the orchid genera *Cattleya, Laelia* and *Sophronotis* should also be carried out.

11. Dominican Republic appears from the CITES trade statistics for 1983-89 to be one of the leading source countries for CITES Appendix-II plants. Very little information is available on nursery production of CITES plants within the country. This is needed as a matter of priority to establish the veracity of reported trade. The role of Dominican Republic in the re-export of Appendix-II plants, legally and illegally acquired in source countries, should also be investigated.

12. Further attention needs to be paid to the levels of exports of wild-collected Malagasy succulents. Information on the conservation status in the wild of traded species needs to be collected through field survey, and the impact of commercial collection assessed. The feasibility of establishing reserves with controlled harvesting should be investigated. Appendix-I listing for additional species such as *Ceropegia armandii* appears to be necessary.

13. The high-volume export trade in wild-collected cacti, cycads, and orchids from Mexico is a major cause for concern. Further information should be sought on the current situation and the Mexican Authorities encouraged to control the export of wild plants. USA enforcement agencies should provide full assistance.

14. There have been instances when wild collected succulents have been exported from South Africa, with incorrect documentation. South Africa should be urged to ensure that plant consignments are inspected prior to export to prevent abuse of documents for artificially propagated plants.

Taxon-specific Recommendations

15. A field survey of the conservation status of *Notocactus* (*Parodia* subgenus Notocactus) should be commissioned.

16. A survey of the genus *Ferocactus* in trade should be carried out drawing together information from the range states i.e. Mexico and USA and the major importing countries of Europe and Japan.

17. *Dendrobium* is the most heavily traded genus of orchid and a significant number of plants in trade are wild-collected. A review of trade in the genus should be carried out. Preparation of a checklist of species names with distributions and conservation categories should have high priority.

18. A survey of the trade in *Pleione* would be of interest. It is unclear whether all plants exported by Japan are propagated. Clarification should be sought from the CITES Authorities. Nursery inspections in China (including Taiwan) and Japan would be desirable. At the same time other aspects of the trade in temperate orchids could be investigated.

19. There is concern about the continuing trade in *Cypripedium* collected from the wild. Monitoring of the trade is essential and information should be sought on the impact of commercial collection on wild populations. There is

uncertainty about levels of propagation in Europe, the USA and Japan and this should be clarified. Parties should be urged to control exports at sustainable levels and fully implement national conservation legislation where appropriate.

20. Information on levels of trade in the Cycad genus *Dioon*, which has a number of species of conservation concern, suggests that Appendix-I listing for this genus is appropriate. There are apparently illegal exports from Mexico, laundered through other countries.

21. A review of the levels of trade in Appendix-I cycads in the family Zamiaceae, i.e. the genera *Ceratozamia*, *Encephalartos* and *Microcycas*, should be carried out.

22. At present the recorded CITES trade data for tree ferns are of little value in monitoring the trade and, in particular, relating levels of trade in tree fern products to the status of species in the wild. The value of the current listings of Cyatheaceae and Dicksoniaceae in Appendix II of CITES should be subject to an expert review, in order to establish whether the method in which trade is presently reported is useful. In particular the units used for reporting trade in tree fern products should be considered with a view to standardisation.

23. An investigation of the international trade in Aloe products should be carried out including an assessment of the impact on wild populations and methods of improving trade controls.

24. An investigation of the international trade in Salep should be carried out.

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N.P. Taylor, Royal Botanic Gardens, Kew. August 1991.

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PLANT TRADE RECORDED IN CITES ANNUAL REPORTS

Imports

ISO	1983	1984	1985	1986	1987	1988	1989
AU	S	S A	S A	S A	S A	S A	nr
AT	F	F	F A	F A	S A	S	S A
BS					F A	F A	
BE	n/p				S A	S A	S A
CA	F A	F A	F A	F A	S A	G/S A	G A
DK		F A	F A	F A	S A	S A	S A
FI					S		
FR	F A	G A		F/G A	F/G A	F/G A	F/G A
DE		S A	S A	S A	S A	S A	S A
GR	n/p	n/p	n/p	n/p	n/p	n/p	S n/p
HK	S	S	S	S	S	S	S
IN					G		
IT	G	S	G A	F A	F A	F A	F/G A
JP	F	F	S	S A	S A	S A	S A
LU	n/p						F
MG	G	G	G	G	G	G	G
NL	n/p	S A	S A	S A	S A	S A	S A
PA				F/G A	G A	G	G A
PT					S A		
SG	n/p	n/p	n/p	n/p	S A	S A	S A
ZA		S	F			F A	
ES	n/p	n/p	n/p		S A	F/G A	G A
CH	S	S	F/G A	F/G A	F/G A	G A	G A
SU					S		
GB	G	G/S					G A
BM	F	G				G A	
US	S A	S A	S A	S A	S A	S A	S A
UY		F	nr	F	F	K	nr

PLANT TRADE RECORDED IN CITES ANNUAL REPORTS

Exports

ISO	1983	1984	1985	1986	1987	1988	1989
AR	G		S	S	S	S	S
AU	S	S A	S A	S A	S A	S A	
AT	F A	F A	F A	F/G A	F A	F	F A
BS				K	F		
BE	n/p	G/S A	G A	G A	G A	G A	G A
BZ	F	F	F	F	F	nr	nr
BO		nr	nr			F	nr
CA	F A	F/G A	F/G A	F/G A	G A	G A	G A
CL	S	nr	S	S	S	S	S
CN	S		S	S	S	S	S
CO	nr			S A	S A	S A	S A
CR	S	S	nr	S	S	S	S
DK		F A	K A	K A	S A	S A	S A
EC	G	S	G	G	G	G	nr
FR		F A		F A	S A	F/G A	S A
DE	S A	S A	S A	S A	S A	S A	S A
GH		G	S	G			
GR	n/p	S n/p	n/p	n/p	n/p	n/p	n/p
GT	G/S	G/S	G/S	S	S	nr	nr
GY					S	S	nr
HK	S	S	S	S	S	S	S
HU	n/p	n/p	nr			F A	
IN	G	S	S A	S A	S A	S A	S A
ID	F A		S A	S A	S A	S A	nr
JP	F	F	F	F A	F	F	F
KE	nr	nr	F	F/G	F	F	nr
MW				nr	F		
MG	G/S	G/S	G	S	S	G/S	S
MY			S	S	S A	G A	
MT	n/p	n/p	n/p	n/p	n/p	n/p	G
MU				F			
MA	nr	nr				S A	S A

ISO	1983	1984	1985	1986	1987	1988	1989
NL		S A	S A	G A	G A	G/S A	G A
NI	S	S	S				
PK			S	S			
PA	S	S/F	F	F		F A	G
PG				nr	S	S	nr
PY			G	G	S	G/S	nr
PH				F A	F A	nr	S A
SG	n/p	n/p	n/p	n/p	S A		S
ZA	S A	S A	S A	S A	S A	S A	S A
ES	n/p	n/p	n/p	S A	F/G A	F/G A	F/G A
LK	nr				G A	G A	S A
SR	G/S	G/S	F/S A	S	F/G A	S	S
TH	nr				nr	nr	nr
TG					G/S		
TT	n/p	nr	nr	nr	G/S A	G/S A	S A
GB	G	G A	S	S A	S	S A	S
BM	F					G A	
US	S A	S A	S A	S A	S A	S A	S A
UY	F	F	nr				nr
VU	n/p	n/p	n/p	n/p	n/p	n/p	S A
VE	G/S A	G/S A	G/S A	S	S	S	nr
ZR	nr		G				
ZW	G/S A	G/S A	G/S A		G	S	

KEY

A = Artificially propagated plants
K = Plants reported to Kingdom level
F = Plants reported to Family level
G = Plants reported to Genus level
S = Plants reported to Species level
n/p = Non-Party
nr = No report

DEFINITIONS OF IUCN CONSERVATION (RED DATA BOOK) CATEGORIES

A. Threatened Categories

Extinct (Ex)
Taxa which are no longer known to exist in the wild after repeated searches of their type localities and other known or likely places.

Endangered (E)
Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Vulnerable (V)
Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. Included are taxa of which most or all the populations are **decreasing** because of over-exploitation, extensive destruction of habitat or other environmental disturbance; taxa with populations that have been seriously **depleted** and whose ultimate security is not yet assured; and taxa with populations that are still abundant but are **under threat** from serious adverse factors throughout their range.

Rare (R)
Taxa with small world populations that are not at present Endangered or Vulnerable but are at risk. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range.

Indeterminate (I)
Taxa known to be Extinct, Endangered, Vulnerable or Rare but where there is not enough information to say which of the four categories is appropriate.

B. Unknown Categories

Status Unknown (?)
No information.

Candidate (C)
Taxa whose status is being assessed and which are suspected but not yet definitely known to belong to any of the above categories.

Insufficiently known (K)
Taxa that are suspected but not definitely known to belong to any of the above categories, following assessment, because of the lack of information.

C. Not Threatened Category

Safe (nt)
Neither rare nor threatened.

Annex 3

PARTICIPANTS AT THE WORKSHOP
TO DISCUSS SIGNIFICANT TRADE IN SPECIES OF PLANTS LISTED IN APPENDIX II OF CITES

Royal Botanic Gardens Kew, 8-9 September 1991

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