CONVENCIÓN SOBRE EL COMERCIO INTERNACIONAL DE ESPECIES AMENAZADAS DE FAUNA Y FLORA SILVESTRES

---

Decimocuarta reunión del Comité de Flora
Windhoek (Namibia), 16-20 de febrero de 2004

Comercio significativo de plantas

# SELECCIÓN DE NUEVAS ESPECIES

1. Este documento ha sido preparado por la Secretaría.

2. De conformidad con lo dispuesto en los párrafos b) y c) del apartado *Selección de especies que han de revisarse* de la Resolución Conf. 12.8, sobre el examen del comercio significativo de especímenes de especies del Apéndice II, el Comité de Flora debería seleccionar especies de urgente preocupación para proceder a su examen. La selección debería basarse en los niveles de comercio registrados y la información que está a disposición del Comité de Flora, la Secretaría, las Partes o los expertos competentes.

3. La Secretaría ha solicitado al PNUMA-CMCM que presente un resumen de los datos del comercio de especies de plantas incluidas en el Apéndice II, durante los últimos cinco años, así como orientación sobre la selección de especies para proceder a su examen.

4. Se pide al Comité de Flora que considere el documento *Review of Significant Trade – Analysis of Trade Trends with notes on the conservation status of selected species – Volume 1. Plants*, preparado por el PNUMA-CMCM (véase el Anexo al presente documento, únicamente en inglés) y recomiende una lista reducida de especies para someterlas al examen del comercio significativo.

# REVIEW OF SIGNIFICANT TRADE

# ANALYSIS OF TRADE TRENDS WITH NOTES ON THE CONSERVATION STATUS OF SELECTED SPECIES

## Volume 1. Plants

**Prepared for the**

**CITES Plants Committee, CITES Secretariat**

**by the**

**United Nations Environment Programme**
**World Conservation Monitoring Centre**

**DECEMBER 2003**

Prepared and produced by: UNEP World Conservation Monitoring Centre, Cambridge, UK

**UNEP WORLD CONSERVATION MONITORING CENTRE (UNEP-WCMC)**
**www.unep-wcmc.org**

The UNEP World Conservation Monitoring Centre is the biodiversity assessment and policy implementation arm of the United Nations Environment Programme, the world's foremost intergovernmental environmental organisation. UNEP-WCMC aims to help decision-makers recognise the value of biodiversity to people everywhere, and to apply this knowledge to all that they do. The Centre's challenge is to transform complex data into policy-relevant information, to build tools and systems for analysis and integration, and to support the needs of nations and the international community as they engage in joint programmes of action.

**UNEP-WCMC** provides objective, scientifically rigorous products and services that include ecosystem assessments, support for implementation of environmental agreements, regional and global biodiversity information, research on threats and impacts, and development of future scenarios for the living world.

Prepared for: The CITES Secretariat, Geneva

A contribution to UNEP - The United Nations Environment Programme

Printed by: UNEP World Conservation Monitoring Centre
219 Huntingdon Road, Cambridge CB3 0DL, UK

# Table of Contents

## INTRODUCTION

Resolution Conf. 12.8 Review of Significant Trade in specimens of Appendix II species directs the Animals and Plants Committees, in cooperation with the Secretariat and experts, and in consultation with range States, to review the biological, trade and other relevant information on Appendix II species subject to significant levels of trade, to identify problems and solutions concerning the implementation of Article IV, paragraphs 2 (a), 3 and 6 (a) of the Convention. As part of this procedure the Secretariat requested UNEP-WCMC to produce a summary from the CITES Trade database of annual report statistics showing the recorded net level of exports for Appendix II species over the five most recent years.

This report includes a summary from the CITES Trade database of annual report statistics for Appendix-II plant species over the eleven most recent years (1992-2002) for specimens recorded from wild sources[1]. Following a detailed examination of the data, UNEP-WCMC determined that the majority of re-export data for wild collected specimens did not add new information to the analysis of the species for review. Therefore, this report includes a summary from the CITES Trade database of annual report statistics showing the recorded gross level of exports[2], but excludes data on re-exports for the majority of plant species[3].

UNEP-WCMC has included additional species information sections in this report to supplement the usual tables of CITES trade statistics. The aim of including these new sections is to assist the CITES Plants Committee with the difficult task of species selection on the basis of significant trade. The report is structured as follows:

**Section 1** highlights species as possible candidates for review by the Plants Committee (whether or not such species have been the subject of a previous review, although excluding those currently under review).

**Section 2** highlights a possible country candidate for the country-level review of significant trade.

**Section 3** (see separate Excel spreadsheet) includes tables of recorded level of exports for Appendix-II plant species over the eleven most recent years (1992-2002).

1 Included with wild collected specimens are those specimens recorded without a source but appeared likely, on examination, to be from wild sources based on knowledge of the species, its range states and likely exporters of wild specimens.

2 Gross exports = the total quantity (re-)exported of a given commodity.

3 With the exception of *Galanthus* spp. re-exports from Georgia – see explanation in methodology.

## METHODOLOGY

In addition to the summary from the CITES Trade database of annual report statistics, UNEP-WCMC has processed the trade data with the aim of assisting the CITES Plants Committee with the task of species selection for the Review of Significant Trade. Species were selected as possible candidates for review of significant trade according to the following steps:

1) A flowchart (see Figure 1) of yes/no answered questions was used to test information on gross level of exports, based on a number of statistical factors and conservation status. All those with final answers "consider for inclusion in current selection process" were included in a first round review;

2) Recorded trade levels of all species were individually examined, and those not selected by the flowchart but for which it was thought that trade was significant were also included in a first round review; and

3) Additional trade and conservation status information were considered for all species selected under steps 1) and 2), above, and a final list highlighted possible candidates for review.

Trade statistics were extracted from the UNEP-WCMC CITES trade database[4] for Appendix II plant species where the reported source was wild-collected or where there was no reported source but on examination where the material was thought to be wild-collected based on acknowledge of the species and the country of export/origin. The number of individual trade records involved totalled over 70,000. Upon examination of these data, terms were combined for some species where this was thought appropriate. Parties often report timber in both kilograms and cubic metres. Therefore, prior to the creation of the gross export tables, export data reported in kilograms were converted to cubic metres where a conversion factor for the species was available using CITES Identification Manual conversion factors, see Table 1.

**Table 1: Timber conversion factors**

| Species | Mean specific weight. |
|---|---|
| *Pericopsis elata* | 0.66 g/cm$^3$ |
| *Guaiacum sanctum* | 1.23 g/cm$^3$ |
| *Guaiacum officinale* | 1.23 g/cm$^3$ |
| *Swietenia humilis* | 0.61 g/cm$^3$ |
| *Swietenia mahogani* | 0.75 g/cm$^3$ |
| *Prunus africana* | 0.74 g/cm$^3$ |

Data taken from Clemente, M. 1999. *Timber Identification. CITES Identification Manual Vol. 1 Flora.* CITES Secretariat, Geneva.

The majority of re-export data were excluded from the data tables because on examination these data did not add any new information to the analysis of species but only showed data already reported as exports. However, re-export data of *Galanthus* species with origin Georgia were included, as there were shipments not originally reported as exports by Georgia that had then been re-exported with the reported origin Georgia.

The selection of species highlighted as possible candidates for review by the Plants Committee was initially derived using statistical analysis and a flowchart with 'yes' and 'no' questions to answer (see Figure 1). This first step statistical review of data and flowchart was based on the following criteria: a measure of the slope and of spread of trade data over ten years (1992-2001) was produced; then, if the species is listed in the *2003 IUCN Red List of Threatened Species*[5], the global threat status was taken into consideration. Data for 2002 have been included in the full data tables (see Section 3 – Excel spreadsheet), but were excluded in the statistical analysis because, as of 10 December 2003, only 50% of Annual Reports to CITES for 2002 had been received by UNEP-WCMC and included in the CITES Trade database.

**Statistics: Slope**

A species that shows an increase in levels of trade over time can generally be assumed to be in greater need of attention than a species for which trade has been decreasing. However, there may be cases where a decline in trade could be the result of a decline of the species in the wild. Therefore we assessed those species for which there was a high positive slope

4 Maintained by UNEP-WCMC on behalf of the CITES Secretariat.

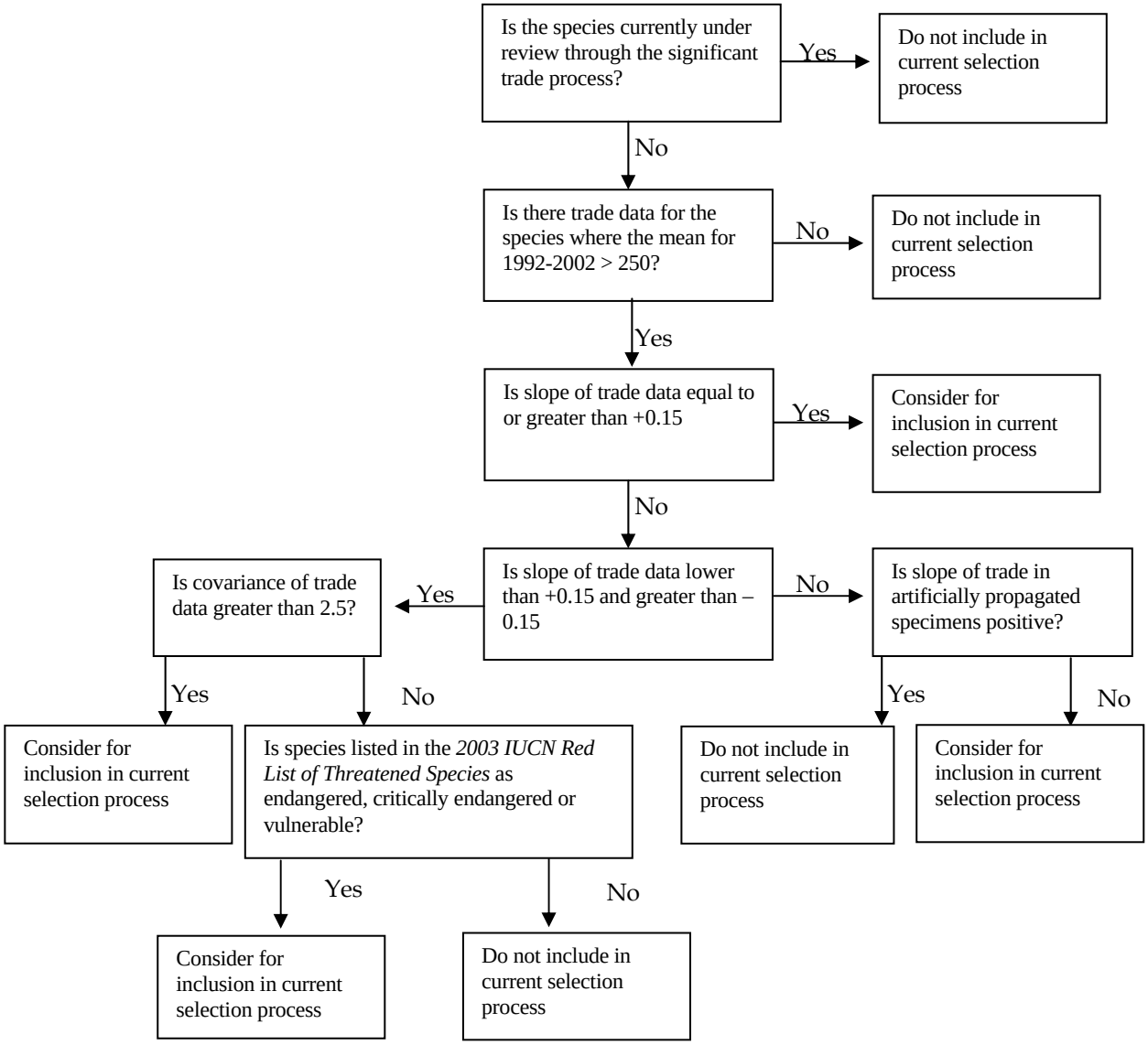
5 IUCN 2003. *2003 IUCN Red List of Threatened Species*. www.redlist.org

and low negative slope. We used Excel's 'slope' function, which returns the slope of the linear regression line through data points in known_ys and known_xs. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line. In this case the xs are ten consecutive years (1992-2001) and the ys represent the level of trade, measured as the number of specimens traded globally (net) every year. Because the value for the slope depends partly on the absolute level of trade, we divided the slope by the mean (total level of trade over the ten year period divided by ten or less depending on the year listed on the CITES Appendices) to allow a proper comparison between species traded at different levels. In the rest of the text, any mention of 'slope' refers to the measure of slope divided by mean.

**Statistics: Spread**

It was decided that a species showing considerable variation in past levels of trade needs more attention than one showing constant trade levels. Many measures of spread exist but the most appropriate when comparing across groups with different means is the coefficient of variation (CV). The CV is used to compare the amount of variation in populations with different means where direct comparisons of the standard deviations (a more common measure of spread) are difficult to make, as they are confounded by differences in scale. The CV is calculated as the standard deviation divided by the mean.

**Figure 1: Flow chart for selection of candidate species for consideration in the Significant Trade Review Process**



## SECTION 1: SPECIES IDENTIFIED AS POSSIBLE CANDIDATES FOR REVIEW OF SIGNIFICANT TRADE

Following the first step statistical analysis and flow chart method of species selection on the basis of trade and threat status, an initial list of 48 species was selected as possible candidates for review of significant trade. CITES trade data for each of these species were reviewed, together with known conservation status and management of the species. Table 2 lists the 48 species and the decision for their inclusion or exclusion as possible candidates for review.

**Table 2: Species identified for inclusion following flow chart process**

| SPECIES | INCLUDED /EXCLUDED | COMMENT |
|---|---|---|
| *Galanthus woronowii* | INCLUDED | See species sheet below |
| *Podophyllum hexandrum* | INCLUDED | See species sheet below |
| *Carnegiea gigantea* | INCLUDED | See species sheet below |
| *Echinopsis chiloensis* | EXCLUDED | The majority of the trade is in rainsticks that are mostly harvested from already dead material |
| *Echinopsis cuzcoensis* | EXCLUDED | The majority of the trade is in rainsticks that are mostly harvested from already dead material |
| *Echinopsis pachanoi* | EXCLUDED | The majority of the trade is in rainsticks that are mostly harvested from already dead material |
| *Echinopsis peruviana* | EXCLUDED | The majority of the trade is in rainsticks that are mostly harvested from already dead material |
| *Eulychnia acida* | EXCLUDED | The majority of the trade is in rainsticks that are mostly harvested from already dead material |
| *Opuntia bigelovii* | EXCLUDED | The majority of the trade is in already dead material |
| *Opuntia fulgida* | EXCLUDED | The majority of the trade is in already dead material |
| *Opuntia imbricata* | EXCLUDED | The majority of the trade is in already dead material |
| *Opuntia subulata* | EXCLUDED | The majority of the trade is in already dead material |
| *Stenocereus thurberi* | EXCLUDED | The majority of the trade is in already dead material |
| *Cyathea contaminans* | INCLUDED | See species sheet below |
| *Cyathea cunninghamii* | INCLUDED | See species sheet below |
| *Cyathea dealbata* | INCLUDED | See species sheet below |
| *Cyathea medullaris* | INCLUDED | See species sheet below |
| *Cyathea smithii* | INCLUDED | See species sheet below |
| *Cibotium barometz* | INCLUDED | See species sheet below |
| *Dicksonia sellowiana* | EXCLUDED | |
| *Euphorbia antisyphilitica* | EXCLUDED | |
| *Euphorbia gottlebei* | EXCLUDED | |
| *Euphorbia hedyotoides* | EXCLUDED | |
| *Pterocarpus santalinus* | INCLUDED | See species sheet below |
| *Aloe ferox* | EXCLUDED | It was decided that South Africa has adequate species monitoring and management |
| *Nepenthes mirabilis* | EXCLUDED | |
| *Ascocentrum christensonianum* | INCLUDED for Viet Nam | See Section 2 |
| *Bletilla striata* | INCLUDED | See species sheet below |
| *Christensonia vietnamica* | INCLUDED for Viet Nam | See Section 2 |
| *Cymbidium ensifolium* | EXCLUDED | |
| *Cymbidium goeringii* | EXCLUDED | |
| *Cypripedium parviflorum* | EXCLUDED | |
| *Dendrobium aduncum* | INCLUDED for Viet Nam | See Section 2 |
| *Dendrobium amabile* | INCLUDED for Viet Nam | See Section 2 |
| *Dendrobium herbaceum* | INCLUDED for Viet Nam | See Section 2 |
| *Dendrobium moniliforme* | INCLUDED for Viet Nam | See Section 2 |
| *Dendrobium nobile* | INCLUDED for Viet Nam | See Section 2 |
| *Gastrodia elata* | EXCLUDED | |

| SPECIES | INCLUDED /EXCLUDED | COMMENT |
|---|---|---|
| *Habenaria acuifera* | EXCLUDED | |
| *Ludisia discolor* | EXCLUDED | |
| *Vanilla aphylla* | EXCLUDED | |
| *Cyclamen coum* | INCLUDED | See species sheet below |
| *Hydrastis canadensis* | EXCLUDED | |
| *Bowenia serrulata* | EXCLUDED | |
| *Taxus wallichiana* | EXCLUDED | |
| *Nardostachys grandiflora* | INCLUDED | See species sheet below |
| *Guaiacum officinale* | EXCLUDED | Majority of trade is from Mexico where a species management programme is being implemented. |
| *Guaiacum sanctum* | EXCLUDED | Majority of trade is from Mexico where a species management programme is being implemented. |

Although not highlighted after use of the flowchart decision-making process, six additional species listed in Table 3 were also selected for consideration after review of trade data or because they had been recently listed in Appendix II. They were then included or excluded on the basis of trade data and/or conservation and species management information.

**Table 3: Additional species identified for consideration**

| SPECIES | INCLUDED /EXCLUDED | COMMENT |
|---|---|---|
| *Galanthus elwesii* | EXCLUDED | Data were reviewed for this species but Turkey, the only range State exporter, appears to have good management controls in place for this species |
| *Panax quinquefolius* | EXCLUDED | Data were reviewed for this species but the United States and Canada, major exporters in recent years, appear to have good management controls in place for this species |
| *Cistanche deserticola* | INCLUDED | See species sheet below |
| *Cyclamen cilicium* | EXCLUDED | Data were reviewed for this species but Turkey, the only range State exporter, appears to have good management controls in place for this species |
| *Cyclamen hederifolium* | INCLUDED | See species sheet below |
| *Picrorhiza kurrooa* | EXCLUDED | The only reported exporter, China, is not a range State for this species, and it is likely that the reported trade refers to the closely related *P. scrophulariiflora*, which is not covered by the CITES listing (Mulliken, 2000) |

The following pages provide accounts for the 16 species selected for possible review of significant trade.

## *1. Galanthus woronowii*

**FAMILY** AMARYLLIDACEAE

**NAME AND AUTHOR** *Galanthus woronowii* Losinsk. in Kom.

**SYNONYMS** *Galanthus ikariae* auct. non Baker, pro parte
*Galanthus ikariae* ssp. *latifolius* Stern pro parte
*Galanthus latifolius* auct. non Rupr.

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

**Georgia**: Occurrence reported (Davis et al., 1999). It occurs in forests, shrubwoods and lower mountain belt in Georgia (Anon., 2003). It is Vulnerable in Georgia (Anon., 2003). Discussions were held during the 11th Meeting of the Plants Committee on plant production techniques, particularly those in Georgia. The minutes of the meeting state "The authorities of Georgia and the Secretariat to look for a solution regarding source code to be included in export permits for *Galanthus woronowii*. It agreed that the bulbs currently harvested from agricultural fields are to be regarded as being of wild origin" (CITES Secretariat, 2002).
**Netherlands**: Reported as "rare, an occasional escape" (Davis *et al.*, 1999).
**Russian Federation**: Occurrence reported in Black Sea Coast Area (Davis *et al.*, 1999) and listed as Rare (Golvanov *et al.*, 1988).
**Turkey**: Occurrence reported in the north-east (Davis, 1984; Davis *et al.*, 1999).
**United Kingdom**: Reported as "rare, an occasional escape" (Davis *et al.*, 1999).

It is of economic importance as an ornamental plant (GRIN, 2003).

**REFERENCES**


Anon. (2003). Rare, Endangered and Vulnerable Plants of the Republic of Georgia. Missouri Botanical Garden. http://www.mobot.org/MOBOT/Research/georgia/afamily.shtml#Amaryllidaceae Downloaded on 14/11/2003.
CITES Secretariat. 2002. Proceedings Eleventh Meeting of the Plants Committee, Langkawi, Malaysia 2001. http://www.cites.org/eng/cttee/plants/11/E-Minutes_PC11.pdf
Davis, A. P., McGough, H. N., Mathew, B. and Grey-Wilson, C. (1999). *CITES Bulb Checklist. For the genera:* Cyclamen, Galanthus *and* Sternbergia. The Royal Botanic Gardens, Kew.
Davis, P. H. (ed.) (1984) *Flora of Turkey*. Vol. 8. Royal Botanic Garden, Edinburgh.
Golovanov, V. D. *et al.* (eds.) (1988). *Red Data Book of RSFSR, plants*. Komarov, Moscow: Academy of Sciences of USSR, Botanical Institut of V. L. Rosagropromizdat. 591 pp. Col. illus., maps.
GRIN (2003). The Germplasm Resources Information Network. http://www.ars-grin.gov/cgi-bin/npgs/html/tax_search.pl?galanthus+woronowii Downloaded on 18/12/2003


**INTERNATIONAL TRADE**

Data reported as *Galanthus ikariae* have been included with *Galanthus woronowii* as the former is now a recognised synonym of *Galanthus woronowii.*

**Net Exports of live/bulbs of *Galanthus woronowii***

| Exporter | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Georgia | 0 | 0 | 0 | 0 | 0 | 10000000 | 10000000 | 0 | 5000042 | 150 | 12000285 |
| Russian Fed. | 0 | 0 | 515000 | 40000 | 10000000 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turkey | 2277775 | 1894500 | 1990000 | 292400 | 615600 | 999908 | 2000000 | 11749915 | 15000000 | 3005950 | 2000000 |

**QUOTAS**

**Export quotas of *Galanthus woronowii* as issued by Georgia and Turkey**

| Exporter | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|
| Georgia | 10000000 | 10000000 | 15000000 | 15000000 | 18000000 |
| Turkey | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 |

## *2. Podophyllum hexandrum*

**FAMILY** BERBERIDACEAE

**NAME AND AUTHOR** *Podophyllum hexandrum* Royle

**COMMON NAME(S)** Himalayan may-apple

**SYNONYMS** *Podophyllum emodi* Honigberger
*Podophyllum emodi* var. *axillare* Chatterjee & Mukherjee
*Podophyllum emodi* var. *bhootanense* Chatterjee & Mukherjee
*Sinopodophyllum emodi* (Honigberger) Ying
*Sinopodophyllum hexandrum*

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

Occurs in forests and on open slopes from 2400-4500 m (Polunin and Stainton, 1984). This species has been considered a rare and threatened species, and removal rates exceed natural regeneration rates (Nadeem *et al*., 2000).

**Afghanistan**: Occurrence reported (Polunin and Stainton, 1984).

**Bhutan**: Reported as a totally protected species, of Indeterminate status (Ministry of Agriculture, Royal Government of Bhutan (1993). Recorded from Ha, Thimphu and Bumthang districts in Central Bhutan, and in Upper Mo Chu district in Northern Bhutan (Grierson and Long, 1984).

**China**: Occurrence reported (Polunin and Stainton, 1984).

**India**: Occurrence reported in Uttaranchal (Rao, 1998), and more particularly in Kumaon (Airi *et al*., 2000), and Garhwal (Bhadula *et al*., 2000). Reported in Himachal Pradesh, where it is found sporadically in Rohru, Kullu, Kangra, Chamba, Nichar and Lahaul & Spiti forest divisions (Chauhan, 1999). It is distributed in restricted pockets of the Himalayas ranging from 2,000 to 4,000 m (Bhadula *et al*., 2000). The population of these plants throughout its range was observed to be very sparse, in decline, and receding towards higher elevations (Rao, 1998). It is variously considered as endangered (Bhadula *et al*., 2000) or critically endangered (CAMP, 1998). It has declined considerably as a result of exploitation to meet the increasing demand of the pharmaceutical industry (Bhadula *et al*., 2000). Export of this species from India has been prohibited, although illegal removal continues (Nadeem *et al*., 2000).

**Nepal**: Recorded from the upper Langtang valley at 4120 m (Malla *et al.*, 1976).

**Pakistan**: Occurrence reported in north Pakistan (Ebel, 1998). It is vulnerable due to over-exploitation in Pakistan (Matin *et al*., 2001).

"Several plants are of high conservation value, e.g. ….*Podophyllum hexandrum* ….for their valuable alkaloids and variable medicinal properties" (Anon., 1997). “Quite an important medicinal plant, the rhizome cotaining podophyllin. Recently investigated as a possible drug used in treatment of cancer” (Polunin and Stainton, 1984).

**REFERENCES**


Airi, S. Rawal, R. S., Dhar, U. and Puroit, A. N. (2000). Population studies on *Podophyllum hexandrum* Royle – a dwindling, medicinal plant of the Himalaya. International Plant Genetic Resources Institute http://www.ipgri.cgiar.org/publications/pgrnewsletter/10popu.htm Downloaded 22/12/2003.

Anon. (1997). *Biodiversity action plan for Bhutan*. National biodiversity strategy and action plan. 188pp. http://www.biodiv.org/doc/world/bt/bt-nbsap-01-en.pdf

Bhadula, S. K., Singh, A., Lata, H., Kuniyal, C. P. and Purohit, A. N. (2000). Genetic resources of *Podophyllum hexandrum* Royle, an endangered medicinal species from Garhwal Himalaya, India. International Plant Genetic Resources Institute http://www.ipgri.cgiar.org/publications/pgrnewsletter/06podo.htm Downloaded 22/12/2003.

CAMP (1998). Selected Medicinal Plants of Northern, Northeastern & Central India. Conservation Assessment and Management Plan. Hosted by Forest Department of Uttar Pradesh, Lucknow, 21-25 January, 1998. http://www.cbsg.org/reports/exec_sum/indian_med_plants_north_camp.pdf Downloaded 22/12/2003.

Chauhan, N. S. (1999) *Medicinal and aromatic plants of Himachal Pradesh*. Indus Publishing Company, New Delhi.

Ebel, F. (1998). Die Schildblättrigkeit krautiger Angiospermen-Sippen in ihrer Beziehung zu Standort und Verbreitung [The leaf peltation in the herbaceous taxa of Angiosperms in its relation to natural habitat and distribution.] Ergänzung zu dem in der Flora (1998) 193, 203-224. http://www.biologie.uni-halle.de/Botany/schild.html Downloaded 22/12/2003.

Grierson, A. J. C. and Long, D. G. (1984) *Flora of Bhutan, including a record of plants for Sikkim.* Vol. 1 Part 2. Royal Botanic Garden, Edinburgh.

Malla, S. B., Shrestha, A. B., Rajshandari, S. B., Shrestha, T. B., Adhikari, P. M. and Adhikari, S. R. (1976) Flora of Langtang and cross section vegetation survey (Central Zone). *Bull. Dept. Med. Plants Nepal* 6: 273 pp.

Matin, A., Khan, M. A., Ashraf, M. and Qureshi, R. A. (2001). Traditional Use of Herbs, Shrubs and Trees of Shogran Valley, Mansehra, Pakistan. *Pakistan Journal of Biological Sciences* 4 (9): 1101-1107.

Ministry of Agriculture, Royal Government of Bhutan (1993). Schedule 2: list of totally protected plant species. *J. Roy. Soc. Arts.*

Nadeem, M., Palni, L.M.S., Purohit, A.N., Pandey, H., Nandi, S.K. (2000). Propagation and conservation of *Podophyllum hexandrum* Royle: an important medicinal herb. *Biological Conservation*, 92 (1): 121-129.

Polunin, O. and Stainton, A. (1984) *Flowers of the Himalaya*. Oxford University Press, Oxford.

Rao, R. R. (1998). Assessment of biodiversity and infraspecific variation among two reputed medicinal plant genera *Aconitum* L. (Ranuculaceae) and *Podophyllum* L. (Podophyllaceae) in the Himalaya. *ENVIS Bulletin* 6 (2): 16-19. http://www.geocities.com/himenvis/vol62/Summary-vol62.html Downloaded 22/12/2003.

Shrestha, T. B. and Joshi, R. M. (1996) *Rare, endemic and endangered plants of Nepal.* WWF Nepal Program.

## INTERNATIONAL TRADE

### Gross Exports of *Podophyllum hexandrum* from China

| Term | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Derivatives (kg) | 0 | 0 | 0 | 0 | 0 | 0 | 10000 | 0 | 0 | 0 | 0 |
| Roots (kg) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 570 | 16000 | 0 | 0 |
| Seeds | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 0 | 0 | 0 |

## *3. Carnegiea gigantean*

**FAMILY** CACTACEAE

**NAME AND AUTHOR** *Carnegiea gigantea* (Engelmann) Britton & Rose

**COMMON NAME(S)** Saguaro

**SYNONYM** *Cereus giganteus* Engelmann

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

At a global level, the species is considered to be demonstrably widespread, abundant and secure (Global Heritage Status Rank G5 (Secure) (21Mar1996)) (NatureServe, 2003).

**Mexico**: Occurrence reported (Hunt, 1999; Oldfield, 1997). "The saguaro is a common plant in the Sonoran Desert, not an endangered species" (National Parks Service, 2003).

**USA**: Occurrence reported (Hunt, 1999; Oldfield, 1997; USDA & NRCS, 2002). In the USA, it is found in Arizona and California; it is critically imperilled in California (NatureServe, 2003). "Despite laws regulating their collection, specimens of *C. gigantea* continue to be illegally removed from habitat to be sold in the commercial landscaping trade….Throughout the south-western USA Native Americans and gigantea collect the fruits of ….*C. gigantea*…for food" (Oldfield, 1997).

Harvested for ornamental value since the early twentieth century (Steenburgh and Lowe, 1977). The biggest threat to the saguaro is rapidly expanding human population and loss of saguaro habitat in the Tucson area. The saguaro is also threatened by invasive species, fire, frost and drought (National Parks Service, 2003).

**REFERENCES**


Hunt, D. R. (comp.) (1999). *CITES Cactaceae checklist*. Second Edition. Compiled with assistance of members of the International Organization for Succulent Plant Study. Kew: Royal Botanic Gardens, Kew and International Organisation for Succulent Plant Study. 315pp.

National Parks Service. (2003). Saguaro information sheet. http://www.nps.gov/sagu/guides/saguarocactus.pdf

NatureServe. (2003). NatureServe Explorer: An online encyclopedia of life [web application]. Version 1.8. NatureServe, Arlington, Virginia. http://www.natureserve.org/explorer Downloaded 14/11/2003.

Oldfield, S. (comp.) (1997). *Cactus and succulent plants - Status survey and conservation action plan.* IUCN/SSC Cactus and Succulent Specialist Group. Gland, Switzerland & Cambridge, UK 212pp.

Steenburgh, W. F. and Lowe, C. H. (1977). *Ecology of the Saguaro: II*. National Park Service Monograph Series Number 8. 242pp.

USDA and NRCS (2002). The PLANTS Database, Version 3.5 (http://plants.usda.gov) National Plant Data Center, Baton Rouge, LA 70874-4490 USA.


**INTERNATIONAL TRADE**

**Gross Exports of *Carnegiea igantean***

| Exporter | Term | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| USA | live | 140 | 45 | 136 | 69 | 44 | 0 | 41 | 0 | 10 | 0 | 0 |
| Mexico | timber | 0 | 0 | 64000 | 101651 | 0 | 115405 | 60080 | 52300 | 30000 | 120000 | 135500 |
| Mexico | timber m3 | 0 | 33 | 0 | 190.136 | 48 | 40.48 | 2 | 73.6 | 73.6 | 0 | 98.14 |
| Mexico | timber kg | 0 | 0 | 0 | 0 | 0 | 0 | 3500 | 0 | 0 | 0 | 19560 |
| USA | timber | 9 | 12 | 0 | 0 | 0 | 50 | 14 | 0 | 0 | 0 | 0 |
| Mexico | timber pieces | 0 | 0 | 64000 | 101651 | 0 | 170040 | 30000 | 0 | 0 | 0 | 0 |
| Mexico | timber pieces kg | 0 | 0 | 0 | 0 | 0 | 0 | 16500 | 0 | 0 | 0 | 0 |
| USA | timber pieces | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 10 | 0 | 0 |

## *4. Cyathea contaminans*

**FAMILY** CYATHEACEAE

**NAME AND AUTHOR** *Cyathea contaminans* (Wallich ex Hook.) Copel. 1909

**SYNONYMS** *Alsophila acuta* C. Presl, 1848; *Alsophila brunoniana* Bed., 1866; *Alsophila clementis* Copel., 1906; *Alsophila contaminans* Wallich ex Hook. 1844, *Alsophila dealbata* C. Presl, 1848; *Alsophila glauca* (Blume) J. Sm. 1841; *Alsophila glaucescens* Wall., 1829; *Alsophila mertensii* Trevis., 1851; *Alsophila smithiana* C. Presl, 1848; *Alsophila smithii* Trevis., 1851; *Alsophila wallichiana* C. Presl, 1836; *Chnoophora glauca* Blume, 1828; *Sphaeropteris glauca* (Blume) R. Tryon, 1970

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

This is a very widespread tree fern that commonly grows as a coloniser in the tropics. Plants are fast growing and always occur in a sunny situation. It was previously known as *C. glauca* (Jones, 1987).

**India**: Occurrence reported (UNEP-WCMC Species database).
**Indonesia**: Occurrence in East Kalimantan reported (Suzuki, 2000) and west Java (Colijn, 2000). Due to the high demand for this species, it is becoming endangered (Anon., 2003b).
**Malaysia**: It is found in rather open places at moderate or high altitudes and often abundant on the edge of forest beside roads in Sarawak (Anon., 2003a) and occurrence reported in Mount Kinabalu, Sabah (Parris *et al.*, 1992). Reported as Lower Risk near threatened in Peninsular Malaysia.
**Myanmar**: Occurrence reported (UNEP-WCMC Species Database).
**Papua New Guinea**: This edible species occurs in areas ranging from 600 - 2,800. It is an important green leafy vegetable at pig feasts in the highlands of PNG (Kambuou, 1995). Reported as Lower Risk near threatened.
**Philippines**: Occurrence reported (Amoroso, 1990) and as Lower Risk near threatened.
**Thailand**: Reported as Lower Risk near threatened.
**Viet Nam**: Recorded in Xuan Lien proposed Nature Reserve (Le Trong Trai *et al.*, 1999). Reported as Lower Risk near threatened (Loc, 1992).

**REFERENCES**


Anon. (2003a). The Forest Department, Sarawak, Malaysia. http://www.forestry.sarawak.gov.my/forweb/ourfor/flora/fern/ccont.htm Downloaded 22/12/2003.

Anon. (2003b). History of and Guide to Purwodadi Botanic Garden. http://www.bogor.indo.net.id/kri/phist.htm Downloaded 22/12/2003.

Amoroso, V. B. (1990). Some endangered economic and endemic ferns of the Philippines. Pp. 15-27 in (unknown published source).

Colijn, E. (2000). Nature conservation in Indonesia. http://users.bart.nl/~edcolijn/gede.html Downloaded 22/12/2003.

Jones, D. L. (1987). *Encyclopaedia of ferns, an introduction to ferns, their structure, biology, economic importance, cultivation and propagation.* Lothian Publishing Company PTY Ltd, Melbourne. pp 433.

Kambuou, R. N. (1995). Papua New Guinea: Country Report to the FAO international technical conference on plant genetic resources (Leipzig,1996). http://www.fao.org/WAICENT/FaoInfo/Agricult/AGP/AGPS/pgrfa/pdf/papuanew.pdf Downloaded 22/12/2003.

Le Trong Trai, Le Van Cham, Bui Dac Tuyen, Tran Hieu Minh, Tran Quang Ngoc, Nguyen Van Sang, Monastyrskii, A. L. and Eames, J. C. (1999) *A Feasibility Study for the Establishment of Xuan Lien Nature Reserve, Thanh Hoa Province, Vietnam*. BirdLife International Vietnam Programme, Hano.

Loc, P. K. (1992). Annotations to: WCMC Conservation status listing for Philippines dated 6 April 1992.

Parris, B. S., Beaman, R. S. and Beaman, J. H. (1992). *The plants of Mount Kinabalu. I. Ferns and fern allies.* Royal Botanic Gardens, Kew, UK.

Suzuki, E. (2000). Plant specimens from Kutai National Park, East Kalimantan, Indonesia. http://biodiversity.sci.kagoshima-u.ac.jp/suzuki/Herbarium/HerbEK.htm Downloaded 22/12/2003.

**INTERNATIONAL TRADE**

**Gross Exports of *Cyathea contaminans***

| Exporter | Term | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Indonesia | dried plants | 0 | 0 | 0 | 0 | 38897 | 0 | 89264 | 0 | 0 | 0 | 0 |
| Malaysia | live | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Indonesia | timber | 0 | 0 | 0 | 0 | 61300 | 332404 | 313986 | 405788 | 52250.5 | 0 | 0 |
| Indonesia | timber kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 997529 | 0 |
| Indonesia | timber shipments | 0 | 0 | 0 | 0 | 0 | 0 | 170220 | 147638 | 0 | 0 | 0 |

## *5. Cyathea cunninghamii*

**FAMILY** CYATHEACEAE

**NAME AND AUTHOR** *Cyathea cunninghamii* Hook.f.

**COMMON NAME(S)** Gully Tree Fern, Slender Tree Fern

**SYNONYMS** *Alsophila cunninghamii* (Hook.f. in Hook., 1854) R.Tryon, 1970;
*Cyathea boylei* F. Muell., 1881;

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

This species requires humus rich acid soil, shade and moisture and it detests sun and especially wind. Plants are slow growing (Jones, 1987) and reach 20 m in height (Salmon, 1980). It occurs mainly in sheltered gullies, overtopping *Dicksonia antarctica* (Bostock, 1998). *Cyathea cunninghamii* occurs mainly in sheltered gullies, overtopping *Dicksonia antarctica* (Bostock, 1998) at low altitudes (0-150m). The species is uncommon. It occurs in mixed forest (*Eucalyptus obliqua/Eucalyptus regnans* overstorey with callidendrous rainforest understorey) and in gallery scrub (DEH, 2003).

**Australia**: It occurs in south-east Queensland, north-east New South Wales, southern Victoria and Tasmania (Bostock, 1998). It is listed as Rare both throughout Australia (DSE, 2002) as well as particularly in Queensland (State of Queensland, 2001) and in Victoria (DSE, 2002). It was recently listed as endangered in Tasmania (DPIWE, 2003)

**French Polynesia**: Reported from the Tuamotu Islands (UNEP-WCMC Species database).

**New Zealand**: It occurs on the North Island, mountains of the east coast and interior and Auckland (Allan, 1961). It ranges from Mangonui to Fiordland and the Chatham Islands, although it is largely confined to the damper west coast of both main islands (Salmon, 1980). On the north island it occurs from Kaitaia to Wellington but is only locally common in the damper western parts (Brownsey and Smith-Dodsworth, 1989). Scattered populations occur in coastal forests along the north and west coasts of the South Island (Brownsey and Smith-Dodsworth, 1989). It favours damp gullies or riverbanks in lowland to montane forest (Brownsey and Smith-Dodsworth, 1989). Reported as Lower Risk near threatened (Given, 1995) and as not threatened (NZERN, 2004)

**REFERENCES**


Allan, H. H. (1961). *Flora of New Zealand*. Vol 1. R. E. Owen, Government Printer, Wellington, New Zealand. pp 1085.

Bostock, P. D. (1998).Cyatheaceae. In *Flora of Australia*. Vol 48 Ferns, gymnosperms and allied groups (A. E. Orchard and P. M. McCarthy ed.s). pp193-205. ABRS/CSIRO Australia.

Brownsey, P. J. and Smith-Dodsworth, J. C. (1989). *New Zealand ferns and allied plants*. David Bateman, Auckland, New Zealand.

DEH (2003). 2. Tasmanian Tree Ferns. In: Tree Fern Management Plan for the Harvesting, Transporting or Trading of Dicksonia ntarctica in Tasmania July 2001. Department of the Environment and Heritage – Australian Government. http://www.deh.gov.au/biodiversity/trade-use/sources/management-plans/approved/treefern-tas/ Downloaded 02 Jan 2004.

DPIWE (2003). Information on Nominations for Listing Species on the Tasmanian Threatened Species Protection Act 1995. Parks & Wildlife - Department of Primary Industries, Water & Environment of Tasmania. http://www.dpiwe.tas.gov.au/inter.nsf/WebPages/SJON-59V9LR?open. Downloaded on 02 Jan 2004.

DSE (2002). Native Flora. Department of sustainability and the Environment, Victoria, Australia. http://www.nre.vic.gov.au/web/root/domino/cm_da/nrecfor.nsf/0/68bdc676150557b44a25679a00026df4?OpenDocument Downloaded 02 Jan 2004

Given, D. (1995). Personal communication to WCMC concerning conservation status of some New Zealand tree ferns.

Jones, D. L. (1987). *Encyclopaedia of ferns, an introduction to ferns, their structure, biology, economic importance, cultivation and propagation.* Lothian Publishing Company PTY Ltd, Melbourne. pp 433.

NZERN (2004). *Cyathea cunninghamii*. The New Zealand Ecological Restoration Network. http://www.members.bush.org.nz/planterguide/species.cfm?Species=Cyathea%20cunninghamii Downloaded 02 Jan 2004.

Salmon, J. T. (1980). *The native trees of New Zealand*.A. H. & A. W. Reed Ltd, Sydney. pp384.

State of Queensland (2001). Nature Conservation Wildlife Regulation 1994 – reprinted as in force on 7 December 2001. http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/N/NatureConWilR94_02C.pdf Downloaded 02 Jan 2004

**INTERNATIONAL TRADE**

**Gross Exports of *Cyathea cunninghamii***

| Exporter | Term | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New Zealand | dried plants | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 |
| Australia | live | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 |
| New Zealand | live | 0 | 0 | 0 | 0 | 0 | 4 | 377 | 525 | 1885 | 1313 | 3241 |
| New Zealand | timber | 0 | 0 | 0 | 0 | 0 | 0 | 500 | 0 | 0 | 67456 | 0 |

## *6. Cyathea dealbata*

**FAMILY** CYATHEACEAE

**NAME AND AUTHOR** *Cyathea dealbata* (Forst. 1786) Sw. 1801

**COMMON NAME** Silver Tree Fern

**SYNONYMS** *Alsophila tricolour* (Colenso 1883) R.Tryon 1970
*Cyathea tricolour* Colenso 1883
*Hemitelia falciloba* Colla 1892

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

This subcanopy species grows to 10 m. A popular tree fern, well known for the silvery white undersides to the fronds and stipes (Jones, 1987). It requires abundant water (Jones, 1987). It is more common in drier forest and more open scrub (Brownsey and Smith-Dodsworth, 1989).

**New Zealand**: Occurrence reported in New Zealand (Crowe, 1994) where it is endemic (Anon., 2003; Brownsey and Smith-Dodsworth, 1989). It is a common species in primary indigenous forests (Lehmann *et al.*, 2002). It also occurs in lowland and montane forest from North Cape to Dunedin but it is largely absent from the west coast and far south of the South island (Brownsey and Smith-Dodsworth, 1989). It is common throughout the North, South and Chatham Islands in forest and sometimes in scrub from sea level to 600 m (Salmon, 1980).

**REFERENCES**


Anon. (2003). The Hidden Forest: Primitive Plants. http://www.hiddenforest.co.nz/plants/trueferns/trueferns.htm Downloaded 22/12/2003.

Brownsey, P. J. and Smith-Dodsworth, J. C. (1989). *New Zealand ferns and allied plants*. David Bateman, Auckland, New Zealand.

Crowe, A. (1994). *Which native fern? A simple guide to the identification of New Zealand native ferns*. Viking. 64 pp.

Jones, D. L. (1987). *Encyclopaedia of ferns, an introduction to ferns, their structure, biology, economic importance, cultivation and propagation.* Lothian Publishing Company PTY Ltd, Melbourne. pp 433.

Lehmann, A., Leathwick, J. R. and McOverton, J. (2002). Assessing New Zealand fern diversity from spatial predictions of species assemblages. *Biodiversity and Conservation* 11: 2217–2238.

Salmon, J. T. (1980). *The native trees of New Zealand.* A. H. & A. W. Reed Ltd, Sydney.


**INTERNATIONAL TRADE**

**Gross Exports of *Cyathea dealbata***

| Exporter | Term | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New Zealand | dried plants | 0 | 0 | 0 | 0 | 192 | 0 | 1 | 0 | 0 | 0 | 0 |
| New Zealand | live | 0 | 0 | 0 | 15 | 100 | 18 | 668 | 685 | 913 | 536 | 4256 |
| New Zealand | timber | 0 | 0 | 0 | 0 | 0 | 0 | 195 | 0 | 0 | 0 | 0 |

## *7. Cyathea medullaris*

**FAMILY** CYATHEACEAE

**NAME AND AUTHOR** *Cyathea medullaris* (G. Forster) Swartz, 1801

**COMMON NAME** Black Tree Fern

**SYNONYM** *Alsophila extensa* R. Br., 1810; *Alsophila extensa* (Forst.) Spr., 1827; *Alsophila marianna* Gaud., 1827; *Cyathea affinis* Hook. & Baker, 1865; *Cyathea cumingii* Baker, 1874; *Cyathea deorsilobata* Copel., 1911; *Cyathea extensa* (Forst.) Sw., 1801; *Cyathea grantii* Copel., 1932; *Cyathea medullaris* var. *polyneuron* (Col.) ?; *Cyathea polyneuron* Col., 1879; *Cyathea scabra* Baker, 1876; *Cyathea societarum* Baker, 1874; *Hemitelia cumingii* Trevis., 1851; *Hemitelia extensa* (Forst.) C. Presl, 1848; *Polypodium medullare* G. Forster, 1786; *Sphaeropteris medullaris* (Forst.) Bernh., 1801

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

A splendid robust tree fern, renowned for its massive head covered with black scales and huge, spreading crown of lacy fronds, it is adaptable and easy to grow (Jones, 1987). It prefers damp areas and is sensitive to frost (Brownsey and Smith-Dodsworth, 1989).

**Australia**: Occurrence reported in New South Wales, Tasmania and Victoria (Allan, 1961).
**Fiji:** Occurrence reported (Jones, 1987).
**French Polynesia**: Occurrence reported in the Tubuai Islands (Waldren *et al.*, 1995) and listed as Endangered (Hallé, 1978). Also reported in the Society and Tuamotu Islands.
**New Zealand**: Occurrence reported (Jones, 1987). It occurs in lowland forest throughout, uncommon east of the divide in south Mamaku (Allan, 1961). It is common in the lowland forest of the North Island, but mostly coastal in the South Island and absent from the drier parts of Canterbury and Otago (Brownsey and Smith-Dodsworth, 1989).
**Pitcairn Islands**: Reported as Endangered (Waldren *et al.*, 1995).
**Samoa**: Occurrence reported.

**REFERENCES**


Allan, H. H. (1961). *Flora of New Zealand*. Vol 1. R. E. Owen, Government Printer, Wellington, New Zealand. pp 1085.
Brownsey, P. J. and Smith-Dodsworth, J. C. (1989). *New Zealand ferns and allied plants*. David Bateman, Auckland, New Zealand.
Hallé, F. (1978). Arbres et forêts des Iles Marquises. *Cah. Pac.* 21: 315-357.
Jones, D. L. (1987). *Encyclopaedia of ferns, an introduction to ferns, their structure, biology, economic importance, cultivation and propagation.* Lothian Publishing Company PTY Ltd, Melbourne.
Waldren, S., Florence, J. and Chepstow-Lusty, A. J. (1995). Rare and endemic vascular plants of the Pitcairn Islands, south-central Pacific Ocean: a conservation appraisal. *Biological Conservation* 74: 83-98.


**INTERNATIONAL TRADE**

**Gross Exports of *Cyathea medullaris***

| Exporter | Term | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New Zealand | dried plants | 0 | 0 | 0 | 0 | 240 | 100 | 1 | 0 | 12 | 0 | 0 |
| Vanuatu | dried plants | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| New Zealand | live | 0 | 0 | 0 | 4 | 100 | 45 | 621 | 887 | 785 | 501 | 4391 |
| New Zealand | timber | 5 | 0 | 0 | 0 | 0 | 0 | 385 | 6 | 0 | 0 | 0 |

## *8. Cyathea smithii*

**FAMILY** CYATHEACEAE

**NAME AND AUTHOR** *Cyathea smithii* Hook.f., 1854

**COMMON NAME** Soft Tree Fern

**SYNONYMS** *Alsophila smithii* (Hook.f.) R. Tryon, 1970, *Hemitelia smithii* (Hook.f.) Hook., 1865; *Hemitelia stellulata* Colla, 1886

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

A large tree fern well suited to temperate districts with a cold, moist climate (Jones, 1987).

**New Zealand**: Occurrence reported (Given, 1992). It is endemic to New Zealand and found in the lowland to montane forests from latitude of 35° southwards (Allan, 1961). It is found in damp places in forests from near sea level to at least 1,000 m from Mangonui south through the North, South, Stewart, Auckland, and Chatham Islands (Salmon, 1980). This species is common throughout New Zealand in montane forest of the North Island and in lowland to montane areas of the South Island (Brownsey and Smith-Dodsworth, 1989). It favours colder, wetter conditions and is the dominant tree fern at higher altitudes and in the far south (Brownsey and Smith-Dodsworth, 1989).

**REFERENCES**


Allan, H. H. (1961). *Flora of New Zealand*. Vol 1. R. E. Owen, Government Printer, Wellington, New Zealand. pp 1085.

Brownsey, P. J. and Smith-Dodsworth, J. C. (1989) *New Zealand ferns and allied plants*. David Bateman, Auckland, New Zealand.

Given, D. R. (1992). Letter to Hugh Synge concerning conservation status of New Zealand plants.

Jones, D. L. (1987). *Encyclopaedia of ferns, an introduction to ferns, their structure, biology, economic importance, cultivation and propagation.* Lothian Publishing Company PTY Ltd, Melbourne.

Salmon, J. T. (1980). *The native trees of New Zealand.* A. H. & A. W. Reed Ltd, Sydney.


**INTERNATIONAL TRADE**

**Gross Exports of *Cyathea smithii***

| Exporter | Term | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New Zealand | dried plants | 0 | 72 | 17 | 0 | 168 | 0 | 0 | 0 | 0 | 0 | 0 |
| New Zealand | live | 0 | 56 | 0 | 81 | 102 | 15 | 535 | 348 | 543 | 1062 | 4115 |
| New Zealand | timber | 0 | 72 | 0 | 0 | 0 | 0 | 180 | 0 | 0 | 0 | 0 |

## *9. Cibotium barometz*

**FAMILY** DICKSONIACEAE

**NAME AND AUTHOR** *Cibotium barometz* (L.1753) J. Smith 1842

**SYNONYMS** *Balantium glaucescens* Link, 1841; *Cibotium assamicum* Hook., 1844; *Cibotium baranetz* Christ, 1907; *Cibotium djambianum* Hassk., 1856; *Cibotium glaucescens* (Link) Kunze, 1841; *Cibotium glaucophyllum* C. Presl, 1836; *Cibotium glaucum* J. Smith, 1841; *Dicksonia assamica* (Hook.) Griff., 1849; *Dicksonia barometz* (L.) Hook. & Baker, 1866

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

Plants are hardy and easily grown (Jones, 1987).

**China**: Occurrence reported (Jones, 1987). Status in China reported as Vulnerable and wild plants under State protection (Hong Kong Herbarium, 2004(?)). The species has a relatively widespread distribution, occurring in the valley, edges of the forest in tropical and subtropical zones in China, Indochina and southeast Asia. Its populations are reported to be decline due to habitat destruction accelerated by collection for medicinal use. However, hard data are still difficult to attain. Dried rhizome of this species is in demand as medicine. It is known to be in trade and to be collected from the wild. Significant trade surveys in China noted this species as priority for conservation action (HaiNing and Shi Yong, 2003).
**Hong Kong**: Occurrence reported (UNEP-WCMC database).
**India**: Occurrence reported (Iwatsuki, 1988; Jones, 1987).
**Indonesia**: Reported as Rare on Java and occurrence reported on Sumatra.
**Japan**: Reported as not threatened (Nakaike, 1995).
**Malaysia**: Occurrence reported (Jones, 1987). This is common in open situations in forest on steep slopes in the hills and mountains, and may be abundant amongst secondary growth in clearings where the forest is regenerating (Piggott, 1988). The hairs, fresh or charred, have been used as a styptic and used to stuff pillows, and the leaves can be used medicinally in case of fainting (Piggott, 1988). Reported as not threatened.
**Myanmar**: Occurrence reported (Nakaike, 1992) in Tavoy (Beddome, 1883).
**Nepal**: Occurrence reported.
**Papua New Guinea**: Reported as Rare (Parris, 1988).
**Philippines**: Reported as Rare (Amoroso, 1990).
**Taiwan**: Occurrence reported (Li *et al.*, 1975) and reported as Rare (Taiwan Endemic Species Research Institute, 1995).
**Thailand**: Recorded as not threatened (Tagawa and Iwatsuki, 1979).
**Viet Nam**: Occurrence reported (Loc, 1992). Lecup and Quang Tu (2000) report a broad impression that market demand for wild collected specimens is far exceeding the current supply capacity.

**REFERENCES**


Amoroso, V. B. (1990). Some endangered economic and endemic ferns of the Philippines. pp. 15-27 in (unknown published source).

Hong Kong Herbarium, 2004(?)). *Cibotium barometz* (L.) J. Sm. http://www.hkherbarium.net/Herbarium/5Cibotium%20barometz.htm Downloaded 02 Jan 2004.

Beddome, R. H. (1883). *Handbook to the ferns of British India, Ceylon and the Malay Peninsula*.Thacker, Spink and Co., London. pp500.

HaiNing, Q. and D. Shi Yong. (2003). Test of the applicability of the criteria for listing on Appendix I and Appendix II. http://www.cites.org/common/prog/criteria/flora/C_barometz_CN.pdf Downloaded on 02 Jan 2004.

Iwatsuki, K. (1988). An enumeration of the pteridophytes of Nepal. Pp. 231-339 *In* Ohba, H. and Malla (eds.). *Himalayan Plants*. Tokyo: Tokyo Press.

Jones, D. L. (1987). *Encyclopaedia of ferns, an introduction to ferns, their structure, biology, economic importance, cultivation and propagation.* Lothian Publishing Company PTY Ltd, Melbourne. pp 433.

Lecup, I. and B. Quang Tu (2000) . A participatory diagnosis of the local non timber forest products and their market environment in two communes in Tua Chua District, Lai Chau Province. Vietnamese – German Technical Cooperation. http://www.mekonginfo.org/mrc_en/doclib.nsf/0/78E25960B87ECA4C472569340035837O/$FILE/FULLTEXT.html Downloaded 02 Jan 2004.

Li, H.-L., T.-S. Liu, T.-C. Huang, T. Koyama & C.E. Devol (1975). *Flora of Taiwan*. Taipei: Epoch

Loc, P. K. (1992). Annotations to WCMC printout entitled: Conservation status listing for Philippines dated 6 April 1992. Unpublished.

Ministry of Science, Technology and Environment (1996). *Sach do Viet Nam Phan Thuc Vat.* [*Red Data Book of Vietnam*] *Volume 2. Plants*. Hanoi: Science and Technics Publishing House. 484 pp.
Nakaike, T. (1992). *New flora of Japan, pteridophytes*. 868 pp.
Nakaike, T. (1995). Annotations to WCMC printout entitled "Conservation status listing of tree ferns of Japan". Unpublished
Parris, B. (1988). List of ferns in the WCMC database for Peninsular Malaysia with annotations by Barbara Parris. Unpublished.
Piggott, A. G. (1988). *Ferns of Malaysia in colour.* Tropical Press SDN. BHD., Kuala Lumpur, Malaysia. pp 458.
Tagawa, M. and Iwatsuki, K. (eds.) (1979). *Flora of Thailand* 3(1):1-128.
Taiwan Endemic Species Research Institute (1995). Conservation Status Listing of Plants in Taiwan (Draft). 79 pp. Unpublished.

**INTERNATIONAL TRADE**

**Gross Exports of *Cibotium barometz***

| Exporter | Term | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| China | derivatives | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1200 | 0 | 0 | 0 |
| China | derivatives flasks | 0 | 0 | 0 | 0 | 0 | 0 | 240 | 0 | 10000 | 423 | 0 |
| China | derivatives kg | 0 | 0 | 31000 | 4000 | 0 | 0 | 0.23 | 19.26 | 505 | 6675.42 | 1456.976 |
| China | derivatives shipments | 0 | 0 | 0 | 0 | 0 | 0 | 10363 | 1910 | 1696 | 2389 | 0 |
| China | live | 0 | 0 | 0 | 0 | 0 | 0 | 720 | 0 | 0 | 0 | 50 |
| Thailand | live | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 0 | 0 |
| China | roots kg | 0 | 4000 | 16100 | 328000 | 17470 | 0 | 0 | 0 | 0 | 14200 | 39400 |
| Viet Nam | roots kg | 0 | 0 | 7000 | 210000 | 50000 | 0 | 43000 | 213000 | 185000 | 153000 | 97000 |

## *10. Pterocarpus santalinus*

**FAMILY** LEGUMINOSAE

**NAME AND AUTHOR** *Pterocarpus santalinus* Linn. f.

**COMMON NAME(S)** Algum, Almug, Saunderswood, Red Sandalwood

**GLOBAL CONSERVATION STATUS** Endangered B1 + 2de (Oldfield, et al, 1998); Endangered (Walter & Gillett, 1998)

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

Occurs mainly in peninsular India, and sporadically in other states (Anon., 1997). Seed germination studies are being carried out in the field and *in vitro* for *Pterocarpus santalinus*. *In vitro* propagation protocols are being developed for *P. santalinus* (DBT, 2003).

**China**: Uncertain status reported (International Legume Database & Information Service, 2003) but likely to be introduced (Kumar and Sane, 2003).

**India**: Red sandalwood is restricted to the southern parts of the Eastern Ghats where it occurs in dry deciduous forest. It has a restricted natural range and grows typically on dry, hilly, often rocky ground and occasionally found growing on precipitous hillsides at altitudes of 150 - 900 m (Anon., 1997). It is found in the Cuddapah region in southern Andhra Pradesh (ENVIS, 2003), and also in Tamil Nadu and Pondicherry (Kumar and Sane, 2003). Recorded as Endangered (Ved, 1995). Threats to this species include habitat loss and degradation, selective logging, and clear cutting (CAMP Workshops on Medicinal Plants in India 1996). It is commercially valuable for its timber and for the extraction of dye, medicine and cosmetics, and has been overexploited in the past. It has been described by UNDP (2003) as an important plant species of medicinal value in the southern region of India and assessed as being endangered. Although export from India is prohibited by national legislation, large quantities are exported regularly (Anon., 1997). Illegal trade has been reported though exact figure unknown (Anon., 1997).

**Pakistan:** Occurrence reported (Richter and Dallwitz, 2002) but likely to be introduced (Kumar and Sane, 2003).

**Sri Lanka**: Occurrence reported as an introduction (Kumar and Sane, 2003).

**Taiwan**: Occurrence reported as an introduction (Kumar and Sane, 2003).

**REFERENCES**


Anon. (1997). Proposal to include *Pterocarpus santalinus* in Appendix II of CITES (unpublished). Ninth Conference of the Parties to CITES, Fort Lauderdale, Florida, USA.

CAMP Workshops on Medicinal Plants in India (1996). *Pterocarpus santalinus.* In: IUCN 2003. *2003 IUCN Red List of Threatened Species.* www.redlist.org. Downloaded 22/12/2003.

Department of Biotechnology (DBT) (2003). Ministry of Science and Technology of India. http://dbtindia.nic.in/r&d/med&aroplants.html Downloaded 22/12/2003.

ENVIS (2003). Environmental Information System - Medicinal Plants of Conservation Concern. Focus on 880 traded medicinal plants of India. http://envis.frlht.org.in/botanical_search.php?txtbtname=Pterocarpus+santalinus&gesp=1764%7CPterocarpus+santalinus+L.F Downloaded 22/12/2003

International Legume Database & Information Service (2003). http://www.ildis.org/LegumeWeb/6.00/taxa/16068.shtml Downloaded 22/12/2003.

Kumar, S. and Sane, P. V. (2003) *Legumes of South Asia, a check-list*. Royal Botanic Gardens, Kew.

Oldfield, S.O., Lusty, C. & A.MacKinven. 1998. *The World List of Threatened Trees.* World Conservation Press. 650pp.

Richter, H. G. and Dallwitz, M. J. (2002). Commercial timbers: descriptions, illustrations, identification, and information retrieval. In English, French, German, and Spanish. Version: 18th October 2002. http://biodiversity.uno.edu/delta/ Downloaded 22/12/2003.

UNDP (United Nations Development Programme) (2003). Environment Programme Support Sub-Programme for Medicinal Plants Conservation and Sustainable Utilisation, India. http://www.undp.org.in/Programme/Environment/mplants/default.htm Downloaded 22/12/2003.

Ved, D. K. (1995). Plants under threat - new list forged. (from FRLHT). *AMRUTH* 5: 2-3.

Walter, K.S. & H.J. Gillett. 1998. *1997 IUCN Red List of Threatened Plants.* Compiled by the World Conservation Monitoring Centre, CambridgeUK. 862pp.

**INTERNATIONAL TRADE**

**Gross Exports of *Pterocarpus santalinus***

| Exporter | Term | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| India | extract kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2497 | 0 | 0 | 0 |
| Cambodia | timber $m^3$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29.884 | 0 | 0 | 0 |
| Madagascar | timber $m^3$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 |

## *11. Bletilla striata*

**FAMILY** ORCHIDACEAE

**NAME AND AUTHOR** *Bletilla striata* (Thunb.) Rchb.f.

**SYNONYMS** *Bletia gebina* Lindl., *Bletia hyacinthina* (Sm.) Aiton, *Bletia striata* (Thunb.) Druce, *Bletilla elegantula* (Kraenzl.) Garay & G. A. Romero, *Bletilla gebina* (Lindl.) Rchbf., *Bletilla striata* f. *gebina* (Lindl.) Ohwi, *Bletilla striata* var. *gebina* (Lindl.) Rchb.f., *Bletilla striata* var. *kotoensis* (Hayata) Masam., *Calanthe gebina* (Lindl.) Lindl., *Coelogyne elegantula* Kraenzl., *Cymbidium hyacinthinum* Sm., *Cymbidium striatum* (Thunb.) Sw., *Epidendrum striatum* (Thunb.) Thunb., *Gyas humilis* Salisb., *Jimensia nervosa* Raf., *Jimensia striata* (Thunb.) Garay & R. E. Schult., *Limodoru hyacinthinum* (Sm.) Donn, *Limodorum striatum* Thunb. in J. A. Murray, *Polytoma inodora* Lour. ex Gomes, *Sobralia bletioides* Brongn. ex Decne.

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

**China**: Occurrence reported in Central, Northern and Southern China (Royal Botanic Gardens, Kew, 2003).
**Japan**: Occurrence reported (Royal Botanic Gardens, Kew, 2003). Reported as rare in Honshu, Shikoku and Kyushu (Ohwi, 1965).
**Korea, Rep. of**: Occurrence reported (Royal Botanic Gardens, Kew, 2003; Tchang, 1989).
**Lao P.D.R.**: Seidenfaden (1973) noted that Gagnepain and Guillaumin (1932-1934) reported its occurrence in northern Laos.
**Taiwan**: Recorded from Lanyu Island (Liu and Su, 1978).
**Viet Nam**: Seidenfaden (1973) referred to a specimen in the Paris Museum labelled "Cochinchina? Cult.?".

**REFERENCES**


Royal Botanic Gardens, Kew (2003) Monocot Checklist. http://www.rbgkew.org.uk/data/monocots. Downloaded 24 June 2003.
Gagnepain, F. and Guillaumin, A. (1932-1934) Orchidacées. Pp. 142-647 in Lecomte, *Flore Gén. Indoch.* 6.
Liu, T.-S. and Su, H.-J. (1978) Orchidaceae. Pp. 859-1137 in *Flora of Taiwan*, Vol. 5. Epoch Publishing, Taipei.
Ohwi, J. (1965) *Flora of Japan*.
Seidenfaden, G. (1973) An enumeration of Laotian orchids. *Bull. Mus. Nat. Hist. Nat.* (3)71: 101-152.
Tchang Bok Lee (1989) [*Illustrated flora of Korea*.] (In Korean)


**INTERNATIONAL TRADE**

**Gross Exports of *Bletilla striata***

| Exporter | Term | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| China | derivatives kg | 0 | 0 | 0 | 0 | 7600 | 0 | 0 | 30005 | 2 | 0 | 0 |
| China | derivatives shipments | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 130 | 0 | 0 | 0 |
| China | dried plants kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 198 | 300 | 0 | 0 |
| China | live | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 3000 |
| Viet Nam | live | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 0 |

## *12. Dendrobium nobile*

**FAMILY** ORCHIDACEAE

**NAME AND AUTHOR** *Dendrobium nobile* Lindl.

**SYNONYMS** *Dendrobium coerulescens* Wall. ex Lindl., *Dendrobium formosanum* (Rchb.f.) Masam., *Dendrobium lindleyanum* Griff., *Dendrobium nobile* Lindl. var *alboluteum* Huyen & Aver., *Dendrobium nobile* var. *formosanum* Rchb.f., *Dendrobium nobile* Lindl. f. *nobilius* (Rchb.f.) M. Hiroe, *Dendrobium nobile* Lindl. var. *nobilius* Rchb.f.

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

**Bhutan**: Occurrence reported (Roberts *et al.*, 1997). Status reported as Rare (Pradhan, 1993).
**China**: Occurrence reported (Roberts *et al.*, 1997).
**India**: Occurrence reported (Roberts *et al.*, 1997). Status reported as Indeterminate (Arora and Gupta, 1983).
**Lao P.D.R.**: Occurrence reported (Roberts *et al.*, 1997).
**Myanmar**: Occurrence reported (Roberts *et al.*, 1997).
**Nepal**: Occurrence reported (Roberts *et al.*, 1997).
**Taiwan**: Occurrence reported (Roberts *et al.*, 1997). Liu and Su (1978) reported that it was probably not a native species.
**Thailand**: Occurrence reported (Roberts *et al.*, 1997). Identified as a priority for conservation action following a workshop considering orchids in trade in Thailand (Royal Botanic Gardens Kew, 1999).
**Viet Nam**: Occurrence reported (Roberts *et al.*, 1997).

The variety *alboluteum* is only found in Viet Nam, but *nobile* occurs in all countries listed above (Roberts *et al.*, 1997).

**REFERENCES**


Arora, Y. K. and Gupta, R. K. (1983). Native ornamental orchids: conservation and cultivation of endangered and extinct species. *J. Econ. Taxon. Bot.* 4 (2):393-411.

Liu, T.-S. and Su, H.-J. (1978) Orchidaceae. Pp. 859-1137 in *Flora of Taiwan*, Vol. 5. Epoch Publishing, Taipei.

Pradhan, R. (1993). Annotations to WCMC plant list for Bhutan dated 31 August 1993.

Roberts, J. A., Allman, L. R., Beale, C. R., Butter, R. W., Crook, K. R. and McGough, H. N. (comps.) (1997). *CITES Orchid Checklist. Volume 2 For the genera*: Cymbidium, Dendrobium *(selected sections only)*, Disa, Dracula *and* Encyclia. Kew: Royal Botanic Gardens. 300 pp.

Royal Botanic Gardens Kew. 1999. A survey of the orchid trade in Thailand. 23pp. http://europa.eu.int/ hail/environment/cites/studies/study_orchids_thailand.pdf


**INTERNATIONAL TRADE**

**Gross Exports of *Dendrobium nobile***

| Exporter | Term | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| China | Derivatives | 18000 | 0 | 0 | 0 | 0 | 0 | 0 | 600 | 0 | 0 | 0 |
| China | Derivatives kg | 0 | 0 | 0 | 0 | 1000 | 0 | 0 | 0 | 56 | 3049.7 | 6.15 |
| China | Derivatives shipments | 8629 | 92 | 145 | 0 | 0 | 0 | 0 | 0 | 655 | 320 | 0 |
| Viet Nam | Derivatives kg | 0 | 0 | 0 | 0 | 5000 | 0 | 0 | 0 | 0 | 0 | 0 |
| Viet Nam | Dried plants kg | 0 | 0 | 0 | 0 | 0 | 0 | 20000 | 67000 | 0 | 16500 | 22000 |
| China | Extract flasks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| China | Live | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Thailand | Live | 123 | 459 | 13099 | 747 | 835 | 477 | 0 | 0 | 0 | 0 | 0 |
| Viet Nam | Live | 0 | 0 | 0 | 0 | 0 | 250 | 400 | 1776 | 130 | 0 | 0 |
| China | Roots kg | 0 | 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Laos | Roots kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 400000 | 0 |
| Viet Nam | Roots kg | 0 | 0 | 0 | 28175 | 0 | 24500 | 39000 | 0 | 23000 | 13000 | 0 |

## *13. Cistanche deserticola*

**FAMILY** SCROPHULARIACEAE

**NAME AND AUTHOR** *Cistanche deserticola* Y. C. Ma

**COMMON NAME** Desert living cistanche

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

**China**: Occurrence reported from Nei Monggol Zizhiqu and Xinjiang Uygur Zizhiqu (National Environment Protection Bureau, 1987) and recorded as Endangered (Fu and Jin, 1992). "This species is a unique parasitic herb, distributed in Gansu, Shaanxi provinces, Xingjiang Uygur Autonomous Region, Ningxia Hui Autonomous Region, Inner Mongolia Autonomous Region of China" (CITES Secretariat, 2000).

Comments from the proposal submitted by China to list the species include: "Because Cistanche deserticola Ma is a parasitic herb growing on the roots of *Haloxylon ammodendron* and *H. persicum* in desert areas. It is difficult to cultivate Cistanche deserticola Ma and to develop the population quickly…. Inner Mongolia Autonomous Region is the top native producing area of the species where the quantity of the drug is the best of all; the annual production is about 70 tons at present. *Cistanche deserticola* Ma produced in Ningxia Hui Autonomous Region is used only in the local region in recent years. It is produced in Gansu province for a long time, but the production decreased quickly for indiscriminate collection. This species distributes widely in North Xingjiang Uygur Autonomous Region where annual output is about 50 tons….. The population of the species decreased, distributive area shrunk, resource deposit declined…… For over exploitation, the population of this species was getting less and less and its distributive areas shrunk dramatically. In addition, people collected it only, but not propagate it. Now it is difficult to find the herb in 20km region around the residential area in Inner Mongolia Autonomous Region and in 100km region around the residential area in Xingjiang Uygur autonomous region" (CITES Secretariat, 2000).

"Legal trade: The commodity of the species mainly exported to Japan, Hongkong, and Southeast Asia. The world trade volumes has grown stably. From fifties to sixties, the commodity of Cistanche desertecola Ma was mainly collected in Inner Mongolia, and purchases were more than sales all the time. From nineteen seventies, because of over exploitation, the resource in Inner Mongolia Autonomous Region decreased gradually, and the resource in Xingjiang Uygur Autonomous Region was not developed to utilize, the purchase tended to decline. With the utilization of Cistanche desertecola Ma in Xingjiang Uygur Autonomous Region, purchase rose obviously. The annual purchases have kept 400-500 tons at the beginning of eighties, and world trade volumes were up to 120 tons per year. With increase of the world trade volumes, the resource of the species decreased dramatically. The world trade volumes is intending to decline in recent years, and now the whole volumes of Cistanche desertecola Ma even can't meet the foreign market" (CITES Secretariat, 2000).

"Illegal Trade: Considering its obvious effects and high demand in national and international markets, it is traded in smuggling and other illegal methods" (CITES Secretariat, 2000).

**Mongolia**: Reported as Endangered (Batjargal and Enkhbat, 1998).

"Famous and valuable Chinese medicinal plants, such as *Cistanche deserticola* and *Cynomorium songaricum*, have decreased in wild habitats as the result of overcollecting…Recently, government bans on hunting and collecting rare and endangered animals and plants have been enacted, but poaching and collecting are still serious problems" (Anon., 1995).

**REFERENCES**


Anon. (1995). *China's Biodiversity: A Country Study*. State Environmental Protection Administration, China. http://www.zhb.gov.cn/english/biodiv/state_imp_en/country_study.html

Anon. (1996). *Biodiversity Conservation Action Plan for Mongolia. Appendix 7 List of plant species classified as very rare and rare under the Mongolian Law on Natural Plants*. Pp. 119-122.

Batjargal, Z. and Enkhbat, A. (editors). (1998). *Biological Diversity in Mongolia. First National Report to the Convention on Biological Diversity*. Ministry for Nature and Environment of Mongolia, UNEP and GEF Ulaanbatar. 144pp. http://www.biodiv.org/doc/world/mn/mn-nr-01-en.pdf

CITES Secretariat. 2000. Proposal 11.59. Consideration of Proposals for Amendment of Appendices: *Cistanche deserticola*. Proposal submitted by The People's Republic of China. http://www.google.co.uk/search?q=cache:i5SI_ZEN_UMJ:www.cites.org/eng/cop/11/prop/59.pdf+%22Cistanche+deserticola%22+status&hl=en&ie=UTF-8

Fu, L. and Jin, J. (eds.) (1992). *China Plant Red Data Book. Rare and endangered plants. Vol. 1*. Beijing: Science Press. xviii, 741 pp.

IUCN & TRAFFIC. 2000. Analysis of proposals to amend the CITES Appendices. Submitted to the Eleventh Meeting of Conference of the Parties Nairobi, Kenya 10-20 April 2000. Unpublished.

National Environment Protection Bureau (1987). *The list of rare and endangered plants protected in China*. Botanical Institute of Chinese Academy of Sciences, Beijing: Academy Press. 96 pp.

**INTERNATIONAL TRADE**

**Gross Exports of *Cistanche deserticola***

| Exporter | Term | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| China | derivatives | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| China | derivatives kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4200 | 0 | 1233.046 |
| China | derivatives shipments | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| China | stems kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3750 | 2589.28 |

## *14. Cyclamen coum*

**FAMILY** PRIMULACEAE

**NAME AND AUTHOR** *Cyclamen coum* Mill.

**SYNONYMS** *Cyclamen coum* Mill. ssp. *caucasicum* (K. Koch) O. Schwarz
*Cyclamen coum* Mill. ssp. *coum* forma *albissimum* R. H. Bailey, Koenen, Lilywh. & P. J. M. Moore
*Cyclamen coum* Mill. ssp. *coum* forma *pallidum* Grey-Wilson
*Cyclamen coum* Mill. ssp. *elegans* (Boiss. & Bhuse) Grey-Wilson

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

A highly variable species. Has a wide, through discontinuous distribution from Bulgaria in eastern Europe, through northern and central Turkey to the southern Caucasus and northern Iran and then southwards to Syria and the Lebanon. The species also has a wide altitudinal range from sea-level to over 2,100 m. Along the shores of the Black Sea it is a common plant. At higher altitudes it is typically a woodland plant or a plant of scrub or rock crevices (Grey-Wilson, 1988).

It is of economic importance as an ornamental plant (GRIN, 2003).

**Armenia**: Occurrence reported (Davis *et al.*, 1999).
**Azerbaijan**: Occurrence reported (Davis *et al.*, 1999).
**Bulgaria**: Occurrence reported in the east (Davis *et al.*, 1999). It is considered endangered in Bulgaria (P. Zhelev, Aug 2002, in Kathe *et al.* 2003. Information sourced from the RDB of Bulgaria and from official orders of Ministry of Environment and Water).
**Georgia**: Occurrence reported (Davis *et al.*, 1999).
**Iran**: Occurrence reported (Davis *et al.*, 1999; Rechinger, 1965).
**Israel**: Occurrence reported in the north (Davis *et al.*, 1999). It occurs in the shade of shrubs, at altitudes of 1,100-1,200 m. It is found in Upper Galilee, Golan, where it is rather rare; it is protected by law, and grown for ornament in pots and rock gardens (Feinbrun-Dothan, 1978).
**Lebanon**: Occurrence reported (Davis *et al.*, 1999).
**Russian Federation**: Occurrence reported (Davis *et al.*, 1999).
**Syria**: Occurrence reported in the west (Davis *et al.*, 1999).
**Turkey**: Occurrence reported (Davis, 1978; Davis *et al.*, 1999). The Turkish First National Report to the Convention on Biological Diversity (www.biodiv.org) notes the following: *C. coum* is very restricted to certain regions and affects the economical structure of those regions because there are so many native people who collect geophytes from the mountains.
**Ukraine:** Occurrence reported (Shishkin and Bobrov, 1952). It occurs in mountain woods, mostly oak (Shishkin and Bobrov, 1952).

**REFERENCES**


Davis, A. P., McGough, H. N., Mathew, B. and Grey-Wilson, C.. (1999). *CITES Bulb Checklist. For the genera:* Cyclamen, Galanthus *and* Sternbergia. The Royal Botanic Gardens, Kew. 87pp.

Davis, P. H. (ed.) (1978) *Flora of Turkey*. Vol. 6. Royal Botanic Garden, Edinburgh.

Feinbrun-Dothan, N. (1978). *Flora Palaestina*. Part Three, Text Ericaceae to Compositae. The Israel Academy of Science and Humanities, Jerusalem.

Grey-Wilson, C. (1988). *The Genus* Cyclamen. The Royal Botanic Gardens, Kew in association with Christopher Helm and Timber Press. 147 pp.

GRIN (2003). The Germplasm Resources Information Network. http://www.ars-grin.gov/cgi-bin/npgs/html/tax_search.pl?cyclamen+coum Downloaded on 18/12/2003.

Rechinger, K. H. (1965). *Flora Iranica*, *Flora des Iranischen hochlandes und der umrahmenden gebirge*. Primulaceae. Akademische Druck- u. Verlagsanstalt, Graz, Austria. 37+Shishkin, B. K. and Bobrov, E. G. (ed.s) (19652. *Flora of the U.S.S.R.*. Vol XVIII, Metachlamydeae. Izdatel'stvo Akademii Nauk SSSR, Msocow – 1952 –Leningrad.

**INTERNATIONAL TRADE**

**Gross Exports of live *Cyclamen coum* and *Cyclamen coum* ssp. *caucasicum***

| Exporter | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Georgia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 200060 | 400200 |
| Netherlands | 675 | 0 | 0 | 1050 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turkey | 69750 | 152650 | 125800 | 79545 | 98025 | 140000 | 210400 | 250000 | 250000 | 300000 | 300000 |

## *15. Cyclamen hederifolium*

**FAMILY** PRIMULACEAE

**NAME AND AUTHOR** *Cyclamen hederifolium* Aiton

**SYNONYMS** *Cyclamen hederifolium* Aiton var. *confusum* Grey-Wilson
*Cyclamen hederifolium* Aiton var. *hederifolium* forma *albiflorum* (Jord.) Grey-Wilson

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

Has a wide Mediterranean distribution, being found from south-east France eastwards to south Turkey, including many Mediterranean islands, but excluding Cyprus.

**Albania**: Occurrence reported (Davis *et al.*, 1999).
**Bulgaria**: Occurrence reported (Davis *et al.*, 1999).
**France**: Occurrence reported (Davis *et al.*, 1999).
**Greece**: Occurrence reported (Davis *et al.*, 1999).
**Italy**: Occurrence reported (Davis *et al.*, 1999).
**Serbia & Montenegro**: Occurrence reported (Davis *et al.*, 1999).
**Switzerland**: Occurrence reported (Davis *et al.*, 1999).
**Turkey**: Occurrence reported in the west (Davis, 1978; Davis *et al.*, 1999). The Turkish First National Report to the Convention on Biological Diversity (www.biodiv.org) notes the following: *C. hederifolium* is very restricted to certain regions and affects the economical structure of those regions because there are so many native people who collect geophytes from the mountains.

"In some Near East countries (e.g.Turkey), bulbous plants are used for ornaments as well as in pharmaceutical and cosmetic industries. They have traditionally been used in the floristic trade locally and are now also being sold abroad. The export of flowers earned US$2,374,000 in 1995. Some of the most important bulbous plants are: *Eranthis hyemalis*, *Anemone blande*, *Leucozum aestivum* and *Cyclamen hederifolium*" (Heywood, 1997).

**United Kingdom**: Occurrence reported as an introduced species (Davis *et al.*, 1999).

Grey-Wilson (1988) refers to *C. hederifolium* forma *album* (syn. 'Album') as being scarce in wild populations but widely cultivated in gardens; however, he queries the use of the name and it is not listed in Davis *et al.* (1999). Extremely variable. Will grow in almost any garden and sows itself around freely. The best known hardy *Cyclamen*, in cultivation at least since the sixteenth century. Specimens over 130 years old have been recorded.

It is of economic importance as an ornamental plant (GRIN, 2003).

**REFERENCES**


Davis, A. P., McGough, H. N., Mathew, B. and Grey-Wilson, C.. (1999). *CITES Bulb Checklist. For the genera:* Cyclamen, Galanthus *and* Sternbergia. The Royal Botanic Gardens, Kew. 87pp.

Davis, P. H. (ed.) (1978) *Flora of Turkey*. Vol. 6. Royal Botanic Garden, Edinburgh.

Grey-Wilson, C. (1988). *The Genus* Cyclamen. The Royal Botanic Gardens, Kew in association with Christopher Helm and Timber Press. 147 pp.

GRIN (2003). The Germplasm Resources Information Network. http://www.ars-grin.gov/cgi-bin/npgs/html/tax_search.pl?cyclamen+coum Downloaded on 18/12/2003

Heywood, V. 1997. *Plant resources and their diversity in the Near East.* In: *Medicinal, Culinary and Aromatic Plants In The Near East* Proceedings of the International Expert Meeting organized by the Forest Products Division, FAO Forestry Department and the FAO Regional Office for the Near East 19 - 21 May 1997 Cairo, Egypt http://www.fao.org/docrep/X5402e/x5402e03.htm


**INTERNATIONAL TRADE**

**Gross Exports of live *Cyclamen hederifolium* and *Cyclamen hederifolium* var. *hederifolium* fa. *hederifolium***

| Exporter | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Netherlands | 5276 | 1000 | 195 | 35850 | 0 | 0 | 800 | 0 | 0 | 0 | 0 |
| Turkey | 1184375 | 1651000 | 1499228 | 474890 | 1094300 | 1315000 | 1452532 | 1441850 | 1250000 | 1300000 | 1275000 |

## *16. Nardostachys grandiflora*

**FAMILY** VALERIANACEAE

**NAME AND AUTHOR** *Nardostachys grandiflora* DC.

**COMMON NAME** Himalayan spikenard, Jatamansi

**DISTRIBUTION AND LOCAL CONSERVATION STATUS**

Recorded as occurring from Uttaranchal to south-west China (Polunin and Stainton, 1984) on rocks, ledges and open slopes from 3,600-4,800 m. It is widely distributed on undisturbed slopes (3,000 – 5,000 m) of the Himalayas (Anon., 1997b). Populations have declined in some parts of its range due to over-harvesting of the species's rhizomes for use in traditional medicine and as ingredients in perfumes and oils (Mulliken, 2000).

**Afganistan:** Occurrence reported (Anon., 1997b).

**Bhutan** Status recorded as Vulnerable (Pradhan, 1993). "May 25, 198? The Director of Forests approved a proposal to ban exports of medicinal plants..." (Anon., 1997a). "Particularly highly-prized plants, such as *Nardostachys grandiflora*, have been pushed to the brink of extinction by over-exploitation, according to Tinley Tshitila, a Research Officer in the Medicine and Aromatic Plants Section at the Yusipang National Agricultural Research Centre near Thimphu, the capital of Bhutan. "Demand, particularly from India, is so high that we banned exports, except in semi-processed form, so that we can try to control the trade and make sure our farmers benefit." Also, Bhutan has introduced a regime of sustainable harvesting from the wild. Using the traditional trading system, specialists worked with farmers to explain and encourage less-damaging collection. The most exploited area was Lingzhi, but now collection is permitted, in rotation, in other areas - Bumthang and Eastern Trashigang - too" (Emmett, 2003). Domestically, it is used to manufacture incense and in the preparation of indigenous medicine. Collection of this species from the wild is permitted, although exports of this species are banned (Mulliken, 2000).

**China**: Occurrence reported in Xizang Zizhiqu (Hara *et al.*, 1978-1982). Domestically it is not considered to be commonly used in traditional medicine (Mulliken, 2000).

**India**: Occurrence reported (Jain and Rao, 1983). Recorded in Himachal Pradesh, on alpine rocky slopes in Manjiban, Jakha-Kanda, Tangankhai and the Great Himalayan National Park, between 3,000 and 4,000 m. The market rate for the rhizomes was Rs. 90-160 per kg (Chauhan, 1999). Also recorded from Uttaranchal (Polunin and Stainton, 1984) and Sikkim (Chauhan, 1999). Domestically it is widely used as medicine and in perfumeries. Domestic harvest is permitted, except in Uttaranchal where it is banned. Exports and re-exports of this species in its raw form are prohibited (Mulliken, 2000).

**Myanmar:** Occurrence reported (Anon., 1997b).

**Nepal**: Recorded as Vulnerable (Shrestha and Joshi, 1996) due to extensive collection for export. Legally protected (export of raw material banned, processed material may be exported under licence) under the Forest Regulations, 1995 (amended in 2001) "NTFPs, especially medicinal plants from which underground parts (root, rhizome, tuber) and bark are collected, are adversely affected by uncontrolled harvesting. For example, there has been drastic depletion of plants that were once very abundant, such as *Nardostachys grandiflora* (Jatamansi) from the Jumla area. The medicinal plants of Nepal that are being used in traditional medicinal practised by local communities as well as in the Ayurvedic medical system for primary health care have also been harvested indiscriminately for export to meet international demands. Such plants include *N. grandiflora*" (His Majesty's Government of Nepal Ministry of Forests and Soil Conservation, 2002). Domestically it is used as medicine. Collection is authorised via permits which specify collection area but not quantity or harvest times. Nepal was the primary country of export of this species, exporting large amounts of unprocessed rhizomes and smaller quantities of oil. Much of these were exported to India. Export of unprocessed rhizomes is banned. Mulliken (2000) found little quantitative information available on the impact of harvest levels in Nepal. It is widely collected by villagers and shepherds who visit alpine regions in late summer (Shrestha and Joshi, 1996).

**Pakistan:** Domestically it is used for medicinal purposes. Commercial exploitation from reserved forests is forbidden. Where it is allowed, it is usually through the sale of the lease of an area.

**REFERENCES**


Anon. (1997a). *Biodiversity action plan for Bhutan*. National biodiversity strategy and action plan. 188pp. http://www.biodiv.org/doc/world/bt/bt-nbsap-01-en.pdf

Anon. (1997b). *IUCN Analyses of the proposals to amend the CITES Appendices*. Prepared by the IUCN Species Survival Commission and the TRAFFIC Network for the tenth meeting of the Conference of the Parties to CITES. IUCN The World Conservation Union, Gland, Switzerland.

Chauhan, N. S. (1999) *Medicinal and aromatic plants of Himachal Pradesh*. Indus Publishing Company, New Delhi.

Emmett, S. (2003). Mountain medicines. *New Agriculturist On-Line.* http://www.new-agri.co.uk/03-1/focuson/focuson5.html

Hara, H., Stearn, W. T. and Williams, L. H. J. (1978-1982). *An enumeration of the flowering plants of Nepal*. London, British Museum (Natural History). 3 vols.
His Majesty's Government of Nepal, Ministry of Forests and Soil Conservation (2002). *NepalBiodiversity Strategy*. 117pp. http://www.biodiv.org/doc/world/np/np-nbsap-01-en.doc
Jain, S. K. and Rao, R. R. (1983). *An assessment of threatened plants of India*. Proceedings of the seminar held at Dehra Dun, 14-17 Sept., 1981. Howrah, Botanical Survey of India. 334 pp.
Mulliken, T. A. (2000). Implementing CITES for Himalayan medicinal plants *Nardostachys grandiflora* and *Picrorhiza kurrooa*. *TRAFFIC Bulletin* 18 (2): 63-72.
Polunin, O. and Stainton, A. (1984) *Flowers of the Himalaya*. Oxford University Press, Oxford.
Pradhan, R. (1993). Annotations to WCMC plant list for Bhutan dated 31 August 1993.
Shrestha, T. B. and Joshi, R. M. (1996). *Rare, endemic and endangered plants of Nepal*. WWF Nepal Program, Kathmandu.

**INTERNATIONAL TRADE**

**Gross Exports of *Nardostachys grandiflora* from China**

| Term | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| roots kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12500 | 0 |

## SECTION 2: POSSIBLE CANDIDATE COUNTRY FOR COUNTRY-LEVEL REVIEW OF SIGNIFICANT TRADE

As mentioned in Section 1, following the first step statistical analysis and flow chart method of species selection, an initial list of 49 species was selected as possible candidates for review of significant trade. During the second stage of reviewing all species recorded trade level, a pattern emerged identifying **Viet Nam** as a possible candidate country for a country-level review of significant trade.

Orchidaceae spp. are the main group of species with an increase in trade from Viet Nam in recent years. It appears from the data that, following a ban on export of wild orchids from Thailand, the trade in some of the species was then taken up by Viet Nam, as illustrated by graphs 1-3 below.

Table 1 highlights gross exports of Orchidaceae species from Viet Nam (direct exports only) for the years 1995-2002.

Economy and Environment Program for Southeast Asia (EEPSEA), in their recent Research Report, highlight the main reasons for the rapid growth in this trade in Viet Nam and highlight key failures in the country's attempts to control it. The author of the report did, however, concentrate on fauna, while highlighting the fact that there is also a highly developed illegal trade in plant products in the country (EEPSEA Research Report 2003-RR6, Wildlife Trading in Vietnam: Why it Flourishes, by Nguyen Van Song [Economics and Rural Development Faculty, Hanoi Agricultural University # I, Vietnam].

http://www.idrc.org.sg/en/ev-47045-201-1-DO_TOPIC.html)

**Table 4: Gross exports of wild-sourced Appendix II-listed Orchidaceae species from Viet Nam 1994-2002**

*(Data are shown if the total export for 1995-2002 was equivalent to 50 or more specimens)*

| Taxon | Term | Unit | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Orchidaceae spp. | live | | | 690 | 1210 | 3321 | 3400 | 1170 | 32851 | 23808 | **66450** |
| *Acampe* spp. | live | | | | 14 | 38 | | | | | **52** |
| *Acampe carinata* | live | | | | | 105 | 10 | 20 | | | **135** |
| *Acampe rigida* | live | | | | | 105 | 35 | 30 | | | **170** |
| *Acineta superba* | live | | | | | 50 | | | | | **50** |
| *Aerides* spp. | live | | 3 | 6 | 104 | 123 | 1 | | | | **237** |
| *Aerides crassifolium* | live | | | | | 81 | | 50 | 50 | | **181** |
| *Aerides falcatum* | live | | | | | 960 | | 51 | | | **1011** |
| *Aerides krabiense* | live | | | | | 970 | 15 | | | | **985** |
| *Aerides multiflorum* | live | | | | | 961 | 11 | 151 | | | **1123** |
| *Aerides odoratum* | live | | | | | 961 | 13 | 50 | | | **1024** |
| *Aerides quinquevulnerum* | live | | | | | 240 | 15 | | | | **255** |
| *Ania penangiana* | live | | | | | 1 | 35 | 20 | | | **56** |
| *Anoectochilus* spp. | live | | | | 10 | 205 | | | | | **215** |
| *Anoectochilus sikkimensis* | live | | | | | | 15 | 20 | | 20 | **55** |
| *Arachnis* spp. | live | | 1 | 2 | 26 | 22 | | | | | **51** |
| *Arachnis flos-aeris* | live | | | | | 1 | 40 | 40 | | | **81** |
| *Arachnis* x *maingayi* | live | | | | | 10 | 40 | 20 | | | **70** |
| *Arundina graminifolia* | live | | | | | 53 | 3 | | | | **56** |
| *Ascocentrum* spp. | live | | | | 44 | 5133 | | | | 100 | **5277** |
| *Ascocentrum christensonianum* | live | | | | 50 | 3421 | 925 | 1010 | 1500 | | **6906** |
| *Ascocentrum garayi* | live | | 1 | | | 1801 | 30 | 150 | | | **1982** |
| *Ascocentrum rubescens* | live | | | | | | 1 | 50 | | | **51** |
| *Bromheadia aporoides* | live | | | | | | | 120 | | | **120** |
| *Bulbophyllum* spp. | live | | 1 | 13 | 725 | 3268 | 22 | 100 | 100 | 1100 | **5329** |
| *Bulbophyllum blepharistes* | live | | | | | 158 | | | | | **158** |
| *Bulbophyllum evrardii* | live | | | | | 20 | 215 | 80 | | 10 | **325** |
| *Bulbophyllum frostii* | live | | | | | | 740 | 100 | | | **840** |
| *Bulbophyllum lepidum* | live | | | | | 139 | 505 | 20 | | 470 | **1134** |
| *Bulbophyllum macranthum* | live | | | | | | 30 | 50 | | | **80** |
| *Bulbophyllum nigrescens* | live | | | | | | | 100 | | | **100** |
| *Bulbophyllum picturatum* | live | | | | | | | 50 | | 20 | **70** |
| *Bulbophyllum putidum* | live | | | | | | 750 | 100 | | 120 | **970** |
| *Bulbophyllum refractum* | live | | | | | 100 | 30 | 50 | | 10 | **190** |
| *Bulbophyllum spathulatum* | live | | | | | | | 50 | | | **50** |
| *Bulbophyllum umbellatum* | live | | | | | 20 | 15 | 50 | | 10 | **95** |
| *Calanthe* spp. | live | | 5 | | 180 | 50 | | | | | **235** |
| *Calanthe triplicata* | live | | | | | | | | | 110 | **110** |
| *Christensonia vietnamica* | live | | 5 | | | 4531 | 780 | 1060 | | 50 | **6426** |
| *Cleisostoma* spp. | live | | 5 | | 160 | 110 | | | | | **275** |
| *Cleisostoma arietinum* | live | | | | | | | 50 | | | **50** |
| *Cleisostoma filiforme* | live | | | | | | 30 | 50 | | | **80** |
| *Cleisostoma fuerstenbergianum* | live | | | | | | | 50 | | | **50** |
| *Cleisostoma tenuifolium* | live | | | | | | | 50 | | | **50** |
| *Coelogyne* spp. | live | | 2 | | 152 | 2284 | 776 | 50 | | 200 | **3464** |
| *Coelogyne assamica* | live | | | | | | 20 | 50 | | | **70** |
| *Coelogyne fimbriata* | live | | | | | | 70 | | | | **70** |
| *Coelogyne lawrenceana* | live | | | | | 500 | 20 | 50 | 50 | 10 | **630** |
| *Coelogyne lentiginosa* | live | | | | | 200 | | | | | **200** |
| *Coelogyne mooreana* | live | | 100 | 50 | | 200 | 560 | 50 | | | **960** |
| *Coelogyne nitida* | live | | | | | 400 | 1 | | | | **401** |
| *Coelogyne rigida* | live | | | | | | | 50 | | | **50** |
| *Coelogyne sanderae* | live | | | | | | 20 | 150 | | | **170** |
| *Coelogyne virescens* | live | | | | | 6 | 25 | 50 | | 10 | **91** |

| Taxon | Term | Unit | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Cymbidium* spp. | live | | 5 | | 724 | 712 | 42 | 20 | 100 | | **1603** |
| *Cymbidium aloifolium* | live | | | | | 10 | 10 | | | 30 | **50** |
| *Cymbidium cyperifolium* | live | | | | 50 | | | | | | **50** |
| *Cymbidium eburneum* | live | | | | | | 20 | 100 | | | **120** |
| *Cymbidium erythrostylum* | live | | | | | | 220 | 340 | | | **560** |
| *Cymbidium insigne* | live | | | | | | 20 | 50 | | | **70** |
| *Cymbidium kanran* | live | | | | | 10 | 20 | 50 | | | **80** |
| *Cymbidium munronianum* | live | | | | | 10 | 20 | 50 | | | **80** |
| *Cymbidium schroederi* | live | | | | | 50 | | | | | **50** |
| *Cymbidium tracyanum* | live | | | | | 750 | | | | | **750** |
| *Dendrobium* spp. | dried plants | | | | | 10000 | | | | | **10000** |
| *Dendrobium* spp. | dried plants | kg | | | | 28000 | 25000 | | 10000 | | **63000** |
| *Dendrobium* spp. | live | | 5 | 20 | 472 | 12352 | 36 | 101 | 250 | 650 | **13886** |
| *Dendrobium* spp. | roots | kg | | | | | | | 10000 | | **10000** |
| *Dendrobium aduncum* | live | | | | | | 500 | 2280 | 1500 | | **4280** |
| *Dendrobium amabile* | live | | | | | | 105 | 3290 | 300 | | **3695** |
| *Dendrobium anosmum* | live | | 50 | | 100 | 108 | 1014 | 230 | 100 | 20 | **1622** |
| *Dendrobium bellatulum* | live | | | | 100 | 600 | 675 | 50 | 200 | 550 | **2175** |
| *Dendrobium brymerianum* | dried plants | kg | | | | | | | | 1000 | **1000** |
| *Dendrobium brymerianum* | live | | | | | 600 | | | | 230 | **830** |
| *Dendrobium capillipes* | live | | | | | 100 | | 1520 | 500 | | **2120** |
| *Dendrobium cariniferum* | live | | | | | 100 | | 50 | | | **150** |
| *Dendrobium chlorostylum* | live | | | | | | 310 | 100 | | | **410** |
| *Dendrobium chrysanthum* | live | | | | | | 310 | 60 | 50 | | **420** |
| *Dendrobium chryseum* | live | | | | | | 10 | 50 | | | **60** |
| *Dendrobium chrysotoxum* | live | | | | 100 | 500 | 1 | 80 | 50 | | **731** |
| *Dendrobium crystallinum* | live | | | | | | | | 100 | | **100** |
| *Dendrobium dantaniense* | live | | | | | | | 50 | | | **50** |
| *Dendrobium delacourii* | live | | 50 | | | | | 50 | 200 | | **300** |
| *Dendrobium densiflorum* | live | | | | | | 10 | 50 | 150 | | **210** |
| *Dendrobium devonianum* | live | | | | | | | 50 | | | **50** |
| *Dendrobium dickasonii* | live | | | | | | | 50 | | | **50** |
| *Dendrobium draconis* | live | | | | 100 | 300 | 10 | 1550 | 1600 | | **3560** |
| *Dendrobium falconeri* | live | | | | | 200 | | | | | **200** |
| *Dendrobium farmeri* | live | | | | 100 | 600 | 1020 | 50 | | | **1770** |
| *Dendrobium fimbriatum* | live | | | | | | | 50 | | | **50** |
| *Dendrobium formosum* | live | | | | | | 230 | 2085 | 1700 | | **4015** |
| *Dendrobium gibsonii* | live | | | | | | 300 | 140 | | | **440** |
| *Dendrobium gratiosissimum* | live | | | | 100 | | | 50 | | | **150** |
| *Dendrobium hancockii* | live | | | | | | | 50 | | | **50** |
| *Dendrobium harveyanum* | live | | | | | | | 1300 | | 200 | **1500** |
| *Dendrobium herbaceum* | dried plants | kg | | | | 23000 | | | | 11000 | **34000** |
| *Dendrobium herbaceum* | roots | kg | | | | | | 35000 | | | **35000** |
| *Dendrobium hercoglossum* | live | | | | | | | 50 | | | **50** |
| *Dendrobium infundibulum* | live | | | | | | | 50 | 50 | | **100** |
| *Dendrobium lindleyi* | live | | | | | 400 | | 1 | 600 | 250 | **1251** |
| *Dendrobium moniliforme* | dried plants | | | | | 3700 | | | | | **3700** |
| *Dendrobium moniliforme* | dried plants | kg | | | | 5000 | | | | | **5000** |
| *Dendrobium nobile* | derivatives | kg | | 5000 | | | | | | | **5000** |
| *Dendrobium nobile* | dried plants | kg | | | | 20000 | 67000 | | 16500 | 22000 | **125500** |
| *Dendrobium nobile* | live | | | | 250 | 400 | 1776 | 130 | | | **2556** |
| *Dendrobium nobile* | roots | kg | 28175 | | 24500 | 39000 | | 23000 | 13000 | | **127675** |
| *Dendrobium ochraceum* | live | | | | | | 20 | 50 | | | **70** |
| *Dendrobium parcum* | live | | | | | 100 | | 20 | | | **120** |
| *Dendrobium pendulum* | live | | | | | | 310 | 80 | | | **390** |
| *Dendrobium primulinum* | live | | | | 100 | | | 50 | | | **150** |
| *Dendrobium secundum* | live | | | | | | 1500 | 1210 | 1500 | | **4210** |

| Taxon | Term | Unit | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Dendrobium sulcatum* | live | | | | | | | 50 | | | **50** |
| *Dendrobium thyrsiflorum* | live | | | | 100 | 800 | 2710 | 735 | 300 | | **4645** |
| *Dendrobium tortile* | live | | | | | 100 | 20 | 30 | | 20 | **170** |
| *Dendrobium unicum* | live | | | | | | | | | 350 | **350** |
| *Dendrobium wardianum* | live | | | | | | | | 100 | 150 | **250** |
| *Dendrobium williamsonii* | live | | | | | | | | 100 | | **100** |
| *Dendrochilum* spp. | live | | | | | 350 | | | | | **350** |
| *Epigeneium* spp. | live | | | | | 501 | 200 | | | 100 | **801** |
| *Eria* spp. | live | | 5 | 6 | 92 | 149 | 38 | | | 100 | **390** |
| *Eria ornata* | live | | | | | 100 | | | | | **100** |
| *Eria thwaitesii* | live | | | | | 100 | | | | | **100** |
| *Eulophia* spp. | live | | 5 | | 16 | 103 | | | | | **124** |
| *Gastrochilus* spp. | live | | | | | 204 | | | | | **204** |
| *Gastrochilus acaulis* | live | | | | | | 20 | 30 | | | **50** |
| *Gastrochilus obliquus* | live | | | | | | 25 | 30 | | | **55** |
| *Geodorum siamense* | live | | | | | 201 | | | | | **201** |
| *Habenaria rhodocheila* | live | | | | | 1 | | 20 | | 4000 | **4021** |
| *Holcoglossum subulifolium* | live | | | | | 222 | 10 | | | | **232** |
| *Hygrochilus parishii* | live | | 1 | | 200 | 1 | | 20 | | | **222** |
| *Liparis* spp. | live | | 2 | | 10 | 204 | 3 | | | | **219** |
| *Listera* spp. | live | | | | | 100 | | | | | **100** |
| *Luisia* spp. | live | | | | 21 | 100 | | | | | **121** |
| *Oberonia* spp. | live | | 1 | | 42 | 10 | 225 | | | 100 | **378** |
| *Oberonia dalatensis* | live | | | | | | 25 | 60 | | | **85** |
| *Oberonia langbianensis* | live | | | | | | 25 | 30 | | | **55** |
| *Oeceoclades* spp. | live | | | | | 100 | | | | | **100** |
| *Ornithochilus difformis* | live | | 1 | 1 | | 6 | 45 | | | | **53** |
| *Otochilus fuscus* | live | | 1 | 1 | | 1 | 565 | 20 | | | **588** |
| *Papilionanthe* spp. | live | | | | | 2 | 880 | | | 380 | **1262** |
| *Papilionanthe pedunculata* | live | | | | 150 | 10 | 50 | 100 | | | **310** |
| *Papilionanthe teres* | live | | | | | 200 | | | | | **200** |
| *Pecteilis susannae* | live | | | | | 101 | | | | | **101** |
| *Phaius* spp. | live | | 5 | | 134 | 18 | | | | | **157** |
| *Phaius flavus* | live | | | | | | 60 | | | | **60** |
| *Phaius tankervilleae* | live | | | | | 100 | | | | | **100** |
| *Phalaenopsis* spp. | live | | 5 | 6 | 160 | 477 | 15 | | 100 | | **763** |
| *Phalaenopsis amabilis* | live | | | | | 300 | | | | | **300** |
| *Phalaenopsis aphrodite* | live | | | | 50 | | | | | | **50** |
| *Phalaenopsis chibae* | live | | | | | | 15 | 60 | | | **75** |
| *Phalaenopsis mannii* | live | | | | | | | 115 | | 10 | **125** |
| *Phalaenopsis pulcherrima* | live | | | | 50 | 6 | 15 | | | | **71** |
| *Pholidota* spp. | live | | 1 | | 65 | 278 | | | | | **344** |
| *Pholidota articulata* | live | | | | | 10 | 35 | 20 | | | **65** |
| *Pholidota imbricata* | live | | | | | 200 | 15 | 10 | | | **225** |
| *Pteroceras* spp. | live | | | | | 502 | 450 | | | 100 | **1052** |
| *Pteroceras semiteretifolium* | live | | | | | 100 | 30 | 30 | | | **160** |
| *Pteroceras teres* | live | | | | | 1 | 300 | 30 | | | **331** |
| *Renanthera* spp. | live | | | | 20 | 202 | | | | 100 | **322** |
| *Renanthera annamensis* | live | | | | | | 275 | 1860 | | | **2135** |
| *Renanthera coccinea* | live | | | | | 202 | 790 | | | 30 | **1022** |
| *Rhynchostylis* spp. | live | | 5 | 6 | 144 | 7224 | 1 | | | | **7380** |
| *Rhynchostylis coelestis* | live | | 50 | | | | | | 1000 | | **1050** |
| *Rhynchostylis gigantea* | live | | | | | 600 | | 80 | | | **680** |
| *Rhynchostylis retusa* | live | | | | | | | | 50 | | **50** |
| *Saccolabium* spp. | live | | 1 | 6 | 50 | 12 | 25 | | | | **94** |
| *Sarcanthus* spp. | live | | 1 | 5 | 64 | 15 | 20 | | | | **105** |
| *Schoenorchis* spp. | live | | 1 | 3 | 54 | 44 | | | | | **102** |

| Taxon | Term | Unit | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Schoenorchis gemmata* | live | | | | | 20 | 36 | | | 110 | **166** |
| *Sobralia* spp. | live | | | | | 100 | | | | | **100** |
| *Spathoglottis* spp. | live | | 5 | | 40 | 4 | 25 | | | | **74** |
| *Staurochilus fasciatus* | live | | | 1 | | 3 | 35 | 50 | | 10 | **99** |
| *Thrixspermum* spp. | live | | 2 | 4 | 30 | 18 | | | | | **54** |
| *Thrixspermum centipeda* | live | | | | | | 30 | 50 | | | **80** |
| *Thunia alba* | live | | | | | 100 | | | | | **100** |
| *Thunia alba* var. *bracteata* | live | | | | | | | 50 | | | **50** |
| *Trias nana* | live | | | | | 100 | | | | | **100** |
| *Trichoglottis* spp. | live | | 2 | 4 | 29 | 33 | 1 | | | | **69** |
| *Uncifera dalatensis* | live | | | | | 301 | 640 | | | | **941** |
| *Vanda* spp. | live | | 5 | | 526 | 69 | 25 | | | | **625** |
| *Vanda denisoniana* | live | | | | 150 | 1 | 16 | 80 | 50 | | **297** |
| *Vanda lilacina* | live | | | | | 212 | | 30 | | | **242** |
| *Vanda pumila* | live | | | | | 1 | | 50 | | 250 | **301** |
| *Vandopsis* spp. | live | | | 4 | 574 | 5 | | 1 | | | **584** |
| **TOTAL for Orchidaceae spp. live and dried plants (no units)** | | | **332** | **828** | **7642** | **77074** | **25382** | **24640** | **45201** | **33788** | **214887** |
| **TOTAL for Orchidaceae spp. dried plants, roots and derivatives (kg)** | | | **28175** | **5000** | **24500** | **115000** | **92000** | **58000** | **49500** | **34000** | **406175** |

**Figure 2: Gross exports of live *Dendrobium draconis* from Viet Nam and Thailand**

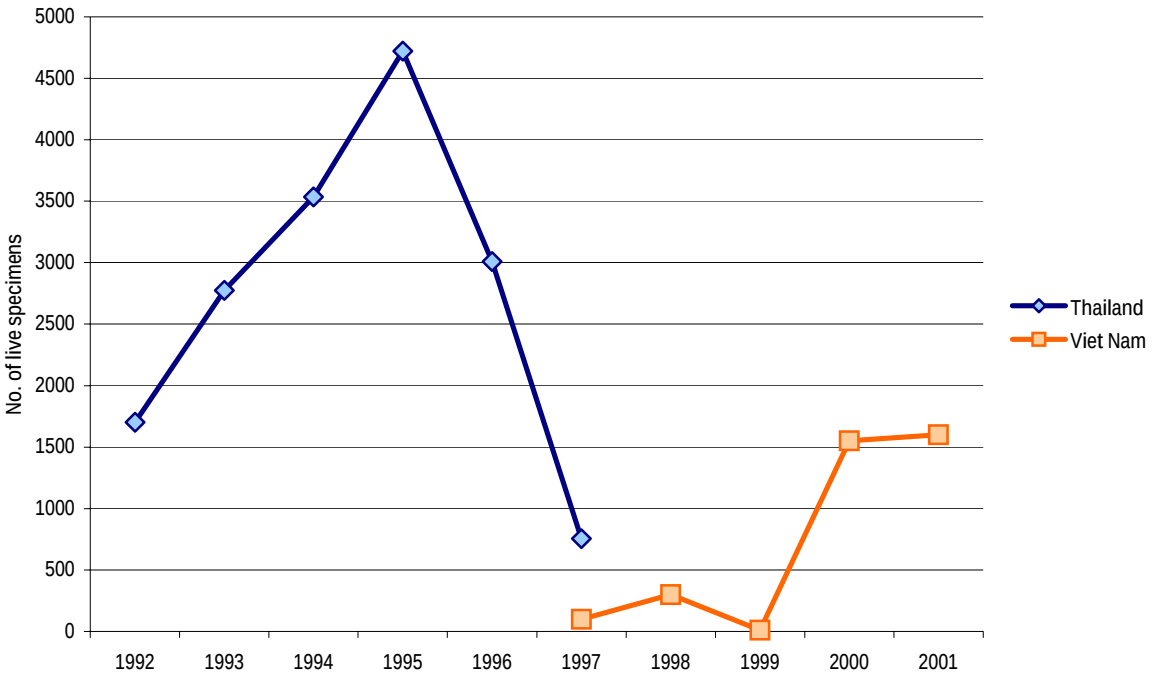



**Figure 3: Gross exports of *Dendrobium nobile* from Viet Nam and Thailand**

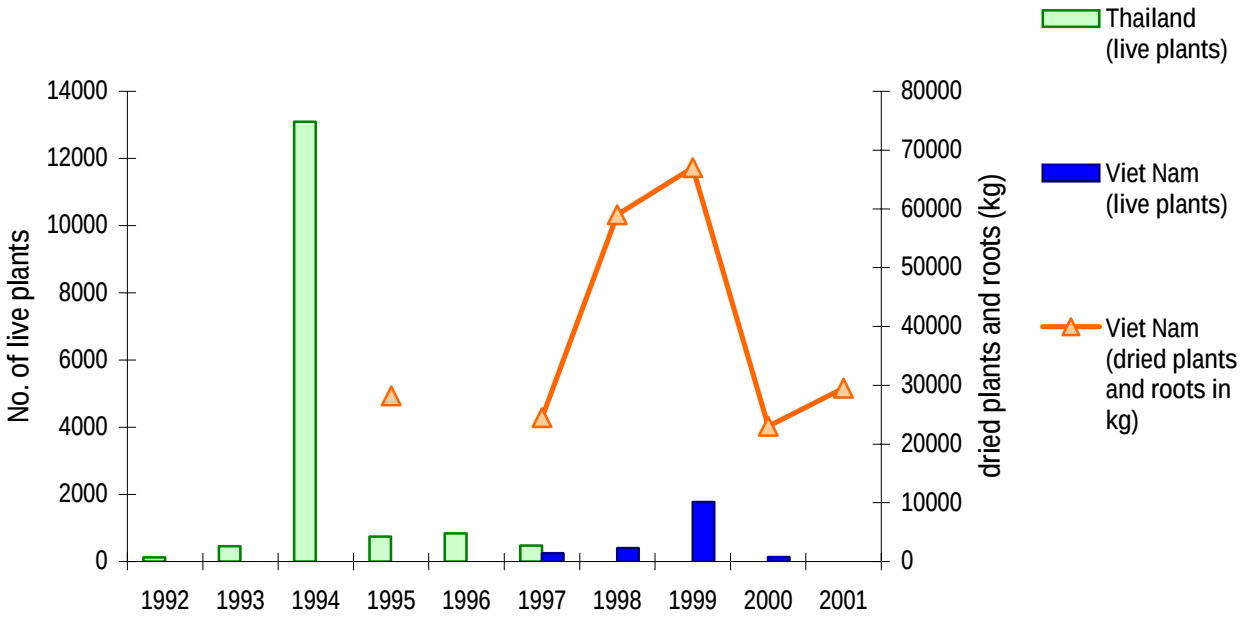


**Figure 4: Gross exports of live *Dendrobium secundum* from Viet Nam and Thailand**