

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

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Twenty-third meeting of the Plants Committee  
Geneva (Switzerland), 22 and 24-27 July 2017

CITES-LISTED MEDICINAL PLANT SPECIES

1. The attached information document has been submitted by the Secretariat in relation to agenda items 15, 32 and 33\*.

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\* *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

# CITES-listed medicinal plant species

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*This documents has been prepared by Jin A Choi under contract with the CITES Secretariat.*

## 1. Background

The aim of this study is to make a list of medicinal plant species and take stock of e-commerce in those medicinal plants, with a particular focus on the use of annotations. As a background, the table below presents all Plants Committee documents related to medicinal plants (keyword search of ‘medicinal’, ‘traditional medicine’, ‘herbal remedy’, and ‘aroma’)

Result

Plant Committee	Category	Document
<b>Twenty-second meeting of the Plants Committee</b> Tbilisi (Georgia), 19-23 October 2015	Agenda and documents	PC22 Doc.22.1 Annex 1 - Quick scan of Orchidaceae species in European commerce as components of cosmetic, food and medicinal products <a href="https://cites.org/sites/default/files/eng/com/pc/22/E-PC22-22-01%20Annex.pdf">https://cites.org/sites/default/files/eng/com/pc/22/E-PC22-22-01%20Annex.pdf</a>
	Information documents	-
	Total documents	1
<b>Twenty-first meeting of the Plants Committee</b> Veracruz (Mexico), 02-08 May 2014	Agenda and documents	-
	Information documents	PC21 Inf. 11. Primer on Importing & Exporting CITES-Listed Species Used in the United States in Dietary Supplements, Traditional Herbal Medicines, and Homeopathic Products (submitted by the United States of America) <a href="https://cites.org/sites/default/files/eng/com/pc/21/E-PC21-Inf-11.pdf">https://cites.org/sites/default/files/eng/com/pc/21/E-PC21-Inf-11.pdf</a>
	Total documents	1
<b>Twentieth meeting of the Plants Committee</b> Dublin (Ireland), 22-30 March 2012	Agenda and documents	PC20 Doc.15.1 Timber species, medicinal plants and agarwood-producing species (Decisions 15.26 and 15.27) – Report of the working group <a href="https://cites.org/sites/default/files/eng/com/pc/20/E20-15-01.pdf">https://cites.org/sites/default/files/eng/com/pc/20/E20-15-01.pdf</a>
	Information documents	PC20 Inf. 9. Questionnaire for the personal care products and herbal products industries on finished products manufactured from orchids that are packaged and ready for retail trade (submitted by the United States of America) <a href="https://cites.org/sites/default/files/common/com/pc/20/inf_docs/E20-09i.pdf">https://cites.org/sites/default/files/common/com/pc/20/inf_docs/E20-09i.pdf</a>
	Total documents	2

<b>Nineteenth meeting of the Plants Committee</b> Geneva (Switzerland), 18-21 April 2011	Agenda and documents	PC19 10.4 Timber species, medicinal plants and agarwood-producing species (Decisions 15.26 and 15.27) – Progress report <b>No document</b>
	Information documents	-
	Total documents	1(0)
<b>Eighteenth meeting of the Plants Committee</b> Buenos Aires (Argentina), 17-21 March 2009	Agenda and documents	PC18 Doc.8.5 Progress report on seven Asian species of medicinal plants <a href="https://cites.org/sites/default/files/eng/com/pc/18/E-PC18-08-05.pdf">https://cites.org/sites/default/files/eng/com/pc/18/E-PC18-08-05.pdf</a> PC18 Doc.14.4 Medicinal plants <a href="https://cites.org/sites/default/files/eng/com/pc/18/E-PC18-14-04.pdf">https://cites.org/sites/default/files/eng/com/pc/18/E-PC18-14-04.pdf</a>
	Information documents	PC18 Inf. 6. Trade survey study on succulent Euphorbia species protected by CITES and used as cosmetic, food and medicine, with special focus on Candelilla wax <a href="https://cites.org/sites/default/files/common/com/pc/18/X-PC18-Inf06.pdf">https://cites.org/sites/default/files/common/com/pc/18/X-PC18-Inf06.pdf</a>
	Total documents	3
<b>Seventeenth meeting of the Plants Committee</b> Geneva (Switzerland), 15-19 April 2008	Agenda and documents	17.1 Timber species and medicinal plants PC17 Doc.17.1.1 Overview on non-detriment findings for timber species and medicinal plants <a href="https://cites.org/sites/default/files/eng/com/pc/17/E-PC17-17-01-01.pdf">https://cites.org/sites/default/files/eng/com/pc/17/E-PC17-17-01-01.pdf</a> PC17 Doc.17.1.2 Summary report on the non-detriment findings for ramin (Gonystylus spp.) for Malaysia in 2008 <a href="https://cites.org/sites/default/files/eng/com/pc/17/E-PC17-17-01-02.pdf">https://cites.org/sites/default/files/eng/com/pc/17/E-PC17-17-01-02.pdf</a> PC17 Doc.17.1.3 Final report on the study on abundance, distribution and conservation status of Guaiacum sanctum L. in Mexico <a href="https://cites.org/sites/default/files/eng/com/pc/17/E-PC17-17-01-03.pdf">https://cites.org/sites/default/files/eng/com/pc/17/E-PC17-17-01-03.pdf</a>
	Information documents	PC17 Inf. 10. Review of the Status, Harvest, Trade and Management of Seven Asian CITES-listed Medicinal and Aromatic Plant Species <a href="https://cites.org/sites/default/files/common/com/pc/17/X-PC17-Inf-10.pdf">https://cites.org/sites/default/files/common/com/pc/17/X-PC17-Inf-10.pdf</a>
	Total documents	4

<b>Sixteenth meeting of the Plants Committee</b> Lima (Peru), 03-08 July 2006	Agenda and documents	PC16 Doc.10.5 Asian medicinal species <a href="https://cites.org/sites/default/files/eng/com/pc/16/E-PC16-10-05.pdf">https://cites.org/sites/default/files/eng/com/pc/16/E-PC16-10-05.pdf</a> PC16 Doc.17.1 Medicinal plants <a href="https://cites.org/sites/default/files/eng/com/pc/16/E-PC16-17-01.pdf">https://cites.org/sites/default/files/eng/com/pc/16/E-PC16-17-01.pdf</a>
	Information documents	PC16 Inf. 9. International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (ISSC-MAP) <a href="https://cites.org/sites/default/files/common/com/pc/16/X-PC16-09-Inf.pdf">https://cites.org/sites/default/files/common/com/pc/16/X-PC16-09-Inf.pdf</a>
	Total documents	3
<b>Fifteenth meeting of the Plants Committee</b> Geneva (Switzerland), 17-21 May 2005	Agenda and documents	PC15 Doc.10.2.2 Seven Asian medicinal species <a href="https://cites.org/sites/default/files/eng/com/pc/15/E-PC15-10-02-02.pdf">https://cites.org/sites/default/files/eng/com/pc/15/E-PC15-10-02-02.pdf</a> PC15 Doc.17. Annotations for medicinal plants included in Appendix II <a href="https://cites.org/sites/default/files/eng/com/pc/15/E-PC15-17.pdf">https://cites.org/sites/default/files/eng/com/pc/15/E-PC15-17.pdf</a>
	Information documents	PC15 Inf. 8. Annotation #9 and the Guiding principles for annotations relating to medicinal plants <a href="https://cites.org/sites/default/files/common/com/pc/15/X-PC15-08-Inf.pdf">https://cites.org/sites/default/files/common/com/pc/15/X-PC15-08-Inf.pdf</a> PC15 Inf. 10. International standard for sustainable wild collection of medicinal and aromatic plants (ISSC-MAP) <a href="https://cites.org/sites/default/files/common/com/pc/15/X-PC15-10-Inf.pdf">https://cites.org/sites/default/files/common/com/pc/15/X-PC15-10-Inf.pdf</a>
	Total documents	4
<b>Fourteenth meeting of the Plants Committee</b> Windhoek (Namibia), 16-20 February 2004	Agenda and documents	PC14 Doc.7.2 Definitions of the technical terms used in the annotations for medicinal plants [Decisions 12.23 and 11.118 (Rev. CoP12)] <a href="https://cites.org/sites/default/files/eng/com/pc/14/E-PC14-07-02.pdf">https://cites.org/sites/default/files/eng/com/pc/14/E-PC14-07-02.pdf</a>
	Information documents	PC14 Inf. 3. Revision of the # Annotations for medicinal and aromatic plants included in the CITES Appendices <a href="https://cites.org/sites/default/files/common/com/pc/14/X-PC14-03-Inf.pdf">https://cites.org/sites/default/files/common/com/pc/14/X-PC14-03-Inf.pdf</a>
	Total documents	2

<b>Thirteenth meeting of the Plants Committee</b> Geneva (Switzerland), 12-15 August 2003	Agenda and documents	PC13 10.1 Definitions of the technical terms used in the annotations of medicinal plants [Decisions 12.23 and 11.118 (Rev.CoP12)] <i>No document</i> PC 13 15.3 Checklist of medicinal and aromatic plants, new edition <i>No document</i>
	Information documents	-
	Total documents	2(0)
<b>Twelfth meeting of the Plants Committee</b> Leiden (Netherlands), 13-17 May 2002	Agenda and documents	12. Medicinal plants 12.1 Implementation of Decision 11.165 on trade in traditional medicines PC12 Doc.12.1.1 Inventory of operations where artificial propagation of CITES species is conducted for medicinal purposes <a href="https://cites.org/sites/default/files/eng/com/pc/12/E-PC12-12-01-01.pdf">https://cites.org/sites/default/files/eng/com/pc/12/E-PC12-12-01-01.pdf</a> PC12 Doc.12.1.2 List of species traded for medicinal purposes <a href="https://cites.org/sites/default/files/eng/com/pc/12/E-PC12-12-01-02.pdf">https://cites.org/sites/default/files/eng/com/pc/12/E-PC12-12-01-02.pdf</a> PC12 Doc.12.1.3 Proposal from Italy <a href="https://cites.org/sites/default/files/common/com/pc/12/X-PC12-12-01-03.pdf">https://cites.org/sites/default/files/common/com/pc/12/X-PC12-12-01-03.pdf</a>
	Information documents	-
	Total documents	3
<b>Eleventh meeting of the Plants Committee</b> Langkawi (Malaysia), 03-07 September 2001	Agenda and documents	12. Medicinal plants PC11 12.1 Trade in <i>Prunus africana</i> <i>No document</i> PC11 12.2 Possible future activities <i>No document</i>
	Information documents	PC11 Inf. 7. Enquête sur les annotations des plantes médicinales inscrites à l'Annexe II <a href="https://cites.org/sites/default/files/eng/com/pc/11/X-PC11-Inf_07.pdf">https://cites.org/sites/default/files/eng/com/pc/11/X-PC11-Inf_07.pdf</a>
	Total documents	3(1)

<p><b>Tenth meeting of the Plants Committee</b> Shepherdstown (United States of America), 11-15 December 2000</p>	Agenda and documents	<p>PC10 10.2.1 Trade in medicinal plants (CITES Project S-109): progress report <i>No document</i></p> <p>11. Medicinal plants</p> <p>PC10 11.1 Trade in Prunus africana <i>No document</i></p> <p>PC10 11.2 Possible future activities <i>No document</i></p> <p>PC10 21.1 Presentation by Germany of "Conservation and Sustainable Use of Adonis vernalis, a Medicinal Plant in International Trade" <i>No document</i></p>
	Information documents	-
	Total documents	4(0)
<p><b>Ninth meeting of the Plants Committee</b> Darwin (Australia), 07-11 June 1999</p>	Agenda and documents	<p>PC9 Doc.7.1 Harmonization of annotations to plant species traded for medicinal properties; report</p> <p>PC9 Doc.9.1.3 Trade in medicinal plants (CITES Project S-109); report</p> <p>PC9 Doc.9.2 Medicinal Plants</p> <p>PC9 Doc.9.2.1 Definition of future working priorities regarding significant trade studies, taking into account the report of CITES project S-109 and priorities established at PC8</p> <p>PC9 Doc.9.2.2 Trade in Prunus africana; report .</p> <p>PC9 Doc.9.5 Threats to plant population in Poland because of trade as medicinals</p> <p>Every Agenda can be found here: <a href="https://cites.org/sites/default/files/eng/com/pc/09/proceed.pdf">https://cites.org/sites/default/files/eng/com/pc/09/proceed.pdf</a></p>
	Information documents	-
	Total documents	5



## 2. A list of CITES-listed medicinal plant species

The term medicinal plants does not have an official definition within CITES and a plethora of definition can be found for 'medicinal plants', 'medicinal and aromatic plants', or 'traditional medicine' from various international organizations, non-governmental organizations, and independent researchers.

### **DEFINITIONS**

ITC(International Trade Centre):

**Medicinal & Aromatic Plants (MAPs)** are botanical raw materials, also known as herbal drugs, that are primarily used for therapeutic, aromatic and/or culinary purposes as components of cosmetics, medicinal products, health foods and other natural health products. They are also the starting materials for value-added processed natural ingredients such as essential oils, dry and liquid extracts and oleoresins.

from: <http://www.intracen.org/itc/sectors/medicinal-plants/>

WHO(World Health Organization):

**Traditional medicine:** Traditional medicine is the sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness.

**Herbal medicines:** Herbal medicines include herbs, herbal materials, herbal preparations and finished herbal products, that contain as active ingredients parts of plants, or other plant materials, or combinations.

- **Herbs:** crude plant material such as leaves, flowers, fruit, seed, stems, wood, bark, roots, rhizomes or other plant parts, which may be entire, fragmented or powdered.

- **Herbal materials:** in addition to herbs, fresh juices, gums, fixed oils, essential oils, resins and dry powders of herbs. In some countries, these materials may be processed by various local procedures, such as steaming, roasting, or stir-baking with honey, alcoholic beverages or other materials.

- **Herbal preparations:** the basis for finished herbal products and may include comminuted or powdered herbal materials, or extracts, tinctures and fatty oils of herbal materials. They are produced by extraction, fractionation, purification, concentration, or other physical or biological processes. They also include preparations made by steeping or heating herbal materials in alcoholic beverages and/or honey, or in other materials.

- **Finished herbal products:** herbal preparations made from one or more herbs. If more than one herb is used, the term mixture herbal product can also be used. Finished herbal products and mixture herbal products may contain excipients in addition to the active ingredients. However, finished products or mixture products to which chemically defined active substances have been added, including synthetic compounds and/or isolated constituents from herbal materials, are not considered to be herbal.

from: <http://who.int/medicines/areas/traditional/definitions/en/>

FAO(Food and Agriculture Organization of the United Nations):

**Medicinal Aromatic Plants (MAPs)** can be defined as botanicals that provide people with medicines

– to prevent disease, maintain health or cure ailments. In one form or another, they benefit virtually everyone on Earth through nutrition, toiletry, bodily care, incense and ritual healing. (Medicinal and Aromatic Plant Working Group, 2010)

from: <http://www.fao.org/docrep/015/i2473e/i2473e00.pdf>

ISSC-MAP(International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants) :  
“**Medicinal**” and “**aromatic**” are terms describing properties of chemistry and use that can be ascribed to plants. **Medicinal plants** prevent, alleviating, or curing disease. This group can be defined narrowly, to include only those plants already known to be used in this way in some system of medicine, traditional or modern, or it can be defined broadly to include potential, as yet undiscovered uses of this nature. **Aromatic plants** contain fragrant, essential oils valued as perfumes, herbs, spices, and as medicines. Many "medicinal" plants are thus also "aromatic" (and vice versa), just as medicinal and aromatic uses overlap within particular taxa with other important categories of plant use, such as foods and beverages. The coincidence of highly desirable qualities within particular taxa makes these groups all the more important as plant genetic resources. The degree of overlap between medicinal and aromatic properties and uses has supported the treatment of medicinal and aromatic plants as a single category, particularly from the point of view of commercial harvest, trade, and agriculture.

from: [file:///C:/Users/Choi01/Downloads/issc\\_map\\_standard\\_version1\\_0.pdf](file:///C:/Users/Choi01/Downloads/issc_map_standard_version1_0.pdf) and  
<http://edepot.wur.nl/137166>

Research Paper “Medicinal and Aromatic Plants in India” by Satyabrata Maiti and K. A. Geetha  
“**Medicinal plants** are those plants which are used in official and various traditional systems of medicines throughout the world”. Other definition could be “**Medicinal plants** are plants that provide people with medicines - to prevent disease, maintain health or cure ailments”. In one form or another, they benefit virtually everyone on earth. No exact definition of Medicinal Plant is possible. **Aromatic plants** are a special class of plants used for their aroma and flavour. Many of them are exclusively used also for medicinal purposes in aromatherapy as well as in various systems of medicine.

from:

<http://nsdl.niscair.res.in/jspui/bitstream/123456789/742/4/Medicinal%20and%20Aromatic%20plants.pdf>

Book ‘Guidelines for the Appropriate use of Herbal Medicines’ (WHO) 1998:

**Herbal medicines:** plant-derived materials or products with therapeutic or other human health benefits which contain either raw or processed ingredients from one or more plants. In some traditions, materials of inorganic or animal origin may also be present, although for the purpose of this document, the focus will be on plant materials only.

Under this definition, there are three kinds of herbal medicines: raw plant materials, processed plant materials and medicinal herbal products. The definition does not apply where the active component has been identified, and either isolated or synthesized as a chemical component of a drug product.

- **Medicinal herbal products:** finished, labelled pharmaceutical products in dosage forms that contain one or more of the following: powdered plant materials, extracts, purified extracts, or partially purified active substances isolated from plant materials. Medicines containing plant material combined with chemically defined active substances, including chemically defined, isolated constituents of plants, are not considered to be herbal medicines.

- **Processed plant materials:** plant materials treated according to traditional procedures to improve their safety and efficacy, to facilitate their clinical use, or to make medicinal preparations.

- **Raw plant materials:** fresh or dry plant materials which are marketed whole or simply cut into small pieces.

**Medicinal plant:** a plant which has been used for medical purposes at one time or another, and which, although not necessarily a product or available for marketing, is the original material of herbal medicines.

from: <http://apps.who.int/medicinedocs/en/d/Jh2945e/4.html>

In order to establish the list below, a broad definition of medicinal plants, including aromatic plants was chosen since it corresponds to use of the term in past Plants Committee documents: .

*“medicinal” is used in the broad sense to include similar and often overlapping uses such as aromatics, cosmetics, spices and food additives.”* (PC14 Doc. 7.2) Furthermore, medicinal plant species often have several different uses and there is a lot of overlap area between medicinal plants and aromatic plants. For this study, ‘CITES-listed medicinal plants’ are understood as plants with medicinal and/or aromatic uses.

The list of medicinal plant species below is based on 30 different references, including all of the medicinal plant related working and information documents from PC9 to PC22. I searched in the CITES Appendices for the scientific name of the plant species recorded as medicinal plants in each reference. All medicinal plant species in the list below can be found in the CITES Appendices in effect as of 2 January 2017.

# CITES-listed Medicinal Plant Species

Jina Choi

			Source
<b>LILIACEAE</b>			
	<i>Aloe</i> spp.#4 (Except the species included in Appendix I. Also excludes <i>Aloe vera</i> , also referenced as <i>Aloe barbadensis</i> which is not included in the Appendices)		(Korean Government) (RobersonEmily, 2008) (HawkinsBelinda, 2008) (AHPAAmerican, 2014)
	- <i>Aloe africana</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe arborescens</i>		(Schippmann, 2001) (RobersonEmily, 2008) (Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe aristata</i>		(Schippmann, 2001) (RobersonEmily, 2008) (HawkinsBelinda, 2008)
	- <i>Aloe asperifolia</i>		(Schippmann, 2001) (RobersonEmily, 2008) (Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe ballyi</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe buettneri</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe calidophila</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe camperi</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe capitata</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe carolineae</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe chabaudii</i>		(Schippmann, 2001) (RobersonEmily, 2008) (Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe christianii</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe citrina</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe cooperi</i>		(Schippmann, 2001) (RobersonEmily, 2008) (Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe cryptopoda</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe dawei</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe dichotoma</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe divaricata</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)

	- <i>Aloe duckeri</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe elgonica</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe esculenta</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe excelsa</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe ferox</i>		(Schippmann, 2001) (BGCI) (RobersonEmily, 2008) (Useful Tropical Plants, 2017) (HawkinsBelinda, 2008) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
	- <i>Aloe flexilifolia</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe globuligemma</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe greatheadii</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe hereroensis</i>		(Schippmann, 2001) (RobersonEmily, 2008) (Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe kedongensis</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe kilifiensis</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe lateritia</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe linearifolia</i>		(Schippmann, 2001) (RobersonEmily, 2008) (HawkinsBelinda, 2008)
	- <i>Aloe littoralis</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe lomatophylloides</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe macrocarpa</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe macroclada</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe macrosiphon</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe mayottensis</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe marlothii</i>		(Schippmann, 2001) (RobersonEmily, 2008) (Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe microcantha</i>		(Schippmann, 2001) (RobersonEmily, 2008) (HawkinsBelinda, 2008)
	- <i>Aloe microdonta</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe ngongensis</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe nuttii</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe nyeriensis</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe officinalis</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe perryi</i>		(Schippmann, 2001) (RobersonEmily, 2008) (Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe pulcherrima</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	- <i>Aloe rabaiensis</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)

	<i>-Aloe rivae</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	<i>-Aloe scabrifolia</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	<i>-Aloe schweinfurthii</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	<i>-Aloe secundiflora</i>		(Schippmann, 2001) (RobersonEmily, 2008) (Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	<i>-Aloe sinkatana</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	<i>-Aloe tenuior</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	<i>-Aloe turkanensis</i>		(Schippmann, 2001) (RobersonEmily, 2008) (Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	<i>-Aloe vaombe</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	<i>-Aloe volkensii</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	<i>-Aloe wilsonii</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	<i>-Aloe wollastonii</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
	<i>-Aloe zebrina</i>		(Useful Tropical Plants, 2017) (HawkinsBelinda, 2008)
<b>AMARYLLIDACEAE</b>			
	<i>Galanthus</i> spp. #4		
	<i>-Galanthus nivalis</i>		(Schippmann, 2001) (AHPAAmerican, 2014)
	<i>-Galanthus woronowii</i>		(Schippmann, 2001)
	<i>Sternbergia</i> spp. #4		
	<i>-Sternbergia lutea</i>		(Schippmann, 2001)
<b>APOCYNACEAE</b>			
	<i>Hoodia</i> spp . #9		(BGCI) (RobersonEmily, 2008) (HawkinsBelinda, 2008) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005)
	<i>Rauvolfia serpentina</i> #2		(Schippmann, 2001) (BGCI) (Department of Forest and Park Services, 2012) (R&D center of Flower Valley Agrotech, 2005) (HawkinsBelinda, 2008) (AHPAAmerican, 2014) (MullikenTeresa & CroftonPetra, 2008) (GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006) (TRAFFIC & IUCN Species Programme, 2005) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)

ARALIACEAE			
	<i>Panax ginseng</i> #3 (Only the population of the Russian Federation; no other population is included in the Appendices)		(BGCI) (Korean Government) (HawkinsBelinda, 2008) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
	<i>Panax quinquefolius</i> #3		(Schippmann, 2001) (BGCI) (LeopoldSusan, 2015) (HawkinsBelinda, 2008) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
ARAUCARIACEAE			
<i>Araucaria araucana</i>			(Molia.K.Koch)
BERBERIDACEAE			
	<i>Podophyllum hexandrum</i> #2		(Schippmann, 2001) (BGCI) (R&D center of Flower Valley Agrotech, 2005) (HawkinsBelinda, 2008) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
CACTACEAE			
	CACTACEAE spp .9#4 (Except the species included in Appendix I and except <i>Pereskia</i> spp., <i>Pereskopsis</i> spp. and <i>Quiabentia</i> spp.)		
	- <i>Cereus hildmannianus</i>		(Schippmann, 2001)
	- <i>Harrisia pomanensis</i> (=Harrisia bonplandii)		(Schippmann, 2001) (AHPAAmerican, 2014)
	- <i>Lophophora williamsii</i>		(Schippmann, 2001) (LeopoldSusan, 2015) (AHPAAmerican, 2014)
	- <i>Myrtillocactus geometrizans</i>		(Schippmann, 2001)
	- <i>Opuntia ficus-indica</i>		(Schippmann, 2001) (AHPAAmerican, 2014)
	- <i>Opuntia humifusa</i> (=Opuntia compressa)		(Schippmann, 2001) (AHPAAmerican, 2014)
	- <i>Opuntia monacantha</i>		(Schippmann, 2001)
	- <i>Peniocereus serpentinus</i>		(AHPAAmerican, 2014)
	- <i>Rhipsalis baccifera</i>		(Schippmann, 2001)

	- <i>Schlumbergera truncata</i>		(Schippmann, 2001)
	- <i>Selenicereus grandiflorus</i> (=Cactus grandifloras)		(Schippmann, 2001) (AHPAAmerican, 2014)
<i>Pelecypora</i> spp.			(Wikipedia)
<i>Turbinicarpus</i> spp.			
- <i>Turbinicarpusseudomacrochele</i>			(IUCN Red List)
<b>COMPOSITAE</b> (Asteraceae)			
<i>Saussurea costus</i>			(BGCI) (R&D center of Flower Valley Agrotech, 2005) (HawkinsBelinda, 2008) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
<b>CYATHEACEAE</b>			
	<i>Cyathea</i> spp. #4		
	- <i>Cyathea dregei</i>		(Schippmann, 2001)
	- <i>Cyathea gigantea</i>		(R&D center of Flower Valley Agrotech, 2005)
<b>CYCADACEAE</b>			
	CYCADACEAE spp.#4 (Except the species included in Appendix I)		
	- <i>Cycas circinalis</i>		(Schippmann, 2001)
<i>Cycas beddomei</i>			(Wikipedia) (IUCN Red List)
<b>DICKSONIACEAE</b>			
	<i>Cibotium barometz</i> #4		(Schippmann, 2001) (BGCI) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
<b>DIOSCOREACEAE</b>			
	<i>Dioscorea deltoidea</i> #4		(Schippmann, 2001) (BGCI) (R&D center of Flower Valley Agrotech, 2005) (MullikenTeresa & CroftonPetra, 2008) (TRAFFIC & IUCN Species Programme, 2005) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)



DROSERACEAE			
	<i>Dionaea muscipula</i> #4		(Schippmann, 2001) (BGCI) (Dentali & Zimmermann, 2012) (LeopoldSusan, 2015) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
EBENACEAE			
	<i>Diospyros</i> spp. #5 (Populations of Madagascar)		
	- <i>Diospyros borneensis</i>		(Department of Agriculture of Brunei Darussalam Government, 2000)
	- <i>Diospyros peregrina</i>		(R&D center of Flower Valley Agrotech, 2005)
EUPHORBIACEAE			
	<i>Euphorbia</i> spp.#4 (Succulent species only except <i>Euphorbia misera</i> and the species included in Appendix I. Artificially propagated specimens of cultivars of <i>Euphorbia trigona</i> , artificially propagated specimens of crested, fan-shaped or colour mutants of <i>Euphorbia lactea</i> , when grafted on artificially propagated root stock of <i>Euphorbia neriifolia</i> , and artificially propagated specimens of cultivars of <i>Euphorbia 'Milii'</i> when they are traded in shipments of 100 or more plants and readily recognizable as artificially propagated specimens, are not subject to the provisions of the Convention)		(AHPAAmerican, 2014)
	- <i>Euphorbia antiquorum</i> Linn.		(Department of Forest and Park Services, 2012) (SchneiderErnst, 2009)
	- <i>Euphorbia antisyphilitica</i>		(BGCI) (AHPAAmerican, 2014) (SchneiderErnst, 2009) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005)
	- <i>Euphorbia bupleurifolia</i>		(Schippmann, 2001)
	- <i>Euphorbia candelabrum</i>		(SchneiderErnst, 2009)
	- <i>Euphorbia cerifer</i>		(SchneiderErnst, 2009)
	- <i>Euphorbia clavarioides</i>		(Schippmann, 2001)
	- <i>Euphorbia cooperi</i>		(Schippmann, 2001) (SchneiderErnst, 2009)
	- <i>Euphorbia grandidens</i>		(Schippmann, 2001)
	- <i>Euphorbia ingens</i>		(Schippmann, 2001)
	- <i>Euphorbia lathyris</i> (=E. <i>spongiosa</i> )		(SchneiderErnst, 2009)

	- <i>Euphorbia neriifolia</i> Linn.		(Department of Forest and Park Services, 2012) (R&D center of Flower Valley Agrotech, 2005) (SchneiderErnst, 2009)
	- <i>Euphorbia pulvinata</i>		(Schippmann, 2001)
	- <i>Euphorbia resinifera</i>		(Schippmann, 2001) (SchneiderErnst, 2009)
	- <i>Euphorbia thymifolia</i> Linn.		(Department of Forest and Park Services, 2012) (Department of Agriculture of Brunei Darussalam Government, 2000) (R&D center of Flower Valley Agrotech, 2005)
	- <i>Euphorbia tirucalli</i> Linn.		(Department of Forest and Park Services, 2012) (SchneiderErnst, 2009)
	- <i>Euphorbia trigona</i>		(SchneiderErnst, 2009)
	- <i>Euphorbia unispina</i>		(SchneiderErnst, 2009)
	- <i>Euphorbia woodii</i>		(Schippmann, 2001)
	- <i>Euphorbia unispina</i>		(SchneiderErnst, 2009)
<b>FAGACEAE</b>			
		<i>Quercus mongolica</i> #5 (Russian Federation)	(Korean Government)
<b>GNETACEAE</b>			
		<i>Gnetum montanum</i> #1 (Nepal)	(Schippmann, 2001)
<b>LEGUMINOSAE</b>			
	<i>Caesalpinia echinata</i> #10		(Molia.K.Koch)
	<i>Dalbergia cearensis</i> #15		(ZhouJiaju,)
	<i>Dalbergia cochinchinensis</i> #4		(ZhouJiaju,)
	<i>Dalbergia congestiflora</i> #15		(ZhouJiaju,)
	<i>Dalbergia cultrata</i> #15		(ZhouJiaju,)
	<i>Dalbergia ecastophyllum</i> #15		(ZhouJiaju,)
	<i>Dalbergia ferruginea</i> #15		(ZhouJiaju,)
	<i>Dalbergia melanoxydon</i> #15		(ZhouJiaju,)
	<i>Dalbergia miscolobium</i> #15		(ZhouJiaju,)
	<i>Dalbergia nitidula</i> #15		(ZhouJiaju,)
	<i>Dalbergia odorifera</i> #15		(ZhouJiaju,)
	<i>Dalbergia oliveri</i> #15		(ZhouJiaju,)
	<i>Dalbergia riparia</i> #15		(ZhouJiaju,)
	<i>Dalbergia sericea</i> #15		(ZhouJiaju,)
	<i>Dalbergia sissoo</i> #15		(ZhouJiaju,)
	<i>Dalbergia spruceana</i> #15		(ZhouJiaju,)
	<i>Dalbergia stevensonii</i> #15		(ZhouJiaju,)
	<i>Dalbergia variabilis</i> #15		(ZhouJiaju,)

	<i>Dalbergia volubilis</i> #15		(ZhouJiaju,)
	<i>Guibourtia tessmannii</i> #15		(ObengE.A., 2015)
	<i>Pterocarpus erinaceus</i>		(Useful Tropical Plants, 2017)
	<i>Pterocarpus santalinus</i> #7		(Schippmann, 2001) (BGCI) (Department of Forest and Park Services, 2012) (AHPAAmerican, 2014) (MullikenTeresa & CroftonPetra, 2008) (GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006) (TRAFFIC & IUCN Species Programme, 2005) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
<b>MELIACEAE</b>			
	<i>Swietenia humilis</i> #4		(Useful Tropical Plants, 2017)
<b>NEPENTHACEAE</b>			
	<i>Nepenthes</i> spp.#4 (Except the species included in Appendix I)		(Schippmann, 2001) (R&D center of Flower Valley Agrotech, 2005)
	- <i>Nepenthes distillatoria</i>		(Schippmann, 2001) (AHPAAmerican, 2014)
<i>Nepenthes khasiana</i>			(Schippmann, 2001) (R&D center of Flower Valley Agrotech, 2005)
<b>OLEACEAE</b>			
		<i>Fraxinus mandshurica</i> #5 (Russian Federation)	(Korean Government)
<b>ORCHIDACEAE</b>			
	ORCHIDACEAE spp.10#4 (Except the species included in Appendix I)		(GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006)
	- <i>Acampe praemorsa</i>		(Schippmann, 2001)
	- <i>Aceras anthropophorum</i>		(Schippmann, 2001)
	- <i>Acrolophia cochlearis</i>		(Schippmann, 2001)
	- <i>Aerangis mystacidii</i>		(Schippmann, 2001)
	- <i>Amitostigma gracile</i>		(Schippmann, 2001)
	- <i>Anacamptis pyramidalis</i>		(Schippmann, 2001)
	- <i>Anoectochilus formosanus</i>		(Schippmann, 2001) (BrinckmannJosef, 2014)
	- <i>Anoectochilus roxburghii</i>		(Schippmann, 2001)
	- <i>Ansellia aficana</i>		(Schippmann, 2001)
	- <i>Anelliagigantea</i>		(Schippmann, 2001)
	- <i>Arundina graminifolia</i>		(Schippmann, 2001)
	- <i>Barlia robertiana</i>		(Schippmann, 2001)

- <i>Bletilla formosana</i>		(Schippmann, 2001)
- <i>Bletilla ochracea</i>		(Schippmann, 2001)
- <i>Bletilla striata</i>		(Schippmann, 2001) (BGCI) (Korean Government) (nansarang, 1997) (BrinckmannJosef, 2014) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
- <i>Bolusiella maudiae</i>		(Schippmann, 2001)
- <i>Brassocattleya marcella</i> =( <i>Brassocattleya marcella</i> Koss) hybrid		(BrinckmannJosef, 2014)
- <i>Bulbophyllum calodictyon</i>		(Schippmann, 2001)
- <i>Bulbophyllum inconspicuum</i>		(Schippmann, 2001) (Korean Government) (nansarang, 1997)
- <i>Bulbophyllum kwangtungense</i>		(Schippmann, 2001)
- <i>Bulbophyllum odoratissimum</i>		(Schippmann, 2001)
- <i>Bulbophyllum radiatum</i>		(Schippmann, 2001)
- <i>Calanthe davidi</i>		(Schippmann, 2001)
- <i>Calanthe discolor</i>		(Korean Government) (BrinckmannJosef, 2014)
- <i>Calyptrochilum emarginatum</i>		(Schippmann, 2001)
- <i>Changnienia amoena</i>		(Schippmann, 2001)
- <i>Comperia comperiana</i>		(Schippmann, 2001)
- <i>Corallorhiza odontorhiz</i>		(AHPAAmerican, 2014)
- <i>Cremastra appendiculata</i>		(Schippmann, 2001) (Korean Government) (nansarang, 1997) (BrinckmannJosef, 2014)
- <i>Cremastra variabilis</i>		(Schippmann, 2001) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
- <i>Cycnoches cooperi</i>		(BrinckmannJosef, 2014)
- <i>Cymbidium goeringii</i>		(Korean Government) (nansarang, 1997) (BrinckmannJosef, 2014)
- <i>Cymbidium grandiflorum</i> (= <i>Cymbidium hookerianum</i> Rchb.f.)		(BrinckmannJosef, 2014)
- <i>Cymbidium great flower</i> Marie Laurencin hybrid		(BrinckmannJosef, 2014)
- <i>Cymbidium kanran</i> Makino		(BrinckmannJosef, 2014)
- <i>Cymbidium lancifolium</i> Hook.		(BrinckmannJosef, 2014)
- <i>Cymbidium lucky flower</i> 'Anmitsuhime' hybrid		(BrinckmannJosef, 2014)
- <i>Cypripedium acaule</i>		(AHPAAmerican, 2014)

- <i>Cypripedium calceolus</i> var. <i>pubescens</i> (= <i>Cypripedium parviflorum</i> var. <i>pubescens</i> )		(AHPAAmerican, 2014)
- <i>Cypripedium macranthum</i>		(Korean Government) (nansarang, 1997) (LeopoldSusan, 2015)
- <i>Cypripedium pubescens</i> (= <i>Cypripedium parviflorum</i> E.Salisb.)		(BrinckmannJosef, 2014) (AHPAAmerican, 2014)
- <i>Cyrtopodium punctatum</i>		(Schippmann, 2001)
- <i>Cyrtorchis arcuata</i>		(Schippmann, 2001)
- <i>Cyrtosia septentrionalis</i>		(Korean Government) (nansarang, 1997)
- <i>Dactylorhiza hatagirea</i>		(Schippmann, 2001)
- <i>Dactylorhiza iberica</i>		(Schippmann, 2001)
- <i>Dactylorhiza majalis</i> (= <i>Orchis latifolia</i> )		(AHPAAmerican, 2014)
- <i>Dactylorhiza osmanica</i>		(Schippmann, 2001)
- <i>Dactylorhiza romana</i>		(Schippmann, 2001)
- <i>Dendrobium acinaciforme</i>		(Schippmann, 2001)
- <i>Dendrobium aduncum</i>		(Schippmann, 2001)
- <i>Dendrobium aphyllum</i>		(Schippmann, 2001)
- <i>Dendrobium bellatulum</i>		(Schippmann, 2001)
- <i>Dendrobium bifarium</i>		(Schippmann, 2001)
- <i>Dendrobium candidum</i>		(Schippmann, 2001)
- <i>Dendrobium cariniferum</i>		(Schippmann, 2001)
- <i>Dendrobium chrysanthum</i>		(Schippmann, 2001)
- <i>Dendrobium chryseum</i>		(Schippmann, 2001)
- <i>Dendrobium chrysotoxum</i>		(Schippmann, 2001)
- <i>Dendrobium crepidatum</i>		(Schippmann, 2001)
- <i>Dendrobium crumenatum</i>		(Schippmann, 2001)
- <i>Dendrobium densiflorum</i>		(Schippmann, 2001)
- <i>Dendrobium devonianum</i>		(Schippmann, 2001)
- <i>Dendrobium discolor</i>		(Schippmann, 2001)
- <i>Dendrobium falconeri</i>		(Schippmann, 2001)
- <i>Dendrobium fimbriatum</i>		(Schippmann, 2001) (BrinckmannJosef, 2014) (AHPAAmerican, 2014)
- <i>Dendrobium gibsonii</i>		(Schippmann, 2001)
- <i>Dendrobium gratiosissimum</i>		(Schippmann, 2001)
- <i>Dendrobium hainanense</i>		(Schippmann, 2001)
- <i>Dendrobium hancockii</i>		(Schippmann, 2001)
- <i>Dendrobium henryi</i>		(Schippmann, 2001)
- <i>Dendrobium hercoglossum</i>		(Schippmann, 2001)

- <i>Dendrobium hookerianum</i>		(Schippmann, 2001)
- <i>Dendrobium huoshanense</i>		(Schippmann, 2001) (BrinckmannJosef, 2014)
- <i>Dendrobium jenkinsii</i>		(Schippmann, 2001)
- <i>Dendrobium linawianum</i>		(Schippmann, 2001)
- <i>Dendrobium lituiflorum</i>		(Schippmann, 2001)
- <i>Dendrobium loddigesii</i>		(Schippmann, 2001)
- <i>Dendrobium lohoense</i>		(Schippmann, 2001)
- <i>Dendrobium macraei</i>		(Schippmann, 2001)
- <i>Dendrobium moniliforme (=Onychium japonicum)</i>		(Schippmann, 2001) (Korean Government) (nansarang, 1997) (BrinckmannJosef, 2014)
- <i>Dendrobium monticola</i>		(Schippmann, 2001)
- <i>Dendrobium moschatum</i>		(Schippmann, 2001)
- <i>Dendrobium nobile</i>		(Schippmann, 2001) (BGCI) (BrinckmannJosef, 2014) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
- <i>Dendrobium officinale</i>		(BrinckmannJosef, 2014) (AHPAAmerican, 2014)
- <i>Dendrobium ovatum</i>		(Schippmann, 2001)
- <i>Dendrobium pachyphyllum</i>		(Schippmann, 2001)
- <i>Dendrobium parishii</i>		(Schippmann, 2001)
- <i>Dendrobium planibulbe</i>		(Schippmann, 2001)
- <i>Dendrobium plicatile (=Flickingeria fimbriata)</i>		(Schippmann, 2001) (AHPAAmerican, 2014)
- <i>Dendrobium phalaenopsis (=Callista Phalaenopsis)</i>		(BrinckmannJosef, 2014)
- <i>Dendrobium primulinum</i>		(Schippmann, 2001)
- <i>Dendrobium pulchellum</i>		(Schippmann, 2001)
- <i>Dendrobium purpureum</i>		(Schippmann, 2001)
- <i>Dendrobium reptans</i>		(Schippmann, 2001)
- <i>Dendrobium strongylanthum</i>		(Schippmann, 2001)
- <i>Dendrobium subulatum</i>		(Schippmann, 2001)
- <i>Dendrobium teretifolium</i>		(Schippmann, 2001)
- <i>Dendrobium terminale</i>		(Schippmann, 2001)
- <i>Dendrobium tokai</i>		(Schippmann, 2001)
- <i>Dendrobium tosaense</i>		(Schippmann, 2001)
- <i>Dendrobium trigonopus</i>		(Schippmann, 2001)
- <i>Dendrobium williamsonii</i>		(Schippmann, 2001)
- <i>Dendrobium wilsonii</i>		(Schippmann, 2001)
- <i>Diaphananthe millarii</i>		(Schippmann, 2001)

- <i>Diaphananthe xanthopollinia</i>		(Schippmann, 2001)
- <i>Disa aconitoides</i>		(Schippmann, 2001)
- <i>Epipactis yunannensis</i>		(Schippmann, 2001)
- <i>Eulophia clitellifera</i>		(Schippmann, 2001)
- <i>Eulophia cucullata</i>		(Schippmann, 2001)
- <i>Eulophia parviflora</i>		(Schippmann, 2001)
- <i>Eulophia petersii</i>		(Schippmann, 2001)
- <i>Eulophia speciose</i>		(Schippmann, 2001)
- <i>Eulophia streptopetala</i>		(Schippmann, 2001)
- <i>Flickeringia bifida</i>		(Schippmann, 2001)
- <i>Flickeringia comate</i>		(Schippmann, 2001)
- <i>Flickeringia fimbriata</i>		(Schippmann, 2001)
- <i>Flickeringia lonchophylla</i>		(Schippmann, 2001)
- <i>Gastrodia elata</i>		(Schippmann, 2001) (BGCI) (Korean Government) (nansarang, 1997) (BrinckmannJosef, 2014) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
- <i>Goodyera procera</i>		(Schippmann, 2001)
- <i>Goodyera schlechtendaliana</i>		(Schippmann, 2001) (Korean Government) (nansarang, 1997)
- <i>Gymnadenia conopsea</i>		(Schippmann, 2001) (Korean Government) (nansarang, 1997)
- <i>Gymnadenia orchidis</i>		(Schippmann, 2001)
- <i>Habenaria intermedia</i>		(BrinckmannJosef, 2014)
- <i>Himantoglossum affine</i>		(Schippmann, 2001)
- <i>Himantoglossum caprinum</i>		(Schippmann, 2001)
- <i>Liparis remota</i>		(Schippmann, 2001)
- <i>Malaxis acuminata</i>		(Schippmann, 2001) (BrinckmannJosef, 2014)
- <i>Malaxis muscifera</i>		(AHPAAmerican, 2014)
- <i>Microcoelia exilis</i>		(Schippmann, 2001)
- <i>Mystacidium capense</i>		(Schippmann, 2001)
- <i>Mystacidium millari</i>		(Schippmann, 2001)
- <i>Mystacidium venosum</i>		(Schippmann, 2001)
- <i>Neofinetia falcata</i>		(BrinckmannJosef, 2014)
- <i>Neotinea maculata</i>		(Schippmann, 2001)
- <i>Ophrys bombyliflora</i>		(Schippmann, 2001)

	<i>-Ophrys ferrum-equinum</i>	(Schippmann, 2001)
	<i>-Ophrys fusca</i>	(Schippmann, 2001)
	<i>-Ophrys holoserica</i>	(Schippmann, 2001)
	<i>-Ophrys lutea</i>	(Schippmann, 2001)
	<i>-Ophrys mammosa</i>	(Schippmann, 2001)
	<i>-Ophrys phrygia</i>	(Schippmann, 2001)
	<i>-Ophrys reinholdii</i>	(Schippmann, 2001)
	<i>-Ophrys scolopax</i>	(Schippmann, 2001)
	<i>-Ophrys sicula</i>	(Schippmann, 2001)
	<i>-Ophrys speculum</i>	(Schippmann, 2001)
	<i>-Ophrys tenthredinifera</i>	(Schippmann, 2001)
	<i>-Ophrys umbilicata</i>	(Schippmann, 2001)
	<i>-Orchis anatolica</i>	(Schippmann, 2001)
	<i>-Orchis coriophora</i>	(Schippmann, 2001)
	<i>-Orchis italica</i>	(Schippmann, 2001)
	<i>-Orchis laxiflora</i>	(Schippmann, 2001)
	<i>-Orchis maculata</i> L. (=Dactylorhiza maculata)	(BrinckmannJosef, 2014) (AHPAAmerican, 2014)
	<i>-Orchis mascula</i>	(Schippmann, 2001) (AHPAAmerican, 2014)
	<i>-Orchis militaris</i>	(Schippmann, 2001)
	<i>-Orchis morio</i>	(Schippmann, 2001) (BrinckmannJosef, 2014) (ItalyCITES, 2002)
	<i>-Orchis pallens</i>	(Schippmann, 2001)
	<i>-Orchis palustris</i>	(Schippmann, 2001)
	<i>-Orchis papilionacea</i>	(Schippmann, 2001)
	<i>-Orchis pinetorum</i>	(Schippmann, 2001)
	<i>-Orchis provincialis</i>	(Schippmann, 2001)
	<i>-Orchis purpurea</i>	(Schippmann, 2001)
	<i>-Orchis sancta</i>	(Schippmann, 2001)
	<i>-Orchis simia</i>	(Schippmann, 2001)
	<i>-Orchis spitzelii</i>	(Schippmann, 2001)
	<i>-Orchis tridentata</i>	(Schippmann, 2001)
	<i>-Oreorchis patens</i>	(Korean Government) (nansarang, 1997)
	<i>-Paphiopedilum Maudiae</i> hybrid	(BrinckmannJosef, 2014)
	<i>-Phalaenopsis amabilis</i>	(BrinckmannJosef, 2014)
	<i>-Phalaenopsis lobbii</i>	(BrinckmannJosef, 2014)
	<i>-Phalaenopsis pulcherrima</i>	(BrinckmannJosef, 2014)
	<i>-Phalaenopsis sogo yukidian</i> hybrid	(BrinckmannJosef, 2014)
	<i>-Pholidota cantonensis</i>	(Schippmann, 2001)
	<i>-Pholidota chinensis</i>	(Schippmann, 2001)



	<i>-Pholidota yunnanensis</i>		(Schippmann, 2001)
	<i>-Platanthera bifolia</i>		(Schippmann, 2001)
	<i>-Platanthera chlorantha</i>		(Schippmann, 2001)
	<i>-Pleione bulbocodioides</i>		(Schippmann, 2001) (BrinckmannJosef, 2014)
	<i>-Pleione yunannensis</i>		(Schippmann, 2001) (BrinckmannJosef, 2014)
	<i>-Polystachya concreta</i>		(Schippmann, 2001)
	<i>-Polystachya ottoniana</i>		(Schippmann, 2001)
	<i>-Polystachya pubescens</i>		(Schippmann, 2001)
	<i>-Polystachya sandersonii</i>		(Schippmann, 2001)
	<i>-Rangaeris muscicola</i>		(Schippmann, 2001)
	<i>-Serapias vomeracea</i>		(Schippmann, 2001)
	<i>-Spiranthes sinensis</i>		(Schippmann, 2001) (Korean Government) (nansarang, 1997)
	<i>-Spiranthes spiralis (= Spiranthes autumnalis)</i>		(AHPAAmerican, 2014)
	<i>-Tangtsinia nanchuanica</i>		(Schippmann, 2001)
	<i>-Thunia alba</i>		(Schippmann, 2001)
	<i>-Traunsteinera globosa</i>		(Schippmann, 2001)
	<i>-Tridactyle bicaudata</i>		(Schippmann, 2001)
	<i>-Tridactyle tridentate</i>		(Schippmann, 2001)
	<i>-Vanda coerulea</i>		(BrinckmannJosef, 2014)
	<i>-Vanda teres</i>		(BrinckmannJosef, 2014)
	<i>-Vanda tessellata</i>		(R&D center of Flower Valley Agrotech, 2005) (BrinckmannJosef, 2014)
	<i>-Vanilla pilifera</i>		(R&D center of Flower Valley Agrotech, 2005) (RuffEmily, 2015) (RuffEmily, 2015)
	<i>-Vanilla planifolia</i>		(Schippmann, 2001) (RuffEmily, 2015)
<b>OROBANCHACEAE</b>			
	<i>Cistanche deserticola</i> #4		(BGCI) (AHPAAmerican, 2014) (MullikenTeresa & CroftonPetra, 2008) (TRAFFIC & IUCN Species Programme, 2005) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
<b>PALMAE</b>			
		<i>Lodoicea maldivica</i> #13 (Seychelles)	(Wikipedia) (IUCN Red List)

<b>PODOCARPACEAE</b>			
		<i>Podocarpus neriifolius</i> #1 (Nepal)	(Schippmann, 2001)
<b>PORTULACACEAE</b>			
	<i>Anacampseros</i> spp. #4		(Wikipedia)
<b>PRIMULACEAE</b>			
	<i>Cyclamen</i> spp. 11 #4		
	- <i>Cyclamen hederifolium</i>		(Schippmann, 2001)
	- <i>Cyclamen purpurascens</i>		(Schippmann, 2001) (AHPAAmerican, 2014)
<b>RANUNCULACEAE</b>			
	<i>Adonis vernalis</i> #2		(BGCI) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004) (ItalyCITES, 2002)
	<i>Hydrastis canadensis</i> #8		(Schippmann, 2001) (BGCI) (Dentali & Zimmermann, 2012) (RobersonEmily, 2008) (LeopoldSusan, 2015) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
<b>ROSACEAE</b>			
	<i>Prunus africana</i> #4		(Schippmann, 2001) (BGCI) (HawkinsBelinda, 2008) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
<b>SANTALACEAE</b>			
	<i>Osyris lanceolata</i> #2 (Populations of Burundi, Ethiopia, Kenya, Rwanda, Uganda and the United Republic of Tanzania)		(HawkinsBelinda, 2008)

SARRACENIACEAE			
	<i>Sarracenia</i> spp.#4 (Except the species included in Appendix I)		
	- <i>Sarracenia flava</i>		(Schippmann, 2001)
	- <i>Sarracenia purpurea</i>		(Schippmann, 2001) (AHPAAmerican, 2014)
SCROPHULARIACEAE			
	<i>Picrorhiza kurrooa</i> #2 (Excludes <i>Picrorhiza scrophulariiflora</i> )		(Schippmann, 2001) (BGCI) (R&D center of Flower Valley Agrotech, 2005) (AHPAAmerican, 2014) (MullikenTeresa & CroftonPetra, 2008) (GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006) (TRAFFIC & IUCN Species Programme, 2005) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
STANGERIACEAE			
<i>Stangeria eriopus</i>			(IUCN Red List) (Wikipedia)
TAXACEAE			
	<i>Taxus chinensis</i> and infraspecific taxa of this species #2		(BGCI) (RobersonEmily, 2008) (GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005)
	<i>Taxus cuspidata</i> and infraspecific taxa of this species 12#2		(BGCI) (Korean Government) (RobersonEmily, 2008) (GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005)
	<i>Taxus fuana</i> and infraspecific taxa of this species #2		(BGCI) (RobersonEmily, 2008) (GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005)
	<i>Taxus sumatrana</i> and infraspecific taxa of this species #2		(BGCI) (RobersonEmily, 2008) (GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005)

	<i>Taxus wallichiana</i> #2		(Schippmann, 2001) (BGCI) (R&D center of Flower Valley Agrotech, 2005) (RobersonEmily, 2008) (HawkinsBelinda, 2008) (MullikenTeresa & CroftonPetra, 2008) (GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006) (TRAFFIC & IUCN Species Programme, 2005) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
<b>THYMELAEACEAE</b>			
	<i>Aquilaria</i> spp. #14		(BGCI) (LandryJen, 2015 Spring) (HawkinsBelinda, 2008) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005)
	- <i>Aquilaria agailocha</i> Roxb		(Department of Forest and Park Services, 2012) (LandryJen, 2015 Spring) (HawkinsBelinda, 2008)
	- <i>Aquilaria crassna</i>		(Useful Tropical Plants, 2017)
	- <i>Aquilaria malaccensis</i>		(Schippmann, 2001) (Department of Agriculture of Brunei Darussalam Government, 2000) (R&D center of Flower Valley Agrotech, 2005) (LandryJen, 2015 Spring) (HawkinsBelinda, 2008) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
	- <i>Aquilaria sinensis</i>		(AHPAAmerican, 2014)
	<i>Gonystylus</i> spp. #4		(LandryJen, 2015 Spring) (MalaysiaCITES, 2008) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005)
	- <i>Gonystylus confusus</i>		(LandryJen, 2015 Spring) (Useful Tropical Plants, 2017)
	- <i>Gonystylus macrophyllus</i>		(LandryJen, 2015 Spring) (Useful Tropical Plants, 2017)

	<i>-Gonystylus keithii</i>		(LandryJen, 2015 Spring) (Useful Tropical Plants, 2017)
	<i>Gyrinops</i> spp. #14		
	<i>-Gyrinopswalla Gaertn</i>		(BGCI)
	<i>-Gyrinopswalla Gaertn</i>		(Department of Forest and Park Services, 2012)
<b>VALERIANACEAE</b>			
	<i>Nardostachys grandiflora</i> #2		(Schippmann, 2001) (BGCI) (HawkinsBelinda, 2008) (AHPAAmerican, 2014) (MullikenTeresa & CroftonPetra, 2008) (GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006) (TRAFFIC & IUCN Species Programme, 2005) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
<i>Encephalartos</i> spp .			(Wikipedia)
<b>ZINGIBERACEAE</b>			
	<i>Siphonochilus aethiopicus</i> #4		(Schweinf.B.L.Burt, 2017)
<b>ZYGOPHYLLACEAE</b>			
	<i>Guaiacum</i> spp. #2		(GroupIUCN/SSC, Annotations for medicinal plants in Appendices 2 and 3, 2006)
	<i>-Guaiacum officinale</i>		(Schippmann, 2001) (BGCI) (AHPAAmerican, 2014) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
	<i>-Guaiacum coulteri</i>		(BGCI) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)
	<i>-Guaiacum sanctum</i>		(Schippmann, 2001) (BGCI) (AHPAAmerican, 2014) (Useful Tropical Plants, 2017) (MexicoScientific, 2008) (GroupIUCN/SSC, Annotation for Medicinal Plants included in Appendix II , 2005) (GroupIUCN/SSC, Revision of the Annotations for Medicinal and Aromatic Plants included in the CITES Appendices, 2004)

## Summary

FAMILY NAME	NUMBER OF SPECIES
ORCHIDACEAE (Orchids)	195
LILIACEAE (Aloes)	59
LEGUMINOSAE (FABACEAE) (Afroformosa, cristobal, palisander, rosewood, sandalwood)	22
EUPHORBIACEAE (Spurges)	18
CACTACEAE (Cacti)	13
THYMELAEACEAE (AQUILARIACEAE) (Agarwood, ramin)	8
TAXACEAE (Himalayan yew)	5
AMARYLLIDACEAE (Snowdrops , sternbergias)	3
ZYGOPHYLLACEAE (Lignum-vitae)	3
APOCYNACEAE (Elephant trunks, hoodias)	2
ARALIACEAE (Ginseng)	2
CYATHEACEAE (Tree-ferns)	2
CYCADACEAE (Cycads)	2
EBENACEAE (Ebonies)	2
NEPENTHACEAE (Pitcher-plants)-Old World	2
PRIMULACEAE (Cyclamens)	2
RANUNCULACEAE (Golden seals, yellow adonis, yellow root)	2
SARRACENIACEAE (Pitcher-plants)-New World	2
ARAUCARIACEAE (Monkey-puzzle tree)	1
BERBERIDACEAE (May-apple)	1
COMPOSITAE (ASTERACEAE) (Kuth)	1
DICKSONIACEAE (Tree-ferns)	1
DIOSCOREACEAE (Elephant's foot, kniss)	1
DROSERACEAE (Venus' flytrap)	1
FAGACEAE (Beeches)	1
GNETACEAE (Gnetums)	1
MELIACEAE (Mahoganies, West Indian cedar)	1
OLEACEAE (Ashes, etc.)	1
OROBANCHACEAE (Broomrape)	1
PALMAE (ARECACEAE) (Palms)	1
PODOCARPACEAE (Podocarps)	1
PORTULACACEAE (Lewisias, portulacas, purslanes)	1
ROSACEAE (African cherry, stinkwood)	1
SANTALACEAE (Sandalwoods)	1
SCROPHULARIACEAE (Kutki)	1
STANGERIACEAE (Stangerias)	1
VALERIANACEAE (Himalayan spikenard)	1
ZAMIACEAE (Cycads)	1
ZINGIBERACEAE (Ginger lily, Natal ginger)	1

	<b>SUM</b>
<b>FAMILY</b>	<b>39</b>
<b>SPECIES</b>	<b>365+</b>

Total 30 references.

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### 3. E-commerce survey of CITES-listed medicinal plant species focused on eBay and amazon

This study checks that the current annotations cover the medicinal plant products sold on the Internet and identifies the types of products that are not included in the current CITES annotations but are frequently traded internationally in a high volume. For both eBay and Amazon, the actual transaction volume is unknown. However, it is assumed that the trading volume or market demand is proportional to the number of registered products.

This study was conducted in four steps:

- 1) eBay and amazon were chosen based on their size and popularity.

Statista, The Statistics Portal, reported “According to recent industry figures, Amazon is the leading e-retailer in the United States with close to 136 billion U.S. dollars in 2016 net sales. As of the first quarter of 2016, the e-retailer reported more than 310 million active customer accounts worldwide. Due to Amazon’s global scope and reach, it is also considered one of the most valuable brands worldwide.”

Statista also reported the following on eBay: “eBay also consistently ranks as one of the biggest U.S. online companies based on market cap, which was over 31 billion U.S. dollars as of December 2016. As of the first quarter of 2017, eBay lists more than 169 million active buyers across its various properties. eBay is also one of the most-visited shopping platforms in the United States, surpassing 107 million monthly visits as of July 2016.” <https://www.statista.com/topics/846/amazon/>  
<https://www.statista.com/topics/2181/ebay/>

- 2) search for the 365 CITES-listed medicinal plant species on eBay and Amazon by using their scientific names

This phase of investigation was first conducted from June to August 2016 (before CITES CoP17) and again from March to May 2017 (after CITES CoP17) to take into account any amendment adopted at CoP17. Scientific names were used because there are several common names for each medicinal plant species, and one common name can also correspond to several different species. Also, in some cases, different names exist for different parts of the same plant, so it was almost impossible to search by common name.

The products displayed in the search results are divided into 13 subcategories:

1. Live Plant
2. Cutting-Part of live plant mostly for propagation except several cactus pad
3. Seed
4. Bulb or Tuber-for ornamental purpose-propagation
5. Dried Plant-mostly for eating purpose-stem, root, leaves
6. Powder
7. Wood nugget
8. Wood Product-Complete processing
9. Tea
10. Edible Seed, Fruit or Confectionary

11. Health Product-Designer food, dietary supplement, nutraceutical, functional food
12. Cosmetics-skincare, make up, hair
13. Aroma products-Oil, oud, Fragrance.

The number of products corresponding to each category is indicated. Based on each species' result, the most frequently traded product is recorded.

On eBay, the country where the item is sold is indicated in the item description. If the number of items retrieved is less than 30, all items are clicked on to identify the country of sale, and when more than 30 items are listed, at least 30 random items are checked to identify the country of sale.

However, on Amazon, information on the country of sale was not available because only the ID of the seller appears in the product description.

- 3) Detailed study of 'urgent conservation medicinal plant species' mentioned in four references

The four references used were:

1. Plants for life: Medicinal plant conservation and botanic gardens, Belinda Hawkins.
2. Journal of Medicinal Plant Conservation, A United Plant Savers' Publication.
3. Medicinal Plants at Risk, Center for Biological Diversity.
4. Tonnage Surveys of Select North American Wild-Harvested Plants 2006-2010, AHPA (American Herbal Products Association).

Detailed research on the selected plant species was done by searching with the scientific name of the species and the most used common name, and the results were divided into 13 categories above.

- 4) Comparison of the products in trade on eBay and Amazon with the current CITES annotations

Thanks to this comparison, it was possible to determine whether a product is included in the current annotation or not and which product are 'exceptions'. The attached Excel sheet containing the results of the study is color-coded as follows:

Color	Meaning
Blue	<ul style="list-style-type: none"> <li>Product is already included in the CITES annotation.</li> <li>However, it is not known whether the international trade in these products is accompanied by the proper CITES permit.</li> </ul>
Purple	<ul style="list-style-type: none"> <li>Products are excluded from the CITES annotation.</li> <li>If the volume of excluded products is significant, it is necessary to reconsider whether it should be included in the annotation again.</li> <li>Also, if the excluded product requires an enormous amount of raw material, for example, to produce 1 g of extract, if the raw material consumes 10 kg, which is 10,000 times its concentrate, this excluded product may need to be discussed again.</li> </ul>
Red	<ul style="list-style-type: none"> <li>Products are not mentioned in the annotation.</li> <li>Depending on the amount of trade, discussion on revision of annotation can be considered.</li> </ul>
Pink box	<ul style="list-style-type: none"> <li>Species that need further studies because of the high demand in medicinal products made of those species.</li> <li>Medicinal plant species who have more than 20 medicinal related products, and have the total results more than 40 in either.</li> </ul>
Green box	<ul style="list-style-type: none"> <li>Results are too difficult to analyze.</li> <li>This is the case of whole species, for example 'Orchidaceae species except species included in Appendix I'. In these cases, it is nearly impossible to search all Orchidaceae species except for the species in Appendix I. It is also almost impossible to analyse the result and categorize them because of the enormous number of search results.</li> </ul>
Blue box	<ul style="list-style-type: none"> <li>Species who needs detailed survey based on the four references mentioned above.</li> <li>Detailed research on the selected plant species was done by searching with the scientific name of the species and the most used common name.</li> <li>Species included in the critical analysis based on the results.</li> </ul>
Yellow box	<ul style="list-style-type: none"> <li>Registered species after CoP17</li> </ul>

List of medicinal plant species that need further studies due to high demand (pink box in the Excel sheets)

Species	Source	Species	Source
<i>Aloe</i> spp.	eBay	<i>Guaiacum</i> spp.	Amazon
<i>Aloe arborescens</i>	eBay, Amazon	<i>Panax ginseng</i>	eBay, Amazon
<i>Aloe ferox</i>	eBay, Amazon	<i>Panax quinquefolius</i>	eBay, Amazon
<i>Aloe perryi</i>	eBay	<i>Cactaceae</i> spp.	eBay
<i>Hoodia</i> spp.	eBay, Amazon	<i>Opuntia ficus-indica</i>	eBay, Amazon
<i>Rauvolfia serpentina</i>	eBay	<i>Saussurea costus</i>	eBay
<i>Orchis mascula</i>	eBay	<i>Diospyros</i> spp.	Amazon
<i>Phalaenopsis amabilis</i>	eBay	<i>Euphorbia</i> spp.	Amazon
<i>Vanilla planifolia</i>	eBay, Amazon	<i>Euphorbia antisiphilitica</i>	eBay
<i>Cistanche deserticola</i>	eBay	<i>Prunus Africana</i>	eBay
<i>Hydrastis canadensis</i>	eBay, Amazon	<i>Aquilaria</i> spp.	eBay, Amazon
<i>Cyclamen</i> spp.	Amazon	<i>Nardostachys grandiflora</i>	eBay, Amazon
<i>Picrorhiza kurrooa</i>	Amazon	<i>Guaiacum officinale</i>	eBay, Amazon

## 4. Analysis

The study's strengths and weaknesses can be summarized as follows. It is the first study on CITES medicinal plant species traded over the Internet. This study can contribute to the implementation of Decisions 17.92 to 17.96 and 15.57 on *Combating wildlife cybercrime* (<https://cites.org/eng/dec/valid17/81840>), and Decisions 16.162 (Rev. CoP17) to 16.163 (Rev. CoP17) on *Annotations* (<https://cites.org/eng/dec/valid17/81903>).

Investigating e-commerce in medicinal plants is different from conventional market research. The advantage of this study is that it provides the most recent and up-to-date information on trade at online marketplaces and can help estimate the volume and geographic scope of global Internet trade, as well as identify the species most frequently traded via e-commerce. The survey provides detailed and accurate information with an analysis of 365 species of medicinal plants traded on eBay and Amazon, rather than just a few species or a general search on multiple search engines.

The following limitations should be highlighted.

1. The search has been done using only scientific names. Therefore, common names were not included in the survey, except for the detailed research. Significant volumes of trade in CITES-listed medicinal plants may have been overlooked.
2. There is a discordance between the search result numbers and the number of actual items. Sometimes in the internet shopping mall, there are discordances between the results numbers and the numbers of actual items showed in the window. This phenomenon gets worse as the results numbers increase.
3. It is not possible to know the real trade volumes. We do not have the data to know the accurate total amount of trade or the actual number of transactions. Moreover, it is not possible to check if the items are selling well or how many of products have been traded. Further, the stocks and goods posted on the Internet are not fixed and change over time.
4. There is also no way to determine whether any transaction is international or domestic. It is difficult to know who actually sells and who buys items because of the anonymity of Internet transactions. At least, in the case of eBay, the nationality of seller is verifiable. With Amazon on the other hand, the nationality of both seller and buyer is unknown since they only use ID for trading.
5. For international transactions, there is no guarantee that the products traded were accompanied by CITES documents. Almost nowhere it is specified in the detailed description of the item that the product in trade might need a CITES permit. Only 52 items out of the total 360,021 items mentioned CITES in their descriptions on eBay (*Hoodia* spp.: 7 items, *Aloe* spp.: 37 items, *Cypripedium macranthum*: 2 items, *Aquilaria* spp.: 6 items) and only 6 products among the total 308,604 items mentioned CITES in their descriptions on Amazon (*Aquilaria* spp.: 6 items). Thus even if it is a CITES-listed commodity, no one could tell whether CITES document were used for a transaction.

## 5. Recommendations

Regardless of the limitations of this study, it still provides an understanding of international trade patterns of medicinal plants and provides a detailed description of e-commerce for each species. This survey can provide a foundation for much more specific and in-depth research in the future.

### <Future research that can be derived from this study>

#### 1. Taking into account trade that might not be reported in CITES annual trade reports

In the past, most of the studies assessing the suitability of annotations were predominantly based on international trade data gathered by UNEP-WCMC. This data misses out thousands of trade transactions in CITES medicinal plant species that could benefit from being included in the Review of Significant Trade. In this research, many CITES-listed medicinal plants were found to be good candidates for the RST due to high market demand, international trade in specimens coming from the wild, and questions about sustainability of exports.

#### 2. Research to estimate the amount of medicinal plant products traded over the Internet

For this research, two of the most popular Internet commerce sites were examined as case studies. In the future, research could be expanded to include other internet marketplaces for medicinal plant species. This would entail investigating which countries have developed Internet shopping malls that sell the most medicinal plants worldwide, which companies are market leaders, and whether CITES permits or certificates are obtained when international transactions are made.

### <Further necessary research and materials>

Although not directly relevant to this study, the following recommendations on research and materials would be important to ensure the conservation of medicinal plants.

#### 1. Resource inventory documents from each Party

Collect data on medicinal plant resources such as habitat, distribution, ecology, wild populations, biology, etc. This basic data is needed to establish long-term sustainable medicinal plant management plans.

It is recommended that each Party periodically identifies the most consumed medicinal plants in their domestic markets, whether these are included in CITES Appendices or not. This could be used to inform new listings or amendments to CITES Appendices. A concrete example of this is a proposal submitted by Italy in 2002 at the twelfth meeting of the Plants Committee (PC12Doc 12.1.3: <https://cites.org/sites/default/files/common/com/pc/12/X-PC12-12-01-03.pdf>).

#### 2. In-country market research

Further research could identify which medicinal plants are in high demand and which products are consumed in each country. Studies could also investigate the factors driving this high demand – whether cultural or historical. The results of these studies would contribute to the development of

national and international demand reduction strategies and would also help customs identify which products should be closely controlled.

### 3. International trade in medicinal plants

Further research would identify the most traded medicinal plants and their most traded parts and derivatives, as well as the most important consuming, importing, and exporting countries for medicinal plant products.

### 4. Research on the private sector

Trade in medicinal plants is difficult to control because of the different names of plants in trade and of the lack of data on the different types of products in trade. Private sector research would identify the major companies using CITES-listed medicinal plants (mainly pharmaceutical companies, health supplement foods companies, cosmetics companies, etc.) and categorize the products in trade according to CITES' annotations, i.e. which products are subject to CITES controls and which ones are exempted. Practical identification manual material can be completed based on this research. It would also help people understand the application of annotations with concrete examples.

### 5. Research on customs control

Further research could investigate the nature of control enforced at country borders, i.e. which tests are conducted for medicinal plants traded internationally and how often these controls are conducted at ports and airports. Through this research, we could find out which controls are most effective and identify best practices.

### 6. Domestic laws and controls for medicinal plants

An analysis of domestic laws, regulations, disciplines, etc. related to medicinal plants would be useful and help identify which department or organization is responsible for medicinal plants in each country. This directory would be useful if any trade or management issues related medicinal plants arise in the future.

### 7. Study on how HS codes are used for medicinal plants

It is hard to grasp the volumes of international trade in a specific medicinal plant with HS codes. The study would focus on the discordant use of HS codes by countries for the same medicinal plant products and on the fact that one HS code contains too many different medicinal plant products.

## **<How Parties, the Plants Committee and the CITES Secretariat can contribute>**

### 1. Applying CITES controls effectively and efficiently for CITES medicinal plant species.

The survey confirms that CITES' current annotations for medicinal plant species adequately cover most of the major commodities in trade, with some exceptions. However, even if the annotations are appropriate, they are frequently neglected or poorly implemented. For medicinal plants, the species is often not 'readily identifiable' because products are usually small compared to live ornamental plants or wood-derivative products and because they are processed in the form of extracts, pills, capsules, powder, etc. It would be useful to develop identification manuals which can

easily be updated and understood by everyone and to organize training sessions or workshops for customs officers and CITES scientific and management authorities' officers.

a) Directed to the Parties: Raise awareness of the existing annotations for medicinal plant species with customs and CITES scientific and management authorities by developing or updating identification manuals with photos of the actual type of products in trade, along with the relevant annotation.

b) Directed to Parties and the Secretariat: Provide training courses or organize workshops to help customs and MA and SA officers identify medicinal plants in trade and apply the relevant annotation.

c) Directed to the Secretariat: Closely cooperate with the Convention on Biological Diversity Secretariat since medicinal plant groups are directly connected to health, income and livelihood of remote rural communities and since CBD acts upon the ABS Protocol (Nagoya Protocol on Access and Benefit sharing).

d) Directed to the Secretariat: Build partnerships with IGOs, NGOs, Governments, Research Institutes, Private Sectors and other stakeholders dealing with medicinal plant related issues.

e) Directed to Parties and the Plants Committee: Examine how trade, including e-commerce, in medicinal plants with the existing annotations impacts the conservation of these species.

## 2. Regulating e-commerce

There is a need to more effectively regulate international e-commerce in medicinal plant products, for example by building partnerships with major marketplaces such as amazon and eBay to develop a system to explain CITES regulations when someone uploads and/or purchases products containing CITES-listed medicinal plants.

## 3. Set up a knowledge-sharing platform on medicinal plants

The objectives of this platform would be to share knowledge and experience on the best way to ensure sustainability and promote legality and traceability of CITES-listed medicinal plants, and to connect experts and officers who work with medicinal plant-related tasks.

## 4. Collaborate with the private sector

There is a need to engage with the private sector to improve CITES regulations over medicinal plants and their implementation. The private sector could probably be interested in promoting an 'eco-friendly' image by following CITES provisions and utilizing medicinal plants in sustainable ways.