

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and its Role in Conservation of Cacti and Other Succulent Plants

Maurizio Sajeve^{1*} • Francesco Carimi^{2**} • Noel McGough^{3***}

¹ Dipartimento di Scienze Botaniche dell'Università di Palermo, Via Archirafi 38, I-90123 Palermo, Italy

² Consiglio Nazionale delle Ricerche, Istituto di Genetica Vegetale, Unità Organizzativa Regionale di Palermo, Italy

³ Conventions and Policy Section, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AE, United Kingdom

Corresponding author: * sajeve@unipa.it, ** francesco.carimi@igv.cnr.it, *** n.mcgough@kew.org.uk

ABSTRACT

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) contributes to nature conservation by regulating international trade in listed species by means of a permit system. Through this control system all parties assist in maintaining the listed rare and threatened species in the wild. CITES allows trade in wild specimens up to a level that is not detrimental for the survival of the species in the wild, that is, a use of nature commonly referred to as sustainable use. The basis of CITES are discussed with special emphasis on the Cactaceae and other succulent plants included in the Convention. The framework of regulation of plants in trade is outlined and the impact of illegal trade is discussed. The definition of artificial propagation used by CITES is explained. Additional references and resources for an in-depth study of the convention are provided.

Keywords: biodiversity, legislation, non-detriment, policy, regulation, sustainable use

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INTRODUCTION

Habitat destruction is the main cause of the strong decline in biodiversity, but trade of wild plants and animals is certainly the second cause. The idea of regulating trade in wildlife first arose in the 1960's with a draft resolution approved by the IUCN – the International Union for Conservation of Nature – in 1963.

The text of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was approved by some 80 countries in 1973, and entered into

force in July 1975. CITES is under the umbrella of the United Nations through The United Nations Environment Programme (UNEP). Nowadays over 170 countries are member states of CITES (Fig. 1).

CITES aims to control and regulate trade of species whose trade is, or can be in the near future, a serious threat to their survival in habitat. The intentions of CITES are clearly stated in the preamble to the text of the Convention, claiming for protection of biodiversity: “The contracting States recognizing that wild fauna and flora in their many beautiful and varied forms are an irreplaceable part of the

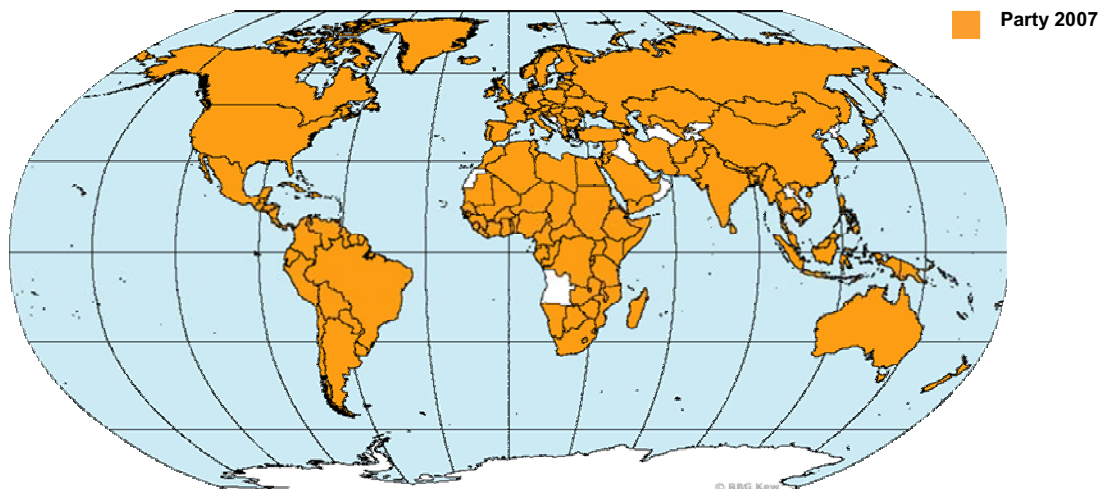


Fig. 1 Parties to the Convention (adapted from McGough 2006).

natural system of the earth which must be protected for this and the generations to come; Conscious of the ever-growing value of wild fauna and flora from aesthetic, scientific, cultural, recreational and economic point of view; Recognizing that peoples and States are and should be the best protectors of their own wild flora and fauna; Recognizing, in addition, that international cooperation is essential for the protection of certain species of wild fauna and flora against over-exploitation through international trade; Convinced of the urgency of taking appropriate measures to this end: Have agreed as follows: ..."

CITES regulates trade of plant and animal species, the aim of this paper is to give an overview of what CITES is and how it works focusing on cacti and other succulent plants.

THE CITES FRAMEWORK

CITES is an international treaty to which only countries may become a Party. Each Party is required to appoint one or more Management Authorities, and at least one Scientific Authority. The Management Authority, always a government department, executes the provisions of the Convention and is responsible for issuing CITES permits. The CITES Secretariat based in Geneva, Switzerland, co-ordinates and assists the Parties with the implementation of the Convention.

The Scientific Authority provides scientific advice to the Management Authority on applications for CITES permits and may also advise on trade and certain policy matters (Rosser and Haywood 2002). The most important task of the Scientific Authority is to provide advice to the Management Authority on whether the export, and in some cases the import, of a plant will be detrimental to the survival of the species in the wild. A meeting of the Conference of the Parties (CoP) to CITES takes place every 2-3 years and is an opportunity for the Parties to amend the Appendices, and to discuss policy and enforcement matters. At a CoP, Parties are represented by official Government delegations. All Parties have one vote and equal voting rights. Proposals to amend the list of taxa included in the Appendices may be tabled by Parties at a CoP, following a consultation process. To be accepted, a proposal must gain a two thirds majority of the votes cast. Non-governmental and intergovernmental organisations may also participate at CoP, but do not have voting rights.

Listing proposals are judged against a series of criteria and these are laid down in Resolution Conf. 9.24 (Rev. CoP13) (see www.cites.org). The latest version of these criteria were developed in the 1990's as part of a process which started in tandem with the development of the IUCN Red list categories and criteria. After the initial workshops the process separated into two lines of development. The

Red List categories and criteria were further developed by IUCN and the CITES criteria for amendment of Appendices I and II were finalised by the CITES technical committees and adopted at the 9th meeting of the Conference of the Parties in Fort Lauderdale, USA in 1994. Further small revisions were made to the criteria in 2004. The criteria are made up, for the most, part of biological criteria but also include trade criteria, guidelines on their application and note the importance of the precautionary approach.

In between meetings of the Conference of the Parties several technical Committees exist including the Plants Committee. The Plants Committee provides advice and guidance to the CoP, other Committees, working groups and the Secretariat on all aspects relevant to the international trade in CITES listed species. The actual Committee is made up of elected individuals from each of the six CITES regions (Africa, Asia, Central and South America and the Caribbean, Europe, North America, Oceania), and only they have voting rights. Representatives of the Parties, non-governmental organisations, trade and conservation bodies also participate in the meeting (Wijnstekers 2003).

CITES is based on three Appendices (see <http://www.cites.org>) which list regulated species depending on their level of threat. Despite the fact that the attention of the public and the media is more prominent for animal species, the number of threatened plants is higher. More than 25,000 taxa of plants are included in the CITES Appendices while listed animals are about 5000.

Appendix I includes species which are threatened with extinction whose trade would lead them to extinction. Trade in wild collected specimens is prohibited, while it is permitted subject to appropriate certification for artificially propagated plants.

Appendix II lists species which could become extinct if trade would continue uncontrolled. This Appendix also includes species which are difficult to differentiate from those threatened, although they themselves might not be at risk of extinction (termed look-alike in CITES). Most of the plants species are included in Appendix II. Trade in wild collected specimens is allowed but it is subject to permits.

Appendix III lists species which are protected by individual countries within their borders, and for which they seek co-operation from other parties to CITES. Trade in wild collected plants is permitted and subject to certificates.

CITES contributes to conservation by regulating international trade through a system of permits. This control system permits all involved countries to assist each other and to cooperate. It is important to underline that CITES allows trade in wild plants in a way that is not detrimental for the survival of the species in the wild. The value of nature can provide people in the country of origin with an income, thus giving value to conservation.

As well as the plants themselves, the trade in any part of

listed plants, or any product made from them, is also subject to CITES controls. This includes scientific material such as herbarium specimens.

Parties to CITES implement the convention by including the relevant controls in their national legislation. Each country assigns Management and Scientific Authorities and also identifies enforcement agencies. Enforcement of the Convention at international borders is frequently carried out by national Customs agencies. Some countries establish specialist wildlife enforcement agencies with their Customs or other government agencies. Botanic gardens can play an important role in advising CITES authorities, training enforcement officials and caring for seized or confiscated plants. Many countries designate botanic gardens as official CITES rescue centres. Within countries enforcement may be carried out by the police or specialist wildlife inspectors which are part of the CITES Management Authorities.

Individual countries must produce annual reports on their trade and if problems arise they may find themselves subject to sanctions recommended by the CITES Standing Committee. A number of countries have been subject to trade bans until they have carried out remedial actions.

The CITES Significant Trade process is a mechanism by which the CITES Animals and Plants Committees review the trade in regulated species on a regular basis. If non-sustainable trade is suspected, an in-depth review of the trade in the relevant species is carried out and recommendations are put forward which must be implemented by the relevant Parties or they are subject to sanctions recommended by the CITES Standing Committee. A country-wide review has recently been carried out for Madagascar, a country rich in endemic succulents.

CACTI, SUCCULENT PLANTS AND CITES

After the Second World War, thanks to the welfare and the transports improvement, the horticultural trade has received a strong impulse. Greenhouses and heating became affordable by more people and the market of exotic plants increased. Cactus and other succulent plants were in cultivation centuries before. Baron Wilhelm von Karwinsky found in Mexico the first specimens of *Ariocarpus* (Figs. 2, 3) in 1830, and sold one of the three plants he collected for 1000 francs – a sum exceeding the value of the plant's weight in gold (Barthlott 1979). Nowadays the possibility to cultivate and propagate these rare plants lead to a lower market price but on the other hand raised the demand dramatically, especially for the rarer ones.

The high demand for wild plants led to a very high pressure on wild populations, and some taxa became virtually extinct in the wild by the end of the 1970's. There is a high level of international trade in other succulent plants groups (Sajeve and Costanzo 1994, 2000; McGough 2006) and as a result several taxa are now included in CITES Appendices.

Cactaceae

The family Cactaceae is a natural family typical of the American continent (Fig. 4). Only a few species of *Rhipsalis*, an epiphytic genus, grow naturally in Madagascar and Sri Lanka. Plants in this family show a very wide range of forms and dimensions, from the genera with strong ancestral characters (e.g. *Pereskia*, a genus with broad leaves and non photosynthetic stems), to the most derived genera such as *Ariocarpus*, *Melocactus* and several more. Dimensions vary from a few centimetres in diameter (*Blossfeldia*) to one metre and more in *Echinocactus*, or several metres tall as with *Carnegiea gigantea*. When CITES entered into force the whole family of the Cactaceae was included in Appendix II, with some taxa gaining the extra protection of Appendix I. Around 90 species are included in Appendix I, therefore prohibiting trade in wild collected ones (Fig. 5). Most species are included in Appendix II. Trade in these Appendix II listed species is allowed from both artificially

propagated and wild-collected sources, subject to the issuance of a permit (Sajeve and Orlando 1989; Sajeve *et al.* 1992; Hunt 1999; Lüthy 2001; Hunt 2006).

Succulent Euphorbiaceae

The genus *Euphorbia* includes over 2000 species, with representatives distributed throughout the world. Their habit ranges from annual plants and shrubs to large trees and succulent species. Probably the best known plant in the genus is *Euphorbia pulcherrima* or poinsettia, which is not CITES controlled.

Most succulent *Euphorbia* have green, succulent stems and range in size from only a few centimetres tall to over 4 metres tall. Leaves are usually reduced in size and ephemeral, and spines are often present at the stems edges. In very simple terms succulent *Euphorbia* have three life forms – tree-like, shrubby, and root or 'caudiciform' succulents. The succulent *Euphorbia* take the same role in Africa as the cacti do in the Americas. All succulent species of *Euphorbia*, of which there are about 700, are listed in CITES Appendix II. In addition, ten dwarf succulent Madagascan species are listed in CITES Appendix I (Carter and Eggli 2003; Lüthy 2006).

Aloe

There are over 500 taxa in the genus *Aloe*, concentrated in southern and eastern Africa and Madagascar. Twenty-two *Aloe* species are listed in CITES Appendix I with the remainder of the genus, excluding *Aloe vera*, are listed in CITES Appendix II (Figs. 6, 7).

Aloe species can be identified by their characteristic leaf structure. However, their life form varies considerably. Species range from the 20 metre tall "tree Aloes" to miniature plants that are only a few centimetres tall. Although *Aloe* species are generally recognised by their rosettes of succulent leaves and tall, candle-like inflorescences, these characteristics are also a feature of several other succulent genera, such as *Agave*. The juices contained within the leaves of some species of *Aloe* have been used for medicinal and cosmetic purposes for centuries (Newton and Vaughan 1996; Lüthy 2006). *A. vera*, the only *Aloe* species not covered by the CITES Convention, is propagated worldwide to supply the medicinal and cosmetics industries. *A. vera* was excluded from CITES at the 9th meeting of the Conference of the Parties in 1994 as no true wild populations are now known to exist (Fig. 8).

Pachypodium

The genus *Pachypodium* is listed in CITES Appendix II, with three species being listed in CITES Appendix I. The Appendix I species are all Malagasy species and were listed in the 1990's due to their rarity and trade demand (Newton and Rowley 2001; Lüthy 2006).

Didiereaceae

The Didiereaceae is a small family of succulents made up of four genera, *Alluaudia*, *Alluaudiopsis*, *Decarya* and *Didierea*. Many taxa have an erect column-like habit similar to columnar *Euphorbia* or cacti. They are an important part of the dry thorny forest of southern and south-western Madagascar. They are threatened by habitat clearance, burning and charcoal production. Demand for wild plants of these taxa for the specialist horticulture trade peaked in the 1980's. After that propagation became more common. All species of the Didiereaceae family (Rowley 1992) are included in Appendix II.

Fouquieria

The genus includes some 11 species and is confined to Mexico and the southwest of the USA. There are three species



Figs 2-10. (2) *Ariocarpus retusus* ssp. *trigonus* (Cactaceae) in habitat. Diameter of the plant = 21 cm (App. I). (3) Seedling of *Ariocarpus bravoanus* (Cactaceae) 1 cm tall (App. I). (4) *Ferocactus acanthodes* (Cactaceae) in habitat (App. II). (5) Wild collected Mexican cacti confiscated by the German Custom (Courtesy Prof. W. Barthlott). (6) *Aloe dichotoma* (Aloaceae) in habitat (App. II). (7) *Aloe brevifolia* var. *depressa* (Aloaceae) in habitat (App. II). (8) *Aloe vera* (Aloaceae) in cultivation (not listed in CITES Appendices). (9) *Fouquieria columnaris* (Fouquieriaceae) in habitat (App. II). (10) *Welwitschia mirabilis* (Welwitschiaceae) in habitat (App. II).

in the genus *Fouquieria* (Fouquieriaceae) listed on the CITES Appendices – *Fouquieria fasciculata* and *F. purpusii* are listed in Appendix I while *F. columnaris* is included in Appendix II. In the case of *F. columnaris* (Boojum tree) it can form dramatic columnar trees up to 18 metres tall and 400 years old (Fig. 9). *F. purpusii* and *F. fasciculata* are smaller shrubs native to Mexico and attractive to the collector. International trade in wild plants outside North America is unlikely.

Anacampseros and Avonia

Anacampseros and *Avonia* (formerly included in *Anacampseros*) include over 20 species, the majority found in Africa (Rowley 1995). All species are listed in CITES Appendix II. The African species are of horticultural interest, with specialist collection being a potential threat. However, the current CITES trade data suggests only very low levels of trade. Nevertheless there have been reports of illegal trade in *Anacampseros alstonii* in eastern Europe.

Welwitschia mirabilis

Welwitschia mirabilis is a unique, long lived (up to 1500 years) succulent plant that survives on moisture from fog and dew. It was formerly listed in CITES Appendix I but it was later downlisted to Appendix II as the plant is relatively common within its habitat and is well protected in its native range. It is native to Angola and Namibia and is not likely to be traded from the wild, with the possible exception of seeds. *W. mirabilis* is the only species in this genus (Fig. 10).

Dioscorea

Dioscorea deltoidea is listed in CITES Appendix II as it is traded for its medicinal, and the horticultural market has a minor impact on international trade.

Nolina interrata

Nolina interrata, or Dehasa Beargrass, is a native of southern California, USA, restricted to a few localities in San Diego County, and also Baja California, Mexico. It is a

grass-like succulent with a flattened swollen base. Despite the fact that international trade in wild plants is unlikely it is listed in Appendix II of CITES.

Lewisia serrata

Lewisia serrata – a small perennial of some interest to alpine plant enthusiasts. It is confined to the shady mossy cliffs of the rivers that drain the Sierra Nevada, in Eastern California, USA. This species is available as propagated plants in more than sufficient numbers to supply the trade demand. It is listed in CITES Appendix I even if international trade in wild plants is unlikely.

Dudleya

Dudleya stolonifera and *Dudleya traskiae* – two rare species endemic to California, USA. They are listed in CITES Appendix II, but international trade in wild plants is unlikely.

Bromeliaceae

Some consider Bromeliads to be succulent. *Tillandsia* is a large genus in the family of Bromeliaceae. There are over 300 species in this genus and they occur naturally in tropical America. They are called Air Plants due to their poorly developed root stocks and apparent ability to draw their nutrients from the air. They are epiphytes growing on other plants and any substrate they can find. Many species are common and are widely distributed. Within their range of distribution certain species grow abundantly on telephone wires. Seven species are listed on CITES Appendix II due to their restricted distribution and demand in trade (Luther 1994). In trade they are novelty ornamentals – for example bought as house plants in Northern Europe. Guatemala is a major producer and exporter, for example supplying the European market with weekly cargo flights of cultivated material. Until recently the trade was thought to be well regulated and sustainable. However questions have been raised with regard to whether some cultivation methods used for *Tillandsia xerographica* are consistent with the CITES definition of artificial propagation and therefore sustainable.

Agave

Although there are over 200 species in the genus *Agave*, only two species are regulated under CITES, not including the species that are used to make tequila. *Agave parviflora* is listed in Appendix I while *A. victoria-reginae* is in Appendix II. All of the controlled species occur naturally in Mexico. It is unlikely to be any problem international trade in these species.

EXEMPTIONS FOR ARTIFICIALLY PROPAGATED PLANTS

Many plants are artificially propagated on a large scale. One of the benefits of CITES has been to encourage the artificial propagation of many plants. Artificial propagation takes the pressure off wild populations, removing the need for plants to be collected from the wild and providing the public with a supply of cheap, high quality, uniform, disease-free plants. Many plants are effectively exclusively traded from artificially propagated sources. Recognising this, the Parties have taken the decision to exempt some specific species from CITES controls. These exemptions include a number of cultivars of cacti, cultivars of *Cyclamen persicum*, cultivars of three species of *Euphorbia* and also *Cymbidium*, *Dendrobium*, *Phalaenopsis* and *Vanda* orchid hybrids packed to the required standards.

The CITES definition of “artificially propagated” includes several unique criteria. The application of these criteria may result in a plant which bears all the physical characteristics of artificial propagation being considered as

wild collected in CITES terms. One of the key points is that plants must be grown in controlled conditions. This means, for example, the plants are manipulated in a non-natural environment to promote prime growing conditions and to exclude predators. A traditional nursery or simple greenhouse is “controlled conditions”. A managed tropical shade house would also be an example of “controlled conditions”. Temporary annexation of a piece of natural vegetation where wild specimens of the plants already occur would not be ‘controlled conditions’. Also, wild collected plants are considered wild even if they have been cultivated in controlled conditions for some time. The cultivated parent stock must have been established in a manner not detrimental to the survival of the species in the wild and managed in a manner which ensures long term maintenance of the cultivated stock. The cultivated parental stock must have been established in accordance with the provisions of CITES and relevant national laws. This means that the stock must be obtained legally in CITES terms and also in terms of any national laws in the country of origin. For example, a plant may have been illegally collected within a country of origin then cultivated in a local nursery and its progeny exported as artificially propagated. However such progeny cannot be considered to be artificially propagated in CITES terms due to the illegal collection of the parent plants. Seeds can only be considered artificially propagated if they are taken from plants which themselves fulfil the CITES definition of artificially propagated. The term “cultivated parental stock” is used in order to allow some addition of fresh wild collected plants to the parental stock. It is acknowledged that parental stock may need to be occasionally supplemented from the wild. As long as this is done in a legal and sustainable way it is allowed.

CONCLUSIONS

Several endangered species have recovered from the edge of extinction due to effective implementation of CITES. Over the years seizures of illegally wild collected plants (Fig. 5) have forced the market to move to artificial propagation (Fig. 3) and to a more sustainable use of the wild populations. There is still a lot of work to be done. Newly described species require time before an evaluation of their status in the wild is completed and sometimes unsustainable trade may start very early. CITES has now been enforced for over 30 years, and new conventions on conservation and sustainable use can take advantage of this experience.

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SUGGESTED WEB SITES RELATED TO CITES

- CITES Home Page: Official site of the CITES Secretariat. Includes lists of Parties, Resolutions, Appendices and other documents. www.cites.org.
- IUCN - The World Conservation Union: IUCN brings together governments, non-governmental organisations, institutions and individuals to help nations make the best use of their natural resources in a sustainable manner. www.iucn.org.
- IUCN Species Survival Commission: SSC is the IUCN's foremost source of scientific and technical information for the conservation of endangered and vulnerable species of flora and fauna. www.iucn.org/themes/ssc.
- UNEP - World Conservation Monitoring Centre: The UNEP-WCMC provides information services on the conservation and sustainable use of the world's living resources, and assists others in the development of information systems. www.unep-wcmc.org/index.html.
- TRAFFIC International: TRAFFIC is a programme of WWF and the IUCN established to monitor the trade in wild plants and animals. The TRAFFIC Network is the world's largest monitoring programme with offices covering most parts of the world. The Network works closely with the CITES Secretariat. www.traffic.org.