

*A brief overview*

## **Nepal's CITES-reported orchid exports**



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#### **Summary**

Nepal is one of the major exporters of wild plants, including ornamental and medicinal orchids to other Southeast Asian countries, China, North America, and Europe. The trade includes species common in Ayurvedic and Chinese pharmacopeia, used either individually or mixed with other plants for a wide range of purposes. This report provides important insights into the historical and current status of legal orchid trade in Nepal. We reviewed the legal, international export of orchids from Nepal starting in 1977, the year Nepal began CITES reporting until 2018 (although there was no trade data reported during 2016-2018), with a particular focus on recent trends (2008-2016), based on the CITES trade database ([trade.cites.org](http://trade.cites.org), downloaded in January 2021). Over this period, a total of 38 species from 15 genera (and several unidentified ones) were exported from Nepal; however, only 4 genera (*Dendrobium*, *Coelogyne*, *Cymbidium*, *Otochilus*) were reported by Nepal. Wild-harvested orchids overwhelmingly dominated the legal trade (96%, 47,889 kg), while a few of them were artificially propagated. Likewise, the export was dominated by a single genus, *Dendrobium* although 12 species from 4 genera (*Dendrobium*, *Coelogyne*, *Cymbidium*, and *Otochilus*) were reported in trade by Nepal and its importing countries. Thailand is its major importer; almost all were *Dendrobium* stems exported for the purpose of trade and collected from the wild. It is important to note that there is a huge discrepancy in data reported by Nepal and its importers.

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# Nepal's CITES-reported orchid exports

## 1. Introduction

Orchids are widely traded globally for their medicinal and ornamental properties (Hinsley et al., 2018). Nepal is one of the major exporters of wild plants, including ornamental and medicinal orchids to other Southeast Asian countries, China, North America, and Europe. This includes species common in Ayurvedic and Chinese pharmacopeia, used as a paste, powder, juice, and used either individually or mixed with other plants for a wide range of purposes, including for uses as aphrodisiacs, energizers, skin burns, bone problems, headaches, wounds, insect repellent, skin fungi, as an antidote against snake and scorpion bites, and induce abortion (Subedi et al., 2013; Acharya and Rokaya, 2010).

There is little understanding about the extent or scale of Nepal's orchid harvest and trade (Subedi et al., 2013), including both legal and illegal domestic and international trade. It is thus hard to understand the implications of commercial trade on the long-term conservation of Nepal's > 500 orchid species (Subedi et al., 2013; Bhandari et al., 2020). The limited existing data on orchid trade comes from a) local harvest and trade records, b) national trade records c) national seizure records of illegal trade, d) Convention on International Trade in Endangered Species of Wild Fauna, and Flora (CITES) reported international trade records.

Nepal's legal trade data for orchids (as reported by the CITES Trade Database) is only available (starting from 1977) until 2016 just before the CITES Act (2017) came into action which envisioned a ban on the wild harvest and trade of all the CITES-listed species (CITES ACT 2017, Article 67). It was ratified in CITES Regulation 2019 but as the authorities are yet to prepare a management plan for orchids, the orchid trade has not resumed yet (at least until the time of this analysis). It is important to note that the recent trade data does not reflect on the impacts of covid-19 in trade reporting because the parties normally report almost after a year or more.

This report provides the first analysis of Nepal's CITES-reported international trade records for orchids and covers the period from 1977 to 2018. This data originates from Nepal's CITES Management Authority within the Department of Forest and Soil Conservation, which is responsible for issuing trade permits, managing trade data, and reporting. This review provides important insights into the historical and current status of the legal orchid trade.

## 2. Methods

We reviewed the legal, international export of orchids from Nepal starting in 1977, the year Nepal began CITES reporting until 2018 (although there was no trade data reported during 2016-2018), with a particular focus on recent trends (2008-2016), based on the CITES trade database ([trade.cites.org](http://trade.cites.org), downloaded in January 2021). We used particular search terms like exporting countries: Nepal; importing countries: all; source: all; purposes: all; trade terms: all terms, taxon: Orchidaceae. During the data download stage, we did not omit re-exports and personal items or scientific trade because we wanted to download all the data exported by Nepal (including re-exports). (Note that for those individuals without units, we assumed the total number of specimens as suggested by the CITES User guide Version-8).

We used comparative tabulation outputs instead of net/gross outputs of the CITES Trade Database. This is because we wanted to explore the reported sources and purposes of trade in the specimens. To calculate trade volumes, except in some circumstances (where a large amount of orchids were reported as imported from Nepal by importer countries like China, the UK, and the USA) we used only those records that were reported by Nepal (exporter reported quantity, rather than the importer reported quantities, and there are many discrepancies between these - most of the trade events seem to be recorded by importing countries but there is no record from Nepal side. In such cases, we have recorded the data for countries that we know from literature are the presumed importers of Nepalese orchids like China). We also prepared the trade-chain map using Trade mapper (<http://trademapper.co.uk/>). We attempted to identify how many individual shipments were made per year, but only four records were identifiable in the data from the CITES MA.

## 3. Results

### 3.1. Summary of historic orchid trade analysis (1977-2016)

Historically, orchids were traded in large quantities from Nepal. In fact, orchids dominated Nepal's CITES-listed plant exports, although the quantitative comparison is not possible because trade volumes were either not reported or did not use uniform units. Most of these plants were exported for commercial trade, were of unknown source, and exported by the kilogram of stems (Table 1).

Over this period, a total of 38 species from 15 genera (and several unidentified ones) were exported from Nepal (Appendix 2). However, only 4 of these genera (*Dendrobium*, *Coelogyne*,

*Cymbidium*, *Otochilus*) were reported by Nepal to the CITES database (database), with all of the remaining genera (including *Aerides*, *Agrostophyllum*, *Arachnis*, *Arundina*, *Bulbophyllum*, *Calanthe*, *Gastrochilus*, *Paphiopedilum*, *Pione*, *Vanda*) reported only in the CITES data of importing countries noticed this issue where the importer countries have recorded the trade which is not recorded by Nepal. Over a quarter of specimens (27% importer reported and 7% exporter reported) could not be identified in species form; they were reported as *Orchid* spp.

Table 1. Orchid genera exported, as reported by Nepal (1977 -2018)

Genus	Traded volume (units)			
	Live (individuals)	Live (kg)	Stems (kg)	Roots (kg)
Coelogyne	5			
Cymbidium	9			
Dendrobium	0	7,992	40,800	997
Otochilus	4			
Orchidaceae	3,512			

### 3.2. Contemporary trade trends (2008-2016)

Over the 2008-2016 period, Nepal reported 49,789 kg of orchid trade (the importer reported volume for this same period was 44,194 kg), with volumes fluctuating tremendously across years (Fig. 1, the 2015 dip explained by the earthquake). In addition, a small number of individual plants were reported over this period (Table 2).

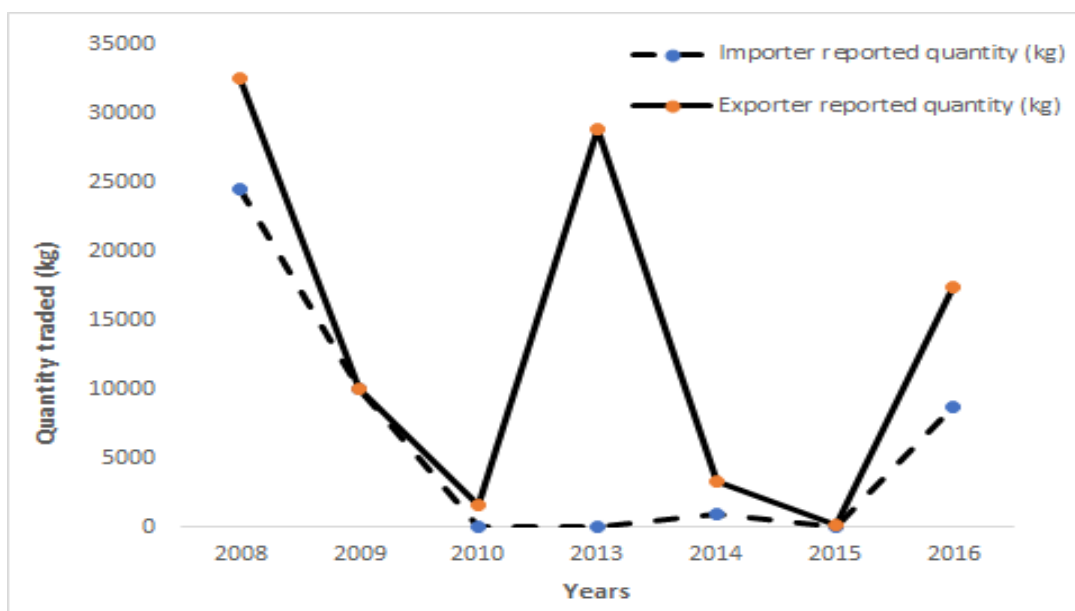


Figure 1: Trade volume (kg) of orchids exports from Nepal reported (2008 to 2016)

The majority of reported trade were as stems (82%, 40,800 kg) while some amount was traded live (16%, 7,992 kg), and a very small amount as dried roots (2%, 997 kg). Trade volumes reported in stems were normally traded in large quantities, often reported as kilograms, while those reported as individuals were in small volumes (Table 2).

Table 2: Overview of orchid species exported from Nepal (2008 and 2018)

Species	Origin (wild, propagated)	Live/dry	Purpose	Leading importer	Amount traded	Year(s)
<i>Coelogyne nitida</i>	Propagated	Live	Trade	Japan	5 individuals	2013
<i>Cymbidium iridioides</i>	Propagated	Live	Trade	Japan	3 individuals	2013
<i>Cymbidium sp.</i>	Propagated	Live	Circus or exhibition	Japan	6 individuals	2013
<i>Dendrobium amoenum</i>	Wild	Stems	Trade	Thailand	9,309kg	2013
<i>Dendrobium aphyllum</i>	Wild	Stems and live	Trade	Thailand, Switzerland, China	stems 10,894kg, live 7,992kg	2008, 2010, 2013
<i>Dendrobium dixonianum</i>	Propagated	roots	Trade	China	347kg	2013
<i>Dendrobium dixonianum</i>	Wild	stems	Trade	Thailand	2,378kg	2014
<i>Dendrobium eriiflorum</i>	Propagated	stems	Trade	Thailand	3 individuals	2015
<i>Dendrobium fimbriatum</i>	Wild	Stems	Trade	Thailand	9,309kg	2013
<i>Dendrobium spp.</i>	Wild	Stems	Trade	Thailand	8,007kg	2016
<i>Dendrobium transparens</i>	Propagated	roots and stems	Trade	China	roots 650kg, stems 900kg	2013, 2015, 2016

<i>Otochilus fuscus</i>	Propagated	live	Trade	Japan	4 individuals	2013
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Two other *Dendrobium* orchid species were also traded in large volumes as reported by importers (Thailand) but were absent from Nepal's records: 2,598 kg stem of *D. denudans* and 3,675 kg of *D. nitida*. Nepal also recorded two cases of re-exports, both from Thailand. One in 2013, 9309kg stems of *D. aphyllum* and the other in 2014, 2378 kg stems of *D. dixonianum*. Both of these records were collected from the wild for the purpose of trade.

### 3.2.1. Trade dominated by wild-collected plants

Wild-harvested orchids overwhelmingly dominated the reported legal trade over this period (96%, 47,889 kg), while only 4% (1,699.5 kgs) were from artificially propagated (in the genera *Dendrobium*, *Coelogyne*, *Cymbidium*, and *Otochilus*) and a small amount source was unidentified (200 kg).

No Non-detriment Findings (NDF) were conducted for wild-harvested orchids. This was confirmed by the CITES focal person; NDFs are currently conducted only for species that have a quota system (i.e. *Nardostachys grandiflora*), however, the Government of Nepal published and implemented an orchid harvesting guideline in 2013, [“सुनाखरी संकलन तथा खेति विकास \(कार्यविधि\) निर्देशिका, २०६९”](#) (Lamichhane and Parajuli, 2014). It was a legally binding document endorsed by the Government of Nepal and sets out the procedures by which orchids can be harvested from the wild. Similarly, the Ministry of Forests and Soil Conservation, with the technical support of UNDP Nepal, carried out a comprehensive [value chain analysis](#) of several plants including wild orchids and developed the non-legally binding document, Value Chain Designing of Orchids of Panchase (2014). It explored the possibilities for the commercialization of wild-harvested orchids from the Panchase Forest Area.

A small volume of plants was of artificially propagated origin, in accordance with Resolution Conf. 11.11 (Rev. CoP15), as well as parts and derivatives thereof, exported. The Government in its orchid harvesting guideline has prioritized [13 species of orchids](#) for the purpose of commercial cultivation and trade.

### 3.2.2. Legal trade dominated by *Dendrobium* spp.

Over the last ten years (2008-2018), 12 species from 4 genera (*Dendrobium*, *Coelogyne*, *Cymbidium*, and *Otochilus*) were reported in trade by Nepal and its importing countries (Appendix 1). However, export was dominated by a single genus, *Dendrobium* (Fig. 2). *Dendrobium* was the only genus reported in kilograms and the other genera (*Coelogyne*, *Cymbidium*, and *Otochilus*) were traded as individuals -- 18 individuals, all traded to Japan).

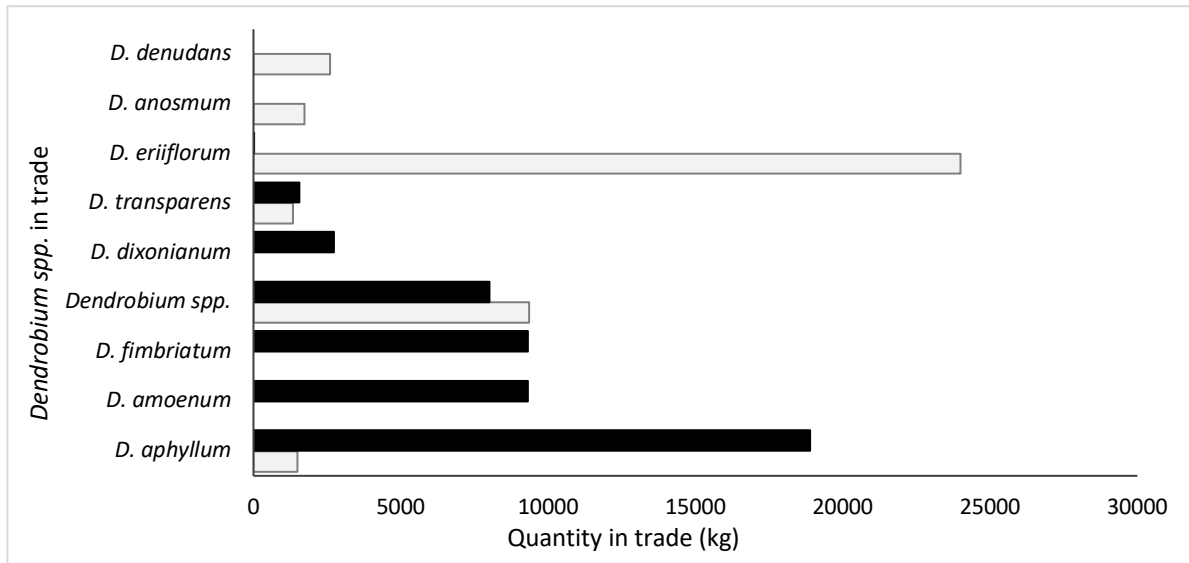


Figure 2. Reported volume of *Dendrobium* species in trade (2008-2016) in Nepal as reported exporters (black) and the importers (white).

### 3.2.3. Countries in trade

As reported by Nepal, only three countries legally imported orchids from Nepal during this period: Thailand (80%, 39,900kg), Switzerland (16%, 7,992 kg), and China (4%, 1,897kg) (Fig. 3). Of these, Thailand is its major importer; almost all were *Dendrobium* stems exported for the purpose of trade and collected from the wild.

However, there is a huge discrepancy in data reported by Nepal and its importers. There are countries that reported that they imported orchids from Nepal that Nepal never listed. This includes China and some records of Thailand. In fact, if we consider both importer and exporter reporter data, China ranks as Nepal's largest importer (e.g., 36,187 kg reported by China vs 1,897 kg reported by Nepal).



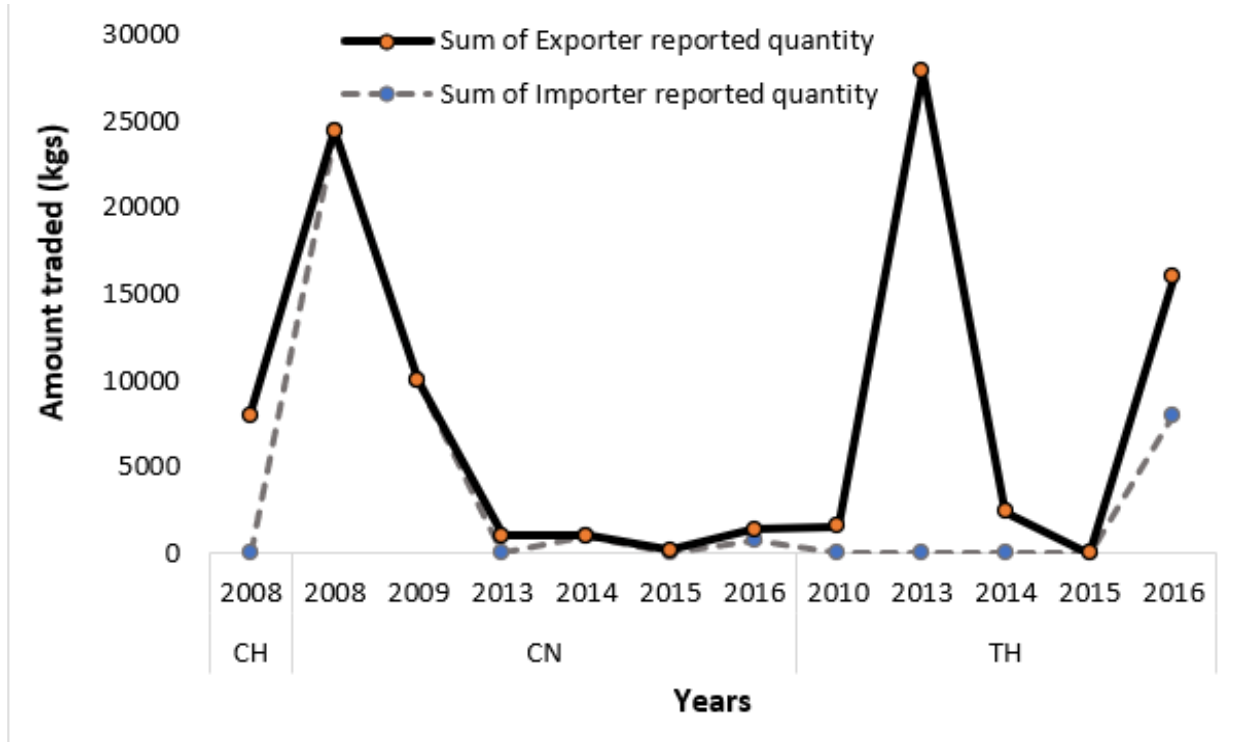


Figure 3. Reported trade volume (kg) by importing country (2008-2018)



Figure 4. Relative volume (kg) of orchid exports reported by Nepal (2008-2018) (Map prepared in trade-mapper)

### 3.3. Changes in trade trend over time

The review of trade data shows the change in the species in trade over time. Historically, if we consider both exporter and importer reported data, there were many species in trade (38 genera). However, in the last ten years, only 12 species from four genera have been recorded; this includes a majority of species in *Dendrobium* and four other species of three genera. Species historically traded in the genera *Calanthe*, *Gastrochilus*, *Paphiopedilum*, *Phais*, *Bulbophyllum*, *Vanda* were no longer reported if we consider data from the exporter, Nepal.

There was also a change in the destination countries. Historically, Great Britain was a significant importer of Nepalese orchids; between 1977-1981 it imported 27,060 individuals in 20 trade events. It imported species of *Calanthe*, *Coelogyne*, *Pleione*, *Cymbidium*, *Paphiopedilum*, *Eria*, *Vanda*, which were sparsely recorded in recent trade events. In fact, different *Paphiopedilum* species (*P. fairrieanum*, *P. hirsutissimum*, *P. teres*, *P. insigne*) were exported historically (between 1979 and 1997) which is considered to be rare at present. The United States, Czech Republic, Denmark, and Nicaragua also historically reported imports from Nepal (although Nepal itself did not report these exports), but have not reported recent imports.

Trade volumes were reported using different metrics over time. Notably, they are now more reported in a standard format, kilograms. During the 2008-2016 period, only 18 live plants were reported without units, which was a major improvement over the historical approach.

#### **4. Discussion**

Given that virtually all trade during this period was reported in kilograms and as stems (rather than individuals), we assume that this is for medicinal rather than ornamental trade, which was confirmed by the CITES management authority (*Paudyal. B., CITES Focal Person, per. comm. 7 March 2021*). The most-traded specimens are the species of *Dendrobium*, *Cymbidium*, and *Otochilus* which have been reported as medicinal orchids (primarily the Tibetan and Chinese medicines) (see, the checklist of medicinal orchids) in the literature (Subedi et al., 2013; Acharya and Rokaya, 2010; Pyakurel et al., 2019). However, the species that are common in the Ayurvedic medicinal tradition, or countries where that tradition exists (e.g., India, Bangladesh), were not listed as involved in the legal trade at all.

The trade was dominated by one genus, *Dendrobium*. This is likely because the commercial orchid farm company, *Dang Suyang Dendrobium eriiflorum Technology Product Pvt, LTd.*, has reported cultivation and trade of *D. eriiflorum* and *D. transparens* since 2011 (Lamichchane and Parajuli, 2014). In 2014, it exported 346.5 kg of *D. eriiflorum* and 650 kg of *D. transparens* to

China; this is reported in the CITES trade data but it is reported by its importer, China (not by Nepal) (note: we confirmed this by checking the trade permits from CITES focal point based in Department of Forest and Soil Conservation, Kathmandu). Two genera, *Dendrobium* and *Otochilus*, which are used for medicinal purposes and heavily threatened due to trade, were found in the dataset (Subedi et al., 2013). However, most of the orchid genera identified in the literature as most threatened by trade in Nepal were absent from the CITES dataset, including *Acampe*, *Aerides*, *Coelogyne*, *Crepidium*, *Dactylorhiza*, *Gastrodia*, *Eulophia*, *Flickingeria*, *Pholidota*, *Satyrium*, *Vanda* (Subedi et al., 2013) and *Orchis latifolia*.

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## Appendices

### Appendix 1: Screenshot of data downloaded from CITES Trade Database

Year	App.	Taxon	Class	Order	Family	Genus	Importer	Exporter	Origin	Importer reported quantity	Exporter reported quantity	Term	Unit	Purpose	Source
2008	II	Dendrobium spp.		Orchidales	Orchidaceae	Dendrobium	CN	NP		4000		live	kg	T	A
2008	II	Dendrobium aphyllum		Orchidales	Orchidaceae	Dendrobium	CH	NP			7992	live	kg	T	W
2008	II	Dendrobium aphyllum		Orchidales	Orchidaceae	Dendrobium	CN	NP		1500		live	kg	T	W
2008	II	Dendrobium eriiflorum		Orchidales	Orchidaceae	Dendrobium	CN	NP		18990		stems	kg	T	W
2009	II	Dendrobium spp.		Orchidales	Orchidaceae	Dendrobium	CN	NP		5000		live	kg	T	A
2009	II	Dendrobium eriiflorum		Orchidales	Orchidaceae	Dendrobium	CN	NP		5000		roots	kg	T	W
2010	II	Dendrobium aphyllum		Orchidales	Orchidaceae	Dendrobium	TH	NP			1585	stems	kg	T	W
2013	II	Coelogyne nitida		Orchidales	Orchidaceae	Coelogyne	JP	NP			5	live		T	A
2013	II	Cymbidium spp.		Orchidales	Orchidaceae	Cymbidium	JP	NP			6	live		T	A
2013	II	Cymbidium iridioides		Orchidales	Orchidaceae	Cymbidium	JP	NP			3	live		Q	A
2013	II	Dendrobium amoenum		Orchidales	Orchidaceae	Dendrobium	TH	NP			9308.91	stems	kg	T	W
2013	II	Dendrobium aphyllum		Orchidales	Orchidaceae	Dendrobium	TH	NP	XX		9308.91	stems	kg	T	W
2013	II	Dendrobium dixonianum		Orchidales	Orchidaceae	Dendrobium	CN	NP			346.5	roots	kg	T	A
2013	II	Dendrobium fimbriatum		Orchidales	Orchidaceae	Dendrobium	TH	NP			9308.91	stems	kg	T	W
2013	II	Dendrobium transparens		Orchidales	Orchidaceae	Dendrobium	CN	NP			650	roots	kg	T	A
2013	II	Otochilus fuscus		Orchidales	Orchidaceae	Otochilus	JP	NP			4	live		T	A
2014	II	Dendrobium spp.		Orchidales	Orchidaceae	Dendrobium	CN	NP		346.5		stems	kg	T	A
2014	II	Dendrobium dixonianum		Orchidales	Orchidaceae	Dendrobium	TH	NP	XX		2378.20	stems	kg	T	W
2014	II	Dendrobium transparens		Orchidales	Orchidaceae	Dendrobium	CN	NP		650		stems	kg	T	A
2015	II	Dendrobium eriiflorum		Orchidales	Orchidaceae	Dendrobium	TH	NP			3	stems	kg	T	A
2015	II	Dendrobium transparens		Orchidales	Orchidaceae	Dendrobium	CN	NP			200	stems	kg		
2016	II	Dendrobium spp.		Orchidales	Orchidaceae	Dendrobium	TH	NP			8007.2	stems	kg	T	W
2016	II	Dendrobium anosmum		Orchidales	Orchidaceae	Dendrobium	TH	NP		1734.40		stems	kg	T	A
2016	II	Dendrobium denudans		Orchidales	Orchidaceae	Dendrobium	TH	NP		2597.60		stems	kg	T	A
2016	II	Dendrobium nobile		Orchidales	Orchidaceae	Dendrobium	TH	NP		3675.20		stems	kg	T	A
2016	II	Dendrobium transparens		Orchidales	Orchidaceae	Dendrobium	CN	NP		700	700	stems	kg	T	A

### Appendix 2: List of orchid species traded from Nepal (1977-2020)

SN	Genera	Species
1	<i>Ascocentrum</i>	<i>Ascocentrum ampullaceum</i>
2		<i>Ascocentrum miniatum</i>
3	<i>Brassia</i>	<i>Brassia hybrid</i>
4	<i>Cattleya</i>	<i>Cattleya aurantiaca</i>
5		<i>Cattleya bicolor</i>
6		<i>Cattleya guttata</i>
7		<i>Cattleya hybrid</i>
8		<i>Cattleya intermedia</i>
9		<i>Cattleya maxima</i>
10		<i>Cattleya spp.</i>
11	<i>Coelogyne</i>	<i>Coelogyne nitida</i>

12		<i>Coelogyne</i> spp.
13	<i>Cymbidium</i>	<i>Cymbidium</i> hybrid
14		<i>Cymbidium iridioides</i>
15	<i>Dendrobium</i>	<i>Dendrobium bicameratum</i>
16		<i>Dendrobium heterocarpum</i>
17		<i>Dendrobium</i> hybrid
18		<i>Dendrobium nobile</i>
19	<i>Grammatophyllum</i>	<i>Grammatophyllum</i> hybrid
20	<i>Laelia</i>	<i>Laelia anceps</i>
21		<i>Laelia autumnalis</i>
22		<i>Laelia pumila</i>
23	<i>Lycaste</i>	<i>Lycaste skinneri</i>
24	<i>Oncidium</i>	<i>Oncidium</i> hybrid
25	<i>Paphiopedilum</i>	<i>Paphiopedilum charlesworthii</i>
26		<i>Paphiopedilum henryanum</i>
27		<i>Paphiopedilum</i> hybrid
28		<i>Paphiopedilum malipoense</i>
29		<i>Paphiopedilum rothschildianum</i>
30		<i>Paphiopedilum</i> spp.
31		<i>Paphiopedilum villosum</i>
32	<i>Phalaenopsis</i>	<i>Phalaenopsis</i> hybrid
33	<i>Rhynchostylis</i>	<i>Rhynchostylis gigantea</i>
34		<i>Rhynchostylis retusa</i>
35	<i>Rossioglossum</i>	<i>Rossioglossum grande</i>
36	<i>Vanda</i>	<i>Vanda</i> hybrid
37		<i>Vanda</i> spp.
38		<i>Orchidaceae</i> hybrid