

Review of Significant Trade East African Aloes

(November 2003)

1. Summary (including recommended category and the basis for categorization)

There are approximately 360 species and subspecies in the succulent plant genus *Aloe*, distributed in Africa, the Arabian Peninsula and certain islands of the Indian Ocean. In East Africa, as defined for this review there are nearly 200 taxa, many of which are naturally rare and confined to specific habitats. The sap of certain Aloes has medicinal or cosmetic applications and has been traded internationally for millennia. *Aloe vera*, the wild origin of which is uncertain, is cultivated as a commercial crop in many countries for extensive use in the pharmaceutical and cosmetic industries. Several South African species are also important in international trade from cultivated and wild harvested sources.

In comparison with overall international levels of trade in *Aloe* extracts, the reported information on quantities exported by East African countries is very small. It is however, apparent that there is a significant trade both between countries within the region and for the wider market which is currently unrecorded in CITES trade statistics. At present Kenya appears to be the main source of *Aloe* extracts traded internationally from the region. The impact of the trade on the conservation status of *Aloe* species is unclear. There is however concern about the levels of exploitation of several species, particularly in view of the lack of regulation. It is apparent that provisions of Article IV, paragraph 2 (a) and paragraph 3 of the Convention are not being implemented for *Aloe* spp. exported from the country. The two species of particular concern because of exploitation for international trade are *A. turkanensis* and *A. scabrifolia*. Other species may be under threat in Kenya because of indiscriminate collection.

No evidence of commercial collection for international trade in Aloes from other East African countries is currently taking place. On the basis of consultation for this review it seems unlikely that this is taking place other than on a very minor scale. It is therefore recommended that efforts to improve implementation of CITES for Aloes should focus on Kenya where the CITES Authorities and NGOs are taking steps to bring the trade under effective control.

On the basis of this preliminary review the following provisional categorization is given for East African *Aloe* spp. in accordance with paragraph i) of Resolution Conf 12.8:

Category "Species of urgent concern" for which the provisions of Article IV, paragraph 2(a) and 3 of the Convention are not being implemented.

***A. scabrifolia*, *A. secundiflora* and *A. turkanensis*.** These species are included in this category because of the levels of exploitation in Kenya for the export trade of the wild harvested extracts. No provisions exist for making non-detriment findings as required by Article IV paragraph 2a) of the Convention or for monitoring levels of exports as required under Article IV paragraph 3. It is possible that additional species are impacted detrimentally by incidental collection for the trade. It is recommended that:

- a) Legislative provisions and administrative procedures are developed in Kenya as a matter of urgency to regulate the export of *Aloe* extracts;
- b) Based on status assessments for *A. scabrifolia*, *A. secundiflora* and *A. turkanensis* quotas are determined for sustainable levels of harvesting where appropriate and as a basis for future monitoring;
- c) Periodic field monitoring is undertaken to ensure that other *Aloe* spp. in the harvesting regions are not impacted by collecting for trade.

Additional remarks

Based on this short survey it appears that relatively few *Aloe* species are exploited for the international trade in extracts. Information on the trade, which has apparently been ongoing for many years is however very difficult to obtain. Given the local value and international demand for *Aloe* products, the potential for sustainable trade to contribute to rural livelihoods appears to be significant.

It is therefore recommended that:

- a) Information is solicited from importing countries, notably China, on the levels of import of *Aloe* extracts from East Africa;
- b) CITES parties and NGOs support the development of community propagation and cultivation schemes for *Aloe* spp. used medicinally to take the pressure off wild populations and support rural livelihoods;
- c) Cultivation and propagation guidelines for *Aloe* spp. with medicinal values are developed as proposed by the Kenya Wildlife Service and certification schemes for sustainably wild harvested or cultivated plants are developed, supported and promoted, as an economic incentive for CITES compliance.

There is also an urgent need to update the conservation assessments for East African *Aloe* spp. using the latest version of the IUCN Red List categories and criteria.

2. Species biology and conservation status

The genus *Aloe* consists of around 360 taxa of succulent plants. The distribution range of the genus extends throughout Africa, with species mainly in the drier areas, and into the Arabian Peninsula and islands off the East coast from Socotra to Madagascar. Nearly 200 taxa are listed for East African countries, as included in this study, in the *CITES Aloe and Pachypodium Checklist* (Eggle et al 2001). The global conservation status of 59 East African taxa is recorded in the *1997 IUCN Red List of Threatened Plants* (Walter and Gillett, 1998) out of a total of 158 globally threatened *Aloe* taxa. The threat status of species according to this publication is given in the Annex.

Few evaluations have been made using the "new" post 1994 IUCN Red List categories and criteria, and only three East African *Aloe* spp. are included in the 2002 IUCN Red List. Additional preliminary assessments with the current IUCN Red List categories have been provided by Demissew, in litt., 2003. Many additional species of East African *Aloe* have limited distributions and are likely to qualify for the IUCN Red List categories according to Criterion B which is based on geographic range. Such restricted range species include, for example, *Aloe amicorum*, *Aloe kulalensis* and *A. multicolor* which are known only from Mount Kulal Biosphere Reserve, in the Northern Frontier Province, Kenya.

2.1 Life history and ecology

The Aloes of East Africa are herbs, shrubs or small trees often with thickened roots. Species are adapted to arid habitats through their succulent habit. Reproduction is by seed or suckers. Although some species are very restricted in distribution, others are widespread and in the absence of competition, may become locally invasive.

2.2 Global distribution – range States of the species

The *Aloe* taxa (species and subspecies) recorded in nine countries of East Africa are listed in the Annex to this report, together with information on threat status where known. Table 1 summarises this information on a country by country basis.

Table 1 – Indigenous, endemic and threatened *Aloe taxa* in East African countries

Country	No. of <i>Aloe</i> taxa	No. of endemic <i>Aloe</i> taxa	No. of taxa recorded as threatened	No. of species threatened by international trade
Djibouti	2	0	1	0
Eritrea	8	1	2	0
Ethiopia	40	19	18	0
Kenya	55	24	26	2
Mozambique	28	5	1	0
Somalia	30	24	13	
Sudan	10	4	0	0
Tanzania	41	23	11	0
Uganda	15	2	4	0

2.3 Population distribution, status, trend and threats by range States

Djibouti: Two *Aloe* spp. are indigenous. One of these species, *Aloe mcloughlinii* is recorded as globally Rare in the 1997 IUCN Red List. The indigenous *Aloe* spp. are used as ornamental domestic plants (Monographie Nationale de la Diversité Biologique, 1999)

Eritrea: Conservation assessments for some species of *Aloe* found in Eritrea have been provided by (Demissew, in litt. 2003) and are included in the Annex. Threats are not currently known.

Ethiopia: Twenty species of *Aloe* are endemic to Ethiopia. The 1997 IUCN Red List of Threatened Plants records 11 species of *Aloe* as being rare or threatened in Ethiopia. More recent assessments of endemic species and species whose range includes neighbouring countries have been provided for this study. These assessments are extracted from a Red List of vascular plants of Ethiopia currently being compiled by Sebsebe Demissew, Ensermu Kelbessa and Luis Vivero (Demissew, in litt. 2003). They are included in the Annex. There is generally no specific threat from harvesting for *Aloe* species in Ethiopia except for *Aloe pulcherrima* which is used medicinally by herbalists in central parts of the country (mainly Shewa and Gojam). This species grows on steep basalt slopes or cliffs with sparse cover of evergreen bushland (Demissew and Gilbert, 1997). Powys, in litt., 2003 notes seeing no sign of *Aloe* harvesting in southern Ethiopia during several expeditions. Habitat destruction is the main threat to Critically Endangered species. Although Aloes can survive in inhospitable conditions, now even marginal lands are being cleared in some areas (Demissew, in litt., 2003). The Critically Endangered *A. harlana* for example grows only on sparsely vegetated, often limestone slopes close to the town of Harla (Demissew and Gilbert, 1997). It has been suggested that the range of some of the more shrubby species may have extended in parts of the country where denudation by erosion following cultivation has created open rocky slopes (Oldfield, 1997).

Kenya: Kenya has the greatest *Aloe* diversity amongst East African countries. As recorded by Egli et al (2001) there are 57 species and subspecies within the country. Information on the distribution of Aloes, their status and threats is relatively well-known for Kenya. The 1997 IUCN Red List of Threatened Plants records 22 species of *Aloe* as being rare or threatened in the country. The 2002 IUCN Red List includes one species, *Aloe ballyi*, a rare tree aloe which, in Kenya, is confined to dense bush near Mwatate in the Taita Hills. The other species have not yet been evaluated using the post 1994 IUCN Red List categories and criteria.

A conservation project for succulent species which included information gathering for a selection of threatened Aloes was initiated by the East African Herbarium in 1996 (see section 3 below). The eight *Aloe* spp selected are considered to be succulents of highest conservation concern within the country. Threats to these species include habitat destruction, grazing and direct exploitation. More recently research on *Aloe* resources in Kenya has been undertaken by the

Kenya Forestry Research Institute (KEFRI) with a specific focus on utilization and the scope for commercialization (Mukonyi et al 2001). This research has noted that *A. turkanensis* and *A. scabrifolia*, both of which are cut for extracts, are threatened. *A. scabrifolia* occurs in the (Samburu) Meru District of the Northern Frontier Province and *A. turkanensis* is found in Baringo District of the Northern Frontier Province as well as in the Karamoja District of Uganda.

In the Laikipia, Samburu, and Baringo districts, Kenya, it has been reported that *Aloe* harvesters will cut any species that yield a decent amount of sap. Fortunately certain uncommon species such as *A. tugenensis* yield very little sap for their size, and so are not cut by the local harvesters on the north and east sides of Lake Baringo. There is concern that several narrow endemic *Aloe* species in northern Kenya and Ethiopia could be easily extirpated by *Aloe* cutters (King, *in litt.* 2003).

Mozambique: One species, *A. cannelii* is listed as Rare in the 1997 IUCN Red List of Threatened Plants. Another species *A. ballii* which occurs in Mozambique and Zimbabwe is included as Endangered in the 2002 IUCN Red List. It is however recorded as Low Risk for Mozambique by Izidine and Bandeira, 2002. Various *Aloe* species have been evaluated as Data Deficient by Izidine and Bandeira, 2002, as shown in the Annex.

Somalia: The 1997 IUCN Red List of Threatened Plants records 15 species of *Aloe* as being rare or threatened in Somalia (see the Annex). Grazing by domestic livestock has been recorded as a threat to certain *Aloe* spp., such as *A. peckii* and *A. pirottae*. The removal of woody vegetation by grazing, has at the same time allowed the spread other unpalatable species such as *A. megalacantha* which has invaded extensive areas on plains surrounding Hargeisa.

Sudan: No specific information has been located on the conservation status of *Aloe* spp. in Sudan. Powys, *in litt.*, 2003 notes that good populations of *A. parvidens* and *A. rivae* exist in Eastern Equatoria Province, species not recorded for the country in Egli et al 2001, and also notes seeing no sign of *Aloe* utilization.

Tanzania: The 1997 IUCN Red List of Threatened Plants records 13 species of *Aloe* as being rare or threatened in Tanzania (see the Annex). The 2002 IUCN Red List includes one species, *Aloe ballyi* which occurs in the South Pare Mts., Manyara escarpment, Ngubora River and Lake Eyassi. Sachedina (1998) reports that some traditional healers have noted a decline in *Aloe* populations used medicinally.

Uganda: The 1997 IUCN Red List of Threatened Plants records 4 species of *Aloe* as being rare or threatened in Uganda (see the Annex).

3. Conservation and management

Few specific measures are currently known to protect or manage wild populations of *Aloe* spp. in countries of East Africa.

In Kenya the Plant Conservation Project of the East African Herbarium initiated a conservation project in 1996 to conserve a range of succulent species including *Aloe archeri*, *A. ballyi*, *A. juvenna*, *A. massawana*, *A. microdonta*, *A. parvidens*, *A. tugenensis* and *A. wrefordii*. The project aimed to carry out field studies to verify the extant populations of the selected species and their conservation status, to document threats, collect stocks for *ex situ* conservation purposes and collect herbarium specimens for further research. It was also intended to inventory protected areas and support enforcement of CITES.

3.1 Habitat protection

The habitats of various *Aloe* spp. may be protected within national parks and other protected areas of East Africa. Examples include *Aloe steudneri* which is thought to occur in the Semien Mountain National Park, one of Ethiopia's two legally gazetted National Parks, and the species mentioned in section 2 above which occur in Mount Kulal Biosphere Reserve.

3.2 Regulation of wild harvesting

At present there appears to be little if any regulation of harvesting of wild *Aloe* spp. in East Africa.

In Kenya, President Moi declared Aloes to be protected species in November 1986 and decreed that aloes could be harvested only from plantations. The presidential decree was not however translated into a legal instrument and was largely ignored. Newton, 1994, reported that in at least one area where the law was observed this unfortunately led to more harm than if the law was ignored. Rather than defoliating plants in natural populations and allowing recovery, plants of *A. secundiflora* were dug up and unsuccessfully re-planted in "plantations". At present Kenya is amending the Wildlife Act and this will address the impacts of *Aloe* harvesting (Kahumbu, *in litt.* 2003).

3.3 Regulation of trade

Regulation of trade in East African *Aloe* spp. and their products does not currently appear to take place.

In Kenya, implementation of CITES and the protection of wild plants are covered by the Wildlife Management and Coordination Act, 1989 with responsibility vested in the Kenya Wildlife Service. There are however no legal provisions relating to wild plants, nor specific legislation relating to harvesting or trade in *Aloe* products (NAREDA, 2003). International trade in *Aloe* extracts takes place in an unregulated manner although the Kenya Wildlife Service is working with the Plant Health Inspectorate KEPHIS to control exports (Kahumbu, *in litt.* 2003). Marshall, 1998 reports that exporters of gums and resins illegally include aloe extract in shipments leaving Kenya and that exports are sometimes labeled as "gum aloes" to facilitate export approval. NAREDA (2003) also reports that *Aloe* products are probably traded under disguised brands and names such as vegetable products, natural gums and essential oil extracts and concentrates.

According to Hafashamina (*in litt.* 2003) in Uganda there has been increasing interest in *Aloe* products recently. "However, it seems most of it goes on in form of semi-processed products which may be smuggled out of the country without being declared to the Law enforcement agents and due to the small size of the semi-processed products, they are easily concealable."

3.4 Monitoring

Systems do not appear to be in place to effectively monitor trade in East African *Aloe* spp. and their products at present.

3.4 Basis of non-detriment findings

Mechanisms are not currently in place to make non-detriment findings for *Aloe* spp. in East Africa as required for trade in species listed in Appendix II of CITES.

4. Overview of trade

Aloe species are generally traded as live plants for the ornamental plant market and as extracts for the cosmetic and medicinal plant industry. The substantial international trade in *Aloe* products is extremely difficult to quantify in terms of overall value and volume. The trade is dominated by products of the widely cultivated *Aloe vera* (*barbadensis*), a species that is only known in cultivation and is not included in the Appendices of CITES. Trade in East African species traded as extracts is relatively small in comparison both with the global trade in *A. vera* products and with trade in South African species, but is of significance domestically and probably also for international markets.

4.1 International trade

Table 2 shows the information on East African *Aloe* spp. in trade as recorded in CITES trade statistics. As can be seen from this table only *Aloe ellenbeckii* is recorded in trade in significant quantities in the trade statistics. This information is recorded by China. According to Professor Newton, *in litt.*, 2003, the information on *Aloe ellenbeckii* being exported as extracts and derivatives is surprising, since this species does not produce the coloured exudate containing medicinally active ingredients. Also, it is quite a small plant which is hardly suitable for harvesting quantities of exudate. It is likely that this is a case of wrong identification. Luke, *in litt.*, 2003 points out that the number of plants needed to produce 1 kg of concentrated extract should not be underestimated and given the possibility of misidentification represents a significant threat to narrowly endemic species.

Table 2 – CITES recorded trade date for East African *Aloe* spp.

Species	Product	Quantity	Year	Country of export	Country of import
<i>Aloe</i> spp.	leaves	30 g	1995	Kenya	USA
	specimens	30 g	1998	Kenya	USA
	live plant	1	1996	Mozambique	Portugal
<i>Aloe</i> spp.	live plant	4	1992	Tanzania	USA
<i>Aloe confusa</i>	live plant	4	2000	Kenya	Saudi Arabia
<i>Aloe dewetii</i>	live plant	4	2000	Kenya	Saudi Arabia
<i>Aloe ellenbeckii</i>	derivatives	70000 kg	1999	Kenya	China
	extract	40000 kg	2000	Kenya	China
	extract	66875 kg	2001	Kenya	China
	live plant	4	2000	Kenya	Saudi Arabia
<i>Aloe elgonica</i>	live plant	4	2000	Kenya	Saudi Arabia
<i>Aloe kulalensis</i>	live plant	4	2000	Kenya	Saudi Arabia
<i>Aloe labworana</i>	live plant	4	2000	Kenya	Saudi Arabia
<i>Aloe lateritia</i>	seed	500 g		Kenya	Norway
<i>Aloe macrosiphon</i>	live plant	4	2000	Kenya	Saudi Arabia
<i>Aloe penduliflora</i>	live plant	4	2000	Kenya	Saudi Arabia
<i>Aloe schweinfurthii</i>	live plant	4	2000	Kenya	Saudi Arabia
<i>Aloe secundiflora</i>	live plant	4	2000	Kenya	Saudi Arabia

Although not recorded in CITES trade statistics it is apparent that a significant export trade in Aloe extracts does take place from Kenya. Estimated quantities in trade have recently been compiled by NAREDA (NAREDA, 2003) and are summarized in Table 3.

Table 3 – Estimated volumes of Aloe products shipped by sea from Mombasa, Kenya 1995 – 1999

Year	Estimated quantity (kg)	Destination
1995	4950	Italy
	12500	Singapore
	13500	Thailand
1996	28110	Pakistan
	18420	Singapore
	34500	Thailand
1997	4230	France
	8010	Italy
	1620	Turkey
	3600	Pakistan
1998	No records	
1999	5313	Pakistan
	9240	UAE (Dubai)

Source: NAREDA (2003)

The main species that are wild-harvested for exudates, in Kenya, are *A. secundiflora*, *A. turkanensis* and *A. scabrifolia*. (Newton, 1994; Newton, *in litt.* 2003, King, *in litt.* 2003). Phytochemical analyses have shown that the first two of these species have high concentrations

of aloein and other compounds of interest to the buyers. *A. ngongensis* plants are also harvested for the exudate. (Newton, *in litt.* 2003).

The main source of commercial Aloe extracts in Kenya is the Baringo District, where *A. secundiflora* and *A. turkanensis* are harvested. Other areas of commercial exploitation are Taita, Laikipia and Samburu. *A. scabrifolia* is harvested from the latter District along with *A. secundiflora*. The trade is mainly organized by Somalis who have, in some areas, trained local communities in Aloe processing techniques. Liquid extracts are collected from communities, checked to determine the quality, heated to produce solidified resin and transported to Nairobi prior to export (Mukonyi et al 2001). The harvesting, processing and export chain for Aloe extracts is elaborated in detail by NAREDA (2003).

Four registered companies are known to be involved in the Kenyan export trade and have close links with partners in the importing companies. The exporters generally trade in a variety of goods including specialized wood products, gums, resins, essential oil extracts and vegetable products NAREDA (2003).

It is likely, but currently not possible to quantify, that there is a significant unrecorded international trade in Aloe extracts both between other countries in East Africa, with other neighbouring countries and to destinations in Europe and elsewhere. As an example of regional trade, although in Ethiopia commercial exploitation of Aloe spp. is not currently thought to take place, according to Marshall, 1998, some Aloe species (known locally as Siber and Eret) are imported to Ethiopia from Eritrea, Somalia and various Middle Eastern countries. Aloe products on sale in Addis Ababa are sold in the form of hardened black extract which apparently escape the attention of Customs officers because of the difficulty of identification. According to NAREDA (2003) the Aloe trade was established within Somalia before the enterprise spread to Kenya.

Under reporting for CITES purposes may partly reflect the fact that Aloe parts and derivatives are not deemed to be readily recognizable and are therefore not controlled for CITES purposes (as noted for the EC countries by Oldfield, 1992).

4.2 Domestic trade

According to Hafashamina (pers. comm. 2003), it is generally known that almost all Aloe species are used medicinally where they exist. Their local trade is informal and undocumented.

In Tanzania, Aloe spp. are widely used in rural areas to treat a variety of ailments (Sachedina, 1998). Interviews with the Association of Traditional Doctors in Moshi and the Lembeni Traditional Healers Association in Lembeni, indicated that traditional healers differentiate between various Aloe species. The urban traditional herbalists generally do not harvest their own medicinal plants, but contract harvesters to collect the required species from the wild (Sachedina, 1998).

In Eritrea, *Aloe camperi* is reported to be one of the eight most commonly used medicinal plants (Shushan, 1985 cited in Marshall, 1998).

The endemic, Aloe sinkata apparently commands a very high price in Sudan where it is used to treat a range of ailments including skin diseases, constipation, fever, tonsillitis and haemorrhoids. Its scarcity is reportedly a cause of conservation concern (Marshall, 1998).

In Kenya, sap from various Aloe species is used in traditional medicine, and the level of traditional utilization is sustainable. Destructive harvesting is apparently occurring because sap buyers offer rural pastoralists cash for sap (King, *in litt.* 2003).

5. Other relevant information (artificial propagation)

Aloe species have been cultivated for centuries for their ornamental, medicinal and cosmetic properties. Cultivation in East Africa is primarily on a small scale for ornamental purposes. Small scale propagation and cultivation schemes for medicinal Aloes have also recently been established in Kenya including *A. secundiflora*, *A. turkanensis* and *A. vera*, recently imported from Arabia and USA (Mukonyi et al 2001). With regard to the currently exploited East African species with medicinal

properties, the potential for propagating *Aloe secundiflora* (and *A. turkanensis*) for sap production is considered to be excellent. Both species can be grown from seed and can be propagated vegetatively as well. *A. turkanensis* is a freely branching species, and small side rosettes can be broken off and planted. *A. secundiflora* usually only has one rosette, but adults tend to start producing suckers if they have been disturbed for example by trampling (King, *in litt.* 2003).

As Aloes are easy to transplant, and can survive without watering after transplanting in arid and semi-arid regions they have considerable potential as dryland crop. They have the additional advantage of maintaining and enhancing the integrity of vegetation in semi-arid rangelands (King, *in litt.* 2003).

The Kenya Wildlife Service promotes the propagation and cultivation of *Aloe* spp. is intending to develop guidelines for sustainable aloe propagation and processing. It is planned to introduce a certification scheme for trade in Aloe products that are sustainably produced (Kahumbu, *in litt.* 2003).

A project is currently planned by a consortium of NGOs and government agencies in Kenya to develop cultivation of endemic Kenyan *Aloe* spp. as a means to enhance conservation, provide primary medicinal plant products, alleviate poverty and contribute to land rehabilitation in arid zones of Kenya (Sachedina, *in litt.* 2003). The potential for commercial cultivation of *Aloe* spp. has also been considered in Tanzania by Sachedina, 1998, who recommends: the encouragement of village medicinal plant gardens; followed by the establishment of *Aloe* growing co-operatives supplying a central processing plant for local production; and eventually a plantation, nursery and processing plant for export.

In Ethiopia, people in central areas have started cultivating *Aloe pulcherrima* in their gardens, due to the scarcity of the species in the vicinity (Demissew, *in litt.* 2003).

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The conservation status and medicinal uses of East African *Aloe* spp.

Species	Medicinal use	Conservation status global	Distribution with national IUCN categories
<i>Aloe aageodonta</i>			Kenya
<i>Aloe adigratana</i>		VU (Demissew, in litt. 2003)	Ethiopia
<i>Aloe albovestita</i>		V	Somalia (V)
<i>Aloe ambigens</i>		R	Somalia (R)
<i>Aloe amicornum</i>			Kenya
<i>Aloe amudatensis</i>		V	Kenya (V), Uganda (V)
<i>Aloe ankoberensis</i>			Ethiopia
<i>Aloe arborescens</i>	Yes (skin problems)		Mozambique
<i>Aloe archeri</i>		V- highest conservation concern (Newton, 1998)	Kenya (V)
<i>Aloe babatiensis</i>		I	Tanzania (I)
<i>Aloe ballii</i>		EN B1 + 2c	Mozambique (LR 1c)
<i>Aloe ballii</i> var. <i>ballii</i>			Mozambique
<i>Aloe ballii</i> var. <i>makurupiniensis</i>			Mozambique
<i>Aloe ballyi</i>	Yes	VU B1 + 2c - highest conservation concern (Newton, 1998)	Kenya (I), Tanzania (E)
<i>Aloe barberae</i>			Mozambique
<i>Aloe bargalensis</i>		V	Somalia (V)
<i>Aloe bella</i>		V	Somalia (V)
<i>Aloe bertemariae</i>		CR (Demissew, in litt. 2003)	Ethiopia
<i>Aloe bicomitum</i>			Tanzania
<i>Aloe boscawenii</i>		I	Tanzania (I)
<i>Aloe brachystachys</i>			Tanzania
<i>Aloe brandhamii</i>			Tanzania
<i>Aloe breviscapa</i>		V	Somalia (V)
<i>Aloe brunneostriata</i>			Somalia
<i>Aloe bukobana</i>			Tanzania
<i>Aloe bulbicaulis</i>			Tanzania
<i>Aloe bullockii</i>		I	Tanzania (I)
<i>Aloe bussei</i>		I	Tanzania (I)
<i>Aloe calidophila</i>	Yes	R	Kenya(R), Ethiopia (R)
<i>Aloe cameronii</i>			Mozambique
<i>Aloe cameronii</i> var. <i>cameronii</i>			Mozambique
<i>Aloe camperi</i>	Yes	LR 1c (Demissew, in litt. 2003)	Eritrea, Ethiopia
<i>Aloe canarina</i>		I	Sudan, Uganda (I)
<i>Aloe cannellii</i>		R	Mozambique (R)
<i>Aloe chabaudii</i>		Not threatened in Mozambique (Bandeira, in litt 2003)	Mozambique, Tanzania

Species	Medicinal use	Conservation status global	Distribution with national IUCN categories
<i>Aloe chabaudii</i> var. <i>verekeri</i>			Mozambique
<i>Aloe cheranganiensis</i>		V	Kenya (V), Uganda (V)
<i>Aloe christianii</i>			Mozambique, Tanzania
<i>Aloe chrysostachys</i>		V	Kenya (V)
<i>Aloe citrina</i>	Yes		Ethiopia, Kenya, Somalia
<i>Aloe classenii</i>		V	Kenya (V)
<i>Aloe confusa</i>		R/V	Kenya (R), Tanzania (V)
<i>Aloe congdonii</i>			Tanzania
<i>Aloe crassipes</i>			Sudan
<i>Aloe cremnophila</i>		R	Somalia (R)
<i>Aloe cryptopoda</i>			Mozambique
<i>Aloe dawei</i>			Kenya, Uganda
<i>Aloe debrana</i>		LR lc (Demissew, in litt. 2003)	Ethiopia
<i>Aloe decurva</i>		V	Mozambique (V)
<i>Aloe deserti</i>		V	Kenya (V), Tanzania (V)
<i>Aloe diolii</i>			Sudan
<i>Aloe dorotheae</i>		I	Tanzania (I)
<i>Aloe duckeri</i>			Tanzania
<i>Aloe elata</i>			Kenya, Tanzania
<i>Aloe elegans</i>		LR lc (Demissew, in litt. 2003)	Eritrea, Ethiopia
<i>Aloe elgonica</i>	Yes	V	Kenya (V)
<i>Aloe ellenbeckii</i>			Ethiopia, Kenya, Somalia
<i>Aloe eminens</i>		LR nt	Somalia
<i>Aloe erensii</i>			Kenya, Sudan
<i>Aloe eumassawana</i>		LR nt (Demissew, in litt. 2003)	Eritrea
<i>Aloe excelsa</i>	Yes		Mozambique
<i>Aloe excelsa</i> var. <i>breviflora</i>			Mozambique
<i>Aloe excelsa</i> var. <i>excelsa</i>			Mozambique
<i>Aloe fibrosa</i>		V	Kenya (V), Tanzania (V)
<i>Aloe fimbrialis</i>			Tanzania
<i>Aloe flexilifolia</i>	Yes	I	Tanzania (I)
<i>Aloe francombei</i>			Kenya
<i>Aloe friisii</i>		EN (Demissew, in litt. 2003)	Ethiopia
<i>Aloe gilbertii</i>			Ethiopia
<i>Aloe gilbertii</i> ssp. <i>gilbertii</i>		LR nt (Demissew, in litt. 2003)	Ethiopia
<i>Aloe gilbertii</i> ssp. <i>megalacanthoides</i>		LR nt (Demissew, in litt. 2003)	Ethiopia
<i>Aloe gillettii</i>			Somalia
<i>Aloe glabrescens</i>			Somalia
<i>Aloe gracilicaulis</i>			Somalia
<i>Aloe greatheadii</i> var. <i>greatheadii</i>			Mozambique

Species	Medicinal use	Conservation status global	Distribution with national IUCN categories
<i>Aloe grisea</i>		V	Somalia (V)
<i>Aloe harlana</i>		CR (Demissew, in litt. 2003)	Ethiopia
<i>Aloe hazeliana</i>			Mozambique (DD)
<i>Aloe heliderana</i>		V	Somalia (V)
<i>Aloe hemmingii</i>			Somalia
<i>Aloe heybensis</i>			Somalia
<i>Aloe hildebrandtii</i>			Somalia
<i>Aloe jacksonii</i>		I	Ethiopia (I)
<i>Aloe jucunda</i>		E	Somalia (E)
<i>Aloe juvenna</i>		R – highest conservation concern (Newton, 1998)	Kenya (R)
<i>Aloe kedongensis</i>			Kenya
<i>Aloe kefaensis</i>		CR (Demissew, in litt. 2003)	Ethiopia
<i>Aloe ketabrowniorum</i>			Kenya
<i>Aloe kilifiensis</i>	Yes	E	Kenya (E)
<i>Aloe kulalensis</i>		R	Kenya (R)
<i>Aloe labworana</i>			Sudan, Uganda
<i>Aloe lateritia</i>	Yes		Ethiopia, Kenya, Tanzania
<i>Aloe lateritia</i> var. <i>graminicola</i>			Ethiopia, Kenya
<i>Aloe lateritia</i> var. <i>lateritia</i>			Kenya, Tanzania
<i>Aloe leachii</i>		I	Tanzania (I)
<i>Aloe leedalii</i>			Tanzania
<i>Aloe lensayuensis</i>		V	Kenya (V)
<i>Aloe leptosiphon</i>		I	Tanzania (I)
<i>Aloe lindenii</i>			Somalia
<i>Aloe littoralis</i>			Mozambique
<i>Aloe lolwensis</i>			Kenya
<i>Aloe luntii</i>			Somalia
<i>Aloe macleayi</i>			Sudan
<i>Aloe macrocarpa</i>			Djibouti, Eritrea, Ethiopia, Sudan
<i>Aloe macrosiphon</i>	Yes		Tanzania, Uganda, Kenya
<i>Aloe marlothii</i> var. <i>marlothii</i>	Yes (anti malaria)	Not threatened in Mozambique (Bandeira, in litt 2003)	Mozambique
<i>Aloe massawana</i>		- highest conservation concern (Newton, 1998)	Tanzania
<i>Aloe mawii</i>			Mozambique, Tanzania
<i>Aloe mcloughlinii</i>		CR (Demissew, in litt. 2003)	Djibouti, Ethiopia
<i>Aloe medishiana</i>		V	Somalia (V)
<i>Aloe megalacantha</i>			Ethiopia, Somalia

Species	Medicinal use	Conservation status global	Distribution with national IUCN categories
<i>Aloe megalacantha</i> ssp. <i>alticola</i>		LR nt (Demissew, in litt. 2003)	Ethiopia
<i>Aloe megalacantha</i> ssp. <i>megalacantha</i>		LR nt (Demissew, in litt. 2003)	Ethiopia
<i>Aloe menyhartii</i>			Mozambique
<i>Aloe menyhartii</i> ssp. <i>Ensifolia</i>			Mozambique
<i>Aloe menyhartii</i> ssp. <i>Menyhartii</i>			Mozambique
<i>Aloe microdonta</i>	Yes	- highest conservation concern (Newton, 1998)	Somalia, Kenya
<i>Aloe molederana</i>			Somalia
<i>Aloe monticola</i>		VU(Demissew, in litt. 2003)	Ethiopia
<i>Aloe morijensis</i>		E	Kenya (E), Tanzania (E)
<i>Aloe mubendiensis</i>			Uganda
<i>Aloe multicolor</i>			Kenya
<i>Aloe munchii</i>			Mozambique (DD)
<i>Aloe murina</i>			Kenya
<i>Aloe myriacantha</i>			Kenya, Tanzania, Uganda
<i>Aloe mzimbwana</i>			Tanzania
<i>Aloe ngongensis</i>	Yes		Kenya, Tanzania
<i>Aloe nuttii</i>			Tanzania
<i>Aloe nyeriensis</i>	Yes	V	Kenya (V)
<i>Aloe otallensis</i>		LR nt (Demissew, in litt. 2003)	Ethiopia
<i>Aloe parvibracteata</i>			Mozambique
<i>Aloe parvidens</i>		- highest conservation concern (Newton, 1998)	Ethiopia, Kenya, Somalia, Tanzania
<i>Aloe peckii</i>		V	Somalia (V)
<i>Aloe pembana</i>			Tanzania
<i>Aloe penduliflora</i>			Kenya
<i>Aloe percrassa</i>		LR nt (Demissew, in litt. 2003)	Eritrea, Ethiopia
<i>Aloe pirottae</i>		LR lc (Demissew, in litt. 2003)	Ethiopia, Kenya
<i>Aloe plowesii</i>			Mozambique (DD)
<i>Aloe powysiorum</i>		R	Kenya (R)
<i>Aloe pubescens</i>		LR nt (Demissew, in litt. 2003)	Ethiopia, Kenya
<i>Aloe pulcherrima</i>		EN(Demissew, in litt. 2003)	Ethiopia
<i>Aloe pustuligemma</i>			Kenya
<i>Aloe rabaiensis</i>	Yes		Tanzania, Somalia, Kenya
<i>Aloe retrospiciens</i>		R	Somalia (R), Ethiopia (R)
<i>Aloe rhodesiana</i>			Mozambique
<i>Aloe richardsiae</i>		I	Tanzania (I)
<i>Aloe rigens</i>			Somalia

Species	Medicinal use	Conservation status global	Distribution with national IUCN categories
<i>Aloe rigens</i> var. <i>rigens</i>			Somalia
<i>Aloe rivae</i>	Yes	V	Ethiopia (R), Kenya (R)
<i>Aloe rugosifolia</i>		V	Ethiopia (V), Kenya (V)
<i>Aloe rupestris</i>			Mozambique (DD)
<i>Aloe ruspoliana</i>	Used as a poison		Ethiopia, Kenya, Somalia
<i>Aloe scabrifolia</i>	Yes		Kenya
<i>Aloe schelpei</i>		R	Ethiopia (R)
<i>Aloe schoelleri</i>		CR (Demissew, in litt. 2003)	Eritrea
<i>Aloe schweinfurthii</i>			Sudan, Uganda
<i>Aloe scobinifolia</i>		V	Somalia (V)
<i>Aloe secundiflora</i>	Yes & Ethnovet.		Ethiopia, Kenya, Tanzania
<i>Aloe secundiflora</i> var. <i>secundiflora</i>			Ethiopia, Kenya, Tanzania
<i>Aloe secundiflora</i> var. <i>sobolifera</i>			Tanzania
<i>Aloe sinana</i>		VU (Demissew, in litt. 2003)	Ethiopia
<i>Aloe sinkatana</i>	Yes		Sudan
<i>Aloe somaliensis</i>		V	Somalia
<i>Aloe somaliensis</i> var. <i>marmorata</i>			Somalia
<i>Aloe somaliensis</i> var. <i>somaliensis</i>			Somalia
<i>Aloe spicata</i>			Mozambique
<i>Aloe steudneri</i>		VU (Demissew, in litt. 2003)	Eritrea, Ethiopia
<i>Aloe suffulta</i>			Mozambique
<i>Aloe tewoldei</i>		CR (Demissew, in litt. 2003)	Ethiopia
<i>Aloe tororoana</i>		V	Uganda (V)
<i>Aloe torrei</i>			Mozambique
<i>Aloe trichosantha</i> ssp. <i>longiflora</i>			Ethiopia
<i>Aloe trichosantha</i> ssp. <i>trichosantha</i>		LR nt (Demissew, in litt. 2003)	Eritrea, Ethiopia
<i>Aloe trigonantha</i>		LR nt (Demissew, in litt. 2003)	Ethiopia
<i>Aloe tugenensis</i>		- highest conservation concern (Newton, 1998)	Kenya
<i>Aloe turkanensis</i>	Yes		Kenya, Uganda
<i>Aloe tweediae</i>			Kenya, Sudan, Uganda
<i>Aloe ukambensis</i>		E	Kenya (E)
<i>Aloe veseyi</i>		R	Tanzania (R)
<i>Aloe vituensis</i>		V	Kenya (V)
<i>Aloe volkensii</i>			Kenya, Tanzania, Uganda

Species	Medicinal use	Conservation status global	Distribution with national IUCN categories
<i>Aloe volkensii</i> ssp. <i>Multicaulis</i>			Kenya, Tanzania, Uganda
<i>Aloe volkensii</i> ssp. <i>Volkensii</i>			Kenya, Tanzania
<i>Aloe wilsonii</i>			Uganda, Kenya
<i>Aloe wollastonii</i>			Kenya, Tanzania, Uganda
<i>Aloe wrefordii</i>		- highest conservation concern (Newton, 1998)	Kenya, Sudan, Uganda
<i>Aloe yavellana</i>		EN (Demissew, in litt. 2003)	Ethiopia
<i>Aloe zebrina</i>			Mozambique

Notes:

The distribution of most of the taxa listed for Mozambique extends to other countries of Southern Africa which were not considered for this review.

The IUCN Red List categories given are:

Post 1994 Categories:

CR Critically Endangered
 EN Endangered
 VU Vulnerable
 LR nt Low Risk Near Threatened
 LR lc Low Risk Least Concern

Pre-1994 Categories (as used in Walter and Gillett, 1998):

E Endangered
 V Vulnerable
 R Rare
 I Indeterminate

Sources of information:

Nomenclature and distribution: Eggli, Newton, and Rowley (2001)

Conservation status: 2002 IUCN Red List; Walter and Gillett (1998); Newton (1998); Izidine and Bandeira, 2002 (for Mozambique); Bandeira, in litt. 2003, Demissew, in litt. 2003

Medicinal use: Various reports as listed in the reference list including Marshall (1998) and NAREDA (2003); Bandeira, in litt. 2003; Internet search for information on the species listed in CITES trade statistics.