

The Red List of Endemic Trees & Shrubs of Ethiopia and Eritrea



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FAUNA & FLORA INTERNATIONAL (FFI), founded in 1903 and the world's first international conservation organization, acts to conserve threatened species and ecosystems worldwide, choosing solutions that are sustainable, are based on sound science and take account of human needs.

THE GLOBAL TREES CAMPAIGN is a joint initiative developed by FFI and the UNEP World Conservation Monitoring Centre in partnership with a wide range of other organizations around the world. The aim of the Campaign is to save the world's most threatened trees and the habitats in which they grow through the provision of information, delivery of conservation action and support for sustainable use.

THE IUCN/SSC GLOBAL TREE SPECIALIST GROUP forms part of the Species Survival Commission (SSC), the largest of IUCN's six volunteer commissions with a global membership of 8000 experts. SSC advises IUCN and its members on the wide range of technical and scientific aspects of species conservation and is dedicated to securing a future for biodiversity. The aims of the IUCN/SSC Global Tree Specialist Group are to promote and implement global red listing for trees and act in an advisory capacity to the FFI/UNEP-WCMC Global Trees Campaign.

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Foreword

Trees are important to the well-being of people in every country of the world, providing essential ecological, economic and cultural services. The first global assessment of the conservation status of trees worldwide indicated that around 8000 tree species are threatened with extinction. This information was published in 1998 in *The World List of Threatened Trees* (Oldfield *et al.* 1998) and was subsequently incorporated into the IUCN Red List. Tree species currently form 68 percent of the plant species included in the IUCN Red List but there are many more tree species that remain to be evaluated. The IUCN/SSC Global Tree Specialist Group was established in 2003 to take on the important role of assessing the global conservation status of trees.

The collection of information on tree species of conservation concern is vital for planning conservation action. The second role of the IUCN/SSC Global Tree Specialist Group is to act as an advisory body for the Global Trees Campaign, which aims to save the world's most threatened tree species and the habitats where they grow. The Campaign was developed by Fauna & Flora International (FFI) and the UNEP World Conservation Monitoring Centre in direct response to the publication of *The World List of Threatened Trees*.

The Global Trees Campaign provides an important practical mechanism for implementation of the Global Plant Conservation Strategy of the Convention on Biological Diversity. Global tree red listing contributes directly to Target 2 of the Strategy, which calls for a provisional list of threatened plant species by 2010. In many ways Target 2 underpins the other ambitious targets, which relate to *in-situ* and *ex-situ* conservation,

and sustainable use and trade in plants. Projects of the Global Trees Campaign carried out in partnership with organizations and individuals around the world help to deliver these various targets. The projects contribute to halting the loss of forest biodiversity and the provision of support to rural livelihoods.

The Global Tree Specialist Group is committed to undertaking a global assessment of the conservation status of tree species. We are working on both a taxonomic and regional basis, making the most of available resources and expertise. Publication of the results of the global assessment will be undertaken as components of the work are completed. This will ensure that regular indicators of progress are produced, updated tree conservation data are made widely available and that tree conservation initiatives around the world can be supported. This first publication, the *Red List of Endemic Trees and Shrubs of Ethiopia and Eritrea*, summarizes currently available information and makes a strong plea for further research and conservation action. Comments and the submission of further information on the species included in this list are most welcome.

Sara Oldfield
Chair of the IUCN/SSC Global Tree
Specialist Group

Introduction

The countries of Ethiopia and Eritrea, situated in the Horn of Africa, possess one of the richest assemblages of plants in the African continent. In this mountainous and geologically active territory, Afromontane habitats and Somali-Masai savannas among others have combined to create a unique regional identity. The richness and endemism of the floral biodiversity have been noted by many authors (Friis *et al.* 2001, Thulin 2004, Vivero 2003, Williams *et al.* 2004). The Horn of Africa (Ethiopia, Eritrea, Djibouti and Somalia) is a major centre of plant diversity and endemism (Davis *et al.* 1994), harbouring more than 8000 plant species, with 24 percent endemic to the region (Friis *et al.* 2003). The region is not just rich in endemic species but also in native populations of useful or economically important plants and their relatives (Harlan 1969, Tewolde Berhan 1991, Zohary 1970). Tree species are of particular importance in this region of low forest cover.

The plants of Ethiopia and Eritrea are generally studied together because of the historical and biogeographical links between the countries. They are covered by the ongoing Flora of Ethiopia and Eritrea project. Together they have a wild flora of some 7000 taxa (Vivero *et al.* 2005). The tree flora consists of an estimated 1100 species (Demel *et al.* 2000).

In Ethiopia and Eritrea, environmental degradation and deforestation have been taking place for centuries. High rates of habitat destruction due to natural hazards, civil conflicts and the subsequent displacement of people have been particular problems in recent years. With mounting demographic pressure on diminishing natural resources, trees are still being cleared at an alarming rate to open up land for agriculture and livestock production. Tree cutting for fuelwood and construction materials is also a significant threat. More than 90 percent of the total energy of the

two countries comes from biomass, with fuelwood being the highest component (Vivero 2001). In addition, Ethiopia has the largest population of livestock in Africa; thus grazing pressure has increased the rate at which tree and shrub species are becoming scarcer. Extinction processes may be hastened by the extremely narrow distribution and limited ecological tolerance of some species in this region.

As yet no complete red list of plants has been compiled for Ethiopia and Eritrea and neither country has a national red list. Partial lists of threatened plants have been published for Afroalpine, endemic or woody taxa (Ensermu *et al.* 1992, Friis 1992, Hedberg 1957, Viswanathan 1986). The 1997 IUCN Red List of Threatened Plants (Walter & Gillett 1998) included 163 species from Ethiopia and Eritrea, with 48 woody taxa. The World List of Threatened Trees (Oldfield *et al.* 1998) included 22 species. Currently 56 species are included in the 2004 IUCN Red List of Threatened Species (IUCN 2004), all of them woody plants, of which 20 are threatened. The information on 135 endemic taxa presented in this report provides significant new information for inclusion in the IUCN Red List.

SOCIAL AND FOOD SECURITY CONSIDERATIONS

Ethiopia is one of the countries with the highest prevalence of hunger, poverty and destitution in the world. The situation is similar in Eritrea. Poor and vulnerable people generally lack the opportunity to preserve biodiversity and they are often forced to use natural resources in an unsustainable way, as a source of food, fuel or income. Useful endemic trees and shrubs that are under threat in the wild include *Erythrina burana*, *Senecio myriocephalus* and *Solanecio gigas*, which is used as hedge plants around household yards; *Boswellia pirottae*, a source of incense and fuelwood, and *Maytenus addat*, used for fuel, medicine and timber.

Hagenia abyssinica, formerly one of the commonest high-altitude forest trees in Ethiopia, is nowadays reduced to scattered individuals in mountain areas. The bark, flowers and roots of this species are highly valued for medicinal purposes, used as a drug to treat intestinal parasites. The shrub *Taverniera abyssinica*, another important medicinal species, is threatened by collecting. It is sold in urban markets as a cure for stomach cramps and fever.

Wood products represent a major proportion of building materials, furniture, agricultural tools and household energy for the rural poor of Ethiopia and Eritrea. In addition, forest products such as gums, incense, resins, spices, honey and wax from beekeeping play an important role in the consumption patterns and income diversification of rural communities (Vivero 2001). The role of these products in rural communities remains poorly documented. In addition to having an important local market, some of Ethiopia's forest products are exported, including honey and about half of the officially traded volumes of gums and incense. Hence they are likely to contribute significantly to rural household economies. Much harvesting of forest products is undertaken by people who combine this with some form of agriculture. Generally collecting takes place in secondary forests, bush fallow or farm bush rather than in pristine forests. In many situations, fallow vegetation, farm bush and even the forest itself are actively managed by local users to conserve or encourage species of value, and to make the resource easier to use (Jagger & Pender 2000).

Another important consideration in the use of rare and declining wild plant taxa is their value as food. Consumption is a key issue for many species, considering the high levels of malnutrition and extreme poverty suffered by most Ethiopians. Edible wild plants make a major contribution to the dietary intake of rural people during

times of food shortage. Hence, the consumption of wild plants is a necessary part of the strategies adopted by people in order to survive a harsh environment (UNDP-EUE 1999, Guinand & Lemessa 2000). Famine foods are plants consumed only at times of food stress, namely drought, war and other hardship (Getahun 1974). Famine foods characteristically are more energy-rich; however they often require complicated and time-consuming processing and they often have an unappealing taste. Some threatened woody plants are commonly considered as edible for hungry people, such as the endemic *Moringa rivae* subsp. *longisiliqua* (VU) or the near endemic *Cordeauxia edulis* (VU), see Box 1.

Successful strategies to conserve these plants should involve actions such as local cultivation, non-destructive harvesting techniques and use of alternative species, based on awareness campaigns, capacity building, knowledge and local empowerment in resource management.

RED LISTING FOR CONSERVATION ACTION

Assessment of the conservation status of the woody taxa of Ethiopia and Eritrea is an important first step in planning conservation and sustainable use activities. This preliminary publication is a product of a red list initiative which was started in 2000 by Jose Luis Vivero, and subsequently supported by the two main researchers of the National Herbarium, Dr Ensermu Kelbessa and Professor Sebsebe Demissew. The rationale behind this endeavour was the need to build on the scanty information available about threatened plants of Ethiopia and Eritrea, and to stimulate conservation interest in, and action for, the many rare and endemic species found in the area.

A list of threatened endemic plants was prepared and presented at the XVII Association pour l'Etude Taxonomique de la Flore d'Afrique Tropicale (AETFAT) meeting, held in Addis Ababa (Vivero et

al. 2005). Information on endemic woody plants has been extracted from that list for inclusion in this report. It is hoped that publication of this preliminary document will elicit comments and the submission of further information on these species, which can be included in the final information incorporated into the IUCN Red List.

The taxonomy, nomenclature and floristic regions used in this document have been drawn from the published volumes of the *Flora of Ethiopia and Eritrea* (Hedberg & Edwards 1989, Hedberg et al. in press, Edwards et al. 1995, 1997, 2000) and from the manuscripts under preparation for this flora. The provinces are the old administrative regions of Ethiopia, which have already been used for phytogeographical purposes (Friis et al. 2001, Nordal et al. 2001). In addition, a detailed search of herbarium specimens was conducted to validate areas of occurrence and taxonomic doubts. Some other unpublished materials were also used to complement the existing data.

Initial effort has focused on the strictly endemic plant species, which are a special responsibility for Ethiopia and Eritrea. Endemic species were identified through reviewing more than 6000 species from 200 families. There are 428 endemic and near endemic woody taxa in Ethiopia and

Eritrea, of which 107 are trees and 321 are shrubs. In this report, IUCN Red List Categories and Criteria are given for 135 endemic taxa. These 135 threatened woody taxa (31 trees and 104 shrubs) represent 13 percent of the total woody plant flora estimated for the *Flora of Ethiopia and Eritrea* area (Demel et al. 2000). Work is ongoing for the near endemic taxa (those also present in neighbouring countries, namely Djibouti, Somalia, Sudan and/or Kenya) and trees that are used commercially. Finally, plant species that are not globally threatened but have restricted ranges in Ethiopia and Eritrea (locally threatened plants) will be assessed.

The conservation status assessment was primarily based on literature review, herbarium data and experience-based knowledge of the authors. For many taxa, the available information or herbarium data were very scarce, with many known only from the type collection. Since this is the first assessment for many taxa and is based on scanty information, a precautionary approach was used, as recommended by IUCN (IUCN 2005). Only IUCN criteria A2cd, B1a, b(i,ii,iii,iv) and B2a, b(i,ii,iii,iv) were applied, as adequate information relating to other criteria was not available at the time of the study. The

Box 1: The importance of *Cordeauxia edulis* in pastoral areas

Cordeauxia edulis provides a good example of the importance of wild plants to communities living in hostile regions. It is a leguminous shrub found in semi-arid bushland on sandy soils of Somalia and Ethiopia (0-600 m). The roots go deep to tap underground water. It is used as firewood, fodder, bee forage, soil conservation, a living fence and for tannins. Both leaves and seeds are used. The seed is eaten raw, roasted or cooked. It has a sweetish agreeable taste and high nutritive value. From the leaves, a tea is brewed and the extract is also used as a dye. It used to be a common tree in the Somali region where nuts were used as food by pastoralists and leaves as an infusion. Nowadays it has become rare due to over-exploitation during famine and the species is considered to be Vulnerable. It has potential as a food crop to be planted in the driest areas of the region.

category Extinct has not been used, due to lack of evidence of extinction for any species. Species have been assigned the higher risk categories if they are known only from a single or few localities, or they have not been collected for many years.

Criterion A relates to declining populations, with 1c being used when there is an observed, estimated or suspected reduction in the area of occupancy or extent of occurrence. Sub-criterion 1d was applied when levels of exploitation were considered a threat to the species survival. Geographic range size and fragmentation, criterion B, was the most frequently applied, either because of severe fragmentation or limited

number of locations (1a, 2a), or for continuing decline (1b, 2b). Only the first four qualifiers were used, as the number of mature individuals of a species was generally unknown.

CURRENT CONSERVATION MEASURES FOR THREATENED TREES AND SHRUBS

Information on the distribution and abundance of threatened plant species is of primary importance in the planning and implementation of biodiversity conservation activities. The need for attention to be focused on rare and threatened species is recognized within the objectives and implementing mechanisms of the main international biodiversity conventions, notably

the Convention on Biological Diversity (CBD). Both Ethiopia and Eritrea are parties to this Convention. Ethiopia became a party in 1994 and Eritrea in 1996, with its National Biodiversity Strategy and Action Plan published in 2000. Both countries are committed to the CBD Global Strategy for Plant Conservation.

Traditional conservation practices, present in many highland areas of Ethiopia, have contributed to the conservation of forest genetic resources for centuries. Some of these practices include farm forestry in the south-western highlands, tree-based soil and water management in Konso, and forest-based resources management in Borena. Furthermore, the Gedeo people have an ecologically sound land use system where fairly dense natural trees are left on farms in which coffee, false banana (enset) and other food crops are inter-cropped. The people of Tigray, North Shoa and North Wello are practising area closures where the regeneration of the natural vegetation is enhanced.

As yet no specific measures are being implemented in Ethiopia and Eritrea for the conservation of Critically Endangered plant species. No field research is being conducted to assess in detail the threat status of plants, and no plant conservation activity is undertaken in any of the various protected areas. Moreover, many parts of Ethiopia and Eritrea have not been thoroughly explored from a botanical perspective and the available information presented in Vivero *et al.* (2005) can be expected to show a bias towards the best collected areas. Indeed, there are high mountains (above 4000 m) that have never been explored by botanists and may harbour new species, given the high level of endemism of the Afroalpine flora (Hedberg 1994). Despite the threatened status of Ethiopia's rich and unique natural heritage, as a consequence of poverty, conflict and livestock pressure, scanty

Box 2: The Forest Genetic Resources Conservation Project of Ethiopia

The Forest Genetic Resources Conservation Project was launched in 1998. Undertaken by the Institute of Biodiversity Conservation and Research (IBCR), the major objectives are the following:

- Developing a strategy/concept for the conservation of the Ethiopian forest genetic resources
- Creating awareness among the public and the government
- Building institutional capacity
- Establishing and maintaining a gene-bank and an *ex-situ* stand for the conservation of threatened indigenous trees and shrubs
- Establishing and managing suitable *in-situ* conservation sites.

The majority of the 58 Forest Priority Areas have been inventoried both biologically and socio-economically as a means to prioritize the forests for *in-situ* conservation efforts. The conservation of forest genetic resources is considered part of an integrated approach covering:

- Implementation of sustainable forest management
- Conservation of forest genetic resources
- Development of tree improvement programmes
- Promotion of reforestation and afforestation.

As there is only limited knowledge on genetic variation, reproductive biology and seed physiology of most indigenous species of Ethiopia the emphasis has been on *in-situ* conservation.

Source: National Report to CBD on Forest Biological Diversity

funds are available to tackle biodiversity conservation issues.

RECOMMENDATIONS FOR FURTHER CONSERVATION ACTION

As noted above, few plant conservation activities are presently undertaken in Ethiopia and Eritrea, despite the richness and threat status of the biodiversity in these countries. Not surprisingly, food security and poverty reduction projects and programmes are priorities for donor support. However, biodiversity is closely interwoven with poverty and hunger. Wild plant and animal products are sources of food, medicines, income-generating activities and building materials for poor rural households. In this sense, the rich biodiversity is one of the major assets local people have and it should be protected and exploited in a sustainable way.

Initiatives aiming to conserve plant diversity, such as the indigenous tree propagation centre described in Box 3, require urgent support. Funding is also being sought for an initiative promoted by two of the authors (Jose Luis Vivero and Ensermu Kelbessa) entitled *Conservation Atlas of Flora of Ethiopia and Eritrea*. The aim of this initiative is to provide information for the conservation and sustainable use of plant diversity in Ethiopia and Eritrea, including the most appropriate areas and strategies to conserve threatened flora, taking into consideration the livelihoods of vulnerable people and ensuring their participation. Outputs from this project would include species profiles for all threatened plants, recovery programmes for Critically Endangered species, preliminary identification of Important Plant Areas, Endemic Plant Areas and Alliance for Zero Extinction sites (see Box 4), and increased technical training capacity at university level on plant conservation and sustainable use.

Box 3: Biology and propagation of *Hagenia abyssinica* and *Podocarpus falcatus*

Hagenia abyssinica and *Podocarpus falcatus* are two extremely important tree species in Ethiopia, both economically and ecologically. Both are of serious conservation concern within the country. *P. falcatus* yields a valuable timber and is a source of food (fruits) and shelter for many birds and wild animals. *H. abyssinica* is important as a source of medicine and also timber. A Global Trees Campaign project undertaken in 2000 studied the germination and propagation of the two species for ecological restoration.

In July 2004, a Centre for Indigenous Trees Propagation and Biodiversity Development was established, with a view to conserving *H. abyssinica*, *P. falcatus*, and many other endangered Ethiopian trees. Located approximately 50 km west of Addis Ababa, the Centre's objectives are to fight against biodiversity loss at the genetic, species and ecosystem levels, and to increase the capacity to provide timely, innovative and practical solutions to conservation problems.

Further funding is required to take forward implementation of the results of the study on *P. falcatus* and *H. abyssinica*, as well as to strengthen the new Centre.

Sources: Negash (1995, 2001, 2002, 2003a, 2003b, 2004)

Box 4: Important Plant Areas and Alliance for Zero Extinction sites

Various international initiatives are underway to identify and protect areas of outstanding biodiversity importance.

Target 5 of the Global Strategy for Plant Conservation states: *Protection of 50 percent of the most important areas for plant diversity assured*. Important Plant Areas (IPAs) are defined by Plantlife International as natural or semi-natural sites exhibiting exceptional botanical richness and/or supporting an outstanding assemblage of rare, threatened and/or endemic plant species and/or vegetation of high botanic value.

The criteria for selection of IPAs are based on:

- The presence of globally threatened plants
- Exceptional botanical richness and diversity in relation to its bio-geographical zone
- Habitat type of global or regional importance.

Alliance for Zero Extinction (AZE) sites are those known to hold the last remaining populations of Critically Endangered or Endangered species, the only area where a particular species occurs or holding the overwhelmingly significant population of a species (www.zeroextinction.org).

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Provinces of Ethiopia

The provinces shown here and used in this document are the old administrative regions of Ethiopia, which have been extensively used for phytogeographical purposes.



KEY

AF	Afar	GJ	Gojjam	SU	Shewa
AR	Arsi	HA	Hararghe	TU	Tigray
BA	Bale	IL	Illubabor	WG	Wollega
GD	Gondar	KF	Keffa	WU	Wello
GG	Gamo Goffa	SD	Sidamo		

LIST OF ABBREVIATIONS

AETFAT	Association pour l'Etude Taxonomique de la Flore d'Afrique Tropicale	FFI	Fauna & Flora International
AZE	Alliance for Zero Extinction	GSPC	Global Strategy for Plant Conservation
CAFEE	Conservation Atlas of Flora of Ethiopia and Eritrea	IPA	Important Plant Area
CBD	Convention on Biological Diversity	IUCN	The World Conservation Union
		SSC	Species Survival Commission
		UNEP-WCMC	United Nations Environment Programme World Conservation Monitoring Centre

The Red List of Endemic Trees and Shrubs of Ethiopia and Eritrea

The taxa listed below are confined to Ethiopia unless Eritrea is also specified. The Ethiopian provinces in which the taxa occur are given in abbreviated form (see p.10).

THREATENED AND NEAR THREATENED ENDEMIC SPECIES

Acacia bavazzanoi Pic.-Serm.

Leguminosae EN A2cd+B1ab(i,ii,iii,iv)
Ethiopia and Eritrea TU, GD, GJ, SU

This woodland tree species grows at altitudes of 1350-2400 m.

Acacia bricchettiana Chiov.

Leguminosae CR A2cd+B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
HA

A shrub of dry scrub vegetation at low altitude, this species is only known from two type collections.

Acacia negrii Pic.-Serm.

Leguminosae VU A2cd+B1ab(i,ii,iii,iv)
GD, WU, GJ, SU, HA, SD

A tree of upland wooded grassland, where it grows at altitudes of 1800-3100 m.

Acacia prasinata A. Hude

Leguminosae CR A2cd+B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
AF, SU

A tree species known only from areas of dry woodland or semi-desert bushland in Afar and Shewa, growing at altitudes of 900-1300 m. Its habitat is vulnerable to overgrazing and cutting for fuelwood. It occurs in Awash National Park.

Acacia pseudonigrescens Brenan & Ross

Leguminosae CR A2cd+B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
BA

A tree species with a very restricted range known only from a limestone area of succulent shrubland at 300- 400 m on the track to Kelafo in the Ogaden. The area, although susceptible to degradation, is relatively unthreatened.

Acacia venosa Hochst. ex Benth.

Leguminosae CR A2cd+B1ab(i,ii,iii,iv)
Ethiopia and Eritrea (?) TU, GD

A woodland tree species confined to parts of west Eritrea, Tigray and Gondar on the high plateau where the majority of the Ethiopian population lives. It grows at altitudes of 1900-2400 m. The northern forests have diminished most noticeably because of the expansion of farmed land, increased human habitation and overcutting for fuelwood.

Acalypha marissima M. Gilbert

Euphorbiaceae CR B1ab(i,ii,iii,iv)
WG

A shrub that grows on open or forested slopes at altitudes of 1900-2050 m.

Acanthus sennii Chiov.

Acanthaceae NT
GD, GJ, WG, SU, HA, AR, BA, KF, GG, SD

This shrub is found in areas of *Juniperus-Podocarpus* forest, along roadsides and in grassland, usually in rocky places. It occurs at altitudes of 1700-3200 m.

Argyrobium schimperianum A. Rich

Leguminosae EN B1ab(i,iii)
TU, GD, GJ, SU

A shrub of upland bushland and grassland, growing at 2100-3500 m.

Barleria grandis Hochst. ex Nees

Acanthaceae VU A2c+B1ab(i,ii,iii,iv)
Ethiopia and Eritrea TU, GD, SU, WG, KF

A shrub species that occurs in woodland habitats along river valleys at altitudes of 1600-1800 m.

Barleria longissima Lindau

Acanthaceae CR B1ab(i,iii,iv)+B2ab(i,iii,iv)
SD

A shrub species known only from the type specimen collected in 1893.

Becium formosum (Gurke) Chiov. ex Lanza

Lamiaceae VU B2ab(i,ii,iii,iv)
BA

A shrub of *Acacia-Commiphora* woodland, found on rocky slopes on limestone at 1700-1800 m.

Becium grandiflorum (Lam.) Pic. Serm.

Lamiaceae NT
Ethiopia and Eritrea TU, GD, WU, SU, WG, SD

This shrub grows in mountain bushland, pastures and rocky slopes at 1600-3100 m.

Blepharis cuspidata Lindau

Acanthaceae CR B1ab(i,iii,iv)+B2ab(i,iii,iv)
SD

A shrub species known only from the type collected in *Acacia-Commiphora* bushland on rocky slopes at 700-800 m.

Blepharispermum obovatum Chiov.

Asteraceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
BA

This shrub species has only been collected once, at altitudes of 500-1000 m on plateaux between El Mara and Mt Ello.

Boswellia ogadensis Vollesen

Burseraceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
HA

A distinct but little-known tree species that is recorded only from the type locality near the Webi Schebele river in Kelafo at 300-400 m. It is confined to a small but relatively undisturbed area of *Acacia-Commiphora* bushland on rocky limestone slopes. It yields a resin that can be used as incense.

Boswellia pirottae Chiov.

Burseraceae VU A2c
GD, GJ, WU, SU, KF

Populations of this tree are isolated and restricted to woodland on steep rocky slopes along the Tekeze, Abay and Gibe river systems. They grow at altitudes of 1200-1800 m. Human population and agricultural activities are increasing in the area.

Cadaba divaricata Gilg

Capparidaceae VU B2ab(ii,iv)
SD, HA

A shrub that has a scattered distribution in *Acacia-Commiphora* bushland at altitudes of 300-400 m.

Cladostigma nigistiae Sebsebe

Convolvulaceae EN B2ab(ii,iv)
SD

A shrub of *Acacia-Commiphora* woodland growing at altitudes of 750-1440 m on stony limestone ridges and granite outcrops. It can be found 19 km north-west of Bogol Mayo, on the road from Dolo to Filtu.

Commiphora monoica Vollesen

Burseraceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
BA

A tree known only from five collections around the Sof Omar caves. It grows in dense *Commiphora* bushland on rocky limestone slopes at altitudes of 1250-1400 m. It is the only wholly monoecious species in the genus.

Crotalaria agatiflora Schweinf. subsp. *enlangeri* Bak. f.

Leguminosae NT
SU, HA, IL, AR, GG

A shrub of forest margins and heath scrub, growing at 2000-3400 m.

Crotalaria exaltata Polhill

Leguminosae EN B1ab(i,iii)
SU, BA, KF, SD

From the Kefa, Shewa, Bale and Sidamo regions, this small tree occurs in the margins of upland forest or bamboo thicket above 3000 m.

Crotalaria intonsa Polhill

Leguminosae VU B1ab(i,iii)
GD, SU, KF, SD

A shrub species that grows in upland grassland and at forest edges at 1350-2800 m.

Crotalaria rosenii (Pax) Milne-Redh. ex Polhill

Leguminosae NT
SU, AR, BA, KF, SD

A shrub of forest margins, secondary scrub and stream edges, growing at 1350-3000 m.

Crotalaria sacculata Chiov.

Leguminosae CR A2c+B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
SD

A shrub of upland grassland and dry evergreen forest on the Mega plateau, occurring at 1800-2100 m.

Cussonia ostinii Chiov.

Araliaceae NT
WU, GD, GJ, WG, IL, AR, KF, GG

This tree species occurs abundantly in deciduous woodland and montane grassland at altitudes of 1500-2300 m in the west of the country. Increasing human population and their activities threaten the habitat to some extent, especially in the north of its range.

Delosperma abyssinica (Regel) Schwantes

Aizoaceae CR B1ab(i,ii,iii)
TU

A shrub confined to basaltic outcrops.

Delosperma schimperi (Engl.) H.E.K. Hartmann & Niesler

Aizoaceae EN B1ab(i,ii,iii)
TU, WU

A shrub confined to basaltic outcrops occurring at 3550-4110 m on Mt Erareta.

Dombeya kefaensis Friis & Bidgood

Sterculiaceae EN B2ab(i,ii,iii,iv)
KF

A shrub of forest margins and evergreen bushland, recorded just north of the Gogeb river at 1700-2200 m.

Dombeya longibracteolata Seyani

Sterculiaceae VU B2ab(i,ii,iii,iv)

KF, GG, SD

Three localities in Kefa, Gamo Goffa and Sidamo regions are known, where the tree species occurs in *Combretum-Terminalia* woodland at altitudes of 1900-2000 m.

Echinops ellenbeckii O. Hoffm.

Asteraceae EN A2cd+B2ab(i,ii,iii)

SU, AR, HA

A shrub that grows in upland grassland, along roadside margins, and in *Podocarpus* forest at altitudes of 2200-3000 m.

Erythrina burana Chiov.

Leguminosae VU B1ab(i,ii,iii,iv)

HA, BA?

A tree known only from an area of bushland between 1350 m and 2100 m in Hararghe, the species is relatively restricted in distribution but fast growing and under no present threat. Cultivated specimens are found elsewhere in Ethiopia.

Erythrococca uniflora M. Gilbert

Euphorbiaceae EN B2ab(i,ii,iii,iv)

SD

A shrub of *Acacia-Commiphora* bushland growing at altitudes of 900-1400 m. It can be found south east of Filtu on the road to Bogol Mayo.

Erythrophysa septentrionalis Verdc.

Sapindaceae EN B1ab(i,ii,iii)+B2ab(i,ii,iii)

HA

This tree species has only been collected five times in a small area located 21 miles south of Wardere. It grows in *Acacia-Commiphora* bushland at 600-800 m.

Euphorbia baleensis M. Gilbert

Euphorbiaceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)

BA

A shrub of *Acacia-Commiphora* woodland overlying limestone. It grows at altitudes of 1150-1450 m on the Ghinir side of the Sof Omar gorge.

Euphorbia betulicortex M. Gilbert

Euphorbiaceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)

SD

This tree is found in *Commiphora-Kirkia* woodland on steep limestone slopes at 900-1000 m. It is recorded from the El Siro waterholes.

Euphorbia burgeri M. Gilbert

Euphorbiaceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)

HA

A shrub of limestone slopes growing at 1200-1550 m. It is found south of Midaga, 70 km south of Harar.

Euphorbia dalettiensis M. Gilbert

Euphorbiaceae EN B2ab(i,ii,iii,iv)

SD, HA

A shrub that grows at altitudes of 1200-1300 m on steep limestone slopes west of Daletti, above the Gobelli river.

Euphorbia doloensis M. Gilbert

Euphorbiaceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)

SD

This shrub species is known only from the type collection, in open *Commiphora-Boswellia* bushland on steep rocky slopes at 400-500 m in Sidamo region.

Euphorbia ellenbeckii Pax

Euphorbiaceae EN B2ab(i,ii,iii,iv)

SD

A shrub of *Commiphora* woodland growing at 1000-1100 m.

Euphorbia fissispina Bally & Carter

Euphorbiaceae EN B2ab(i,ii,iii,iv)

SD

A shrub that grows in *Acacia-Commiphora* woodland at altitudes of 700-800 m near Bogol Mayo in Sidamo region.

Euphorbia makallensis Carter

Euphorbiaceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)

TU

A shrub that grows in a very limited area of rocky limestone habitat at altitudes of 2260-2385 m. It is known only from the type.

Euphorbia nigrispinioides M. Gilbert

Euphorbiaceae VU B2ab(i,ii,iii,iv)

SU, HA?

A species which is locally common on lava flows growing at 1000-1450 m in open deciduous woodland. It is known from Shewa but its distribution may extend into Hararghe and possibly Somalia.

Euphorbia ogadenensis Bally & Carter

Euphorbiaceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)

BA, HA

A tree of limestone slopes, growing at altitudes of 300-400 m between Ferfer and Mustahil.

Euphorbia somalensis Pax

Euphorbiaceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
HA

A shrub known only from a single collection, from *Acacia-Commiphora* bushland at altitudes of 1100-1200 m.

Euphorbia tetracantha Rendle

Euphorbiaceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
BA

A shrub known only from the type, found west of Wabe Shebele at 600-700m.

Euphorbia uniglans M. Gilbert

Euphorbiaceae EN B2ab(i,ii,iii,iv)
SD

A tree recorded only from a small area of *Acacia-Commiphora* bushland at 1400-1500 m in Sidamo.

Euryops pinifolius A. Rich.

Asteraceae VU B1ab(i,ii,iii)
WU, GJ, SU

This species is a shrub that grows in montane meadows at altitudes of 3200-3700 m. It grows with *Lobelia* on thin soil, on rocks and on cliff margins.

Ficus ruspolii Warb.

Moraceae VU B2ab(i,ii,iii,iv)
SD, KF

This tree is only known from two collections. It is recorded from deciduous bushland at 1800-1900 m.

Helichrysum elephantinum Cufod.

Asteraceae VU B2ab(i,ii,iii)
BA, GG, SD

This shrub grows at altitudes of 2470-3320 m in wet *Hagenia* forest with dense undergrowth.

Helichrysum horridum (Sch. Bip.) A. Rich.

Asteraceae EN B2ab(i,ii,iii,iv)
GD, SU

This shrub grows in *Erica-Lobelia* scrub in Afroalpine vegetation at altitudes of 3300-3600 m.

Hibiscus boranensis Cufod.

Malvaceae VU B2ab(i,ii,iii,iv)
SD

A shrub found in *Juniperus-Barbeya* and *Acacia-Commiphora* woodland at 1200-1750 m.

Hibiscus hochstetteri Cufod.

Malvaceae VU B2ab(i,ii,iii,iv)
Ethiopia and Eritrea TU, GD

A shrub of upland bushland, growing at 1000-1800 m.

Hildebrandtia aloysii (Chiov.) Sebsebe

Convolvulaceae VU B1ab(ii,iii,iv)
HA, BA

A shrub of *Acacia-Commiphora-Combretum* woodland on rocky limestone slopes, growing at altitudes of 850-1520 m.

Hildebrandtia diredawaensis Sebsebe

Convolvulaceae EN B1ab(ii,iii,iv)
HA

A shrub of *Acacia* woodland, growing on limestone slopes at altitudes of 1100-1700 m.

Hybanthus puberulus M. Gilbert

Violaceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
SD

A shrub of *Acacia-Commiphora* bushland on limestone at 1300-1650 m. It grows 100 km from Negele on the road to Filtu.

Hypericum gnidiifolium A. Rich

Guttiferae VU A2cd+B2ab(ii,iii,iv)
TU, SU

A bushy tree known only from two disjunct localities beside streams at altitudes of 1900-2700 m, one in Wogera on the Maye-Borhha Plateau in Tigray, and another in Choa in Shewa. It has not been collected recently.

Indigofera curvirostrata Thulin

Leguminosae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
SD

A shrub with a very limited distribution, growing in bushland on rocky limestone slopes at 900-1000 m, 90 km east of Filtu.

Indigofera ellenbeckii Bak. f.

Leguminosae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
HA

A species of shrub that is only known from the type.

Indigofera kelleri Bak. f.

Leguminosae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
HA

A dry bushland shrub known only from the type.

Indigofera rothii Bak.

Leguminosae EN B1ab(i,ii,iii,iv)
SU, HA

A species that reaches the stature of a small tree. It is confined to upland scrub and forest margins in an area where the majority of the Ethiopian population lives at 2100-2800 m.

Inula arbuscula Del.

Asteraceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
GD

A shrub that grows in *Erica arborea* scrub at altitudes of 3200-3600 m.

Inula confertiflora A. Rich.

Asteraceae NT
WU, SU, HA, BA, AR

A shrub that grows at 2500-3700 m and is recorded from *Juniperus-Podocarpus* forest, along stream banks and montane slopes.

Kanahia carlsbergiana D.Field, I. Friis & M.G. Gilbert.

Asclepiadaceae EN B1ab(i,iii)
AR, BA

A shrub that grows along permanent streams at altitudes of 1300-1900 m. It is known from three collections.

Kirkia burgeri Stannard subsp. *burgeri*

Simaroubaceae VU B2ab(i,ii,iii,iv)
SD, BA, HA

A tree of dense deciduous bush and limestone slopes at 1100-1400 m.

Kleinia gypsophila J.P. Lebrun & A.L. Stork

Asteraceae CR B1ab(i,ii,iii)+B2ab(i,ii,iii)
HA

A shrub species that grows on gypsum soils. It has been recorded 84 km north west of Gode.

Kleinia negrii Cufod.

Asteraceae EN B2ab(i,ii,iii,iv)
WU, HA, SD

A shrub of *Acacia-Commiphora* bushland that grows at altitudes of 100-1250 m.

Kotschya recurvifolia (Taub.) F. White subsp. *aetiopica* Verdc.

Leguminosae VU B1ab(i,iii)
BA, HA, KF, SD

A shrub that grows on grassy slopes, hillsides and roadsides at altitudes of 1300-2400 m.

Lantana kisi A. Rich.

Verbenaceae EN B2ab(i,ii,iii,iv)
TU

A shrub recorded only from Ouodgerate.

Lavandula erythraeae (Chiov.) Cufod.

Lamiaceae CR A2cd+B2ab(i,ii,iii,iv)
Eritrea

This shrub is only known by the type collected at Mount Lesa.

Lindenbergia awashensis Hjertson

Scrophulariaceae EN B1ab(i,ii,iii)+B2ab(i,ii,iii)
AF, SU

A shrub species that grows on lava flows, in *Acacia* woodland and grassland at 600-1500 m.

Maerua boranensis Chiov.

Capparidaceae CR B1ab(i,ii,iii)+B2ab(i,ii,iii)
SD

A shrub that grows at altitudes of 750-1400 m in *Acacia* bushland on calcareous loam and rocky roadsides. Found at Mega, Negelle and Filtu.

Maytenus addat (Loes.) Sebsebe

Celastraceae NT
SU, AR, SD, GG

A tree of Afromontane forest, especially along forest margins, and also in secondary formations. It ranges throughout the highlands at altitudes of 2200-3000 m. In the north the expanding human population and agricultural activities have caused a decline in the extent of the forest and continue to put pressure on the remaining habitat. Where the forest is cleared the tree is often left standing because of its usefulness as timber and firewood. The species also has medicinal uses.

Maytenus cortii (Pichi-Serm.) Cuf.

Celastraceae CR B2ab(i,ii,iii,iv)
GD

A shrub that grows on slopes at altitudes of 3500-3600 m in the Simien Mountains.

Maytenus harenensis Sebsebe

Celastraceae CR A2c+B1ab(i,iii)
BA

A small tree endemic to Harena forest, an Afromontane remnant of forest in the Bale Mountains. It grows at altitudes of 1600-3050 m. The forest is disturbed by logging activities and the building of sawmills in the area has resulted in increased activity.

Maytenus parviflora (Vahl) Sebsebe subsp. **eritreana** (Sebsebe)
 Sebsebe
 Celastraceae EN A2c+B2ab(ii,iv)
 Eritrea
 This species of shrub grows in bushland, often on steep slopes, at altitudes of 1400-2000 m.

Maytenus serrata (A. Rich.) Wilczek
 Celastraceae VU B2ab(ii,iv)
 Ethiopia and Eritrea TU, GD, GJ
 A shrub of rocky or grassy slopes growing at 1650-2250 m.

Monadenium shebeliensis M. Gilbert
 Euphorbiaceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
 HA
 A shrub known only from the type, growing in *Acacia-Commiphora* bushland at 300-400 m.

Moringa rivae Chiov. subsp. **longisiliqua** Verdc.
 Moringaceae VU B2ab(i,ii,iii,iv)
 SD, BA, HA
 A tree of deep rocky gorges and limestone slopes, growing at 1100-1300 m.

Otostegia tomentosa A. Rich. subsp. **steudneri** (Schweinf.) Sebald
 Lamiaceae VU B2ab(i,ii,iii,iv)
 GD, WU
 This shrub is restricted to montane bushland in the Simien Mountains, where it grows at altitudes of 2100-3300 m.

Otostegia tomentosa A. Rich. subsp. **tomentosa**
 Lamiaceae VU B2ab(i,ii,iii,iv)
 Ethiopia and Eritrea TU
 A shrub of montane bushland, growing at altitudes of 2000-3000 m.

Phagnalon quartinianum A.Rich.
 Asteraceae EN B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
 Ethiopia and Eritrea TU
 A shrub of river valleys and montane slopes, growing at altitudes of 1900-2200 m.

Phyllanthus borenensis M. Gilbert
 Euphorbiaceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
 SD
 Known only from the type, this shrub species grows in *Acacia-Commiphora* bushland at 1100-1200 m.

Phyllanthus dewildiorum M. Gilbert
 Euphorbiaceae EN B2ab(i,ii,iii,iv)
 WG, KF
 A shrub of open woodland at 1400-1800 m.

Phyllanthus limmuensis Cufod.
 Euphorbiaceae VU B2ab(i,ii,iii,iv)
 GD, GJ, WG, IL, KF
 This shrub occurs in high rainfall forest, often near streams, at altitudes of 1050-2200 m.

Polyscias farinosa (Del.) Harms
 Araliaceae VU A2cd+B1ab(i,ii,iii,iv)
 TU, GD, GJ, SU, KF
 A tree known as the baboon's chair. It appears to be confined to open woodland on slopes along river systems at altitudes of 1600-2200 m. Although found in an area heavily influenced by agricultural activities and an expanding human population, regeneration is apparently good.

Polysphaeria aethiopica Verdc.
 Rubiaceae EN A2cd+B2ab(ii,iii,iv)
 SD, BA
 A shrub of riverine vegetation, often below high water mark, recorded at altitudes of 800-1350 m.

Pseudoblepharispermum bremeri J.P. Lebrun & A.L. Stork
 Asteraceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
 HA
 A monotypic genus, this shrub grows in open scrub with *Boswellia*, on gypsum soil 150 km south west of Kelafo.

Rhus glutinosa A. Rich. subsp. **glutinosa**
 Anacardiaceae VU A2cd+B1ab(i,ii,iii,iv)
 Ethiopia and Eritrea TU, GD, GJ
 A shrub of forest margins and evergreen scrub, growing at altitudes of 1800-3300 m.

Rhynchosia erlangeri Harms
 Leguminosae EN B1ab(i,iii)
 HA
 A shrub of dry scrub, grassy slopes and rocky areas at 1800-2600 m.

Rhynchosia erythraea Schweinf.
 Leguminosae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
 Ethiopia and Eritrea SU
 A shrub that has a fragmented population. It grows in grassland or bushland at 1000-2000 m on Mt Fantale.

Rhynchosia splendens Schweinf.

Leguminosae CR A2c+B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
GD

A shrub of wooded grassland at 1000-1100 m, this species is known only from the type collection at Metema and may be Extinct.

Rinorea frisi M. Gilbert

Violaceae EN A2cd+B2ab(ii,iii,iv)
IL, KF

A tree that is found in *Aningeria-Celtis* forest at 1000-1100 m.

Rubus aethiopicus R.A. Grah.

Rosaceae EN A2cd+B2ab(ii,iii,iv)
SU, GD

A shrub of *Juniperus* forest or scrub, on moist ground at 2600-3000 m.

Rubus erlangeri Engl.

Rosaceae EN B2ab(ii,iii,iv)
BA, SD

This species of shrub is only known from two collections. It is recorded from open places in *Hypericum* forest, growing at 3600-3700 m.

Ruellia boranica Ensermu

Acanthaceae EN B1ab(i,iii)
SD

This species grows in *Acacia-Commiphora* woodland on limestone at 1300-1600 m.

Satureja punctata (Benth.) Briq. subsp. **ovata** (Benth.) Seybold

Lamiaceae NT
Ethiopia and Eritrea TU, GD, WU, GJ, SU

A shrub of rocky slopes at altitudes of 1800-3700 m.

Satureja unguentaria (Schweinf.) Cufod.

Lamiaceae EN B2ab(i,ii,iii,iv)
GD

This shrub grows on slopes at 1500-1650 m.

Sesbania melanocalis Bidgood & Friis

Leguminosae EN B1ab(i)
KF, WG

This tree species grows at the edges of montane forest and in evergreen bushland at 1800-1900 m.

Sparmannia macrocarpa Ulbr.

Tiliaceae NT
GD, GJ, WU, SU, AR, WG, KF, GG, HA

A shrub of montane forest and scrub-grassland, found at 1800-3000 m.

Stomatanthus meyeri R.M. King & H. Rob.

Asteraceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
KF

A shrub of montane slopes, growing at 2200-2400 m.

Tacazzea venosa Decne.

Asclepiadaceae EN B1ab(i,iii)
TU, GD, GJ

A shrub that grows on sand and in rocky crevices on the banks of rivers, at altitudes of 800-1500 m.

Taverniera abyssinica A. Rich.

Leguminosae CR A2cd+B1ab(i,ii,iii,iv)
TU, SU

An important medicinal species, this shrub is threatened by collecting. It is sold in the Addis Ababa market as a cure for stomach cramps and fever. It grows on limestone bushland at altitudes of 1700-2300 m.

Taverniera schimperi Jaub. & Spach

Leguminosae CR A2cd+B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)
Ethiopia and Eritrea TU, SU

A shrub of bush and woodland growing along the Tekeze river and Blue Nile gorge, at altitudes of 1000-1300 m.

Tephrosia dichrocarpa Steud. ex A. Rich.

Leguminosae EN B1ab(i,iii)
TU, GD, GJ

A shrub of rocky places, roadsides and montane forest, growing at 2200-2400 m.

Terminalia hararensis Engl. ex Diels

Combretaceae DD
BA, HA

A taxonomically dubious tree species that may become synonymous with *T. polycarpa*. It is known only from the type collection in dense bushland in the boundary area between Bale and Hararghe. If found to be a full species, its status would be CR B2ab(ii,iii).

Terminalia hecistocarpa Engl. ex Diels

Combretaceae DD

BA

As with *T. hararensis*, this tree species may be synonymous with *T. polycarpa*. It is known only from the type locality in bushland in Bale. If found to be a full species, its status would be CR B1ab(ii,iii)+B2ab(ii,iii).

Tragia abortiva M. Gilbert

Euphorbiaceae VU B2ab(i,ii,iii,iv)

GG

Growing in deciduous woodland at 1550-1800 m, this species is locally abundant.

Tragia negeliensis M. Gilbert

Euphorbiaceae VU B2ab(i,ii,iii,iv)

SD, BA

A shrub that occurs in grassland with *Acacia* at altitudes of 1300-1600 m

Verbascum arbusculum (A. Rich.) Huber-Morath

Scrophulariaceae CR B1ab(i,ii,iii)+B2ab(i,ii,iii)

SU

This shrub is only known from the type collection. It is recorded from lava flows, *Acacia* woodland and grassland.

Vernonia cylindrica Sch. Bip. ex Walp.

Asteraceae VU Acd

TU, GD, GJ, WG

A shrub of dry hillsides.

Vernonia dalettiensis Mesfin

Asteraceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)

HA

A shrub that grows in mixed woodland on slopes at altitudes of 1300-1400 m, west of Daletti.

Vernonia tewoldei Mesfin

Asteraceae EN B2ab(i,ii,iii,iv)

KF, BA

This shrub grows in evergreen montane forest at 1600-2150 m.

Vernonia thulinii Mesfin

Asteraceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)

WG

A species of wooded grassland on slopes at 1200-1300 m, known from the Didessa river valley.

Vigna debanensis Martelli

Leguminosae CR A2c+B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)

Ethiopia and Eritrea TU

A shrub that grows in grassland and woodland vegetation at 1600-2200 m.

Wellstedia filtuensis D.R. Hunt & J.P. Lebrun

Boraginaceae CR B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)

SD

This species is known only from the type collection. It is a shrub that grows on thin soil with calcareous outcrops at the crest of Mt Filtu.

Wendlandia arabica Defl. subsp. ***aethiopica*** Puff

Rubiaceae EN B2ab(i,ii,iii,iv)

SU

A shrub of rocky slopes, growing at 1400-1500 m.

LEAST CONCERN ENDEMIC SPECIES

Becium ellenbeckii (Gurke) Cufod.

Lamiaceae LC

SD, HA

A shrub of *Acacia-Commiphora* bushland, growing on limestone slopes at 1000-1700 m.

Bothriocline schimperi Oliv. & Hiern. ex Benth.

Asteraceae LC

GD, GJ, SU, WG, KF, IL, GG, AR, BA, SD

A shrub of wet montane forests, wooded grassland and stream banks, found at 1300-2800 m.

Chionothis latifolia Rendle

Amaranthaceae LC

SD, BA, HA

This shrub is found at altitudes of 700-1750 m on rocky hillsides in open dry grassland and *Acacia-Commiphora* scrubland vegetation.

Dombeya aethiopica Gilli

Sterculiaceae LC

GJ, SU, KF, GG, SD 1700-2200 m

A tree of dry *Juniperus* forest, forest margins and secondary forest. It is found in various localities in the west and south-west highlands.

Echinops longisetus A. Rich.

Asteraceae LC
GD, GJ, WU, SU, WG, AR, HA, BA, KF, GG, SD

This shrub species occurs in a variety of habitats (e.g. rocky open woodland, pasture, forest margins, along roadsides) at altitudes of 2000-4000 m.

Erythrina brucei Schweinf.

Leguminosae LC
WU, WG, GJ, SU, BA, HA, IL, KF, GD, GG, SD

A tree of open places in upland forest vegetation, found at 1200-2900 m.

Euphorbia dumalis S. Carter

Euphorbiaceae LC
SU, AR, KF, SD, BA

This shrub grows in disturbed forest margins around villages at altitudes of 2400-3600 m.

Leucas abyssinica (Benth.) Briq.

Lamiaceae LC
Ethiopia and Eritrea TU, GD, GG, SD, BA

A shrub of mountain bushland, rocky slopes, high grassland and forest edges, found at 1300-2600 m.

Lippia adoensis Hochst. ex Walp.

Verbenaceae LC
Ethiopia and Eritrea TU, GJ, SU, AR, HA, KF, GG

A shrub that is common in disturbed areas and at forest margins, growing at 1900-2450 m.

Millettia ferruginea (Hochst.) Bak. subsp. ***darassana*** (Cuf.) Gillett

Leguminosae LC
WG, SU, HA, BA, IL, KF, SD

A tree that is found in rainforest, riparian forest and woodland at 1600-2500 m.

Millettia ferruginea (Hochst.) Bak. subsp. ***ferruginea***

Leguminosae LC
TU, GD, GJ, SU, WG, HA, IL

A tree of upland forest, riparian forest and coffee plantations, growing at altitudes of 1000-2500 m.

Rhus glutinosa A. Rich. subsp. ***neoglutinosa*** (M. Gilbert) M. Gilbert

Anacardiaceae LC
TU, WU, SU, WG, AR, BA, HA

A shrub species of forest margins and open bushland on rocky slopes, growing at altitudes of 1800-3000 m.

Senecio myriocephalus Sch. Bip. ex A. Rich.

Asteraceae LC
TU, GD, WU, SU, KF, HA, BA, SD, AR

Growing in forest margins at altitudes of 2250-3200 m, this shrub is associated with *Hagenia*, *Erica* and *Podocarpus*. It is used as a hedge plant.

Solanecio gigas (Vatke) C. Jeffrey

Asteraceae LC
GD, GJ, WU, SU, BA, KF, IL

A shrub that grows in montane forest clearings and on river banks at altitudes of 1750-3350 m. It is grown as a hedge plant.

Tinnea somalensis Gurke ex Chiov.

Lamiaceae LC
AR, BA, SD

A shrub of open woodland and wooded grassland on calcareous soils, growing at altitudes of 1100-1900 m.

Vepris dainellii (Pichi-Serm.) Kokwaro

Rutaceae LC
GJ, SU, WG, IL, KF, SD, BA

This species is an understory tree of moist montane forest, growing with *Podocarpus* or *Aningeria* at 1000-2500 m.

Vernonia filigera Oliv. & Hiern.

Asteraceae LC
TU, GD, SU, KF, SD

A shrub recorded from wooded grassland, seepage area, and rocky slopes near lakes at 1900-2850 m.

Vernonia leopoldi (Sch. Bip. ex Walp.) Vatke

Asteraceae LC
TU, GD, GJ, SU, WG, KF, HA

This shrub is recorded from hillsides, gorges, roadside thickets and forest margins at 1850-2850 m.

Vernonia rueppellii Sch. Bip. ex Walp.

Asteraceae LC
TU, GD, SU, AR, BA, SD, KF, HA

A species that grows at forest margins and in grassland on open montane slopes at 2150-3000 m.

Annex

IUCN RED LIST CATEGORIES AND CRITERIA

Extinct (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

Extinct in the Wild (EW)

A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

Critically Endangered (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

Endangered (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.

Vulnerable (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.

Near Threatened (NT)

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

Least Concern (LC)

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

Data Deficient (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. DD is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

Not Evaluated (NE)

A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

THE CRITERIA FOR CRITICALLY ENDANGERED, ENDANGERED AND VULNERABLE

Critically Endangered (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing an extremely high risk of extinction in the wild:

- A. Reduction in population size based on any of the following:
1. An observed, estimated, inferred or suspected population size reduction of ≥ 90 per cent over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
 - (a) direct observation
 - (b) an index of abundance appropriate to the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
 2. An observed, estimated, inferred or suspected population size reduction of ≥ 80 per cent over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of ≥ 80 per cent, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
 4. An observed, estimated, inferred, projected or suspected population size reduction of ≥ 80 per cent over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
- B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
1. Extent of occurrence estimated to be less than 100 km², and estimates indicating at least two of a-c:
 - (a) Severely fragmented or known to exist at only a single location.
 - (b) Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - (c) Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
 2. Area of occupancy estimated to be less than 10 km², and estimates indicating at least two of a-c:
 - (a) Severely fragmented or known to exist at only a single location.
 - (b) Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - (c) Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
- C. Population size estimated to number fewer than 250 mature individuals and either:
1. An estimated continuing decline of at least 25 per cent within three years or one generation, whichever is longer, (up to a maximum of 100 years in the future) OR
 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
 - (a) Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 50 mature individuals, OR
 - (ii) at least 90 per cent of mature individuals in one subpopulation.
 - (b) Extreme fluctuations in number of mature individuals.
- D. Population size estimated to number fewer than 50 mature individuals.
- E. Quantitative analysis showing the probability of extinction in the wild is at least 50 per cent within 10 years or three generations, whichever is the longer (up to a maximum of 100 years).
- Endangered (EN)**
- A taxon is Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a very high risk of extinction in the wild:
- A. Reduction in population size based on any of the following:
1. An observed, estimated, inferred or suspected population size reduction of ≥ 70 per cent over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
 - (a) direct observation
 - (b) an index of abundance appropriate to the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
 2. An observed, estimated, inferred or suspected population size reduction of ≥ 50 per cent over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of ≥ 50 per cent, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
 4. An observed, estimated, inferred, projected or suspected population size reduction of ≥ 50 per cent over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, AND where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
- B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
1. Extent of occurrence estimated to be less than 5000 km², and estimates indicating at least two of a-c:
 - (a) Severely fragmented or known to exist at no more than five locations.
 - (b) Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - (c) Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
 2. Area of occupancy estimated to be less than 500 km², and estimates indicating at least two of a-c:
 - (a) Severely fragmented or known to exist at no more than five locations.
 - (b) Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - (c) Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
- C. Population size estimated to number fewer than 2500 mature individuals and either:
1. An estimated continuing decline of at least 20 per cent within five years or two generations, whichever is longer, (up to a maximum of 100 years in the future) OR
 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
 - (a) Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 250 mature individuals, OR
 - (ii) at least 95 per cent of mature individuals in one subpopulation.
 - (b) Extreme fluctuations in number of mature individuals.
- D. Population size estimated to number fewer than 250 mature individuals.
- E. Quantitative analysis showing the probability of extinction in the wild is at least 20 per cent within 20 years or five generations, whichever is the longer (up to a maximum of 100 years).
- Vulnerable (VU)**
- A taxon is Vulnerable when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a high risk of extinction in the wild:
- A. Reduction in population size based on any of the following:
1. An observed, estimated, inferred or suspected population size reduction of ≥ 50 per cent over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are: clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
 - (a) direct observation
 - (b) an index of abundance appropriate to the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
 2. An observed, estimated, inferred or suspected population size reduction of ≥ 30 per cent over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
 3. A population size reduction of ≥ 30 per cent, projected or suspected to be met within the next 10 years or three

- generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
4. An observed, estimated, inferred, projected or suspected population size reduction of ≥ 30 per cent over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, AND where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
- B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
1. Extent of occurrence estimated to be less than 20,000 km², and estimates indicating at least two of a-c:
 - (a) Severely fragmented or known to exist at no more than 10 locations.
 - (b) Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - (c) Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
 2. Area of occupancy estimated to be less than 2000 km², and estimates indicating at least two of a-c:
 - (a) Severely fragmented or known to exist at no more than 10 locations.
 - (b) Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - (c) Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
- C. Population size estimated to number fewer than 10,000 mature individuals and either:
1. An estimated continuing decline of at least 10 per cent within 10 years or three generations, whichever is longer, (up to a maximum of 100 years in the future) OR
 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
 - (a) Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 1000 mature individuals, OR
 - (ii) all mature individuals are in one subpopulation.
 - (b) Extreme fluctuations in number of mature individuals.
- D. Population very small or restricted in the form of either of the following:
1. Population size estimated to number fewer than 1000 mature individuals.
 2. Population with a very restricted area of occupancy (typically less than 20 km²) or number of locations (typically five or fewer) such that it is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period.
- E. Quantitative analysis showing the probability of extinction in the wild is at least 10 per cent within 100 years.

Source: IUCN (2001)

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Photos

Front cover, from left to right; back cover, from right to left: *Euphorbia* spp.; Afroalpine vegetation in Ethiopia; Sanetti plateau, Bale Mountains National Park, Ethiopia; *Juniperus procera*.

All photos: Jose Luis Vivero

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The Red List of Endemic Trees & Shrubs of Ethiopia and Eritrea



Although the Horn of Africa is a major centre of plant diversity and endemism, there is as yet no complete red list of plants for Ethiopia or Eritrea. This preliminary publication is a product of a red list initiative designed to stimulate conservation interest in, and action for, the many rare and endemic woody species found in these two biologically rich countries.

This document has been produced by the Global Trees Campaign under the auspices of the IUCN/SSC Global Tree Specialist Group. The Global Trees Campaign is a joint initiative of Fauna & Flora International and the UNEP World Conservation Monitoring Centre, aiming to save the world's threatened trees and the habitats where they grow.

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