

Inclusion of East African Sandalwood *Osyris lanceolata* in Appendix II

Proponent: Kenya

Summary: East African Sandalwood *Osyris lanceolata* is a semi-parasitic shrub or small tree with wood that yields a commercially important aromatic oil. The species occurs in a range of open habitats, generally in arid and semi-arid environments. It is widespread, occurring mainly in the tropics and some parts of the Mediterranean. It is uncertain whether the recorded distribution for some countries relates to introduced plants.

Subsistence uses of the species in East Africa include timber, fuelwood and herbal medicines. In the past decade, populations in Kenya and United Republic of Tanzania (Tanzania) have been intensively harvested to supply the international trade in sandalwood. Exploitation is reported to have spread to South Sudan and Uganda. Whole trees are uprooted for extraction of the oil that is contained in the trunk, branches and roots. In Tanzania processing factories were established in 2004 and trade in East African Sandalwood was first reported in Kenya in the same year. Increase in use of the species may be associated with a decline in supply of oils and associated products from other sandalwood species (primarily *Santalum* spp., and Red Sanders *Pterocarpus santalinus*, the latter being included in CITES Appendix II). Wood of *Osyris lanceolata* is exported to China and India and semi-processed products to Indonesia, India, South Africa, France, Germany and eastern Asia countries for the cosmetic and pharmaceutical industry.

In Kenya, the species has a wide but scattered distribution and population abundance is apparently low. Very few young plants have been observed in recent field surveys, with most stands aged 20 – 45 years. Studies at various localities reveal poor regeneration potential. Populations have reportedly been declining since 2002, as a result of the heavy exploitation for international trade. The sharp rise in extraction in Kenya is believed to be linked to overexploitation of the resource in Tanzania. In Tanzania, declines have been recorded in various parts of the country including Arusha, Manyara and Kilimanjaro Regions and the Eastern Arc Mountains. There is currently little information on the status of *Osyris lanceolata* in most other parts of its range, although there is no evidence of large-scale exploitation elsewhere. The species has been assessed nationally in both Namibia and South Africa as Least Concern.

Osyris lanceolata was protected in Kenya by Legal Notice No 3176 of 2007 under the Forests Act, 2005. This gave protection to the species for a period of five years to allow for the development of sustainable harvesting mechanisms.

Analysis: *Osyris lanceolata* is a widespread shrub or small tree from the tropics and subtropics, whose original range is unclear but is probably Africa and localised parts of southern Europe. It yields an aromatic oil that is in international demand. Exploitation in East Africa for production of oil and associated products began relatively recently (2004) and has apparently led to population declines in Kenya and Tanzania, with harvest reported now to be spreading to South Sudan and Uganda. However, the species is very widespread and at least locally common outside this region and there is no evidence of large-scale exploitation elsewhere. In view of this, the species would not appear to meet the criteria for inclusion in Appendix II set out in Annex 2 a of *Resolution Conf. 9.24 (Rev. CoP15)*.

| Supporting Statement (SS) | Additional information |
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| <p><i>Osyris lanceolata</i> Hochst. & Steud. (1832).</p> | <p><u>Taxonomy</u></p> <p>The genus is considered in the proposal to be monotypic but The Plant List (2012) lists two other accepted species names for the genus: <i>Osyris speciosa</i> (A.W. Hill) J.C.</p> |

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| 13 synonyms listed in the proposal. | <p><i>Manning & Goldblatt, and Osyris alba L. The African Plant Database (2012) also lists Osyris compressa (P. J. Bergius).</i></p> <p><i>Great variation in leaf size and shape has elicited a considerable synonymy in this species. There are 15 synonyms listed on The Plant List and African Plants Database (2012).</i></p> |

Range

Africa: Kenya, United Republic of Tanzania, Uganda, South Sudan, Rwanda, Burundi, Malawi, Mozambique, Ethiopia, Algeria, South Africa, Zambia and Zimbabwe. Also in Europe (Iberian Peninsula and Balearic Islands), Asia (India to China).

Also Democratic Republic of Congo, Morocco, Namibia, Botswana, Asia (India to SE Asia) (Flora Zambesiaca, 2012).

According to Orwa et al. (2009) the tree is native to Kenya, Tanzania and South Africa and has been planted in Ethiopia, Mozambique, Zimbabwe, Namibia and Botswana.

IUCN Global Category

Not currently listed.

Biological and trade criteria for inclusion in Appendix II (Res. Conf. 9.24 (Rev. CoP15) Annex 2 a)**A) Trade regulation needed to prevent future inclusion in Appendix I**

*Various assessments have been undertaken for trees of East Africa but do not include this species according to information provided by the East African Plant Red List Authority. *O. lanceolata* was assessed as Least Concern against IUCN criteria in 2012 owing to its large extent of occurrence, area of occupancy and wide habitat and altitudinal range (Kalema and Beentje, 2012).*

**O. lanceolata* was listed as Least Concern in the Red List of South African Plants in 2005 (Foden and Potter, 2005) and as Low Risk/Least Concern in the Southern African Plant Red Data List for Namibia in 2002 (Craven and Loot, 2002).*

B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

The main traded products of *O. lanceolata* include aromatic oils extracted from the heartwood, timber for handicrafts and sawdust for making incense. Heartwood of the trunk, branches and roots contain the essential oil, with highest concentrations in the roots. The oil is used in perfumery, pharmaceutical, religious and medicinal practices. The East African Sandalwood oil has been found to have comparable properties with the true Sandalwood oil although of different quality.

Prior to entering into the international commercial market in 2004, Kenya's population of East African Sandalwood was used locally for timber, fuel or for herbal

*According to Dale and Greenway (1961), Breitenbach (1963), Walker (1966) and Mwang'ingo in litt. (2012), the use of *Osyris lanceolata* as a substitute/supplement of Indian sandalwood in Tanzania seems to have started before 1960. Within Tanzania, harvesting was initially concentrated in a few populations yielding good quality material (Mwang'ingo et al., 2003). Increased use of this species began in the early 1990s following a decline in the global sandalwood supply (exports are banned in India and Australia) leading to a decline in the resource and disappearance of the species in some areas. Sandalwood sourced from Africa is expected to remain a large part of the global resource for the next 5 – 10 years. As international volumes of*

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| <p>medicine at subsistence levels. Commercial exploitation started in Tanzania in 2004 and spread to Kenya in 2006 which is now the leading country for exports. Commercial exploitation has spread to South Sudan and Uganda.</p> <p>In Tanzania four sandalwood processing factories were established and licensed in 2004, but due to shortage of raw materials, three were closed down and only one in Babati, Manyara region is still operational. This factory sources its raw materials from most parts of East Africa. In 2011, Uganda authorized several shipments of <i>O. lanceolata</i>, some transiting through Kenya and others through Tanzania.</p> <p>Massive and unsustainable exploitation of this species triggered a ban on its harvesting and trade in Kenya in 2007 (Legal Notice No 3176 of 2007). During the period 2007 – 2011, 276 t of sandalwood material were seized and confiscated in Kenya. The most recent seizure of such materials in Kenya was on 18th September 2012 in Nairobi.</p> <p>Markets for specimens of <i>O. lanceolata</i> have been recorded in Germany, South Africa, France, India, Middle Eastern countries, United Kingdom, and the United States. There are no clear records on trade of the <i>O. lanceolata</i> but it is estimated that 1000 t are annually harvested from Africa, mostly from East Africa. It has been projected that East African Sandalwood is going to contribute significantly to global sandalwood oil trade in the coming 5-10 years. Currently, trade on <i>O. lanceolata</i> is exclusively harvested from the wild.</p> | <p><i>sandalwood have declined, its price has steadily increased over the past few decades (Mwang'ingo et al., 2003, cited in Page. et al., 2012).</i></p> <p><i>African Sandalwood is harvested from natural populations of O. lanceolata in Chad, Sudan, Ethiopia, Uganda, Tanzania and Kenya (Mwang'ingo in litt., 2012).</i></p> <p><i>In Kenya, a study carried out in 2005 revealed that the tree has been overexploited in the areas around Oloitoktok, where the species was formerly common, and the ranches in Kuku, Endonet and Rombo. Due to the overexploitation and resultant scarcity, exploitation then extended to Chyulu and Kibwezi areas. The abundance was reported to increase in Chyulu but it was noted that the only remaining alternative of getting the raw materials is Chyulu national park (Mathenge et al., 2005).</i></p> <p><i>Subsequently it was reported that Kenya is losing the sandalwood tree to illegal harvesting in Kajiado, Taita, Amboseli and surrounding ranches, Samburu, Koibatek, and Kikuyu Escarpment amongst other areas. In the Chyulu hills the tree still grows in abundance compared to the other areas (Kenya Forests, 2009).</i></p> <p><i>A study in the Chyulu hills, Kenya (Ochanda, 2011) showed that locals used sandalwood both for commercial purposes and subsistence medicinal purposes for the treatment both for animals and people such as treatment of snake bites. Due to illegal harvesting, most of the mature trees have been removed. Attempts at local nursery propagation have been unsuccessful. Although the tree is dioecious and it produces seed three times a year, propagation by seed is challenging as most of the seedlings died in the nursery and after transplanting, (presumably due to the absence of host plants).</i></p> <p><i>In Tanzania, the species has been recorded from the following Districts: Arumeru, Monduli, Kilolo, Ludewa, Makete, Mufindi, Njombe, Same, Babati, Mbeya Rural, Kilosa, Rufiji, Sumbawanga Rural ("Ufipa" in text), Singida Rural, and Lushoto (Tropicos.org).</i></p> <p><i>In Tanzania, a small factory operating in Tanga was the major consumer of sandalwood obtained from Lushoto, Same and Kilimanjaro but due to unsustainable overharvesting the traditional sources ran out. Harvesting has since shifted to Babati, Kondoa, Handeni-Kiteto, Singida, Mbulu and to a lesser extent Iringa. The stock is nearly extinct in the Eastern Arc Mountains with few remnants harvested, in Lushoto and Mwanga Districts. Baga, Mazumbai and Mkuzu FRs and the surrounding general lands are the key areas where <i>O. lanceolata</i> is found, there is illegal harvesting in Lushoto District, Mramba and Minja FRs. Malimbwi et al. (2006) reported six legally</i></p> |

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| | <p>registered processing industries in Tanzania with annual demand of 6000 t (which seem too high compared to the existing stock or supply) (Forestry and Beekeeping Division, 2007).</p> <p>In Tanzania, the Ngorongoro Conservation Area Authority reported increased illegal logging in Ngorongoro and Karatu districts, Arusha Region, stating that in the past the trees used to be found in many parts of Arusha, Manyara and Kilimanjaro Regions but many have now disappeared. Buyers pay for truck loads of tree trunks, branches and roots – in 2011 10 t of illegally harvested sandalwood logs were impounded. (Tanzania Daily News, 2012; Arusha Times, 2011).</p> <p>In Uganda, the areas of occurrence are mainly close to Kenya in Karamoja and Mbale. This poses a potential problem of easy smuggling of material from either country into the other, depending on where there are 'softer' regulations and control measures. There are unconfirmed reports of some exploitation but this does not seem to be much since the supply is limited. The species often naturally grows in low abundance in its areas of occurrence (Kalema in litt., 2012).</p> <p>It is thought that one large sandalwood processing plant currently operates in Babati with a monthly consumption of about 40 m³ thus making an annual requirement of about 500 t. The rest of the sandalwood is likely to be exported as raw material (Mwang'ingo in litt., 2012). Unregistered sandalwood processing plants are reported to be in Dar (Chenga in litt., 2012).</p> <p>Various references state that the demand from India has surged following the decline in Indian and Australian Sandalwood (Machua et al., 2009; Mwang'ingo et al., 2003). India is the major importer of timber products from Tanzania including all sandalwood exported in the last half of 2005 (Milledge et al., 2007).</p> |

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under Res. Conf. 9.24 (Rev. CoP15) Annex 2 a or listed in Appendix I

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| <p>Other species that could be considered similar by virtue of the derivatives sought by the market, are the true sandalwoods of the <i>Santalum</i> genus mainly <i>Santalum album</i> and <i>S. spicatum</i>.</p> | <p><i>Sandalwood</i> is a common name of many other plant species together with their wood and oils. The genus <i>Santalum</i> has about 25 species and <i>Thesium</i>, the largest genus in the family <i>Santalaceae</i>, has over 300 species (Mabberley, 2008).</p> <p><i>Pterocarpus santalinus</i> (Red Sandalwood) is the only "Sandalwood" currently listed under CITES, on Appendix II.</p> <p>Due to the inter-changeable common names and uses for these various "Sandalwood" species, combined with the facts that these species are often traded as derivatives (oils, wood chips and incense) and are globally distributed, serious enforcement issues are likely to arise if <i>O. lanceolata</i> is listed in Appendix II.</p> |
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| | <p><i>The mixing of Indian sandalwood products with imported African sandalwood has reduced the confidence in sandalwood products originating from India (Page et al., 2012).</i></p> |

Other information

Threats

O. lanceolata commonly called East African Sandalwood (or false Sandalwood) has recently entered the international market as a substitute for the traditional sandalwood oil derived from species of *Santalum*. Diminishing populations and strict regulations on Australian sandalwood, *Santalum spicatum* and Indian Sandalwood *Santalum album* have led to increasing demands for East African Sandalwood. The tree is exploited for its aromatic essential oils found in the heartwood which matures from 15 years (good quality oil has only been obtained from *S. album* and *S. spicatum* of ages 30 years and above). Older trees are targeted and destructive harvesting methods are used where the whole plant is uprooted. Coupled with poor recruitment rates, slow growth and attack by diseases and pests, exploitation is having a detrimental impact on the population. There are reported cases of unsustainable exploitation of *O. lanceolata* from Kenya, Tanzania, Uganda, and South Sudan. In Kenya, highly affected areas include Baringo, Pokot, Taita, Samburu and Chyulu hills. In Kenya, habitats of *O. lanceolata* face threats from conversion for agriculture and mining.

A taskforce of government institutions was formed to look into the harvesting and trade of sandalwood. In its preliminary survey report it says that poverty in the areas where this species occurs is an underlying factor that might make the fight against the illegal trade difficult to win. Communities around Chyulu National Park earn KShs 4 to KShs 7 for every kilo harvested, which the middleman sells at Kshs 80 per kilo. Successful intervention measures therefore would have to address poverty, and alternative livelihoods (Kenya Forests, 2009).

Harvesting has now moved into national parks where reasonable resources are still available, compared to small amount that can be collected on public land (Mwang'ingo in litt., 2012).

Conservation, management and legislation

Kenya and Tanzania have Decrees controlling trade in wild harvested specimens of the species. *O. lanceolata* is protected in Kenya and Tanzania under Presidential decrees. In Kenya, Legal Notice No 3176 of 2007 under the Forests Act (2005) placed East African Sandalwood under Presidential Protection to allow for development of mechanisms for sustainable harvesting of the species. Further, species exploitation is regulated by the Wildlife Act Cap.376, Environment and Management Coordination Act, 1999, and The Constitution of Kenya, 2010.

Kenya and Tanzania have initiated programs for carrying out species status assessments that will lead to establishment of certification measures for sustainable harvesting of *O. lanceolata*. Both countries have initiated baseline surveys as a basis for species monitoring. Scientific information generated in Kenya and Tanzania shows that currently significant subpopulations of the species in the two countries exist in protected areas, while most of the specimens harvested have been from non-protected areas.

The Kenyan Wildlife Service has been instrumental in enforcing the 2007 presidential decree to protect East African Sandalwood from exploitation through illegal trade and has managed to eradicate the illegal harvesting of the plant within protected areas (Karanja, 2012). However, Kenyan forestry agencies have faced difficulties in enforcing the ban on sandalwood exploitation (Kenya Forests, 2010).

The Presidential Decree was issued on 14th February 2007 effective for five years (State House Kenya, 2007; Kenya Law, 2007). As the Presidential Decree expired in March 2012 there is currently no legal protection for the species in Kenya. The Draft Wildlife Bill for the Republic of Kenya (2011) states this species is nationally listed as a protected Endangered species and also as a wild species for which game farming may be allowed. This is yet to be accepted.

In Tanzania there are gaps in the legal framework as to banning of harvest and allowing processing (ACP FLEGT, 2012). The existence of a Decree in Tanzania is disputed (Anon in litt., 2012).

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| <u>Captive Breeding/Artificial Propagation</u> | |
| <p>There are no established plantations in the species range States. Kenya and Tanzania are, however, actively involved in research and development for improved propagation to enhance establishment of the species in large scale plantations.</p> | <p><i>Preliminary investigations on the regeneration potential of the tree showed that the tree regenerates primarily by exposed root suckers.</i></p> <p><i>The Drylands Forestry Research Programme led by Kenya Forestry Research Institute (2011) has been focusing on development of technologies for propagation, establishment and management of O. lanceolata. Various propagation methods have been tried with varying degrees of success. Seed germination was found to be low, slow and highly variable among seedlots. Propagation through cuttings was hindered by a severe endogenous fungal attack whereas propagation through air layering resulted in over 60% rooting, success. An attempt to propagate East African Sandalwood through tissue culture established a surface sterilization protocol for explant materials. The main problem has been to find a suitable host. Establishment of the species at the nursery required a primary host such as the grain legume Cajanus cajan. Indigenous wild fruits such as Rhus natalensis and Carissa spinarum resulted in higher survival over an 18 months period (Kamweti et al., 2009; Machua et al., 2009).</i></p> <p><i>The Kitui Regional Research Centre has undertaken research on the domestication of high value indigenous tree species including O. lanceolata.</i></p> <p><i>Seeds of the species are being conserved by the Millennium Seed Bank.</i></p> |
| <u>Other comments</u> | |
| | <p><i>In October 2008 40 t harvested in Maralal (Samburu district) were seized at Namanga. Kenya Wildlife Service seized a further 20 t in 2009 and made 40 arrests. As transportation became increasingly difficult it is being processed into chips and sawdust by traders which facilitates transport and export in packages similar to cigarette packs, often sent as 'free samples' which are exempt from duty. In Kenya it is well protected but the volume of impounded products is not well recorded so it is not possible to gauge the scale of illegal activities that are undermining its conservation (Gichora, 2011).</i></p> <p><i>Information from the Kenya Plant Health Inspectorate Service indicates that sandalwood from Kenya is sometimes transported in oil tankers to Tanzania which is difficult to monitor (ACP FLEGT, 2012).</i></p> <p><i>In 2011 over 10 t of illegally harvested sandalwood was impounded (Tanzania Daily News, 2012).</i></p> |

Reviewers: P. Mwang'ingo, J. Lovett, J. Timberlake, R. Gereau, J. de Koning, J. Kalema, S. Ball, H. Beentje, D. Newton, J. Chenga, A. Timoshyna.

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