PNUE-WCMC **Rapport technique**

Rapport sur les combinaisons espèce/pays sélectionnées pour étude par le Comité pour les plantes après la CoP16

Projet CITES nº A-498

UN environment WCMC

Rapport sur les combinaisons espèce/pays sélectionnées pour étude par le Comité pour les plantes après la CoP16

Préparé pour le
Secrétariat CITES

Publié
Mai 2017

Citation
PNUE-WCMC. 2017. Rapport sur les combinaisons espèce/pays sélectionnées pour étude par le Comité pour les plantes après la CoP16. PNUE-WCMC, Cambridge.

Remerciements
Nous souhaitons remercier les nombreux experts dont les données et les avis précieux ont contribué à la compilation du présent rapport.

PNUE-Centre mondial de surveillance continue de la conservation de la nature
(PNUE-WCMC)

219 Huntingdon Road,
Cambridge CB3 0DL, UK
Tel: +44 1223 277314
www.unep-wcmc.org

Table des matières

Résumé

Le présent rapport décrit les taxons sélectionnés pour le processus d'étude du commerce important de la CITES, après la CoP16, et maintenus dans l'étude après la 22e session du Comité pour les plantes. Il a pour mission d'aider le Comité pour les plantes à classer les espèces en fonction des effets du commerce international sur certaines 'combinaisons espèce/pays' sélectionnées et de mettre en évidence les problèmes relatifs à l'application de l'Article IV.

Le Secrétariat CITES a demandé au Centre mondial de surveillance continue de la conservation de la nature de l'ONU Environnement (PNUE-WCMC) de compiler les études pour 11 'combinaisons espèce de plante/pays' sélectionnées pour l'étude du commerce important après la CoP16. Tous les États des aires de répartition ont été consultés et invités à fournir des informations sur la distribution, l'état des populations et les menaces pesant sur différentes espèces dans leurs pays respectifs ainsi que des informations sur le commerce, la protection juridique et les mesures de gestion et de suivi.

Les combinaisons espèce/pays ont été divisées en trois catégories provisoires ('*action nécessaire*', '*statut inconnu*' et '*faible préoccupation*'), conformément au paragraphe 1 (Étape 2, alinéa b) de la résolution Conf. 12.8 (Rev. CoP17) pour examen par le Comité pour les plantes.

Concernant les 11 combinaisons espèce/pays sélectionnées pour l'étude du commerce important après la CoP16:

- Six sont classées provisoirement '**Action nécessaire**' parce que selon l'information disponible, il semble que les dispositions des paragraphes 2 a), 3 ou 6 a) de l'Article IV ne sont pas appliquées.
- Une est classée provisoirement '**Statut inconnu**' parce que l'on n'a pas pu déterminer si les dispositions sont appliquées.
- Quatre sont provisoirement classées '**Faible préoccupation**' parce que selon l'information disponible, il semble que les dispositions sont appliquées. La catégorie 'Faible préoccupation' a également été utilisée lorsque le commerce de spécimens de source sauvage (codes W, R, U et source non déclarée) n'est pas prévu.

Les détails du classement des 11 combinaisons espèce/pays à l'étude figurent dans le tableau 1 (pages iii à vi).

Tableau 1: Classements recommandés pour les 'combinaisons espèce de plante/pays' sélectionnées pour l'étude du commerce important après la CoP16, en fonction des effets du commerce international et des problèmes d'application de l'Article IV

Espèce	État de l'aire de répartition	UICN	Résumé	Recommandation
Amaryllidaceae				
Galanthus elwesii (Perce-neige géant)	Turquie	DD	Espèce évaluée Données insuffisantes (DD) par l'UICN au motif que l'aire de répartition exacte est incertaine et que la population est en déclin et gravement fragmentée. Des études moléculaires récentes indiquent que l'espèce est limitée au sud de la Turquie. Elle serait commune dans les monts Taurus, où se trouvent les plus grandes populations, avec des densités de 40 à 60 individus au m^2. Aucune preuve de déclin dans cette région. La surexploitation et le commerce international sont les principales menaces mais exerceraient un faible risque (bien qu'elles puissent être préjudiciables en l'absence de surveillance). Taux de commerce élevé entre 2006 et 2015 pour les plantes vivantes (bulbes) d'origine sauvage, avec environ 5 millions de bulbes exportés chaque année. Le commerce de plantes d'origine sauvage est généralement en déclin, et le quota d'exportation a été réduit à 4 millions de bulbes en 2015 tandis que les exportations de plantes reproduites artificiellement ont augmenté entre 2006 et 2015. La Turquie a soumis ses rapports annuels pour toutes les années de 2006 à 2015. La Turquie a répondu à la consultation relative à l'étude du commerce important. Les zones de prélèvement et les quotas sont déterminés après inspection/suivi sur le terrain de récoltes précédentes (5 à 6 sites surveillés chaque année) pour évaluer l'impact du prélèvement sur la population. Une période de rotation de trois ans est en vigueur. L'information disponible indique qu'un avis de commerce non préjudiciable conforme aux dispositions de l'Article IV est en place, d'où le classement 'Faible préoccupation'.	**Faible préoccupation**
Apocynaceae				
Hoodia gordonii	État mondial	-	Espèce non évaluée par l'UICN, vaste aire de répartition à travers les régions arides de l'Afrique australe. Taille mondiale de la population inconnue mais en déclin local.	
	Namibie		Espèce présente au sud-est, au sud, à l'ouest et au nord-ouest. Taille de la population inconnue mais présumée stable. Espèce très utilisée par les groupes autochtones mais elle n'est pas considérée menacée par un prélèvement illégal ou une exploitation commerciale. En 2006-2015, les exportations revêtaient principalement la forme d'extraits déclarés sans unité spécifiée (132 787) et de poudre (24 723 kg) et principalement issus de la reproduction artificielle, avec un faible taux de commerce de spécimens d'origine sauvage. En 2015, la Namibie a déclaré l'exportation, de source sauvage, de 20 kg de poudre et 90 extraits (sans unité spécifiée); il s'agissait du premier commerce d'origine sauvage déclaré depuis 2010. La Namibie n'a pas encore soumis de rapport annuel pour 2007 mais tous les autres rapports annuels, de 2006 à 2015, ont été soumis. La Namibie a répondu à la consultation relative à l'étude du commerce important. Les programmes de gestion et de suivi des ressources auraient cessé en raison de la chute de la demande commerciale, les exportations étant limitées à des spécimens d'herbiers. Toutefois, la base d'un avis de commerce non préjudiciable pour des exportations récentes de spécimens d'origine sauvage (2015) n'est pas claire et l'on ne sait pas si des exportations futures de spécimens d'origine sauvage sont prévues, d'où le classement 'Statut inconnu'.	**Statut inconnu**

Espèce	État de l'aire de répartition	UICN	Résumé	Recommandation
	Afrique du Sud		Espèce présente dans trois provinces au moins au sud-ouest et au centre. La taille de la population est inconnue mais elle serait en déclin depuis 2001 en raison d'un prélèvement sans discernement. Pourrait être localement rare ou commune. Menacée principalement par le prélèvement illégal et la perte de l'habitat. Les exportations de 2006 à 2015 concernaient essentiellement des graines prélevées dans la nature et reproduites artificiellement (au total >92 millions), des plantes vivantes reproduites artificiellement (275 000) et de la poudre d'origine sauvage (187 475 kg). Seule la poudre a continué d'être commercialisée en volumes importants après 2010. L'Afrique du Sud a soumis des rapports annuels pour toutes les années, de 2006 à 2015. L'Afrique du Sud a répondu à la consultation relative à l'étude du commerce important. Depuis 2010, toutes les exportations peuvent être retracées jusqu'à la province du Cap occidental uniquement. Ces populations ayant été décimées, le prélèvement dans la nature n'est plus autorisé bien qu'un commerce d'origine sauvage ait été déclaré en 2014 (aucun commerce n'a été déclaré en 2015). Des permis sont délivrés uniquement pour le prélèvement d'individus reproduits artificiellement et sur cette base, l'Afrique du Sud est encouragée à publier un quota d'exportation zéro pour les spécimens prélevés dans la nature. Le commerce d'origine sauvage n'est ni autorisé ni prévu, d'où le classement 'Faible préoccupation'.	**Faible préoccupation**

Espèce	État de l'aire de répartition	UICN	Résumé	Recommandation
Leguminosae				
Pterocarpus santalinus (Bois de santal rouge)	Inde	EN	Espèce évaluée En danger par l'UICN en 1998, à cause de son aire de repartition gravement fragmentée et du déclin des populations. Endémique des Ghats occidentaux de l'Inde. La surexploitation du duramen prélevé illégalement est la première menace, avec des taux élevés de prélèvement illégal (de l'ordre de 3000 tonnes par an) et de commerce illégal. Les taux de commerce déclarés étaient extrêmement variables dans la période 2006-2015. Aucun commerce n'a été déclaré de source sauvage par l'Inde entre 2006 et 2015 ou par des importateurs depuis 2008. Le commerce récent se compose de 213 tonnes de bois de plantation (source A) en 2014 uniquement et 2600 tonnes de bois saisi (source I) en 2014-2015. Un quota d'exportation annuel zéro a été fixé pour le commerce de spécimens d'origine sauvage depuis 2012, ainsi qu'un quota de 310 tonnes métriques issues de la reproduction artificielle. L'Inde a aussi publié un quota d'exportation annuel, en une fois, de bois confisqué/saisi depuis 2012 (code de source 'I'); ce quota est de 9090 tonnes métriques depuis 2015. Le commerce est resté dans les limites du quota mais des exportations de bois saisi ont été signalées sur plusieurs permis chaque année. L'Inde a soumis des rapports annuels pour toutes les années de 2006 à 2015, à l'exception de 2011. Le prélèvement et l'exportation de *P. santalinus* d'origine sauvage sont interdits, la gestion dans le pays est axée sur le contrôle du prélèvement illégal et d'autres menaces ainsi que sur la régénération des populations naturelles. Actuellement, il ne semble pas que les stocks de source cultivée permettent de satisfaire la demande. Le Comité pour les plantes a déjà demandé que l'Inde précise le taux de reproduction artificielle de cette espèce et qu'un système de suivi scientifique des populations exploitées soit établi; le suivi semble aussi pertinent pour les plantations compte tenu de la demande élevée pour l'espèce et du taux élevé d'exportations déclarées provenant de plantations (source A) en 2014. Comme l'Inde n'a pas répondu à la consultation relative à l'étude du commerce important, aucune mise à jour du taux de reproduction artificielle ou de la gestion du bois de plantation n'est disponible pour cette espèce endémique En danger qui a une croissance extrêmement lente (elle atteint une taille exploitable à l'âge de 80 à 100 ans). La base pour les avis de commerce non préjudiciable fiables pour les exportations de populations déclarées comme des plantations n'est pas claire car les résultats des inventaires n'ont pas encore été mis à disposition; d'où le classement 'Action nécessaire'. En outre, le commerce illégal et l'exportation continue de volumes importants de bois saisi restent des domaines de préoccupation sans rapport avec l'application de l'Article IV, bien qu'ils aient un impact sur la survie des populations de cette espèce dans la nature.	**Action nécessaire**
Orchidaceae				
Dendrobium chrysotoxum	RDP lao	-	Espèce non évaluée au plan mondial par l'UICN et l'état et les tendances de la population au niveau mondial sont inconnus. Présente dans le centre et le sud de la RDP lao. Les principales menaces sont le prélèvement non durable pour le commerce international des plantes ornementales et la médecine traditionnelle, et la perte de l'habitat. La RDP lao n'a pas publié de quota d'exportation. Taux élevé de commerce de plantes vivantes entre 2006 et 2015 (730 000 kg); tout le commerce est déclaré comme issu de la reproduction artificielle depuis 2008. La RDP lao a soumis tous ses rapports annuels pour les années 2006 à 2015. La RDP lao n'a pas répondu à la consultation relative à l'étude du commerce important. Aucune information sur les mesures de suivi ou de gestion n'a pu être trouvée. Toutefois, compte tenu de l'absence de commerce de source sauvage prévu (aucun commerce de ce type n'a été déclaré depuis 2007), l'espèce est classée 'Faible préoccupation'.	**Faible préoccupation**

Espèce	État de l'aire de répartition	UICN	Résumé	Recommandation
Dendrobium moschatum	RDP lao	-	Espèce non évaluée au plan mondial par l'UICN et l'état et les tendances de la population au niveau mondial sont inconnus. Présente dans le sud et le sud-est de la RDP lao. Les principales menaces sont le prélèvement pour la médecine traditionnelle et la perte de l'habitat. Aucune exportation de *D. moschatum* n'a été déclarée par la RDP lao entre 2006 et 2015; les importateurs ont déclaré 150 000 kg de plantes prélevées dans la nature en 2006-2007 mais aucun commerce n'a été déclaré depuis. La RDP lao a soumis tous ses rapports annuels pour les années 2006 à 2015. La RDP lao n'a pas répondu à la consultation relative à l'étude du commerce important. Aucune information sur les mesures de suivi ou de gestion n'a pu être trouvée. Toutefois, compte tenu de l'absence de commerce de source sauvage prévu (aucun commerce de ce type n'a été déclaré depuis 2007), l'espèce est classée 'Faible préoccupation'.	**Faible préoccupation**
Rosaceae				
Prunus africana	État mondial	VU	Espèce largement répandue dans les forêts afromontagnardes du continent africain et de Madagascar. Espèce classée Vulnérable au plan mondial (nécessite une mise à jour), avec des déclins de la population à l'échelle de l'aire de répartition.	
Prunus africana (suite)	Cameroun		Espèce présente sur la ligne volcanique des montagnes du Cameroun et la majorité de la population est signalée dans trois zones (mont Cameroun au sud-ouest, Kilum-Ijim au nord-ouest et Adamoua au centre du Cameroun). Les populations sauvages seraient en 'déclin marqué'. L'espèce est principalement menacée par le taux non durable du prélèvement. Toutes les exportations, depuis 2009, sont constituées d'écorce sèche; des quotas ont été publiés chaque année depuis 2010 et dépassent 1 million de kg depuis 2015. Le taux d'exportation élevé, entre 2006 et 2015, s'éleve à 4,8 millions de kg d'écorce séchée de source sauvage, avec des exportations qui dépassent apparemment le quota en 2013 (tout cela selon les importateurs) et le taux de commerce le plus élevé en 2014. Le Cameroun n'a toujours pas soumis de rapports annuels pour 2008, 2010, 2012, 2013 et 2015. Le Cameroun a répondu à la consultation relative à l'étude du commerce important. Les 'Unités d'attribution de *Prunus*' autorisent le prélèvement à condition qu'il y ait des plans de gestion et des inventaires. Selon les inventaires, 185 000 arbres peuvent être exploités dans cinq régions; toutefois, il semblerait que, dans certaines localités, le prélèvement n'ait pas été rigoureusement contrôlé et qu'il ait eu des effets négatifs sur l'espèce et sur son habitat. Un expert a déclaré que, bien qu'il y ait des inventaires et l'obligation de respecter un diamètre minimum, ces règles ne sont pas correctement appliquées et l'on n'utilise pas de bonnes techniques de prélèvement. La base d'avis de commerce non préjudiciable rigoureux pour les exportations n'est pas claire, des préoccupations relatives à la gestion du prélèvement ont été exprimées et le commerce international pourrait avoir des impacts sur cette espèce menacée au plan mondial, d'où le classement 'Action nécessaire'.	**Action nécessaire**
	RDC		Espèce présente dans quatre provinces: Orientale, Katanga, Nord Kivu et Sud Kivu. La population totale est estimée à 109 000 arbres, dont 80 000 seraient exploitables. Les principales menaces seraient la réduction de l'habitat, le prélèvement illégal et l'application inappropriée des directives légales d'exploitation. Quota publié pour l'écorce sèche (232 000 kg en 2015 et 2016). Les exportations de 2006 à 2015 comprennent 1 667 000 kg d'écorce sèche prélevée dans la nature avec des exportations dépassant apparemment le quota en 2013. La RDC a soumis ses rapports annuels pour toutes les années de 2006 à 2015. La RDC a répondu à la consultation relative à l'étude du commerce important. Un expert note que, bien que différentes mesures de gestion soient en place (inventaires annuels, cartes détaillées des zones exploitées, quotas fixés, abattage d'arbres de >30 cm de diamètre seulement), toutes ces mesures ne sont pas correctement appliquées et l'on n'utilise pas de bonnes techniques de prélèvement. La base d'avis de commerce non préjudiciable rigoureux pour les exportations n'est pas claire et il y a des préoccupations relatives à l'efficacité de la gestion du prélèvement en RDC qui pourraient avoir des impacts sur cette espèce menacée au plan mondial; d'où le classement 'Action nécessaire'.	**Action nécessaire**

Espèce	État de l'aire de répartition	UICN	Résumé	Recommandation
Valerianaceae				
Nardostachys grandiflora	Népal	CR	Espèce En danger critique d'extinction au plan mondial selon la Liste rouge de l'UICN avec une population en déclin continu et très rapide. Largement répandue au Népal et présente surtout dans les districts de l'ouest et du centre, mais avec de plus fortes densités à l'ouest et une population en déclin à l'est. Considérée 'menacée' au plan national en 2005. Les principales menaces seraient l'exploitation excessive pour le commerce national et international ainsi que le surpâturage. Taux élevés et croissants du commerce entre 2006 et 2015 pour les produits de source sauvage (870 746 kg) et l'huile (111 147 kg) déclarés par le Népal; les exportations de 2016 seraient plus élevées si l'on en juge par la réponse du Népal à la consultation relative à l'étude du commerce important. Le Népal a soumis des rapports annuels pour toutes les années de 2006 à 2015. Des plans de gestion de district sont en place, autorisant un prélèvement annuel de 55% du stock sur pied avec le prélèvement limité à deux mois de l'année et des inventaires réalisés tous les cinq ans. Toutefois, aucun détail d'études exhaustives n'a été fourni; on ne sait pas clairement comment le taux de prélèvement par district est calculé et il n'y a pas d'informations sur d'autres mesures de gestion, par exemple la durée des périodes de rotation. La base d'un avis de commerce non préjudiciable rigoureux pour cette espèce En danger critique d'extinction n'est pas claire et le taux du commerce a probablement des effets sur l'espèce; d'où le classement 'Action nécessaire'.	**Action nécessaire**
Zygophyllaceae				
Bulnesia sarmientoi	État mondial	LR/cd	Espèce endémique de la région du Chaco en Amérique du Sud. Espèce évaluée au plan mondial par l'UICN comme Faible risque/dépendant de mesures de conservation (nécessite une mise à jour).	
Bulnesia sarmientoi (suite)	Argentine		Espèce présente dans trois provinces du nord du pays. Le volume de bois commercial dans la province de Formosa (d'où viennent les trois quarts de toutes les exportations) est en moyenne de 5,3 m^3 /ha dans les parcelles échantillons où l'on trouve cette espèce, bien que les arbres de taille exploitable ne soient présents que dans une petite proportion des parcelles étudiées. La surexploitation est une menace. Aucun quota d'exportation n'a été publié. Les volumes d'exportation élevés entre 2008 et 2015 comprennent >52 millions de kg de bois d'origine sauvage, plus un commerce additionnel déclaré par volume (converti à environ 6 millions de kg) déclaré par l'Argentine. Le commerce a connu un pic en 2011 puis a décliné. L'Argentine n'a pas encore soumis de rapport annuel pour 2014, mais tous les autres rapports annuels de 2006 à 2015 ont été soumis. L'Argentine a répondu à la consultation relative à l'étude du commerce important. Les plans de gestion sont obligatoires pour procéder à la récolte; les arbres abattus doivent avoir >35 cm de diamètre à hauteur de poitrine (DHP) dans la province de Formosa. Certaines études suggèrent que le prélèvement n'a pas été correctement contrôlé et qu'il y a des effets négatifs sur l'espèce et son habitat. Certaines mesures de gestion sont en place mais la localisation des prélèvements autorisés et le volume du prélèvement dans ces zones ne sont pas fournis. La base d'avis de commerce non préjudiciable rigoureux pour l'exportation dans ces zones n'est pas claire et des préoccupations relatives à la gestion du prélèvement ont été exprimées; d'où le classement 'Action nécessaire'.	**Action nécessaire**

Espèce	État de l'aire de répartition	UICN	Résumé	Recommandation
	Paraguay		Espèce présente dans l'ouest du pays, dans trois départements. Considérée espèce 'En danger' dans le pays compte tenu de différents facteurs, notamment la rareté. L'abondance moyenne signalée est de 23 individus/ha pour les arbres de >9,9 cm DHP et 9 individus/ha pour des arbres de >30 cm DHP (diamètre minimum exploitable), avec un volume exploitable moyen estimé (arbres >30 cm DHP) de 7,1 m^3/ha, bien que ce volume exploitable soit inférieur lorsque l'on ne considère que les troncs (1,73 m^3/ha). Peut être une espèce dominante là où elle est présente. La perte de l'habitat, la dégradation, le feu et la surexploitation sont des menaces pour cette espèce. Quotas d'exportation de 250 000 kg d'extraits et 1,4 million de kg de bois en 2014 uniquement; le commerce des extraits déclaré par le Paraguay semble avoir dépassé le quota. Les exportations de 2008 à 2015 comprennent >2 millions de kg de bois de source sauvage, plus un commerce additionnel déclaré par volume (converti à environ 900 000 kg). Le taux important de commerce des extraits et de l'huile est également signalé. Le commerce a connu un pic en 2011/2012 puis un déclin. Le Paraguay n'a pas encore soumis de rapport annuel pour 2008 mais tous les autres rapports annuels de 2006 à 2015 ont été soumis. Le Paraguay n'a pas répondu à la consultation relative à l'étude du commerce important. Toutefois, le Paraguay a soumis un ACNP pour cette espèce à la Commission européenne en 2017, et celui-ci a été utilisé à profusion pour ce rapport. Des mesures de gestion sont en place, notamment une obligation de disposer d'un plan de gestion dans la zone de prélèvement; les arbres abattus doivent avoir >30 cm DHP. Les quotas sont calculés sur la base d'un niveau de récolte durable de 0,25 m^3/ha/an, mais on ne sait pas clairement s'il s'agit de l'estimation la plus appropriée à utiliser sachant que l'on a obtenu 0,1 m^3/ha/an d'après l'information sur le taux de croissance des arbres. La base de la durabilité de ce taux de prélèvement, les zones où le prélèvement est autorisé et les volumes prélevés dans ces zones ne sont pas clairs. La base d'un avis de commerce non préjudiciable rigoureux pour l'exportation dans ces zones n'est pas claire; d'où le classement 'Action nécessaire'.	**Action nécessaire**

Introduction

L'étude du commerce important (ci-après abrégée ECI) a été établie pour faire en sorte que les dispositions de la Convention (en particulier l'Article IV, relatif aux avis de commerce non préjudiciable) soient dûment appliquées pour les espèces inscrites à l'Annexe II en vue de garantir le maintien du commerce international d'espèces inscrites à la CITES à des niveaux biologiquement durables. La procédure pour l'ECI est décrite dans la résolution Conf. 12.8 (Rev. CoP17). La résolution "Charge le Comité pour les animaux et le Comité pour les plantes, en coopération avec le Secrétariat et des spécialistes, et en consultation avec les États des aires de répartition, d'éxaminer les informations biologiques, commerciales et autres, relativesaux espèces inscrites à l'Annexe II faisant l'objet d'un commerce important, dans le but de déceler les problèmes d'application de l'Article IV, paragraphes 2 (a), 3 and 6 (a)."

Le paragraphe 1 d) ii) charge le Secrétariat de compiler, ou de nommer des consultants chargés de compiler, un rapport sur la biologie et la gestion du commerce des espèces, comprenant toute information pertinente de l'État de l'aire de répartition. Le Secrétariat CITES a demandé au Centre mondial de surveillance continue de la conservation de la nature de l'ONU Environnement (PNUE-WCMC) de compiler les études des 'combinaisons espèce/pays' sélectionnées pour l'ECI après la CoP16 et maintenues dans l'étude après la 22e session du Comité pour les plantes. Le présent rapport offre une vue d'ensemble de l'état de conservation et de l'état du commerce de 11 'combinaisons espèce de plante/pays', classant provisoirement chacune dans l'une des trois catégories définies au paragraphe 1 (Étape 2, alinéa b) de la résolution Conf. 12.8 (Rev. CoP17), pour examen par le Comité pour les plantes:

- '**action nécessaire**' comprend les combinaisons espèce/pays pour lesquelles l'information disponible suggère que les dispositions des paragraphes 2 a), 3 ou 6 a) de l'Article IV ne sont pas appliquées;
- '**statut inconnu**' comprend les combinaisons espèce/pays pour lesquelles le Secrétariat (ou le consultant) n'a pas pu déterminer si ces dispositions sont ou non appliquées; et
- '**faible préoccupation**' comprend les combinaisons espèce/pays pour lesquelles l'information disponible semble indiquer que les dispositions sont appliquées.

Les recommandations pour les 11 'combinaisons espèce/pays' évaluées se trouvent dans le tableau 1 (p. ii à viii).

Méthodes

Chaque étude 'taxon/pays' présente les informations suivantes: historique du processus CITES d'étude du commerce important; caractéristiques de l'espèce, distribution actuelle, état de conservation, tendances de la population et menaces, commerce récent (y compris données sur le commerce CITES et toutes données disponibles sur le commerce illégal), et gestion du taxon dans chaque État de l'aire de répartition, sans oublier toute législation pertinente. La catégorie de la législation nationale définie dans le projet CITES sur les législations nationales (CoP17 Doc. 22 Annex 3 (Rev.1)) pour chaque État de l'aire de répartition est indiquée. Lorsque plusieurs États sont étudiés pour une espèce donnée, une vue d'ensemble de la distribution, de l'état de conservation, des menaces, du commerce et de la gestion est également fournie.

Les données sur le commerce CITES couvrent la période de 2006 à 2015. Les données ont été téléchargées de la base de données sur le commerce CITES (trade.cites.org) le 21 mars 2017 mais quelques mises à jour sur les données sur le commerce ont également été incluses. Sans autre mention, les tableaux sur le commerce comprennent tout le commerce direct (c'est-à-dire excluant les données de réexportation) des taxons étudiés, ainsi que toutes les sources, tous les termes et toutes les unités déclarés dans le commerce. Les volumes du commerce sont fournis tels qu'ils sont déclarés aussi bien par les exportateurs que par les importateurs. Les données de réexportation sont notées séparément, s'il y a lieu. Le tableau 2 contient une liste des rapports annuels CITES reçus de chaque État de l'aire de répartition inclus dans le processus, avec la date à laquelle chacun est devenu Partie à la CITES.

Tableau 2: Vue d'ensemble des rapports annnuels soumis par les États de l'aire de répartition inclus dans l'étude, 2006-2015

Nom du pays	Entrée en vigueur de la CITES	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Argentine	08/04/1981	✓	✓	✓	✓	✓	✓	✓	✓	×	✓
Cameroun	03/09/1981	✓	✓	×	✓	×	✓	×	×	✓*	×
République démocratique du Congo	18/10/1976	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Inde	18/10/1976	✓	✓	✓	✓	✓	×	✓	✓	✓	✓
République démocratique populaire lao	30/05/2004	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Namibie	18/03/1991	✓		✓	✓	✓	✓	✓	✓	✓	✓
Népal	16/09/1975	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Paraguay	13/02/1977	✓	✓	×	✓	✓	✓	✓	✓	✓	✓
Afrique du Sud	13/10/1975	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Turquie	22/12/1996	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Légende: ✓: rapport annuel reçu. ×: rapport annuel non reçu.

*Le Cameroun n'a soumis de rapport annuel pour la flore qu'en 2014.

Tous les rapports bisannuels CITES[1] reçus de chaque État de l'aire de répartition (depuis 2003-2004, le cas échéant) ont été consultés pour relever toute information sur des confiscations/saisies. Seule l'Argentine a mentionné des saisies importantes d'espèces soumises à l'ECI après la CoP16, et des détails sur les saisies de *Bulnesia sarmientoi* figurent dans l'étude de l'espèce.

Les organes de gestion et autorités scientifiques de chaque État de l'aire de répartition ont été contactés par courrier postal et par courriel en février 2017. Ils ont été priés de fournir des informations relatives à l'établissement d'avis de commerce non préjudiciable, la distribution, l'état de conservation, le commerce et la gestion de chaque taxon. Dans la mesure du possible, des spécialistes nationaux ont aussi été contactés et priés de fournir des informations additionnelles spécifiques au pays concerné. Sept États de l'aire de répartition ont répondu à la consulation (Afrique du Sud, Argentine, Cameroun, Namibie, Népal, République démocratique du Congo et Turquie) mais trois n'avaient pas répondu au

[1] Téléchargé de https://cites.org/eng/resources/reports/biennial.php le 22 mai 2017.

moment de la soumission du rapport (mai 2017): Inde, République démocratique populaire lao et Paraguay. Une compilation des réponses des États de l'aire de répartition figure en annexe 2.

Études d'espèces

Galanthus elwesii: Turkey

A. Summary

TURKEY:	Assessed as Data Deficient by the IUCN on the basis that the exact distribution is uncertain and the population is decreasing and severely fragmented. Recent molecular studies indicate that the species is restricted to the south of Turkey. Reported to be common in the Taurus Mountains, where the largest populations occur, with densities of 40-60 individuals per m2 reported. No evidence of declines in this region. Main threats are over-collection and international trade, but these threats were considered low risk (although they could be detrimental where not monitored). High levels of trade 2006-2015 in wild-sourced live plants (bulbs), with approximately 5 million bulbs exported annually. Wild-sourced trade is generally declining, and the export quota was reduced to 4 million bulbs in 2015, whilst exports of artificially propagated plants increased 2006-2015. Annual reports were submitted by Turkey for all years 2006-2015.Turkey responded to the consultation relating to the RST. Harvesting areas and quotas are determined following field inspections/monitoring of previous harvests (5-6 sites monitored annually) to assess the impact of collection on the population. A 3-year rotation period is in place. Available information indicates that a non-detriment finding in accordance with the provisions of Article IV is in place, therefore categorised as Less concern.	RECOMMENDATION: Less concern

RST Background

Galanthus elwesii (Giant Snowdrop) was selected for the Review of Significant Trade (RST) as a priority species for review (all range States) at the 21st meeting of the Plants Committee, May 2014 (PC21 WG2 Doc. 1, PC21 ExSum. Cons.). *G. elwesii* was identified as a species that met a high volume trade threshold 2007-2011, as well as in 2012, on the basis of trade data presented in PC21 Doc. 12.4. At PC22 (October, 2015), responses to the Secretariat's consultation had been received from Greece and Turkey (PC22 Doc. 11.3 Annex). Bulgaria, Greece, Netherlands, Romania and Ukraine were removed from the RST process (no exports), whilst Turkey was retained (PC22 Com. 3 (Rev. by Sec.), PC22 Sum. 5 (Rev. 1)).

G. elwesii was reviewed as a candidate for the RST (PC14 Inf. 6) for PC14 (February, 2004), however, the species was not selected (PC14 WG 3.3 Doc. 1, PC14 Summary Record).

B. Species characteristics

Biology: According to eMonocot (2017), *G. elwesii* is a late winter- to spring-flowering snowdrop and is predominantly a species of high altitudes, occurring mostly on mountains above 800 m and up to 1 600 m. It occurs in a wide range of habitats (Davies, 2011), including broad-leaved and coniferous

woodland, and may also occur in scrub, in grassland, amongst large rocks, and in pockets of soil on rocks and cliff faces, although like most other *Galanthus* species, *G. elwesii* does not grow in places that have been severely modified by humans, such as pasture and deforested areas (eMonocot, 2017).

It was reported that *G. elwesii* usually grows in areas that are snow-covered during the winter, and remain cool in the summer, in north facing locations which provide cooler and wetter conditions than other aspects (eMonocot, 2017). The bulbs are usually located deep in the soil, between 15 and 22 cm down, with the deepest bulbs occurring where plants grow in pockets of soil in rocks and cliffs. *G. elwesii* is frequently encountered in limestone areas, but also occurs on soils of igneous and metamorphic rocks (eMonocot, 2017).

G. elwesii reproduces by seed or vegetatively by bulbs (Yüzbasioğlu, 2008). The IUCN Red List assessment reports confusion between *G. elwesii* and *G. gracilis*; both have 'glaucous leaves and two green marks (or one very large green mark) on each inner perianth segment, and they can occur in similar localities and populations' (Davis, 2011). The species are closely related but can be distinguished from one another by 'the type of vernation (the position of the leaves when they are in bud), which is applanate (leaves flat against each other) and supervolute (one leaf encircling the other), respectively' (Davis, 2011). The assessment also notes that this confusion is particularly critical in their European ranges, as their distributions are poorly understood (Davis, 2011).

Yüzbasioğlu (2008) noted that *G. elwesii* provides an important nectar source for invertebrates whilst also providing a food source for ant species (species unknown) via a fleshy oil-bearing appendage on the seed (an elaiosome).

C. Country reviews

Turkey

Distribution: *G. elwesii* was previously thought to occur in Bulgaria, Greece, Moldova, Romania, Serbia, Turkey and Ukraine with a large extent of occurrence (999 515 km²) and an area of occupancy of 7 400 km² (Davies, 2011). However, recent molecular studies indicate that *G. elwesii* is in fact an endemic species, restricted to southern Turkey (A. Davis, pers. comm. to UNEP-WCMC, 2017)[2].

Within Turkey, *G. elwesii* was previously reported to be distributed in north western, western and southern Anatolia: Adapazari, Bolu, Yozgat, Ankara, Eskisehir, Afyon, Izmir, Isparta, Konya, Karaman and Niğde provinces (Yüzbasioğlu, 2008). However, according to eMonocot (2017) 'studies of *Galanthus* in western Turkey and Greece have shown that many of the populations formerly identified as *G. elwesii* are actually *G. gracilis*, and further investigations are needed to ascertain the true distribution of *G. elwesii*'. The CITES Management Authority of Turkey (*in litt.* to UNEP-WCMC, 2017) reported that *G. elwesii* only occurs naturally to the south and south west of Turkey, with an area of distribution of around 7 000 hectares (70 km²). Additional artificially propagated specimens cover an area of approximately 5 000 hectares (50 km²) and are located in the south and west of the country (CITES MA of Turkey *in litt*. to UNEP-WCMC 2017).

Population status and trends: *G. elwesii* has been assessed as Data Deficient by the IUCN on the basis that further studies are needed to determine the exact distribution; further research is needed to determine whether the species needs to be placed within a threatened category, particularly as many subpopulations have been recognised as being severely fragmented and under a broad range of threats

[2] Species+ distribution information will be updated following publication of peer-reviewed literature on any revised distribution information for this species

(Davis, 2011). The global population (which is considered by IUCN to include Bulgaria, Greece, Maldova, Romania, Serbia, Turkey and Ukraine as range States) was considered to be declining and severely fragmented (Davies, 2011).

The species was considered to be common in the Taurus mountain range in the south of Turkey, where the largest wild populations are found within limestone areas in subalpine pastures between 800-1000 m altitude (Smith, 2008; Yüzbasioğlu, 2008). According to the CITES MA of Turkey (*in litt*. to UNEP-WCMC, 2017) the density of the wild populations ranges from 40-60 individuals per m^2 and in 2008 'annual visual inspections of the harvested populations in Turkey (in the Taurus mountains) indicated that *G. elwesii* had not declined in these regions' (Smith, 2008).

Yüzbasioğlu (2008) noted that *G. elwesii* is not included in the *Red Data Book of Turkish Plants* due to its abundance and wide distribution.

Threats: *G. elwesii* is considered to be threatened by collection and habitat loss at the global level (Davis, 2011). The proposal to include *Galanthus* spp. in CITES Appendix II in 1989 (CoP7 Prop. 54) stated that populations of *Galanthus* species in most European countries are believed to have declined substantially in recent years as a result of habitat loss. Smith (2008) and Yüzbasioğlu (2008) considered that future threats to populations may arise as a result of global warming. Davis (2011) noted that *G. elwesii* is a climate-sensitive species and climate changes may impact some populations.

In Turkey, Davis (2011) considered that collection of bulbs for the legal trade was the major threat to the species, and although this was reported to be mostly non-threatening and sustainable, in some areas where harvesting is not regulated or monitored, it was considered that collecting could be detrimental to the population status (Davis, 2011). According to the CITES MA of Turkey (*in litt.* to UNEP-WCMC, 2017), there are no threats to the population of this species nor is there evidence of illegal trade.

Trade: *G. elwesii* was listed in CITES Appendix II on 18th January 1990, as part of the genus listing for *Galanthus*. All CITES annual reports have been submitted by Turkey for the period 2006–2015. Turkey published export quotas for *G. elwesii* every year since 2006. Quotas for wild-sourced bulbs were published 2006-2017 and quotas for artificially propagated bulbs were published 2009–2017. Trade in *G. elwesii* did not exceed quotas set by Turkey for the period 2006-2015 (Table 1).

According to data in the CITES Trade Database, direct trade in *G. elwesii* from Turkey 2006-2015 consisted of live plants for commercial purposes, the majority of which were wild-sourced with 50 445 101 plants reported by Turkey and 35 547 789 plants reported by importing Parties (Table 2). The remainder of the trade in live plants was artificially propagated. According to data reported by Turkey, wild-sourced exports in 2015 were the lowest reported for the ten year period, while exports of artificially propagated plants peaked in 2015.

Indirect trade in *G. elwesii* originating in Turkey was solely for commercial purposes and predominantly comprised live, wild-sourced plants with over 8 million plants as reported by importers and more than 11.5 million plants as reported by re-exporters (Table 3).

The CITES MA of Turkey (*in litt.* to UNEP-WCMC, 2017) provided export data for combined trade in wild sourced and artificially propagated plants for the three years 2014-2016 (Table 4). For 2015, Turkey's annual report included a total of 6 609 672 plants, more than 2.4 million plants above the volume reported by the MA.

The CITES MA of Turkey (*in litt.* to UNEP-WCMC, 2017) reported that there was no evidence of illegal trade in the country.

Table 1: CITES export quotas for *Galanthus elwesii* bulbs from Turkey, 2006-2017 and global direct exports as reported by countries of import and Turkey, 2006-2015. Turkey has submitted all annual reports 2006-2015.

Quota	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Quota: wild taken bulbs	6100100	6100100	6100000	5600000	5600000	5250000	5250000	5500000	5000000	4000000	4000000	4000000
Reported by importer	5240000	1584200	4304272	2912615	3570590	4329975	3589246	2917350	4402412	2697129	-	-
Reported by Turkey	5600000	5700000	5104120	5600000	4235840	5250000	5250000	5166150	4762037	3776954	-	-
Quota: artificially propagated bulbs	-	-	-	500000	500000	750000	750000	1000000	1500000	3000000	3000000	3000000
Reported by importer	100000	619600	500000	175000	300000	750000	525000	270200	1424188	702582	-	-
Reported by Turkey	357640	400000	500000	175000	500000	750000	750000	939300	1397778	2832718	-	-

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 21/03/2017

Table 2: Direct exports of *Galanthus elwesii* from Turkey, 2006-2015. All trade was in live plants for commercial purposes. Turkey has submitted all annual reports 2006-2015.

Source	Reported by	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
A	Importer	100000	619600	500000	175000	300000	750000	525000	270200	1424188	702582	5366570
	Exporter	357640	400000	500000	175000	500000	750000	750000	939300	1397778	2832718	8602436
W	Importer	5240000	1584200	4304272	2912615	3570590	4329975	3589246	2917350	4402412	2697129	35547789
	Exporter	5600000	5700000	5104120	5600000	4235840	5250000	5250000	5166150	4762037	3776954	50445101

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 21/03/2017

Table 3: Indirect exports of *Galanthus elwesii* originating in Turkey, 2006-2015. All indirect trade was for commercial purposes.

Term	Unit	Source	Reported by	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
flowers	-	W	Importer									36000		36000
			Exporter											
live	kg	W	Importer					500						500
			Exporter											
	-	A	Importer	81500	350500	37680	32500	400000	70270	26750	30090	234400	685750	1949440
			Exporter	81500	566000	234180	178000	400000	70000	102000	204100	378750	840235	3054765
		W	Importer	739025	1086300	1024250	994560	334880	1325515	1122890	1094710	310590	46500	8079220
			Exporter	1357600	1283052	2127200	1317400	1516280	1438965	1032615	1145880	261330	23250	11503572

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 21/03/2017

Table 4. Direct exports of *Galanthus elwesii* originating in Turkey, 2014-2016 as reported by the CITES MA of Turkey (*in litt.* to UNEP-WCMC, 2017).

Year	Exports from Turkey (wild & artificial)	Combined exports of wild and art. prop. live plants (Table 2)
2014	6 138 447	6 159 815
2015	4 183 033	6 609 672
2016	6 410 097	Annual report to be submitted in October 2017

Management: Turkey became a Party to CITES on 23rd September 1996, with entry into force on 22nd December 1996.

Current legislation, produced by the Ministry of Agriculture and Rural Affairs (MARA) (effective since August 1995), controls the harvesting and export of bulbs of *G. elwesii* through the "'Regulations about Production, Uprooting from Wild and Exporting Natural Flower Bulbs", published in the Official Gazette, 19th July 2012 No. 28358 (CITES MA of Turkey *in litt.* to UNEP-WCMC, 2017). *G. elwesii* exports are permitted subject to the publication of an annual quota of bulbs by the Technical Committee of MARA published in the Official Gazette as 'Export List of Natural Flower Bulbs' (CITES MA of Turkey *in litt.* to UNEP-WCMC, 2017).

The CITES MA of Turkey (*in litt*. to UNEP-WCMC, 2017) reported that the sustainable management of geophytes exports is supervised by the Technical Committee which consists of representatives of the Natural Flower Bulbs Experts Council (comprising academics from various universities and Scientific Authorities - TUBITAK) and the Ministries of Forestry and Water Affairs, Economy, Custom and Trade, and Food, Agriculture and Livestock.

Following field inspections and monitoring of harvest and storage facilities of both the wild and cultivated fields in all the distribution areas, the Natural Flower Bulbs Expert Council (previously called the Advisory Committee) produces a report; based on this the Technical Committee decides the quotas and determines the permitted harvesting area at a meeting held in the autumn. The following spring the quotas are divided amongst the relevant bulb companies by the Ministry of Food, Agriculture and Livestock: General Directorate of Plant Production (CITES MA of Turkey *in litt*. to UNEP-WCMC, 2017).

The CITES MA of Turkey indicated that this species has previously been harvested in south, west and central Anatolia (*in litt*. to UNEP-WCMC, 2017). According to Yüzbasioğlu (2008) a rotation system has been implemented for this species, particularly in the Taurus Mountain range, and collection sites must be allowed to regenerate for 3 years before re–collection at the same site can occur. Any small bulbs that are dug up are sieved *in-situ* and replanted immediately and collection is banned from sites where *G. elwesii* occurs alongside rarer species (Yüzbasioğlu, 2008). The CITES MA of Turkey (*in litt*. to UNEP-WCMC, 2017) reported that 5-6 sites are monitored annually.

Smith (2008) considered that these inspections have a very important role in setting harvesting quotas, and that information recorded from the wild plants at the warehouse provides important data on the conservation status of *G. elwesii* habitats and populations from which they have been collected. This information is reportedly obtained by assessing the bulbs of *Galanthus* (species, size classes, numbers etc.) and analysing interim warehouse records (e.g. assessing changing harvest effort based on records held over several years) (Smith, 2008).

Reports from 2008 indicate that despite a quota being set for 500 000 artificially propagated bulbs, only very small amounts were cultivated and any bulbs produced by this method were at that time included in the wild quota; it was generally assumed that most growers transplanted wild material to cultivation

fields (Yüzbasioğlu, 2008). The quota for artificially propagated bulbs has risen from 500 000 to 3 million over recent years whereas the wild quota has been reduced from 6.1 million in 2008 to 4 million in 2017. According to the CITES MA of Turkey (pers. comm. to UNEP-WCMC, 2017), a small amount of wild collected material was grown on in cultivation fields ten years ago with the permission of the Technical Committee; the aim is to increase cultivation of the species, reducing the amount harvested from the wild. No further details on the methods of 'artificial propagation' for *G. elwesii* bulbs in Turkey was provided.

Some wild populations occur in protected areas (CITES MA of Turkey *in litt.* to UNEP-WCMC, 2017) but no further information was received concerning the location of these areas.

Through its national legislation project, the CITES Secretariat categorised the national legislation in Turkey as category 1, meaning legislation that is believed generally to meet the requirements for implementation of CITES.

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

None identified.

E. References

CITES Management Authority of Turkey 2017. Dr. Asli Onay (CITES Management Authority of Turkey) pers. comm. to UNEP-WCMC, 30 March 2017, 7 April 2017 and 10 April 2017.

CITES Management Authority of Turkey 2017. Dr. Asli Onay and Eda Burcu Küçükhüseyin (CITES Management Authority of Turkey) *in litt*. to UNEP-WCMC, 14 March 2017.

Davis, A. 2011. *Galanthus elwesii*. The IUCN Red List of Threatened Species 2011. Avaliable at: http://dx.doi.org/10.2305/IUCN.UK.2011-1.RLTS.T164896A5935589.en. [Accessed 20/03/2017].

Davis, A. 2017. Dr. Aaron Davis (Senior Research Leader, Plant Resources, Royal Botanic Gardens, Kew, UK), pers. comm. to UNEP-WCMC, 20 March 2017.

eMonocot 2010. *Galanthus* elwesii Hook.f., Avaliable from: http://e-monocot.org. [Accessed 28/03/2017].

Smith, M.J. 2008. *The application of population modelling techniques to the development of non-detriment findings for Galanthus elwesii in Turkey.* NDF Workshop Case Studies. WG4 Geophytes and Epiphytes Case Study 6. International Expert Workshop on CITES Non-Detriment Findings. Cancun, Mexico. Avaliable at: http://www.conabio.gob.mx/institucion/cooperacion_internacional/TallerNDF/wg4.html. [Accessed 22/3/2017].

UNEP-WCMC 2010. *Review of species selected from the Analysis of 2007 EC Annual Report to CITES.* Version edited for public release. UNEP-WCMC, Cambridge, UK.

Yüzbasioğlu, S. 2008. *The development of non-detriment findings for Galanthus elwesii Hook. F., in Turkey. WG4 Geophytes and Epiphytes Case Study 7.* International Expert Workshop on CITES Non-Detriment Findings. Cancun, Mexico.

Hoodia gordonii: Namibia and South Africa

A. Summary

Global status	Not assessed by the IUCN, with a widespread distribution across the arid regions of southern Africa. Global population size unknown, but declining locally.	
NAMIBIA:	Occurs in the south east, south, west and north west. Population size unknown, but assumed to be stable. Widely used by indigenous groups, but not considered threatened by illegal harvesting or commercial exploitation. Exports 2006-2015 were mainly in the form of extracts reported without a unit specified (132 787) and powder (24 723 kg) and were primarily artificially-propagated, with low levels of wild-sourced trade. In 2015, Namibia reported wild-sourced exports of 20 kg of powder and 90 extracts reported without a unit specified; this was the first wild-sourced trade reported since 2010. Namibia has not yet submitted an annual report for 2007, but all other annual reports 2006-2015 were submitted. Namibia responded to the consultation relating to the RST. Resource management and monitoring programmes were reported to have ceased due to diminished commercial demand, with exports limited to herbarium specimens. However, the basis for a non-detriment finding for recent wild-sourced exports (2015) is unclear, and it is not known if future wild-sourced exports are anticipated, therefore categorised as Unknown status.	RECOMMENDATION: Unknown status
SOUTH AFRICA:	Occurs in at least three provinces in south west and central locations. Population size unknown, but reported to be in decline since 2001 due to indiscriminate harvesting. May be locally rare or common. Threatened primarily by illegal harvesting and habitat loss. Exports 2006-2015 were primarily in the form of wild-taken and artificially propagated seeds (totalling >92 million), artificially-propagated live plants (275 000), and wild-sourced powder (187 475 kg).Only powder continued to be traded at notable levels after 2010. Annual reports were submitted by South Africa for all years 2006-2015. South Africa responded to the consultation relating to the RST. All exports since 2010 can be traced to the Western Cape province only. Following decimation of these populations, wild-sourced harvest is no longer permitted, although wild-trade was reported in 2014 (none was reported in 2015). Permits are issued to harvest artificially propagated individuals only and on this basis, South Africa are encouraged to publish a zero export quota for wild-sourced specimens. On the basis that wild-sourced trade is not permitted or anticipated, categorised as Less concern.	RECOMMENDATION: Less concern

RST Background

Hoodia gordonii (Bitter Ghaap) was selected for the Review of Significant Trade (RST) as a priority species for review (all range States) at the 21st meeting of the Plants Committee, May 2014 (PC21 WG2 Doc. 1, PC21 ExSum. Cons.). *H. gordonii* was identified as a species that met a high volume trade threshold 2007-2011, as well as in 2012, and a sharp increase in trade in 2011, on the basis of trade data presented in PC21 Doc. 12.4. At PC22 (October, 2015), no responses to the Secretariat's consultation had been received from range States (PC22 Doc. 11.3 Annex). Namibia and South Africa were retained in the RST process (PC22 Com. 3 (Rev. by Sec.), PC22 Sum. 5 (Rev. 1)).

B. Species characteristics

Biology: *H. gordonii* is a perennial succulent shrub (Germishuizen and Meyer, 2003) with multiple stems and sharp spines (Cole *et al.*, 2014). The species was reported to grow up to 1 meter in height (Rowley, 1980; Germishuizen and Meyer, 2003). It has large flowers near the top of the plant, which vary in colour from pale yellow to dark maroon (CITES Management Authority of South Africa *in litt.* to UNEP-WCMC 2017) and are carrion-like to attract flies and facilitate pollination (Vermaak and Viljoen, 2008). Mature plants can grow up to 50 individual branches rising from a common base, and can weigh up to 30 kg (Vermaak and Viljoen, 2008). *H. gordonii* occurs in a wide range of arid habitats characterised by sparse vegetation, from coastal to mountainous areas from 250 m to 1200 m above sea level (Swart, 2008) and including deserts, the Nama Karoo shrublands and savannah, and on both gentle and steep shale ridges (Raimondo *et al.*, 2008). *H. gordonii* can grow in densities ranging from a few plants per hectare to over 130 plants per hectare (Swart, 2008). Swart (2008) also reported that although the life span and age at maturity of *H. gordonii* is unknown, anecdotal data suggests a life span of 15-20 years, with the first flowering event occurring after 3-6 years. Flowering is unsynchronised and occurs reactively to rainfall events, regardless of the season (Swart, 2008).

Distribution: Vermaak and Viljoen (2008) stated that although *Hoodia* species are widespread in the arid regions of southern Africa, *H. gordonii* only occurs in South Africa and Namibia according to herbarium records. However, Raimondo *et al.* (2008) reported that *H. gordonii* is a widespread species with a range of 850 000 km² that covers Namibia, Botswana, Angola and the dry margins of the summer rainfall region of South Africa. The CITES MA of South Africa (*in litt.* to UNEP-WCMC, 2017) described *H. gordonii* as having a patchy distribution pattern and varied density over a wide range which predominantly covers South Africa and Namibia, but includes Botswana and Angola to a lesser extent. Cole *et al.* (2014) reported that *H. gordonii*'s range roughly corresponds to the succulent karoo biome and northwards.

Population status and trends: *H. gordonii* has not been assessed by the IUCN. Swart (2008) stated that although the global population size was unknown, local declines had been observed at sites where exploitation and subsequent die back have occurred. Swart (2008) also stated that recruitment has been reported, but not necessarily at the sites where decline occurred previously.

Threats: Swart (2008) listed naturally-occurring threats to *H. gordonii* as fungus infections, the negative impact of other species on seed production, and natural die back which could cause over 90 per cent decline in clusters. Anthropogenic threats were reported to include commercial wild (illegal) harvesting, habitat destruction resulting from overgrazing, trampling, cultivations, road construction, off-road driving, urban development, and mining, although the impact of climate change on *H. gordonii* needed to be evaluated (Swart, 2008). De Beer and van Wyk (2011) stated that *H. gordonii* stems are traditionally used to suppress appetite and thirst, and van Wyk (2008) stated that *H. gordonii*'s small and widely dispersed populations make them vulnerable to overexploitation.

Overview of trade and management: *H. gordonii* was listed in CITES Appendix II on 12th January 2005, as part of the genus listing for *Hoodia*. According to data in the CITES Trade Database, a wide variety of *H. gordonii* products were reported in global trade 2006-2015. The main products in trade were seeds (reported in 2007 and 2008 only), live plants (as reported by exporters), powder and dried plants reported by weight. Sinovas *et al.* (2016) reported that over 90 million *H. gordonii* seeds were traded in 2007-2008, when the species was the focus of attention by international pharmaceutical companies researching its properties as a dietary supplement. It has been noted that plant stems with their spines removed are the preferred part of the plant for consumption (Holt and Taylor, 2006). Global trade in *H. gordonii* was predominantly in wild-sourced and artificially propagated plants for commercial and scientific purposes.

Raimondo *et al.* (2008) reported high national and international demand for *H. gordonii*, especially between 2004 and 2006, when the price rose to between R500 and R1200 (USD 38-92) per kilogram, causing even remote parts of the distribution to be harvested. Swart (2008) reported that Botswana, one of the range States, has no legislation specifically protecting *Hoodia* species, instead Botswana's Agricultural Resources Convention Act (CAP35:06) addresses "harvesting from the veldt", which is used to manage *Hoodia*.

C. Country reviews

Namibia

Distribution: The CITES Management Authority of Namibia (*in litt.* to UNEP-WCMC, 2017) confirmed that *H. gordonii* is widely distributed throughout the south-east, southern, western and north-west regions of Namibia. Figure 1 provides a map of the species distribution within the country.

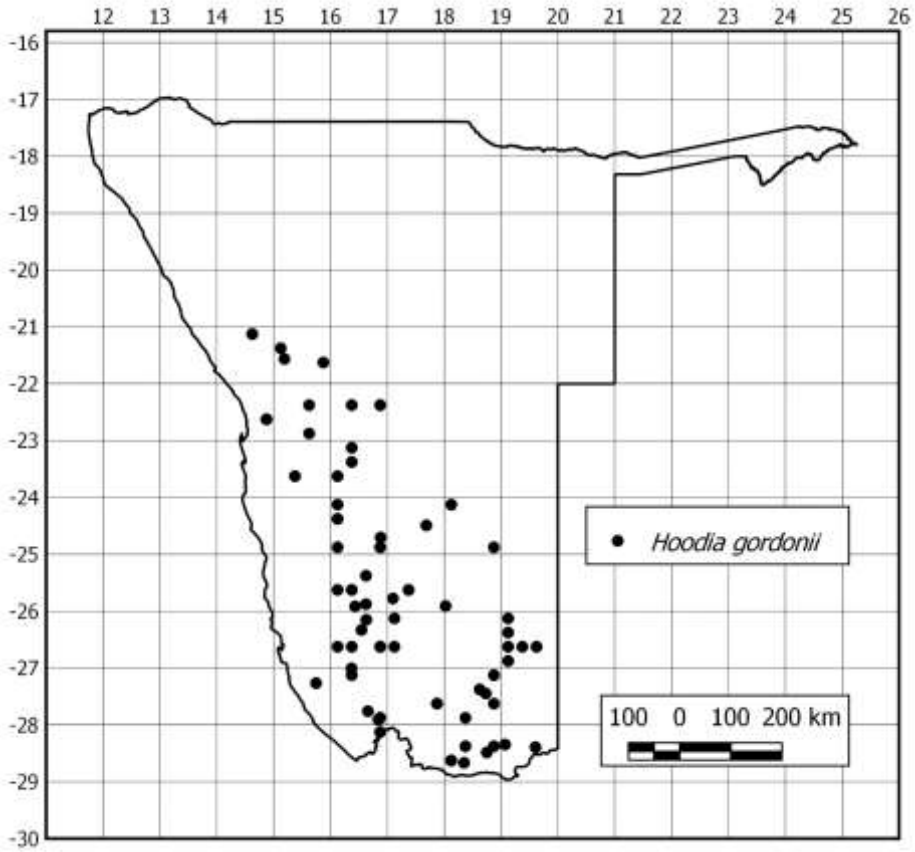


Figure 1. Distribution map of *Hoodia gordonii* in Namibia based on Carr (2017, in CITES MA of Namibia *in litt*. to UNEP-WCMC, 2017).

Population status and trends: The CITES Management Authority for Namibia (*in litt.* to UNEP-WCMC, 2017) reported that population data is not available for *H. gordonii* in Namibia, but it was assumed that the population is substantial and fairly stable and in some areas may have increased due to the abandonment of cultivated plants following the decline of commercial opportunities.

Threats: The CITES MA of Namibia (*in litt.* to UNEP-WCMC, 2017) did not consider that either commercial use or illegal wild harvesting were threats to *H. gordonii* populations, as interest in producing *H. gordonii* commercially had declined a number of years ago. It was reported that no applications had been made for new nursery or harvest permits, and only one or two farmers persisted with cultivation, harvest and export of *H. gordonii,* with attempts to establish a market for *H. gordonii* appearing to be unsuccessful. The CITES MA of Namibia (*in litt.* to UNEP-WCMC, 2017) also reported that *H. gordonii* is widely used in Namibia by the San people as an appetite suppressant and for medicinal use, and to a lesser extent by other indigenous people, although less is known about the utilisation of *H. gordonii* by other indigenous groups.

Trade: Cole *et al.* (2014) reported that 11 223 kg of dried *Hoodia* powder, with a market value of over N$700 000 (USD 53 548) was produced in 2011, with N$145 000 (USD 11 092)'s worth of powder produced in 2012. Cole *et al.* (2014) also stated that over 366 000 *Hoodia* capsules valued at N$293 528 (USD 22 454) were exported in 2011, with 206 250 capsules worth N$165 000 (USD 12 622) exported in 2012. *H. gordonii* is the only *Hoodia* species reported in trade in any substantial quantities, so although these reports only name *Hoodia* species in general, it can be assumed that the majority of these figures refer to *H. gordonii*. Cole *et al.* (2014) also named the main importers of *Hoodia* capsules from Namibia as New Zealand and European countries, particularly Austria, and some African countries. Sinovas *et al.* (2016) reported that between 2005 and 2014, Namibia exported *H. gordonii* powder with an estimated value of USD4.2 million. The CITES MA of Namibia (*in litt.* to UNEP-WCMC, 2017) reported that most of Namibia's exports of *H. gordonii* were in the form of capsules and powder, imported by South Africa, Austria and Germany, and that all exports were from artificially-propagated sources and exported for commercial purposes.

CITES annual reports have been submitted by Namibia for all years 2006-2015 with the exception of 2007. No export quotas have been published for *H. gordonii* by Namibia.

According to data in the CITES Trade Database, the main commodities of *H. gordonii* directly exported from Namibia were extracts reported by number (the majority of which were reported by importers in 2011) and powder reported both by number (principally reported by importers in 2011) and weight (reported by both importers and exporters). The vast majority of this trade was artificially propagated for commercial purposes (Table 1). In addition, Namibia reported the export of 100,000 artificially propagated live plants, for commercial purposes, in 2008; this trade was not reported by importers (Table 1).

Indirect trade in *H. gordonii* originating in Namibia principally comprised commercial trade in powder reported by weight from artificially propagated plants (Table 2); the vast majority of indirect trade was re-exported via South Africa.

Table 1: Direct exports of *Hoodia gordonii* from Namibia, 2006-2015. Quantities are rounded to whole numbers, where applicable. Low levels of trade for scientific purposes and trade for which both importers and exporters reported less than 50 units over the ten year period has been excluded from the table. Namibia has not yet submitted an annual report for 2007.

Term	Unit	Purpose	Source	Reported by	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Chips	kg	T	A	Importer											
				Exporter				2	160	1	1000			10	1173
derivatives	kg	T	A	Importer				200	4	11	1000	1000		120	2334
				Exporter											
	-	T	A	Importer					150	100					250
				Exporter			69								69
			W	Importer					150						150
				Exporter											
dried plants	kg	T	A	Importer		150						860			1010
				Exporter			321							60	381
			W	Importer		200									200
				Exporter	10										10
extract	kg	T	A	Importer					0			100			100
				Exporter				11	116	6	18	961	240		1352
	l	T	A	Importer					0	0	31	30			61
				Exporter				47	28	<1	<1	50			125
	-	T	A	Importer					754						754
				Exporter				15	4500	127267		5	1000	1000	133787
			W	Importer											
				Exporter										90	90
live	-	T	A	Importer											
				Exporter			100000								100000
medicine	kg	T	W	Importer					325						325
				Exporter											
	-	T	A	Importer					500	12					512
				Exporter											
powder	kg	T	A	Importer		680	2668	6794	7408	2482	770	1560	210	40	22612
				Exporter			3554	6071	2049	11215	1120	705		10	24723
			W	Importer					23						23
				Exporter				215	60					20	295
	-	T	A	Importer					100	100000		25			100125
				Exporter											

Term	Unit	Purpose	Source	Reported by	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
specimens	kg	T	A	Importer											
				Exporter						1	111				112
	-	T	A	Importer											
				Exporter						600		500			1100
stems	kg	T	-	Importer											
				Exporter				200							200

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 19/04/2017

Table 2: Indirect exports of *Hoodia gordonii* originating in Namibia, 2006-2015. Quantities are rounded to whole numbers, where applicable.

Term	Unit	Purpose	Source	Reported by	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
derivatives	kg	T	A	Importer											
				Exporter				5							5
extract	kg	T	A	Importer					36						36
				Exporter											
powder	kg	E	W	Importer			1								1
				Exporter											
		T	A	Importer				2000	52	2600	400	200		2	5254
				Exporter		10	125	1039	2760	240	210				4384
			W	Importer			10								10
				Exporter											
	-	T	A	Importer				500			50				550
				Exporter											

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 21/03/2017

Management: Namibia became a Party to CITES on 18th December 1990, with entry into force on 18th March 1991.

The CITES MA of Namibia (*in litt.* to UNEP-WCMC, 2017) stated that *H. gordonii* is protected in Namibia. The species is included on the Schedule 9 list of protected plants (Government of the Republic of Namibia, 1975). The Nature Conservation Ordinance No. 4 of 1975 states that a permit granted by the Minister of Environment and Tourism is required for the harvest, cultivation, relocation and trade of protected plants listed on Schedule 9 (Government of the Republic of Namibia, 1975). The CITES MA of Namibia (*in litt.* to UNEP-WCMC, 2017) reported that resource management and monitoring programmes had ceased in Namibia due to the diminished demand for *H. gordonii* products, however monitoring of *H. gordonii* will expand as part of a long-term plant conservation programme in southern Namibia, subject to available funding. It was also noted that sustainable trade of *H. gordonii* is actively promoted with responsible pharmaceutical companies that support conservation, with plans to establish a controlled harvesting system.

The CITES MA of Namibia (*in litt.* to UNEP-WCMC, 2017) reported that exports were limited to herbarium specimens; however, wild sourced trade for commercial purposes was reported in 2015. Artificial propagation of the species was reported to take place in around 60 registered nurseries in Namibia, with all located in the south-east of the country (CITES MA of Namibia *in litt.* to UNEP-WCMC, 2017).

Through its national legislation project, the CITES Secretariat categorised the national legislation in Namibia as category 1, meaning legislation that is believed generally to meet the requirements for implementation of CITES.

South Africa

Distribution: Raimondo *et al.* (2008) reported that *H. gordonii* was present in three provinces in South Africa, which were all in the centre/ south-west of the country: Free State, Northern Cape and Western Cape. The CITES Management Authority of South Africa (*in litt.* to UNEP-WCMC, 2017) confirmed that the species was protected in five provinces (Western Cape, Free State, North West, Northern Cape and Kwa Zulu Natal Provinces), although it was not explicitly clear whether occurrence was confirmed in all five provinces.

Population status and trends: Raimondo *et al.* (2008) reported that populations in South Africa had declined since 2001 due to indiscriminate harvesting; however, it was not possible to quantify the degree of decline overall, as *H. gordonii* was considered to be widespread and common locally. Swart (2008) stated that although anecdotal information suggested that *H. gordonii* was becoming rarer, the population size of *H. gordonii* in South Africa was unknown. The species was reported to have an uneven distribution, with various assessments recording densities of 7-200 plants per hectare (Swart, 2008)

Threats: Raimondo *et al.* (2008) stated that as a result of a decrease in demand for *Hoodia* internationally, and the strict enforcement of new legislation to protect it, wild harvesting of *H. gordonii* had declined in South Africa. Swart (2008) considered the threats to *H. gordonii* in South Africa to be human-induced habitat loss and degradation, invasive alien species, illegal harvesting, accidental mortality through harvesting of other species, natural die back, and climatic events. Of these, Swart (2008) considered illegal gathering to be the most important threat, followed by habitat loss due to agricultural activities. Swart (2008) commented that legal wild harvesting appeared not to be a threat as harvested sites had not died back, but the possibility of future commercial exploitation and the accidental collection of other *Hoodia* species through mistaken identity was of concern. Swart (2008)

suggested management of the genus rather than individual species as a potential solution, and highlighted that internet trade of *H. gordonii*, although not quantified, was of great concern.

Trade: All CITES annual reports have been submitted by South Africa, 2006-2015. No export quotas have been published for *H. gordonii* by South Africa.

According to data in the CITES Trade Database, the main direct exports of *H. gordonii* from South Africa comprised seeds in 2007, as reported by South Africa only (30 110 000) in 2008, as reported by both South Africa (62 000 000) and importers (50 300 000). According to South Africa, 50 per cent of seeds exported were artificially propagated for scientific purposes, while importers reported 70 per cent of seeds as artificially propagated for commercial purposes.

Other notable exports from South Africa included artificially propagated live plants (according to South Africa), and wild-sourced powder and artificially propagated dried plants reported by weight, according to both South Africa and importers, all of which were for commercial purposes (Table 3). Almost all trade in dried plants was reported 2006-2008 while exports of powder were reported in all years 2006-2015.

Indirect trade in *H. gordonii* originating in South Africa principally consisted of wild-sourced and artificially propagated derivatives and powder, re-exported for commercial purposes (Table 4).

Sinovas *et al.* (2016) reported that Namibia was the main importer of *H. gordonii* seeds from South Africa. Swart (2008) reported that legal harvesting of *H. gordonii* peaked in South Africa in 2007 with 45-50 tonnes of dry material being collected, and commented that *H. gordonii* was exported either as dry material or extracts, despite the fact that according to reported trade data, virtually all exports of *H. gordonii* were seeds. The CITES MA of South Africa (*in litt.* to UNEP-WCMC, 2017) stated that according to the past five years' trade data, *H. gordonii* exports from South Africa can only be traced from the Western Cape Province, and that it is evident that there is no longer a significant market for *H. gordonii*, as demonstrated by the CITES export applications: 21 applications received from 9 applicants to export 4201 kg of *H. gordonii* products between April 2015 and April 2016, decreasing to 16 applications from 6 applicants to export 3353 kg of *H. gordonii* products between April 2016 and April 2017.

Table 3: Direct exports of *Hoodia gordonii* from South Africa, 2006-2015. Quantities are rounded to whole numbers, where applicable. South Africa has submitted all annual reports 2006-2015.

Term	Unit	Purpose	Source	Reported by	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
derivatives	kg	T	A	Importer				467					16		483
				Exporter		18	10			100	150	91	16		385
			W	Importer	200	13		34							247
				Exporter	1248	66	299	66	68	1941	101	102191	1		105981
	-	T	W	Importer											
				Exporter	21057										21057
dried plants	kg	S	W	Importer											
				Exporter			30030								30030
		T	A	Importer	467	48000	67663	32							116162
				Exporter	10455	123100	48000								181555
			W	Importer	910	204	2790								3904
				Exporter	4034	102									4136
	-	T	W	Importer											
				Exporter	1065										1065
extract	kg	T	A	Importer	60			20	33	500				346	959
				Exporter				23	5						28
			W	Importer	2320	110	250		22	60	5	150			2917
				Exporter	100	1			5		5				112
	l		W	Importer						2					2
				Exporter					5	2	1	2880			2888
	-	T	A	Importer						5200					5200
				Exporter											
leaves	kg	T	W	Importer											
				Exporter	1500	30			40						1570
live	-	M	A	Importer	2017										2017
				Exporter											
		T	A	Importer					80						80
				Exporter		275000			80	3			2		275085
medicine	-	T	A	Importer				1511							1511
				Exporter											
powder	kg	T	A	Importer	113	615	1466	2878	7427	1717	2680	2820	5890	7200	32806
				Exporter	2808	6821	9844	6844	11701	3607	460	4486	10477	12042	69090
			W	Importer	12595	10091	21154	2275	8536	4680	6019	6206	206		71762

Term	Unit	Purpose	Source	Reported by	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
				Exporter	55694	23385	32482	1834	14755	6050	7608	43842	1825		187475
	-	T	W	Importer					61						61
				Exporter					3000						3000
seeds	-	P	W	Importer											
				Exporter		10000									10000
		S	A	Importer			100000								100000
				Exporter			47000000								47000000
			W	Importer											
				Exporter		15000000	15000000								30000000
		T	A	Importer			35200000								35200000
				Exporter		100000									100000
			W	Importer			15000000								15000000
				Exporter		15000000									15000000
stems	kg	T	W	Importer	580										580
				Exporter	630										630

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 19/04/2017

Table 4: Indirect exports of *Hoodia gordonii* originating in South Africa, 2006-2015. Quantities are rounded to whole numbers, where applicable.

Term	Unit	Purpose	Source	Reported by	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
derivatives	kg	T	W	Importer		68	<1								68
				Exporter	1833	290	312		9			1	127		2572
	-	P	I	Importer					1	630					631
				Exporter											
		T	A	Importer											
				Exporter								637560			637560
			I	Importer						540					540
				Exporter			1590			310					1900
			W	Importer	710	2400	32850	8580	30960	4260	2700	30	180		82670
				Exporter	99000	49774	109410	158830	144660	58740	23130	26741	23391	12570	706246
dried plants	kg	T	W	Importer											
				Exporter		1	860								861
extract	kg	T	A	Importer		800	2200								3000
				Exporter		4329	3540		7		340		30		8246
			W	Importer		2400	39	22			46	10			2516
				Exporter	139	4057	368	86	310	150	549	867	199	13	6738
	-	T	A	Importer											
				Exporter										78500	78500
medicine	-	M	W	Importer											
				Exporter										204000	204000
		T	W	Importer											
				Exporter										57240	57240
powder	kg	T	A	Importer				545	2576		1500	50	485	24	5180
				Exporter		3279	15	731	3926		2500	100	1377		11928
			W	Importer	1250	8090	190	1104	12	25			104		10775
				Exporter	5010	2669	1960	815	170	10	169	<1	2718		13521
	-	T	W	Importer			3120	1270							4390
				Exporter			1								1

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 19/04/2017

Management: South Africa became a Party to CITES on 15th July 1975, with entry into force on 13th October 1975.

The CITES MA of South Africa (*in litt*. to UNEP-WCMC, 2017) stated that *H. gordonii* is protected by the following legislations: the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA), the Threatened or Protected Species (TOPS) Regulations, Bio prospecting, Access and Benefit Sharing (BAABS) Regulations, and provincial legislations. In addition to this national-level protection, the CITES MA of South Africa (*in litt*. to UNEP-WCMC, 2017) stated that *H. gordonii* is protected in five of the nine provinces in South Africa: Western Cape, Free State, North West, Northern Cape, and Kwa Zulu Natal provinces, (although distribution in all of these provinces is not confirmed (see 'Distribution')).

Specifically, in the Western Cape Province *H. gordonii* is a protected flora in accordance with the provisions of the Nature Conservation Ordinance, No. 19 of 1974. According to the CITES MA of South Africa (*in litt*. to UNEP-WCMC, 2017), prior to 2007, Cape Nature (the nature conservation authority of Western Cape Province) issued licenses to harvest wild *H. gordonii* in the Western Cape, dependent on the harvest methods used, but did not state a limit on the number of plants to be harvested. The Western Cape populations were decimated, so all harvesting of wild *H. gordonii* was suspended in 2007 and only artificially propagated *H. gordonii* was allowed to be harvested. Harvest licenses were replaced with picking permits, which were issued for a specified mass of artificially propagated *H. gordonii*, and permits were issued subject to an on-site inspection of the plants to be harvested. Since the introduction of artificial propagation, no permits or licenses have been issued for the harvest of wild *H. gordonii* in South Africa and the CITES MA of South Africa did not consider illegal harvesting to be an issue (*in litt*. to UNEP-WCMC, 2017).

Swart (2008) stated that the Northern Cape Province issued research permits until early 2000 and put commercial harvest permits on hold until systems were in place to handle the applications. However, no other provinces put harvest permits on hold, so harvest and trade continued without ensuring that the plants being traded were legal (Swart, 2008).

It was reported that a management plan was in place, with the purpose of enabling economic benefits to accrue to the province, to obtain minimum baseline information to ensure that landowners harvest on their own property, to set quotas to ensure sustainable resource use, to obtain baseline information to build a database for the province of its resources and the impact that harvesting has on *H. gordonii* populations, and to acknowledge and respect access and benefit sharing and indigenous knowledge systems (Swart, 2008). It was noted that whilst the main focus of the management plan is on *H. gordonii*, related species, which may be impacted upon, were not taken into account (Swart, 2008).

Swart (2008) reported that previous monitoring took place with site visits where harvesting took place and inspections carried out; these were then followed up at least one year after harvest. However confidence in monitoring at that time was considered to be moderate, as monitoring was not formally structured (Swart, 2008).

Through its national legislation project, the CITES Secretariat categorised the national legislation in South Africa as category 1, meaning legislation that is believed generally to meet the requirements for implementation of CITES.

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

Swart (2008) reported that from 2005 until March 2008, 15.7 tonnes of dry illegal material was confiscated in South Africa, and noted that unconfirmed anecdotal data indicated that it could be more (over 41 tonnes of dry material), since only an estimated 10-15 per cent of illegal trade is detected.

E. References

De Beer, J.J.J. and Van Wyk, B.-E. 2011. An ethnobotanical survey of the Agter-Hantam, Northern Cape Province, South Africa. *South African Journal of Botany*, 77(3): 741–754.

CITES Management Authority of the Republic of South Africa 2017. *in litt.* to UNEP-WCMC, 17 March 2017.

CITES Management Authority of Namibia 2017. *in litt.* to UNEP-WCMC, 12 April 2017.

Cole, D., Mallet, M., Maggs-Kolling, G., Iileka, R., Gottlieb, T., Nott, K., Chimwamurombe, P., Bennett, B., den Adel-Sheehama, S., du Plessis, P. *et al.* 2014. *Indigenous Plant Products in Namibia*. Venture Publications, Windhoek, Namibia. 144 pp.

Germishuizen, G. & N.L. Meyer 2003. Plants of southern Africa: an annotated checklist. Strelitzia 14. Pretoria, South Africa: National Botanical Institute. 1230 pp.

Government of the Republic of Namibia 1975. *Nature Conservation Ordinance*. Windhoek, Namibia, Namibia.

Holt, S. and Taylor, T. 2006. *Hoodia gordonii*: An overview of biological and botanical characteristics: Part 1. *Townsend Letter*, 10.

Raimondo, D., Wynberg, R., Newton, D. and Victor, J.. 2008. *Hoodia gordonii (Masson) Sweet ex Decne. National Assessment: Red List of South African Plants version 2017.1*. Available at: http://redlist.sanbi.org/species.php?species=2705-13. [Accessed: 31/03/2017].

Rowley, G.D. 1980. *Name that Succulent*. Stanley Thornes Ltd, Cheltenham. 268 pp.

Sinovas, P., Price, B., King, E., Davis, F., Hinsley, A., Pavitt, A. and Pfab, M. 2016. *Southern Africa's wildlife trade: an analysis of CITES trade in SADC countries*. Cambridge, UK. 131 pp.

Swart, E. 2008. Case study 6: *Hoodia gordonii* in Southern Africa. *NDF Workshop case studies. WG3 - Succulents and Cycads*, Available at: http://www.euppublishing.com/doi/abs/10.3366/abib.2007.13. [Accessed 30/03/2017].

Vermaak, I. and Viljoen, A. 2008. Indigenous South African Medicinal Plants Part 9: *Hoodia gordonii*. *SA Pharmaceutical Journal*, 13(May): 2008.

van Wyk, B.-E. 2008. A broad review of commercially important southern African medicinal plants. *Journal of Ethnopharmacology*, 119(3): 342–55.

Pterocarpus santalinus: India

A. Summary

INDIA:	Assessed as Endangered by the IUCN in 1998, on the basis of severely fragmented distribution and declining populations. Endemic to hills in the Eastern Ghats of India. Overexploitation through illegal harvest for heartwood is the primary threat, with high levels of illegal harvest (in the region of 3000 tonnes annually) and illegal trade reported. Reported trade levels were highly variable during 2006-2015. No trade reported as wild-sourced by India during 2006-2015 or by the importers since 2008. Recent trade consisted of 213 tonnes of timber from plantations (source A) in 2014 only, and 2600 tonnes of seized timber (source I) in 2014-2015. Annual zero export quota set for wild-sourced trade since 2012, as well as a quota of 310 metric tonnes from artificial propagation. India have also published a quota for annual one-time exports of confiscated/seized wood since 2012 (source code 'I'); this quota has been 9090 metric tonnes since 2015. While trade has remained within quota levels, export of seized timber has been reported on several permits per year. India submitted annual reports for all years 2006-2015, except 2011. The harvest and export of wild-sourced *P. santalinus* is prohibited, management in the country focuses on controlling illegal harvest and other threats and on regeneration of natural populations. Stock from cultivated sources does not currently appear to be available to meet demand. The Plants Committee previously requested that India should clarify the level of artificial propagation of this species, and that a scientific monitoring system of harvested populations should be established; monitoring also appears relevant to plantations given the high demand for the species and the high level of exports reported from plantations (source A) in 2014. As India did not respond to the consultation relating to the RST, no update on the level of artificial propagation or management of timber from plantations is available for this endemic, Endangered species which is extremely slow-growing (reaching harvestable size at 80-100 years). The basis for robust non-detriment findings for export from populations claimed as plantations is unclear, as results of inventories have not yet been made available, therefore categorised as Action is needed. In addition, illegal trade and the continued export of large volumes of seized timber remain areas of concern not related to the implementation of Article IV, although these have an impact on the survival of populations of this speices in the wild.	RECOMMENDATION: Less concern

RST Background

Pterocarpus santalinus (Red Sandalwood) was selected for the Review of Significant Trade (RST) as a priority species for review (all range States) at the 21st meeting of the Plants Committee, May 2014 (PC21

WG2 Doc. 1, PC21 ExSum. Cons.). *P. santalinus* was identified as a species that met a high volume trade threshold for globally threatened species 2007-2011, as well as in 2012, and also met the criteria for being a globally threatened species in trade (Endangered) on the basis of trade data presented in PC21 Doc. 12.4. At PC22 (October, 2015), no responses to the Secretariat's consultation had been received from range States (PC22 Doc. 11.3 Annex). Sri Lanka was removed from the RST process (no exports, not a range State), whilst India was retained (PC22 Com. 3 (Rev. by Sec.), PC22 Sum. 5 (Rev. 1)).

P. santalinus was previously included in the RST following CoP13 (2004). At PC15 (May 2005), information on seven Asian medicinal plant species was considered in PC15 Doc. 10.2.2, and *P. santalinus* was selected for review (PC15 WG2 Doc. 1 (Rev. 1), PC15 Summary Record). India was retained in the RST process as no response was received (PC16 Doc. 10.3 Annex 1, PC16 Summary Record), and at PC17 (April, 2008) trade from India was categorised as of 'Urgent Concern' and a series of recommendations were formulated (PC17 WG4 (Rev. 1)). At the 59th meeting of the Standing Committee (March, 2010), no response to the Secretariat's consultation had been received from India and recommendation to suspend trade was agreed (SC59 summary record). On 30th April 2012, the Secretariat received a report from the Scientific Authority of India comprising a non-detriment finding study (SC62 Doc 27.2 Rev. 1); India was considered to have complied with the recommendations of SC61 and established a zero export quota for specimens from the wild; consequently the Committee's recommendation to suspend trade was withdrawn (SC62 Summary Record).

P. santalinus was also reviewed for PC9 (June, 1999) as part of a study of trade in CITES-listed medicinal plants (Doc. PC9.9.1.3).

B. Species characteristics

Biology: *P. santalinus* is an endemic species to the tropical dry deciduous forests of the Eastern Ghats in southern India (Arunkumar and Joshi, 2014) found at altitudes of 100 m to 1000 m above sea level, with the most favourable altitudes at 200 to 800 m (Raju and Nagaraju, 1999; Padmalatha and Prasad, 2008; Arunkumar and Joshi, 2014). *P. santalinus* grows in shallow, stony, well-drained, hilly, sloping landscapes (Raju and Nagaraju, 1999) in a hot and dry climate with low rainfall of 500-800 mm (CITES Scientific Authority of India, in the 2012 NDF study submitted to the Secretariat). It is a deciduous tree that can cross or self- pollinate (Arunkumar and Joshi, 2014).

P. santalinus reaches a girth of 1.5-1.9 m and a height of 10 to 15 m (Doc. PC9.9.1.3; Padmalatha and Prasad, 2008). The species takes over 40 years to grow to maturity (CITES SA of India, 2012; Kukrety *et al.*, 2013). The CITES SA of India (2012) reported that under natural conditions, *P. santalinus* takes 80 to 100 years to reach a harvestable size of 70 cm girth for heartwood extraction, or 50 to 60 years from a pole size of 30cm.

C. Country review

India

Distribution: *P. santalinus* is endemic to the south of Eastern Ghats in southern India (Babar *et al.*, 2012; Arunkumar and Joshi, 2014). It is found in elevated areas of Chittoor, Cuddapah and Nellore districts in the Seshchalam hills within the Rayalaseema district of Andhra Pradesh (Vedavathy, 2004), partly in Arcot and Chengalpattu in the state of Tamil Nadu, Nigidi hills of Anantapur, Nallamis of Kuenool and in the state of Karnataka (Reddy *et al.*, 2009; Babar *et al.*, 2012; Government of India, 2014). Introduced populations were found in Pakistan, Sri Lanka and Taiwan (Province of China) with reports of cultivation in China and the Philippines (Mulliken and Crofton, 2008; Arunkumar and Joshi, 2014). Figure 1 provides a map of the distribution in India.

P. santalinus was reported to be present in eight forest divisions (Kukrety *et al.*, 2013), with range estimates varying from 200 000 ha (Raju and Nagaraju, 1999; MacLachlan and Gasson, 2010) to 219 000 ha (Senthilkumar *et al.*, 2015) and to 398 000 ha (CITES SA of India, 2012). Of the eight forest divisions in Andhra Pradesh, the largest forests bearing the species were reported to be Kadapa (105 000 ha), Rajampet (85,000 ha) and Proddatur (78 000 ha) (CITES SA of India, 2012).

Within Andhra Pradesh, 60 per cent of the land containing *P. santalinus* are less than one hectare in size (Kukrety *et al.*, 2013).

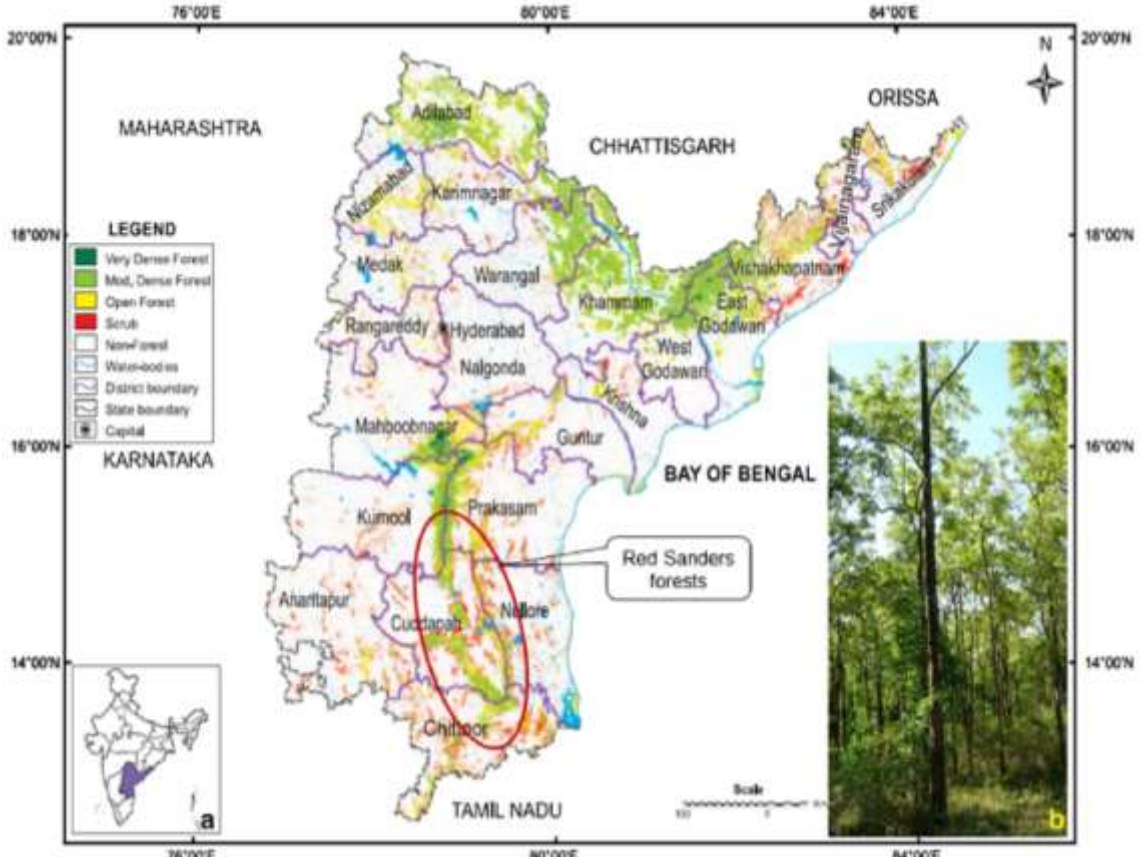


Figure 1. Distribution of *P. santalinus* in Andhra Pradesh, India sourced from Kukrety *et al.*, 2013.

Population status and trends: The IUCN Red List assessment classified *P. santalinus* as Endangered (needs updating) on the basis of severely fragmented distribution and declining populations as the result of logging and harvesting primarily for the timber and dye trade, and to a lesser extent, for harvest for the medicine and cosmetics (IUCN, 1998). *P. santalinus* was described by UNDP as an important endangered plant of medicinal value in southern India (UNDP, 2003 in PC14 Doc 9.3).

The CITES SA of India (2012) reported the area of *P. santalinus* had remained 'more or less constant over the years', but noted that the "quality of the population" was being affected. Based on a survey of random sample plots, the average density of *P. santalinus* plants was estimated to be 167 plants / ha, with 92 trees / ha for trees > 30 cm girth at breast height and 13 trees / ha for trees > 70 cm girth at breast height (CITES SA of India, 2012). The population of *P. santalinus* was reported to be skewed towards smaller girth sizes as a result of unsustainable and extensive harvesting (CITES SA of India,

2012). *P. santalinus* was reported to naturally occur in very low densities of 13 trees per ha which increases the species' vulnerability to illegal harvesting (CITES SA of India, 2012).

No accurate estimates of population status and structure within the natural range could be located.

Threats: The primary threat to *P. santalinus* was reported to be overexploitation caused by illegal harvest as a result of great international demand for its heavy dark red wood (Rao and Raju, 2002; Arunkumar and Joshi, 2014). The CITES SA of India (2012), considered that the skewed distribution of trees towards lower girth classes was due to large scale illegal felling of higher girth class trees for heartwood extraction.

P. santalinus was in demand both domestically and internationally for its two varieties of wood; a rare form which was highly valued on the international markets with rippled grains termed 'red gold' and a straight grained wood named the 'Pride of Andhra Pradesh' (CoP17 Inf. 48; Arunkumar and Joshi, 2014). Japan is a major demand centre for this wood to make the musical instrument 'Shamisen' and for other cultural uses such a traditional crafts (Arunkumar and Joshi, 2014). The wood is used in highly valued furniture in modern China and throughout Chinese history (Arunkumar and Joshi, 2014). *P. santalinus* contains a red dye 'santalin' used within European medicine, in European and American foods as a colouring agent and by French furniture makers (Arunkumar and Joshi, 2014). It was also used as incense in Myanmar and Tibet (Azamthulla *et al.*, 2015).

Global demand for *P. santalinus* was thought to be 3000 tonnes per annum (Kukrety *et al.*, 2013) and the CITES SA of India (2012), estimated that annual removal from natural forests was in the region of 3000 tonnes of heartwood through illegal felling. *P. santalinus* wood is collectable and highly valued at approximately USD 150 000 per m^3 in China due to its rarity following restrictive exportation measures (Wenbin and Xiufang, 2013). If sold at the government standard rate in India the wood was worth approximately Rs. 800 000 per tonne (USD 11 948) to Rs. 12 00 000 per tonne (USD 17 922) in 2016 (Soundararajan *et al.*, 2016). In 2014, the Andhra Pradesh government sold 3 615 tons of seized logs reportedly worth USD 149.8 million (CoP17 Inf. 48).

Illegal logging of this species has been described as 'continuous and rampant' despite the very slow natural growth rate of this species (CITES SA of India,2012), (see 'Trade'). It was reported that there was a significant threat of ecosystem degradation as a result of overexploitation (IUCN, 1998).

P. santalinus has been used domestically in traditional medicines and in folklore to treat diabetes, fever, snake bites, skin ailments, ulcers and as a cosmetic treatment (Padmalatha and Prasad, 2008; Arunkumar and Joshi, 2014). *P. santalinus* is known to have anti-hyperglycaemic, anti-inflammatory, anti-helminthic and aphrodisiac properties, as well as being used to treat dysentery (Azamthulla *et al.*, 2015). Many groups of people use this species for medicinal or cultural purposes in the Chittoor, Kandhamal, the Western Ghats, Kerala, in coastal Karnataka, Assam and Kalahandi (Arunkumar and Joshi, 2014). *P. santalinus* was widely used and 'readily available' in India's herbal medicine industry, however, two pharmaceutical companies considered the species to be in 'short supply' or limited (Mulliken and Crofton, 2008). Wood of low quality was sold for fuel in India (Business Line, 2002).

P. santalinus was traded in markets in Delhi, Kolkata, Mumbai and Haridwar with an estimated 100-400 tonnes of this species being sold per year in Delhi in 1997 (Doc. PC9.9.1.3). The price of this wood was USD 0.5 to 3.1 per kg in 1997 (Doc. PC9.9.1.3).

Other, more minor threats include overgrazing and summer wild fires (IUCN, 1998; CITES SA of India, 2012).

Trade: *P. santalinus* was listed in CITES Appendix II on 16th February 1995, with the annotation designating logs, wood-chips and unprocessed broken material. This annotation was amended on 13th September 2007 to read 'logs, wood-chips, powder and extracts'. All CITES annual reports have been submitted by India for the period 2006-2015, with the exception of 2011. India published a zero export quota for trade in *P. santalinus* for "all specimens from the wild" for the years 2012-2017. Quotas in 2012-2014 were published with the following note: "India will authorize the export of specimens of any type, from 310 metric tonnes of wood per year from artificially propagated source (Source "A") and a one-time export of specimens of any type, from 11 507 metric tonnes of wood from confiscated or seized source (Source "I")". The same note was published with the 2015-2017 quotas, albeit with a limit of 9090.09 metric tons of seized wood.

No trade in wild-sourced *P. santalinus* has been reported by either India or importers since 2008. Source I exports did not exceed the quotas published by India; a permit analysis suggests that India issued five permits for the export of Source I *P. santalinus* in 2014 and 26 permits in 2015. India has banned the commercial export of all wild-taken specimens of species included in Appendices I, II and III (CITES Notif. No. 1999/39).

According to data in the CITES Trade Database, direct trade in *P. santalinus* predominantly comprised timber for commercial purposes with 1 078 610 kg reported by India and 3 470 015 kg reported by importing countries the majority of which was pre-Convention (reported in 2006 and 2008) and confiscated/seized (Source 'I') reported in 2014 and 2015 (Table 1). Importers reported 2933 m^3 wild-sourced timber in 2006 and 177 490 kg of wild-soured timber in 2008; India did not report this trade. All trade reported since 2010 has been in confiscated or seized, or artificially propagated specimens.

Indirect trade in *P. santalinus* originating in India consisted of extracts, specimens and timber from wild-sourced, confiscated/seized and pre-convention specimens, primarily for commercial purposes (Table 2). Low quantities were reported for scientific or law enforcement judicial/forensic purposes.

Illegal trade is a threat to this species to supply international demand (CITES SA of India, 2012). The Andhra Pradesh Forest department seized 3 067 tons of wood between 2001 and 2007 (Kukrety *et al.*, 2013). In 2012-2013, 1 488 forest offence cases exclusively involved this species in Andhra Pradesh, with 1 390 tonnes of wood seized (Arunkumar and Joshi, 2014). In 2012, it was estimated that 10 437 tons of seized stock was held across India; this comprised 7 311 tons seized and held in depots in Andhra Pradesh, and an additional 3 126 tons stored by various authorities outside of Andhra Pradesh (CITES SA of India, 2012). Annually, it was that estimated 800 to 2 000 tons are illegally imported into China (Treanor, 2015). Singapore was also noted as a 'major destination for illegal' *P. santalinus* timber (PC15 Doc. 10.2.2). It is estimated that these seizures of wood only compose 30 per cent of the wood illegally smuggled out of India (CITES SA of India, 2012). Illegal trade routes were identified from the Indian port of Chennai to Malaysia, Singapore or Hong Kong (Treanor, 2015).

Annual harvest from private lands was estimated at 310 tonnes per year in 2012 and no wild harvest was permitted (CITES SA of India, 2012). Exports from plantations were previously authorized (in 1995 and 1996), but since 1999 it was reported that no wood from cultivated sources had been exported (CITES (CITES SA of India, 2012).

Table 1. Direct exports of *Pterocarpus santalinus* from India, 2006-2015. Quantities rounded to whole numbers where applicable. India has not submitted an annual report for 2011.

Term	Unit	Purpose	Source	Reported by	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
chips	-	-	I	Exporter											
				Importer					25000						25000
derivatives	kg	-	I	Exporter											
				Importer		1									1
extract	kg	T	I	Exporter									120		120
				Importer											
			O	Exporter			14178	1413							15591
				Importer											
powder	kg	T	I	Exporter							<1				<1
				Importer							<1				<1
timber	kg	T	A	Exporter									213297		213297
				Importer											
			I	Exporter									312708	2331103	2643811
				Importer									492289	2164037	2656326
			O	Exporter	458509		94096								552605
				Importer	458709		177490								636199
			W	Exporter											
				Importer			177490								177490
	m	T	O	Exporter											
				Importer			94								94
	m^3	T	O	Exporter	2933										2933
				Importer											
			W	Exporter											
				Importer	2933										2933
	-	T	O	Exporter	5003										5003
				Importer											

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 21/03/2017

Table 2: Indirect exports of *Pterocarpus santalinus* originating in India, 2006-2015. Quantities rounded to whole numbers where applicable.

Term	Unit	Purpose	Source	Reported by	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
extract	kg	T	W	Importer											
				Exporter					17	12					29
specimens	-	S	I	Importer											
				Exporter										1	1
timber	kg	L	I	Importer											
				Exporter	65000	54600									119600
		T	I	Importer										26646	26646
				Exporter				169295	36020	12480				26646	244441
			W	Importer			94096			12480					106576
				Exporter	2888		48000								50888
	m	T	O	Importer											
				Exporter			94								94

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 21/03/2017

Management: India joined CITES on 20th July 1976, with entry into force on 18th October 1976.

P. santalinus is protected under Indian legislation and commercial harvest from public forests has been controlled by the government since 1956 (Kukrety *et al.*, 2013). The CITES SA India (2012) provided information on legislation relevant to the species. These included: the *Andhra Pradesh Forest Act, 1967* and the *Indian Forest Act, 1927* that make the transportation or possession of an unauthorised forest product an offence (Government of India Ministry of Law, 1927; Forestry Department, 1967). The *Wild Life Protection Act, 1972* makes the removal of trees in a protected area illegal, including *P. santalinus* (Parliment of India, 1972). *The Foreign Trade Policy, 1962* prohibits the export of *P. santalinus* in any form, including logs, timber, chips and powder from cultivated and wild sources, with the exception of extracts, dyes and instruments, with sanctions including a fine and/or imprisonment for a maximum of seven years (CITES SA of India, 2012). The *Andhra Pradesh Preservation of Private Forest Rules, 1978* categorises this species as "reserved", meaning that cutting, transportation and sale must be permitted by the Divisional Forest Officer (Governer of Andhra Pradesh, 1978). Felling this species is illegal unless the individual tree exceeds 1.3 m height and 120 cm girth (CoP17 Inf. 48). The *Tamil Nadu Forest Act, 1882*, lists this species as "scheduled timber", meaning that possession of this species over 0.5 cubic meters is prohibited, unless identifiable with the Government mark (Tamil Nadu Forest Department, 1882). *P. santalinus* is also regulated by various further transport rules, including permitting*; Andhra Pradesh Sandal Wood and Red Sanders Wood Transit Rules, 1969*, *Pondicherry Timber Transit Rules, 1983* and the *Tamil Nadu Timber Transit Rule, 1968* (CoP17 Inf. 48; CITES SA of of India, 2012).

The export of *P. santalinus* from India was prohibited through the listing of the species of the *Negative List of Exports* in 1994 (Doc. PC9.9.1.3). The Foreign Trade Policy 2015-2020 lists *P. santalinus* as a prohibited item to export in any form, except extracts, dyes and instruments, and these must be coupled with suitable permits before exportation is allowed (CoP17 Inf. 48). The export of wild sourced unworked *P. santalinus* timber has been banned since 1992 and as a result, multiple seizures of illegal shipments totalling hundreds of tonnes took place (PC15 Doc. 10.2.2). Illegal trade was 'reported to be very high' (CITES SA of India, 2012).

No managed harvest was permitted with the exception of removal from private land with permits (CITES SA of India, 2012). The only other felling was reported to be illegal and carried out by opportunistic and selective harvesters (CITES SA of India, 2012), despite the management of trees by the military (Treanor, 2015). Occasionally, the seizures of this wood are sold by the Government of Andhra Pradesh via e-commerce as other sales methods are not permitted (CoP17 Inf. 48; CITES SA of India, 2012).

Each of the eight forest divisions which contain *P. santalinus* have specific management plans for this species (CITES SA of India, 2012). These management plans focus on the control of fire, illegal harvest, grazing, reducing soil erosion and regeneration of natural *P. santalinus* forests (CITES SA of India, 2012). They aim to reduce the likelihood of wild fire by removing a grass (*Cymbopogon coloratus*), which will lessen damage to saplings and seeds of *P. santalinus* (CITES SA of India, 2012). The management plan of Andhra Pradesh Forest Department for *P. santalinus* contains four key elements: increasing the number of plantations and stock of *P. santalinus* outside the natural range, improving *in-situ* conservation by planting seedlings, increasing protection measures by controlling illegal logging by increasing on-the-ground capacity and increasing sanctions for forest-related crimes (CITES SA of India, 2012).

No detailed surveys or long term monitoring of the species were located.

P. santalinus occurs across 168 000 ha within protected areas, wildlife sanctuaries and National Parks (CITES SA of India, 2012), including in the Seshachalam Hills Biosphere Reserve (Guptha *et al.*, 2012), Chamala, Tirupathi, Balapalli, Chitvel, Siddhout, Vontimitta, Proddatur, Badvel, Rapur and Atmakur (CITES SA of India, 2012), Sri Venketswar Wildlife Sanctuary and Sri Lankamalleswara Sanctuary in the

state of Andhra Pradesh. It has been noted that a lack of conservation incentives amongst local people, farmers and other stakeholders have encouraged a switch to cash crops for higher returns instead of managing *P. santalinus* plantations (IUCN, 1998; Kukrety *et al.*, 2013). However, the high price of wood, geographical advantage, the niche market within India creates opportunities to improve local economic conditions and forest conservation (Kukrety *et al.*, 2013). Increasing sustainable wood trade practises with stakeholder participation was considered to be potentially beneficial to the persistence of *P. santalinus* (Arunkumar and Joshi, 2014).

The Plants Committee in 2005 called for greater clarification and implementation of the national export controls for *P. santalinus* and major importing countries such as Japan and China to review their levels of trade, increase the checks and confirm the validity of CITES permits and increase seizures of illegal shipments (PC15 Doc. 10.2.2). India's 2012 non-detriment finding study for *P. santalinus* concluded that the harvest from natural forests was not sustainable and that future exports should be derived from cultivation (CITES SA of India, 2012).

Mulliken and Crofton (2008) in PC 17 Inf. 10 suggested action was required as there was no evidence of a fall in demand and artificial propagation was not yet at a high enough level to undercut the incentives for illegal felling. It was reported that *P. santalinus* could be cultivated outside of its natural range (CITES SA of India, 2012). It was reported that *in-situ* seed stands had been established in Tamil Nadu which covered 21 ha (CoP17 Inf. 48). *Ex-situ* measures include plantations of 3 000 ha of *P. santalinus* in Tamil Nadu and Andhra Pradesh (CITES SA of India, 2012) and establishing private and communal plantations, however the complexities of administration and regulation were noted as a deterrent (Kukrety, 2011).

The CITES MA of India (2012) suggested that future sustainable harvests could be made from plantations and trees grown on private lands, and at that time there were 3 000 ha of *P. santalinus* plantations of various ages within State Forest Departments which were not being felled. It was noted that any exports from these cultivated populations as well as those on private farmland would require detailed inventories to estimate the growing stock available and to assess the quantity and quality of the heartwood (CITES MA of India, 2012). No further details of the inventories of these stocks or information on their management and monitoring could be located, although trade in cultivated timber (source code A) resumed in 2014. The CITES SA of India (2012) recommended that a 'systemic tree improvement programme' needed to be initiated to make the cultivation of this slow growing species profitable under cultivation; it is unclear if this programme was established.

Through its national legislation project, the CITES Secretariat categorised the national legislation in India as category 2, as legislation that is believed generally not to meet all of the requirements for the implementation of CITES.

The CITES Authorities in India were consulted as part of this review, but no response was received.

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

Illegal harvest and trade is the primary threat to the species and high volumes of seized material are being exported. Exports of source I timber have been reported on several permits per year, despite the quota for seized wood specifying that export would be a 'one-time' annual occurrence.

E. References

Arunkumar, A. and Joshi, G. 2014. *Pterocarpus santalinus* (Red Sanders) an Endemic, Endangered Tree of India: Current Status, Improvement and the Future. Available at: http://journals.sjp.ac.lk/index.php/JTFE/article/view/2063. [Accessed: 22/10/2015].

Azamthulla, M., Balasubramanian, R. and Kavimani, S. 2015. A review on *Pterocarpus santalinus* Linn. *World Journal of Pharmaceutical Research*, 4(2): 282–292.

Babar, S., Amarnath, G., Reddy, C.S., Jentsch, A. and Sudhakar, S. 2012. Species distribution models: Ecological explanation and prediction of an endemic and endangered plant species (*Pterocarpus santalinus* L.f.). *Current Science*, 102(8): 1157.

Business Line 2002. *APFDC plans to raise red sanders as plantation crop*. Available at: http://www.thehindubusinessline.com/2002/08/05/stories/2002080500841300.htm. [Accessed: 04/05/2017].

CITES Scientific Authority of India, 2012. Hedge, M., Singh, B.G. and Krishnakumar, N. 2012. *NDF Report Pterocarpus santalinus India*. Institute of Forest Genetics and Tree Breeding, 1–30.

Forestry Department 1967. *The Andhra Pradesh Forest Act*. 1–28 pp.

Governer of Andhra Pradesh 1978. *The Andhra Pradesh Preservation of Private Forest Rules*.

Government of India 2014. *Red Sanders*. 1-10 pp. Available at: http://www.moef.nic.in/downloads/public-information/Chap-8-new.pdf. [Accessed: 4/05/2017].

Government of India Ministry of Law 1927. *The Indian Forest Act*.

Guptha, M.B., Rao, P.V.C., Reddy, D.S., Maddala, S.R.S.C.S. and Babu, P.M. 2012. A preliminary observation on butterflies of Seshachalam Biosphere Reserve, Eastern Ghats, Andhra Pradesh, India. *World Journal of Zoology*, 7(1): 83–89.

IUCN 1998. *Pterocarpus santalinus*. *IUCN Red List of Threatened Species*,

Kukrety, S. 2011. *Restoration of red sanders (Pterocarpus* santalinus *L.) Forests for Ecological and Economic Benefits*. University of Florida. 1-159 pp.

Kukrety, S., Dwivedi, P., Jose, S. and Alavalapati, J.R.R. 2013. Stakeholders' perceptions on developing sustainable Red Sanders (*Pterocarpus santalinus* L.) wood trade in Andhra Pradesh, India. *Forest Policy and Economics*, 26: 43–53.

MacLachlan, I.R. and Gasson, P. 2010. PCA of CITES-listed *Pterocarpus santalinus* (leguminosae) wood. *IAWA Journal*, 31(2): 121–138.

Mulliken, T. and Crofton, P. 2008. *Review of the status, harvest, trade and management of seven Asian CITES-listed medicinal and aromatic plant species*. Bundesamt für Naturschutz (BfN), Federal Agency for Nature Conservation, Germany. PC17 Inf.10.pp.

Padmalatha, K. and Prasad, M.N. V 2008. Morphological and Molecular Diversity in Pterocarpus santalinus L.f - an Endemic and Endangered Medicinal Plant. *Medicinal and Aromatic Plant Science and Biotechnology,* 1(2): 263-273.

Parliment of India 1972. *The Wildlife Protection Act*.

Raju, K.K. and Nagaraju, A. 1999. Geobotany of red sanders (*Pterocarpus santalinus*) - A case study from the southeastern portion of Andhra Pradesh. *Environmental Geology*, 37(4): 340–344.

Rao, S. and Raju, A.J. 2002. Pollination ecology of the Red Sanders *Pterocarpus santalinus* (Fabaceae), an endemic and endangered tree species. *Current Science*, 83(9): 1144–1148.

Reddy, C.S., Reddy, K.N., Murthy, E.N. and Raju, V.S. 2009. Traditional medicinal plants in Seshachalam hills, Andhra Pradesh, India. *Journal of Medicinal Plants Research*, 3(5): 408–412.

Senthilkumar, N., Mayavel, A., Subramani, S.P., Balaji, K. and Deenathayalan, P. 2015. Red sanders, Pterocarpus santalinus L. in Rajampet forest range, Rajampet forest division, Andhra Pradesh, India. *Advances in Applied Research*, 6(10): 130–134.

Soundararajan, V., G, R.K., Murugesan, K. and Chandrashekar, B.S. 2016. A Review on Red Sanders (*Pterocarpus Santalinus* Linn.) – Phyto-Chemistry and Pharmacological Importance. *World journal of pharmacy and pharmaceutical sciences*, 5(6): 667–689.

Tamil Nadu Forest Department 1882. *The Tamil Nadu Forest Act*.

Treanor, N.B. 2015. China's Hongmu Consumption Boom: Analysis of the Chinese Rosewood Trade and Links to Illegal Activity in Tropical Forested Countries. *Forest Trends Report Series*, (December): 1–48.

UNDP 2003. *Environment Programme Support Sub-Programme for Medicinal Plants Conservation and Sustainable Utilisation, India*. Available at: 05/05/2017. [Accessed: 04/05/2017].

Vedavathy, S. 2004. Cultivation of endemic Red Sanders for International trade. *Natural Product Radiance*, 3(2): 83–84.

Wenbin, H. and Xiufang, S. 2013. *Tropical Hardwood Flows in China: Case Studies of Rosewood and Okoumé*.

Dendrobium chrysotoxum: Lao People's Democratic Republic

A. Summary

LAO PDR:	RECOMMENDATION:
Not assessed globally by the IUCN, and global population status and trend unknown. Occurs in central and southern Lao PDR. The main threats are unsustainable collection for the international trade in ornamental plants and traditional medicine, and habitat loss. Lao PDR has not published an export quota. High levels of trade in live plants 2006-2015 (730 000 kg), with all trade reported as artificially propagated since 2008. All annual reports were submitted by Lao PDR for the years 2006-2015. Lao PDR did not respond to the consultation relating to the RST. No information on monitoring or management measures were located. However, given the lack of anticipated wild-sourced trade (none has been reported since 2007), categorised as Less concern.	Less concern

RST Background

Dendrobium chrysotoxum (Fried-egg Orchid) was selected for the Review of Significant Trade (RST) as a priority species for review (all range States) at the 21st meeting of the Plants Committee, May 2014 (PC21 WG2 Doc. 1, PC21 ExSum. Cons.). *D. chrysotoxum* was identified as a species that met a high volume trade threshold 2007-2011, on the basis of trade data presented in PC21 Doc. 12.4. At PC22 (October, 2015), responses to the Secretariat's consultation had been received from Cambodia, China, Myanmar and Nepal (PC22 Doc. 11.3 Annex). Bangladesh, Bhutan, Cambodia, China, India, Myanmar, Nepal, Taiwan (Province of China), Thailand and Viet Nam were removed from the RST process (no exports), whilst Lao People's Democratic Republic (hereafter referred to as Lao PDR) was retained (PC22 Com. 3 (Rev. by Sec.), PC22 Sum. 5 (Rev. 1)).

B. Species characteristics

Biology: *D. chrysotoxum* is an epiphytic orchid with up to 20 flowers (Roy *et al.*, 2007). The flowers are deep yellow with an orange-yellow centre, are fragrant with a honey scent and are present for approximately two weeks (Kamemoto *et al.*, 1999; Atichart, 2013). *D. chrysotoxum* is tolerant to various climatic conditions and is typically located in ever-green semi-deciduous forests at 400-1 000 meters, in tropical to sub-tropical climates (Kaur and Bhutani, 2011). In Lao, PDR *D. chrysotoxum* was observed at 300-1 063 m elevation growing from a limestone substrate (Schuiteman *et al.*, 2008).

Dendrobium species have a very low reproduction rate and therefore slow growth in the wild (Neng-chang, 2004). *Dendrobium* species can reproduce to form morphologically different interspecific hybrids in the wild, which have features of both parental species (Lam *et al.*, 2015).

C. Country review

Lao, PDR

Distribution: *D. chrysotoxum* is present in Bangladesh, Bhutan, Cambodia, southern China, northeastern India, Lao, PDR, Myanmar, Nepal, Taiwan (Province of China), Thailand and Viet Nam (Kumar *et al.*, 2016). In Lao, PDR, *D. chrysotoxum* is present in the provinces of Bolikhamxa, Champasak, Khammouan, Phongsali, Savannakhet, Vientiane, Xaisomboun and Xiangkhoang in the central region and southern region (Schuiteman *et al.*, 2008).

Population status and trends: This species has not been assessed by the IUCN. Little information on population status and trends was located. Ornamental plant traders interviewed in Lao, PDR, Thailand and Myanmar noted that *D. chrysotoxum* had declined over the length of the traders' careers, which was on average six years (Phelps, 2013).

Threats: Unsustainable and excessive collection from wild populations of *D. chrysotoxum* is a global threat, particularly due to the high economic value and great demand for *Dendrobium* species coupled with the slow growth of the species (Neng-chang, 2004; Tao *et al.*, 2010).

D. chrysotoxum is heavily exploited in Lao, PDR for the domestic and international ornamental pot plant trade and the international traditional medicinal market (Schuiteman *et al.*, 2008; Lamxay, 2009; Kaur and Bhutani, 2011). *D. chrysotoxum* is the most commonly used *Dendrobium* species within traditional oriental medicine as it is a therapeutic agent with potential anti-glycaemic, antioxidant, immunostimulant, anti-cataract and anti-tumour forming properties (Roy *et al.*, 2007; Zhao *et al.*, 2007).

Unsustainable and illegal domestic and cross-border trade of *D. chrysotoxum* has been noted in Lao, PDR (Vantomme *et al.*, 2002; Schuiteman *et al.*, 2008). Collection of certain species of *Dendrobium*, including *D. chrysotoxum*, was reported to be undertaken on a large scale in Lao, PDR by Schuiteman *et al.* (2008) who noted that one exporter in central Lao, PDR sent more than 100 000 kg of dried *Dendrobium* stems of wild-sourced plants to China in a single year. Schuiteman *et al.* (2008) considered that this likely represented only a fraction of the total number collected.

Cross-border, often illegal, trade of *D. chrysotoxum* into neighbouring countries was reported to be common, occurring frequently along the Mekong River (Phelps, 2013). According to a review of Southeast Asian orchid trader reports, *Dendrobium* species, including *D. chrysotoxum,* were commonly exported from Lao, PDR to Thailand (Phelps, 2013). Illegal trade was noted to follow Road 9 in central Lao, PDR from Savannakhet, on the border of Thailand, across to the Vietnam border (Phelps, 2013).

Surveys of markets in Thailand undertaken by Phelps and Webb (2015) found a large, previously undocumented trade in wild ornamental plants. Lao, PDR was reported by to be the main source country of orchids at two of the marketplaces investigated: Jatujak and Mukdahan (Phelps and Webb, 2015). *Dendrobium* was by far the most frequently traded orchid genus reported from these markets at (Phelps and Webb, 2015). *D. chrysotoxum* was reported to be present in the Mukdahan market on the Thailand-Lao, PDR border during surveys in 2011/2012 (Phelps & TRAFFIC, 2015).

Habitat loss was also considered a general threat to orchids, with forests reportedly being rapidly converted for timber or agriculture (Schuiteman *et al.*, 2008), and was considered a threat to *D. chrysotoxum* (Kaur and Bhutani, 2011).

Trade: *D. chrysotoxum* was listed in CITES Appendix II on 1st July 1979, as part of the family listing of Orchidaceae. All CITES annual reports have been submitted by Lao, PDR for the period 2006-2015. Lao,

PDR has not published any export quotas for *D. chrysotoxum*. A trade suspension was issued for all commercial trade in specimens of CITES-listed species for Lao, PDR on 19th March 2015 for failing to submit a national ivory action plan (NIAP; CITES Notification No. 2015/013); the suspension was withdrawn on 15 September 2015 (CITES Notification No. 2015/055). A further trade suspension for all commercial trade in specimens of CITES-listed species was issued on 11th February 2016 due to a failure to submit a progress report on the implementation of a national ivory action plan (CITES Notification No. 2016/011). This recommendation to suspend trade was withdrawn on 21st March 2016 (CITES Notification No. 2016/029).

According to data from the CITES Trade Database, direct trade was primarily in live, artificially propagated plants reported by weight (Table 1). From 2006 to 2014, 730 000 kg of live *D. chrysotoxum* were exported from Lao, PDR of which 68 per cent were artificially-propagated (reported 2008-2012) and the remainder wild-sourced (reported in 2006 and 2007 only). Direct exports of artificially propagated *D. chrysotoxum* have declined from 2009 to 2014. All trade was reported by importers; Lao, PDR did not report any exports of *D. chrysotoxum*.

No indirect trade originating in Lao, PDR was reported 2006-2015. Lao, PDR did not report the export of *D. chrysotoxum* during 2006-2015 at the species, genus or family level.

Table 1: Direct exports of *Dendrobium chrysotoxum* from Lao, PDR, 2006-2014. All trade was for commercial purposes. Lao, PDR submitted annual reports for all years 2006-2015.

Term	Unit	Source	Reported by	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
live	kg	A	Importer			150000	150000	100000	50000	50000			500000
			Exporter										
		W	Importer	80000	150000								230000
			Exporter										
	-	W	Importer		5								5
			Exporter										
roots	kg	W	Importer		7000								7000
			Exporter										
stems	kg	A	Importer									50000	50000
			Exporter										

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 21/03/2017

Management: Lao, PDR became a Party to CITES on 1st March 2004, with entry into force on 30th May 2004.

No information was located regarding protection that might be in place or national legislation which may protect populations of *D. chrysotoxum* in Lao, PDR. Phelps (2015) reported that in Laos PDR harvest of forest products including orchids is restricted to production forests with sustainable management plans under Lao Forestry Law No. 6/NA, although no information on management plans could be located. A provincial quota system was established in Lao, PDR for the domestic trade in orchids, however, there was concern regarding the scientific basis this quota was based upon (Lamxay, 2009). Phelps & TRAFFIC (2015) reported that there was no evidence of Lao, PDR 'participating or making effort to participate in a sustainable or managed harvest' and a lack of domestic permit issuing. No further information could be found about the management of the species' harvest and trade in the country.

Export of dried wild orchid stems from Lao, PDR to China were reported to occur illegally (Lamxay, 2009). In 2007, it was reported that large scale commercial trade of this species from a propagative source was lacking (Roy *et al.*, 2007) and cultivation was reported as problematic because of the low rates of survival and yield of *Dendrobium* species (Neng-chang, 2004). Following imports of artificially propagated trade from Lao, PDR reported in 2008 (Table 1), it was noted that propagation and

cultivation in the country took place in the Xiangkhouang region to reduce the pressure on wild populations (Lamxay, 2009).

Phelps (2013) reported that conservation measures could be improved in Southeast Asia by targeted enforcement and greater inspection at already established checkpoints leading to known wildlife markets coupled with interventions and inspections of the expanding private transport network to minimise the illegal trade in *D. chrysotoxum.* Lamxay (2009) suggested that all species of orchids in Lao, PDR should be protected, training of customs officials in orchid identification should be improved, NGO's should have a greater role in the monitoring of orchid trade and there should be general improvement in communication and collaboration between CITES authorities and other relevant stakeholders.

Through its national legislation project, the CITES Secretariat categorised legislation in Lao, PDR as Category 3, meaning legislation "is believed generally not to meet the requirements for the implementation of CITES".

The CITES Authorities in Lao, PDR were consulted as part of this review, but no response was received.

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

Illegal exports of *D. chrysotoxum* have been noted in the literature (Vantomme *et al.*, 2002; Schuiteman *et al.*, 2008; Phelps, 2013).

E. References

Atichart, P. 2013. Polyploid Induction by Colchicine Treatments and Plant Regeneration of *Dendrobium chrysotoxum*. *The Journal of Agricultural Science*, 1(46): 59–63.

Kamemoto, H., Amore, T.D. and Kuehnle, A.R. 1999. *Breeding Dendrobium Orchids in Hawaii*. University of Hawaii Press. 166 pp.

Kaur, S. and Bhutani, K.K. 2011. In Vitro Propagation of Dendrobium chrysotoxum (Lindl .). *Floriculture and Ornamental Biotechnology*, 5(1): 50–56.

Kumar, P., Gale, S.W., Schuiteman, A., Bouamanivong, S. and Fischer, G.A. 2016. Identifying orchid hotspots for biodiversity conservation in Laos: the limestone karst vegetation of Vang Vieng District, Vientiane Province. *Journal of Threatened Taxa*, 8(12): 9397–9417.

Lam, Y., Ng, T.B., Yao, R.M., Shi, J., Xu, K., Sze, S.C.W. and Zhang, K.Y. 2015. Evaluation of chemical constituents and important mechanism of pharmacological biology in Dendrobium plants. *Evidence-based Complementary and Alternative Medicine*, 2015.

Lamxay, V. 2009. *Case study on orchid exports from Lao PDR: recommendations for using the Convention on International Trade in Endangered Species of Wild Fauna and Flora to increase sustainable orchid trade.* National University of Laos, Lao, PDR.

Neng-chang, Y.A.O. 2004. Status quo of Dendrobium spp. Resource in Yunnan and Utilization Skills. *Forest Inventory and Planning*, 4: 23.

Phelps, J. 2013. *Uncovering the trade of wild-collected ornamantal plants in Thailand, including imports from Myanmar and Lao PDR*. M.Phil thesis. University of Cambridge, Cambrudge, UK. 1-360.

Phelps, J. and Webb, E.L. 2015. "Invisible" wildlife trades: Southeast Asia's undocumented illegal trade in wild ornamental plants. *Biological Conservation,* 186(2015): 296-305.

Phelps, J. 2015. *A Blooming Trade: Illegal Trade of Ornamental Orchids in Mainland Southeast Asia (Thailand, Lao PDR, Myanmar)*. TRAFFIC, Petaling Jaya, Selangor, Malaysia.

Roy, J., Naha, S., Majumdar, M. and Banerjee, N. 2007. Direct and callus-mediated protocorm-like body induction from shoot-tips of *Dendrobium chrysotoxum* Lindl. (Orchidaceae). *Plant Cell, Tissue and Organ Culture*, 90(1): 31–39.

Schuiteman, A., Bonnet, P., S., B. and Barthélémy, D. 2008. An annotated checklist of the Orchidaceae of Laos. *Nordic Journal of Botany*, 26: 256–316.

Tao, Y., Zeng, F., Ho, H., Wei, J., Wu, Y., Yang, L. and He, Y. 2010. Pythium vexans Causing Stem Rot of *Dendrobium* in Yunnan Province, China. *Jorunal of Phytopathology*, 159(4): 255–259.

Vantomme, P., Markkula, A. and Leslie, R.N. 2002. *Information and analysis for sustainable forest management: linking national and international efforts in South and Southeast Asia*. 1-202 pp.

Zhao, Y., Son, Y.-O., Kim, S.-S., Jang, Y.-S. and Lee, J.-C. 2007. Antioxidant and anti-hyperglycemic activity of polysaccharide isolated from *Dendrobium chrysotoxum* Lindl. 670–677 pp.

Dendrobium moschatum: Lao People's Democratic Republic

A. Summary

LAO, PDR:	Not assessed globally by the IUCN, and global population status and trend unknown. Occurs in the south and southeast of Lao PDR. The primary threats are collection for use in traditional medicines and habitat loss. No exports of D. moschatum were reported by Lao PDR for the period 2006-2015; importers reported 150 000 kg of wild-sourced plants in 2006-2007, but no reported trade since. All annual reports were submitted by Lao PDR for the years 2006-2015. Lao PDR did not respond to the consultation relating to the RST. No information on monitoring or management measures were located. However, given the lack of anticipated wild-sourced trade (none has been reported since 2007), categorised as Less concern.	RECOMMENDATION: Less concern

RST Background

Dendrobium moschatum was selected for the Review of Significant Trade (RST) as a priority species for review (all range States) at the 21st meeting of the Plants Committee, May 2014 (PC21 WG2 Doc. 1, PC21 ExSum. Cons.). *D. moschatum* was identified as a species that met a high volume trade threshold 2007-2011, on the basis of trade data presented in PC21 Doc. 12.4. At PC22 (October, 2015), responses to the Secretariat's consultation had been received from China, Myanmar and Nepal (PC22 Doc. 11.3 Annex). Bhutan, China, India, Myanmar, Nepal, Thailand and Viet Nam were removed from the RST process (no exports), whilst Lao People's Democratic Republic (hereafter referred to as Lao, PDR) was retained (PC22 Com. 3 (Rev. by Sec.), PC22 Sum. 5 (Rev. 1)).

B. Species characteristics

Biology: *D. moschatum* is an epiphytic orchid (Deb *et al.*, 2009). The species has fragrant pink-yellow flowers that are 5-7 cm width and 4-15 cm in length, which flower during May to June and bear fruit in July to April (Rao and Chowlu, 2006; Gogoi *et al.*, 2010). *D. moschatum* occurs in sub-tropical climates at altitude in open forests (Sembi *et al.*, 2014; Pfahl, 2017). Kumar *et al.* (2011) suggested *D. moschatum* is found exclusively at approximately 1 000 m above sea level, however, Gogoi *et al.* (2010) noted this species was present at 500-1 300 m, and Yonzone *et al.* (2011) recorded its presence at 220 m above sea level. *Dendrobium* species can hybridise in the wild (Lam *et al.*, 2015).

C. Country reviews

Lao, PDR

Distribution: *D. moschatum* is distributed in Bhutan, China, India, Lao PDR, Myanmar, Nepal, Thailand and Viet Nam (Tsavkelova *et al.*, 2003). Occurrence was reported in Lao PDR by Thomas *et al.* (2006). *D. moschatum* was reported to be distributed to the south and southeast of the country, in the

Attapu, Bolikhamxai, Champasak, Louangphrabang, Savannakhet and Vientiane provinces, as well as the lowlands between 'Mekong and Hue' (Schuiteman *et al.*, 2008).

Population status and trends: This species has not been assessed by the IUCN. Little information was located on the population trend or status of *D. moschatum* within Lao, PDR, although the population was thought to have declined on the basis of collection, habitat loss and poor natural regeneration (Sembi *et al.*, 2014).

Threats: As noted above, threats include collection and habitat loss (Sembi *et al.*, 2014). *Dendrobium* species are used widely in traditional medicines (Bulpitt, 2005). Although it was reported that important phytochemicals with active ingredients are found within this species (De and Medhi, 2015), no information could be located on the specific medical use of *D. moschatum* in Lao, PDR.

Lao, PDR is undergoing rural development through the establishment of agro-industrial plantations, mines and hydroelectric power stations; this was reported to be leading to habitat loss and extirpation of native orchid species (Kumar *et al.*, 2016).

Trade: *D. moschatum* was listed in CITES Appendix II on 1st July 1975, as part of the family listing for Orchidaceae. All CITES annual reports have been submitted by Lao, PDR for the period 2006-2015. Lao, PDR has not published any quotas for the export of *D. moschatum*. A trade suspension was issued for all commercial trade in specimens of CITES-listed species for the Lao, PDR on 19th March 2015 for failing to submit a national ivory action plan (NIAP; CITES Notification No. 2015/013); the suspension was withdrawn on 15th September 2015 (CITES Notification No. 2015/055). A further trade suspension for all commercial trade in specimens of CITES-listed species was issued on 11th February 2016 due to a failure to submit a progress report on the implementation of a national ivory action plan (CITES Notification No. 2016/011). This recommendation to suspend trade was withdrawn on 21st March 2016 (CITES Notification No. 2016/029).

According to data in the CITES Trade Database, direct trade in *D. moschatum* from Lao, PDR comprised trade in live, wild-sourced plants for commercial purposes, all of which was reported by importers only in 2006 (91 000 kg) and 2007 (150 000 kg). No exports of *D. moschatum* were reported by Lao, PDR for the period 2006-2015. No indirect trade in *D. moschatum* originating in Lao, PDR was reported for the period 2006-2015.

Management: Lao, PDR became a Party to CITES on 1st March 2004, with entry into force on 30th May 2004.

Collection of this species for commercial purposes within Lao PDR was reported to be "unregulated" (Sembi *et al.*, 2014). Phelps (2015) reported that harvest of forest products including orchids is restricted to production forests with sustainable management plans under Lao Forestry Law No. 6/NA, although no information on management plans could be located. A provincial quota system was established in Lao, PDR for the domestic trade in orchids, however, there was concern regarding the scientific basis this quota was based upon (Lamxay, 2009). Phelps & TRAFFIC (2015) reported that there was no evidence of Lao, PDR 'participating or making effort to participate in a sustainable or managed harvest' and a lack of domestic permit issuing. No further information could be found about the management of the species' harvest and trade in the country.

Lamxay (2009) suggested that all species of orchid in Lao, PDR should be protected, training of customs officials in orchid identification should be improved, NGO's should have a greater role in the monitoring of orchid trade and there should be general improvement in communication and collaboration between CITES authorities and other relevant stakeholders.

Through its national legislation project, the CITES Secretariat categorised the national legislation in Lao, PDR as Category 3, meaning "legislation that is believed generally not to meet the requirements for the implementation of CITES".

The CITES Authorities in Lao, PDR were consulted as part of this review, but no response was received.

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

None identified.

E. References

Bulpitt, C.J. 2005. The uses and misuses of orchids in medicine. *Monthly Journal of the Association of Physicians*, 98(9): 625–631.

De, L.C. and Medhi, R.P. 2015. Orchid- a Diversified Component of Farming Systems for Profitability and Livelihood Security of Small and. *Journal of Global Biosciences*, 4(2): 1393–1406.

Deb, C.R., Deb, M.S., Jamir, N.S. and Imchen, T. 2009. Orchids in indigenous system of medicine in Nagaland, India. *Pleione*, 3(2): 209–211.

Gogoi, K., Borah, R.L. and Sharma, G.C. 2010. Orchid flora of Dibru – Saikhowa National Park and Biosphere Reserve, Assam, India. *Pleione*, 4(1): 124–134.

Kumar, P., Gale, S.W., Schuiteman, A., Bouamanivong, S. and Fischer, G.A. 2016. Identifying orchid hotspots for biodiversity conservation in Laos: the limestone karst vegetation of Vang Vieng District, Vientiane Province. *Journal of Threatened Taxa*, 8(12): 9397–9417.

Kumar, P., Rawat, G.S. and Wood, H.P. 2011. Diversity and Ecology of Dendrobiums (Orchidaceae) in Chotanagpur Plateau, India. *Taiwania*, 56(1): 23–36.

Lam, Y., Ng, T.B., Yao, R.M., Shi, J., Xu, K., Sze, S.C.W. and Zhang, K.Y. 2015. Evaluation of chemical constituents and important mechanism of pharmacological biology in *Dendrobium* plants. *Evidence-based Complementary and Alternative Medicine*, 2015: 25 pp.

Lamxay, V. 2009. *Case study on orchid exports from Lao PDR: recommendations for using the Convention on International Trade in Endangered Species of Wild Fauna and Flora to increase sustainable orchid trade.* National University of Laos, Lao, PDR.

Pfahl, J. 2017. Dendrobium moschatum. Available at: http://www.orchidspecies.com/denmoschatum.htm. [Accessed: 23/03/2017].

Phelps, J. 2015. *A Blooming Trade: Illegal Trade of Ornamental Orchids in Mainland Southeast Asia (Thailand, Lao PDR, Myanmar)*. TRAFFIC, Petaling Jaya, Selangor, Malaysia.

Rao, A.N. and Chowlu, K. 2006. Contributions To the Orchid Flora of Kamlang Wild Life Sanctuary in Lohit District of Arunachal Pradesh. *Bulletin of Arunachal Forest Research*, 22(1 & 2): 22–26.

Schuiteman, A., Bonnet, P., S., B. and Barthélémy, D. 2008. An annotated checklist of the Orchidaceae of Laos. *Nordic Journal of Botany*, 26: 256–316.

Sembi, J.K., Verma, J. and Vij, S.P. 2014. Differential Responses of 6-Benzyladenine and α-Naphthaleneacetic acid on Regeneration Competence of Pseudobulb Segments in *Dendrobium moschatum* sw. (Orchidaceae). *Vegetos*, 27(3): 170.

Thomas, P., Newman, M., Svengsuka, B. and Ketphanh, S. 2006. *A review of CITES Appendices I and II plant species from Lao PDR*. IUCN, Gnommalat, Khammouane Province, Lao PDR. 1-52 pp

Tsavkelova, E.A., Lobakova, E.S., Kolomeitseva, G.L., Cherdyntseva, T.A. and Netrusov, A.I. 2003. Associative cyanobacteria isolated from the roots of epiphytic orchids. *Microbiology*, 72(1): 92–97.

Yonzone, R., Lama, D., Bhujel, R.B. and Rai, S. 2011. Epiphytic orchid species diversity of Darjeeling Himalaya of West Bengal, India. *Asian Journal of Pharmacy and Life Science*, 1(4): 449–465.

Prunus africana: Cameroun et République démocratique du Congo

A. Résumé

État général:	Espèce largement répandue dans les forêts afromontagnardes du continent africain et de Madagascar. Espèce classée Vulnérable au plan mondial (nécessite une mise à jour), avec des déclins de la population à l'échelle de l'aire de répartition.	
CAMEROUN:	Espèce présente sur la ligne volcanique des montagnes du Cameroun et la majorité de la population est signalée dans trois zones (mont Cameroun au sud-ouest, Kilum-Ijim au nord-ouest et Adamoua au centre du Cameroun). Les populations sauvages seraient en 'déclin marqué'. L'espèce est principalement menacée par le taux non durable du prélèvement. Toutes les exportations, depuis 2009, sont constituées d'écorce sèche; des quotas ont été publiés chaque année depuis 2010 et dépassent 1 million de kg depuis 2015. Le taux d'exportation élevé, entre 2006 et 2015, s'éleve à 4,8 millions de kg d'écorce séchée de source sauvage, avec des exportations qui dépassent apparemment le quota en 2013 (tout cela selon les importateurs) et le taux de commerce le plus élevé en 2014. Le Cameroun n'a toujours pas soumis de rapports annuels pour 2008, 2010, 2012, 2013 et 2015. Le Cameroun a répondu à la consultation relative à l'étude du commerce important. Les 'Unités d'attribution de Prunus' autorisent le prélèvement à condition qu'il y ait des plans de gestion et des inventaires. Selon les inventaires, 185 000 arbres peuvent être exploités dans cinq régions; toutefois, il semblerait que, dans certaines localités, le prélèvement n'ait pas été rigoureusement contrôlé et qu'il ait eu des effets négatifs sur l'espèce et sur son habitat. Un expert a déclaré que, bien qu'il y ait des inventaires et l'obligation de respecter un diamètre minimum, ces règles ne sont pas correctement appliquées et l'on n'utilise pas de bonnes techniques de prélèvement. La base d'avis de commerce non préjudiciable rigoureux pour les exportations n'est pas claire, des préoccupations relatives à la gestion du prélèvement ont été exprimées et le commerce international pourrait avoir des impacts sur cette espèce menacée au plan mondial, d'où le classement 'Action nécessaire'	RECOMMANDATION: Action nécessaire
RÉPUBLIQUE DÉMOCRA-	Espèce présente dans quatre provinces: Orientale, Katanga, Nord Kivu et Sud Kivu. La population totale est estimée à 109 000 arbres, dont 80 000 seraient exploitables. Les principales	RECOMMANDATION: Action nécessaire

TIQUE DU CONGO:	menaces seraient la réduction de l'habitat, le prélèvement illégal et l'application inappropriée des directives légales d'exploitation. Quota publié pour l'écorce sèche (232 000 kg en 2015 et 2016). Les exportations de 2006 à 2015 comprennent 1 667 000 kg d'écorce sèche prélevée dans la nature avec des exportations dépassant apparemment le quota en 2013. La RDC a soumis ses rapports annuels pour toutes les années de 2006 à 2015. La RDC a répondu à la consultation relative à l'étude du commerce important. Un expert note que, bien que différentes mesures de gestion soient en place (inventaires annuels, cartes détaillées des zones exploitées, quotas fixés, abattage d'arbres de >30 cm de diamètre seulement), toutes ces mesures ne sont pas correctement appliquées et l'on n'utilise pas de bonnes techniques de prélèvement. La base d'avis de commerce non préjudiciable rigoureux pour les exportations n'est pas claire et il y a des préoccupations relatives à l'efficacité de la gestion du prélèvement en RDC qui pourraient avoir des impacts sur cette espèce menacée au plan mondial; d'où le classement 'Action nécessaire'.

Contexte de l'étude du commerce important

Prunus africana (prunier d'Afrique) a été sélectionné pour l'étude du commerce important (ECI) comme espèce prioritaire (tous les États de l'aire de répartition) à la 21e session du Comité pour les plantes, mai 2014 (PC21 WG2 Doc. 1, PC21 ExSum. Cons.). Sur la base des données du commerce présentées dans le document PC21 Doc. 12.4 à la 22e session du Comité pour les plantes (octobre 2015), il a été reconnu que *P. africana* avait atteint un seuil de volume commercial élevé en 2007-2011, ainsi qu'en 2012. Six États de l'aire de répartition ont répondu à la consultation du Secrétariat (PC22 Doc. 11.3 Annexe). L'Afrique du Sud, l'Angola, le Burundi, les Comores, le Congo, l'Éthiopie, la Guinée équatoriale, le Kenya, Madagascar, le Malawi, le Mozambique, le Nigéria, la République-Unie de Tanzanie, le Rwanda, São Tomé-et-Principe, le Soudan, le Soudan du Sud, le Swaziland, la Zambie et le Zimbabwe ont été supprimés du processus d'ECI (pas d'exportations), ainsi que l'Ouganda, tandis que le Cameroun et la République démocratique du Congo (ci-après dénommée RDC) ont été maintenus [PC22 Com. 3 (Rev. par Sec.), PC22 Sum. 5 (Rev. 1)].

P. africana a été sélectionné pour l'ECI après la 11e session de la Conférence des Parties (2000). À la 12e session du Comité pour les plantes (mai 2002), *P. africana* était l'un des quatre taxons sélectionnés pour l'étude (Résumé PC12) et une étude sur l'espèce a également été demandée à la CoP12 (2002). Cette étude (PC16 Doc. 10.2 Annexe 1) a été discutée à la 16e session du Comité pour les plantes (juillet 2006), après quoi le Burundi, le Cameroun, la Guinée équatoriale, le Kenya, Madagascar, la RDC et la République-Unie de Tanzanie ont été classés 'Préoccupation urgente', plusieurs recommandations générales et recommandations spécifiques à certains États de l'aire de répartition ont été faites et un groupe de travail intersessions a été créé (PC16 WG1 Doc. 1, PC16 Résumé). Les réponses des sept États de l'aire de répartition et la détermination du respect des recommandations du Comité pour les plantes figurent dans le document SC57 Doc. 29.1 (Rev. 2). Le Cameroun a établi un quota d'exportation zéro pour cette espèce pour 2009 et le Comité permanent a recommandé aux Parties de suspendre le commerce avec la Guinée équatoriale, la RDC et la République-Unie de Tanzanie (notification n° 2009/03). La recommandation de suspension du commerce avec la RDC a été retirée en 2012, après la 62e session du Comité permanent (notification n° 2012/057) tandis que les recommandations du Comité

permanent concernant la suspension du commerce avec la Guinée équatoriale et la République-Unie de Tanzanie restent en vigueur.

B. Caractéristiques de l'espèce

Biologie: *P. africana* est un arbre forestier à croissance rapide et à vie longue (Nsawir et Ingram, 2007; Ingram *et al*., 2015), qui peut parfois pousser sous forme de gros arbuste (Kalkman, 1965), mais aussi atteindre plus de 30 m de haut (Schippmann, 2001). On le trouve dans la savane montagnarde (Cunningham et Mbenkum, 1993) et dans les forêts tropicales (Ingram *et al.*, 2015) entre 1000 et 2500 mètres au-dessus du niveau de la mer, ainsi que dans les forêts montagnardes riveraines (Kalkman, 1965).

P. africana est considéré comme une espèce ayant besoin de lumière (PC16 Doc. 10.2; Stewart, 2003; Kiama et Kiyiapi, 2001) surtout abondante sur les marges forestières et dans les zones perturbées (Stewart, 2003). *P. africana* est considéré comme un élément important de l'écosystème (Oldfield *et al.*, 1998), y compris pour l'alimentation et la protection des pollinisateurs et de la faune rare et pour les épiphytes de la canopée (Fashing, 2004; Vinceti *et al.*, 2013). L'espèce est considérée comme répondant bien à la culture (Orwa *et al.*, 2009) et se régénérant bien (Oldfield *et al.*, 1998), ayant "une capacité remarquable à supporter le prélèvement de l'écorce" (Cunningham et Mbenkum, 1993). Cependant, il semblerait que les mauvaises méthodes de prélèvement puissent causer la mort des arbres (Orwa *et al.*, 2009).

P. africana est considéré comme une espèce à vie longue qui "peut pousser jusqu'à 14 m de haut et atteindre 37 cm de diamètre à hauteur de poitrine en 18 ans" (PC16 Doc. 10.2). L'espèce se reproduirait principalement à partir de graines (PC16 Doc. 10.2). Des études génétiques sur *P. africana* dans toute l'Afrique ont identifié cinq régions distinctes (Kadu *et al.*, 2011, 2012).

Distribution: *P. africana* est une espèce largement répandue dans toutes les forêts afromontagnardes du continent africain (Kalkman, 1965), de l'Éthiopie dans la partie la plus septentrionale de son aire de repartition jusqu'à l'Afrique du Sud dans la partie la plus méridionale (Hall *et al.*, 2000) ainsi qu'à Madagascar et dans les îles de la Grande Comore, de São Tomé et de Bioko en Guinée équatoriale (Kalkman, 1965). Au total, l'espèce a été enregistrée dans 22 pays en Afrique centrale, de l'Est et australe (Ingram *et al.*, 2015). Toutefois, elle est limitée à des "îles" de plus en plus isolées de l'habitat montagnard tropical (Schippmann, 2001); et l'on considère que sa distribution est extrêmement fragmentée (Vinceti *et al.*, 2013).

État et tendances de la population: Dans toute l'aire de répartition, et en particulier au Cameroun et à Madagascar, le déclin des populations de *P. africana* a été rapide, poussé par une exploitation non durable de son écorce et de son bois (Oldfield *et al.*, 1998). L'espèce est classée Vulnérable au plan mondial dans la Liste rouge de l'UICN (avec une annotation indiquant que l'évaluation a besoin d'être mise à jour) (World Conservation Monitoring Centre, 1998). L'évaluation pour la Liste rouge de l'UICN note que *P. africana* peut être très commun au niveau local (World Conservation Monitoring Centre, 1998).

Selon Stewart (2003), avant la découverte de ses vertus médicinales, en 1966, *P. africana* était relativement commun, mais jamais abondant. Compte tenu de sa très vaste aire de répartition géographique, l'espèce n'était pas considérée en danger d'extinction (Cable et Cheek, 1998 *in* World Conservation Monitoring Centre, 1998; Jøker, 2003). Toutefois, l'exploitation non durable serait la cause de déclins de population dans la majeure partie de l'aire de répartition géographique (Cunningham et Mbenkum, 1993; Oldfield *et al.*, 1998; Bodeker *et al.*, 2014). L'espèce est signalée commune, localement, dans les régions de montagne (Vinceti *et al.*, 2013).

Menaces: La principale menace pour l'espèce serait le prélèvement non durable à grande échelle pour le commerce international, motivé par la demande d'écorce de *P. africana* pour le marché pharmaceutique (Cunningham et Mbenkum, 1993; Oldfield *et al.*, 1998; Bodeker *et al.*, 2014). Le prélèvement commercial de l'écorce de *Prunus* est signalé depuis les années 1960 et à la fin des années 1990, le marché international d'extrait d'écorce de *P. africana* [pour le traitement de l'hyperplasie bénigne de la prostate (HBP)] valait, selon les estimations, environ 220 millions USD; plus de 3300 tonnes d'écorce auraient été prélevées chaque année (Cunningham *et al.*, 1997 *in* Bodeker *et al.*, 2014). L'écorce de l'espèce serait une des exportations médicinales les plus précieuses de l'Afrique (Cunningham *et al.*, 1997).

L'écorce est prélevée sur l'arbre, séchée puis broyée en copeaux ou en poudre pour produire un extrait (Ingram *et al.*, 2015). Sur le mont Cameroun et dans d'autres régions de toute l'aire de répartition de *P. africana*, beaucoup d'arbres sont morts à cause de l'annélation pratiquée pour retirer l'écorce (World Conservation Monitoring Centre, 1998).

Avant son exploitation commerciale, *P. africana* était utilisé localement, de différentes manières, depuis des centaines d'années (Cheboiwo *et al.*, 2014): l'écorce servait au traitement traditionnel de la fièvre, des douleurs de poitrine et du paludisme (Cunningham et Mbenkum, 1993), comme purgatif pour le bétail et comme poison pour les flèches (Kalkman, 1965) et avec le bois, on fabriquait des manches de hache (Schippmann, 2001), des poteaux, des sculptures ; il servait aussi de bois de feu (Ingram *et al.*, 2015; Nkongmeneck *et al.*, 2014; Nsawir et Ingram, 2007) et à la fabrication de wagons (Cunningham et Mbenkum, 1993). Ce serait aussi une espèce importante pour les abeilles et la production de miel (Ingram *et al.*, 2015). Selon Cheboiwo *et al.* (2014), au Cameroun, au Kenya et à Madagascar, la demande d'écorce des entreprises commerciales a entraîné une extraction accrue, un écorçage excessif et l'abattage d'arbres entiers.

Dawson *et al.* (2000) concluent que les arbres de *P. africana* disparaissent, en raison non seulement de l'exploitation mais aussi du défrichement général de la forêt pour l'expansion agricole car les populations de *P. africana* coïncident souvent avec des régions à la densité démographique humaine élevée. Nkeng *et al.* (2010) estiment que les activités humaines, en particulier le prélèvement, le pâturage et le feu, affectent les arbres de *P. africana* et la croissance des plantules, la mortalité et la reproduction. Fashing (2004) indique que l'appauvrissement de la biodiversité a des effets négatifs sur la dispersion des graines de *P. africana* car c'est une espèce qui a besoin des animaux pour disperser ses graines. Ingram *et al.* (2015) déclarent que la perte de l'habitat, par fragmentation, déboisement et dégradation (Vinceti *et al.*, 2013; Muchugi *et al.*, 2006; Mbatudde *et al.*, 2012) est aussi un problème dans les régions où l'on trouve *P. africana*. La surexploitation menace les caractéristiques et la diversité génétique des populations (Cunningham et Mbenkum, 1993; Dawson *et al.*, 2000).

L'espèce serait extrêmement vulnérable au réchauffement climatique (Mbatudde *et al.*, 2012) et Vinceti *et al.* (2013) prédisent que d'ici à 2050, le climat ne conviendra plus à *P. africana* sur environ la moitié de son aire de répartition actuelle.

Vue d'ensemble du commerce et gestion: *P. africana* a été inscrit à l'Annexe II de la CITES le 16 février 1995. Cette inscription était alors annotée #1[3] et elle est maintenant annotée #4[4]. Le Groupe

[3] #1 fait référence à toutes les parties et tous les produits, sauf: les graines, les spores et le pollen (y compris les pollinies); les semis et les cultures de tissus obtenus *in vitro*, en milieu solide ou liquide et transportés en conteneurs stériles; les fleurs coupées provenant de plantes reproduites artificiellement.
[4] #4 fait référence à toutes les parties et tous les produits, sauf: les graines, les spores et le pollen (y compris les pollinies); les cultures de plantules ou de tissus obtenues *in vitro*, en milieu solide ou liquide et transportées en conteneurs stériles; les fleurs coupées provenant de plantes reproduites artificiellement.

d'experts de la FAO sur les ressources génétiques forestières a inscrit *P. africana* comme l'une des 18 espèces prioritaires pour des mesures de conservation en Afrique (FAO, 1997 *in* Navarro, 2008; Cheboiwo, 2014). Vinceti *et al.* (2013) notent que plusieurs pays d'Afrique ont adopté des politiques visant à garantir la gestion durable de *P. africana* mais que des problèmes de lutte contre la fraude et de contrôle persistent. Tandis que Cheboiwo (2014) estime que la plupart des pays producteurs "n'ont pas encore fait d'efforts concrets pour mettre en œuvre les politiques et les structures juridiques qui permettraient de promouvoir des procédures de plantation et de prélèvement durable, des technologies d'extraction appropriées et le commerce légal de l'écorce."

Cunningham *et al.* (2016) signalent que, dans le commerece international, il y a plus d'écorce d'origine sauvage de *P. africana* que de n'importe quelle autre espèce de plante médicinale africaine. Selon le document PC22 Doc. 13, le Cameroun, l'Ouganda et la RDC sont les principaux exportateurs de *P. africana* et l'industrie pharmaceutique de l'UE est le principal importateur. Les données de la base de données sur le commerce CITES indiquent que le commerce mondial direct durant la période de 10 ans, de 2006 à 2015, concerne essentiellement l'écorce d'origine sauvage à des fins commerciales, avec 7 570 333 kg déclarés par les pays d'importation et 4 934 032 kg déclarés par les pays d'exportation. Selon les exportateurs, les exportations mondiales d'écorce d'origine sauvage à des fins commerciales ont diminué entre 2006 et 2010, puis augmenté de 2011 à 2014; le commerce déclaré par les importateurs montre une tendance semblable avec une augmentation de 2012 à 2014. Le commerce déclaré en 2015 a diminué par rapport à 2014, comme l'indiquent à la fois les exportateurs et les importateurs.

Cunningham *et al.* (1997) estiment à 220 millions USD la valeur annuelle du commerce sans ordonnance de préparations à base de plantes. Cunningham (2008) indique qu'à l'origine, seules deux marques de produits utilisaient *P. africana*, mais qu'à partir de 2008, on compte au moins 40 marques de produits utilisant l'extrait d'écorce de *P. africana* vendus directement dans dix pays et à l'échelon mondial, via l'internet.

Cunningham *et al.* (1993) et Hall *et al.* (2000) expliquent que si l'écorce de *P. africana* est partiellement arrachée (arrachage de deux panneaux seulement par arbre) au lieu d'être entièrement arrachée, l'arbre n'est pas tué et peut se régénérer et être exploité à des intervalles de 5 à 15 ans. Nkeng (2009) dans Cunningham *et al.* (2014) estime que les intervalles requis pour la régénération sont légèrement plus longs et ajoute qu'il faut au minimum sept ans entre les rotations d'exploitation, reconnaissant que dans ce cas, la récolte d'écorce est considérablement inférieure; Eben-Ebai (2011) dans Cunningham *et al.* (2014) indique qu'avec une rotation de six ans sur le mont Cameroun, le rendement de l'écorce est inférieur de 21% à une rotation de cinq ans.

Selon une étude détaillée de Nkeng (2009), une rotation minimum de sept à huit ans est considérée nécessaire si l'on veut que le prélèvement dans la nature se poursuive (Cunningham *et al.*, 2014).

Cunningham *et al.* (1997) indiquent que *P. africana* fait l'objet de commerce sous forme d'écorce séchée non transformée et transformée, et sous forme d'extrait d'écorce, avec environ 2000 kg d'écorce non transformée produisant 1000 kg d'écorce sèche qui, à son tour, produit 5 kg d'extrait (Cunningham, 2008). Schippmann (2001) déclare que ces formes multiples de commerce pour l'écorce de *P. africana* signifient que le commerce n'est ni déclaré ni suivi de manière adéquate car il est difficile à mesurer avec des chiffres comparables.

Selon le document PC22 Doc. 13, le Cameroun et la RDC reçoivent un appui du "Programme pour l'application des dispositions de la CITES aux espèces d'arbres tropicaux" conjointement appliqué par le Secrétariat CITES et l'Organisation internationale des bois tropicaux (OIBT). Ce programme s'efforce de définir et d'appliquer des méthodes de réalisation des ACNP. C'est sur ce programme que le Cameroun et la RDC fondent leur régime de gestion et d'exportation de *P. africana*. Toutefois, l'ICCN (2013) signale que le programme de la RDC a connu des retards d'application.

L'on considère que la vulnérabilité de *P. africana* à différentes menaces justifie la nécessité d'établir des zones hautement prioritaires pour la conservation de l'espèce (Jimu, 2011; Smith *et al.*, 2011; Vinceti *et al.*, 2013; Ingram *et al.*, 2015).

C. Études par pays

Cameroun

Distribution: *P. africana* est distribué le long de la ligne volcanique des montagnes du Cameroun (Nkongmeneck *et al.*, 2014), qui couvre six régions différentes: sud-ouest, nord-ouest, ouest, littoral, centre et Adamawa (Betti *in litt.* to UNEP-WCMC 2017). Nsawir et Ingram (2007) et Chupezi et Ndoye (2006) concluent que la majeure partie des populations de *P. africana* se trouvent dans trois régions: les forêts de Kilum-Ijim dans le nord-ouest, le mont Cameroun dans le sud-ouest et la province d'Adamawa au centre du Cameroun. Le tableau 1 ci-dessous montre les localités spécifiques où *P. africana* pousse au Cameroun.

Tableau 1: Distribution de *P. africana* au Cameroun (source: Betti *in litt.* to UNEP-WCMC 2017)

Régions	Division	Localités
Adamawa	Mayo-Banyo Faro et Deo	Tchabal Mbabo Galim Tignere, Foungoy
Centre	Mbam et Kim Mefou et Akono	Mt Ngora, Yangba, Golep Mt Eloumdem, Wé, Banda banda
Littoral	Moungo	Mt Manengouba, Kupe, Nlonako
Nord-ouest	Bui Boyo Ngoketunjia Momo Mezam Menchum Donga Mantung	Oku, Jakiri, Kilum Ijim, Kumbo, Kom, Nvem Fundong, Belo, Njinikom, Ngeni Kigem Sabga Njikwa, Menka, Ngui, Oshey, Gouzang Santa, Awing, Njong, Bafouchu, Medankwe Mbot, Abor, Abou, Kidjiogam, Adon Abizenaku Furawa, Akweto, Tabenken
Sud-ouest	Fako Meme Lebialem Manya	Mt Cameroun Mt Cameroun Mt Bambouto, Wabane Akwaya et environs
Ouest	Menoua Noun Bamboutos Haut Nkam Ndé Haut Plateau	Santchou, Gwata Malantouem, Bangourain, Nkoutoupit Mt Bambouto: Babadjou Mt Bana, Bafang Bangoulap, Bassamba, Balembo Baham, Bapa, Badenkop

État et tendances de la population: Nsawir et Ingram (2007) indiquent que la population sauvage de *P. africana* au Cameroun semble être en déclin marqué et ajoutent qu'il y a un manque complet de connaissances quant à l'état de la population restante. Katende (1995, in CITES PC16 Doc. 10.2) décrit l'état de la population camerounaise de *P. africana* comme "Vulnérable" et Stewart (2001) considère que le taux actuel de prélèvement n'est pas durable. Selon le document PC16 Doc. 10.2 de la CITES, il y a peu de grands arbres vivants dans les provinces du nord-ouest et de l'ouest du Cameroun, et l'exploitation commerciale s'est étendue jusqu'au plateau reculé d'Adamawa. Cunningham (2008) décrit une structure démographique de la population de *P. africana* montrant une très faible proportion d'arbres adultes dont le diamètre est supérieur à 30 cm et, dans certaines zones, un taux d'exploitation de 80% du nombre total d'individus, avec une exploitation durable pour moins de 10% des arbres étudiés.

Betti (*in litt.* to UNEP-WCMC, 2017) donne des informations sur la densité et les chiffres de la population issus d'inventaires de gestion de *P. africana* réalisés entre 2009 et 2012 (tableau 2). Les inventaires ont été réalisés par l'Agence nationale des forêts (ANAFOR) dans le cadre du programme OIBT-CITES sur les arbres inscrits à la CITES, ainsi que par les entreprises d'exportation de l'écorce et couvrent cinq des six régions où *P. africana* est présent.

Tableau 2: Densité de population et nombre de *P. africana* au Cameroun (source: Betti *in litt.* to UNEP-WCMC 2017)

Région	Arbres / ha	Arbres exploitables / ha	Nombre d'arbres	Nombre d'arbres exploitables
Adamawa	2,8	1,1	197 199	78 414
Centre	2,9	1,3	78 965	34 664
Littoral	3,1	1,2	47 691	18 517
Nord-ouest	4,1	0,6	130 079	18 692
Sud-ouest	3,1	1,4	69 914	31 461
Total	3,1	1,1	521 108	184 972

Menaces: Pour Betti (*in litt.* to UNEP-WCMC 2017), *P. africana* est menacé, au Cameroun, par la réduction de l'habitat, le non-respect des directives des plans de gestion, et une faible demande du marché qui peut encourager les communautés locales à remplacer l'espèce par des plantations d'eucalyptus. Nsawir et Ingram (2007) indiquent que l'exploitation non contrôlée et le prélèvement illégal menacent un marché viable de *P. africana* au Cameroun.

Commerce: Le Cameroun a soumis des rapports annuels à la CITES pour 2006-2009, 2011 et 2014. Le Cameroun a publié des quotas d'exportation pour *P. africana* tous les ans depuis 2006 (tableau 3). Des quotas pour la poudre ont été publiés de 2006 à 2009 et des quotas pour l'écorce sèche de 2010 à 2017. Le commerce de *P. africana,* déclaré par le Cameroun, ne dépasse pas les quotas publiés pour la période 2006-2015; le commerce d'écorce sèche déclaré par les importateurs semble avoir dépassé les quotas publiés en 2014 (tableau 3). Une analyse des permis suggère que 207 500 kg d'écorce déclarés par les importateurs en 2014 ont été exportés avec des permis délivrés en 2013, ce qui replace le commerce de 2014 à l'intérieur du quota. Lorsque le commerce enregistré avec des permis délivrés en 2013 mais déclarés en 2014 est comparé avec le commerce déclaré en 2013 (746 901 kg), il semble que le commerce déclaré par les importateurs dépasse le quota de 2013. Une partie de ce commerce peut être attribuée au quota de 2012 sur la base d'une analyse des permis mais le commerce déclaré par les importateurs en 2013 semble encore dépasser le quota publié.

Selon les données de la base de données sur le commerce CITES, les transactions directes de *P. africana* pour la période 2006-2015 concernent principalement de l'écorce d'origine sauvage à des fins commerciales, avec 2 422 339 kg déclarés par le Cameroun et 4 823 953 kg déclarés par les pays d'importation (tableau 4). Le principal pays d'importation d'écorce de *P. africana* est la France, avec environ les trois quarts du commerce de 2006 à 2015. Les pays d'importation déclarent généralement des quantités plus élevées de transactions d'écorce à des fins commerciales que le Cameroun qui déclare uniquement des transactions d'écorce à des fins commerciales pour 2006 et 2014 (tableau 4). Le reste des exportations de *P. africana* se compose principalement de poudre, avec 557 000 kg déclarés par les importateurs en 2006 et 706 500 kg déclarés par le Cameroun en 2007.

Les transactions indirectes de *P. africana* provenant du Cameroun sont uniquement à des fins commerciales et principalement composées d'écorce, de poudre et d'extrait d'origine sauvage, avec 203 632 kg d'écorce déclarés par les importateurs et 473 139 kg d'écorce déclarés par les réexportateurs (tableau 5).

Tableau 3: Quotas d'exportation CITES pour la poudre et l'écorce sèche de *Prunus africana* du Cameroun, 2006-2017 et exportations directes globales déclarées par les pays d'importation et le Cameroun, 2006-2015. Le Cameroun n'a pas soumis de rapports annuels pour 2010, 2012, 2013 et 2015.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Quota: écorce sèche (kg)	-	-	-	-	150000	350000	658674	634763	974853	1082879	1042353	1042353
Déclaré par importateur	735904	700500		499125		300000	359304	539401	1056140	633579	-	-
Déclaré par Cameroun	1497500								924914		-	-
Quota: poudre (kg)	2000000	2000000	1000000	0	-	-	-	-	-	-	-	-
Déclaré par importateur	557000										-	-
Déclaré par Cameroun		706500									-	-

Tableau 4: Exportations directes de *Prunus africana* du Cameroun, 2006-2015. Tout le commerce direct est de source sauvage. Le Cameroun n'a pas encore soumis de rapports annuels pour 2010, 2012, 2013 et 2015.

Terme	Unité	But	Déclaré par	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
écorce	kg	S	Importateur											
			Exportateur									75		75
		T	Importateur	735904	700500		499125		300000	359304	539401	1056140	633579	4823953
			Exportateur	1497500								924839		2422339
extrait	kg	T	Importateur			2								2
			Exportateur											
feuilles	-	S	Importateur			60								60
			Exportateur			50								50
poudre	kg	T	Importateur	557000										557000
			Exportateur		706500									706500
spécimens	-	S	Importateur											
			Exportateur			240								240
bois	-	S	Importateur			240								240
			Exportateur											

Source: Base de données sur le commerce CITES, PNUE-WCMC, Cambridge, Royaume-Uni, téléchargé le 21/03/2017

Tableau 5: Exportations indirectes de *Prunus africana* originaire du Cameroun, 2006 - 2015. Les quantités sont arrondies à des chiffres entiers, le cas échéant.

Terme	Unité	But	Source	Déclaré par	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
écorce	kg	T	W	Importateur			74150				9594	49894	69994	<1	203632
				Exportateur	550	71850	74150	1561			99410	251	69069	156298	473139
produits	kg	T	A	Importateur											
				Exportateur					<1						<1
			W	Importateur	1708	2750	590								5048
				Exportateur	1900	3102	<1	1	1	2	<1				5007
	-	T	W	Importateur				2160							2160
				Exportateur											
extrait	kg	T	O	Importateur							30	106			136
				Exportateur							265				265
			W	Importateur	5591	2191	2568	3260	2353	2235	7505	4489	321	2800	33311
				Exportateur	7096	2376	3149	3524	3680	1937	2565	2818	1788	3405	32337
	-	T	W	Importateur					108						108
				Exportateur				14760	1374				50		16184
vivant	kg	T	W	Importateur									<1		<1
				Exportateur											
médicament	kg	T	W	Importateur					<1						<1
				Exportateur											
poudre	kg	T	O	Importateur						920	30	306			1256
				Exportateur						1170	110	362			1642
			W	Importateur		6640	1	1	4300	20	7400	200	90	1330	19982
				Exportateur	18800	17100	452	4373	5450	349.2	10110	300	4980	790	62704
bois	m^3	T	W	Importateur					<1						<1
				Exportateur											

Source: Base de données sur le commerce CITES, PNUE-WCMC, Cambridge, Royaume-Uni, téléchargé le 21/03/2017

Gestion: Le Cameroun est devenu Partie à la CITES le 3 juin 1981 et la Convention est entrée en vigueur pour ce pays le 3 septembre 1981.

Schippmann (2001) note que le Cameroun est le principal exportateur de *P. africana* et que le mont Cameroun possède la population de *P. africana* la plus importante du pays. Schippmann (2001) indique que la majeure partie de l'écorce exportée du Cameroun est prélevée sur le mont Cameroun et les hauts plateaux de Bamenda dans le nord-ouest du pays. Cunningham *et al.* (1997) signalent que le Cameroun est un des deux seuls pays de l'aire de répartition de *P. africana* ayant des unités d'extraction et que la majeure partie de l'écorce qui y est exploitée, est extraite localement pour l'exportation.

Entre 1972 et 1987, la société 'Plantecam' avait un monopole d'exploitation de l'écorce et a essayé de faire un prélèvement durable en découpant des panneaux d'écorce opposés sur le tronc, jusqu'à la première branche, pour éviter l'annélation des arbres, limitant ainsi la mortalité des arbres (Nkongmeneck *et al*., 2014; Schippmann, 2001). Toutefois, Cunningham et Mbenkum (1993) indiquent qu'après l'octroi de 50 licences de prélèvement additionnelles en 1985, cette méthode de prélèvement durable a cessé d'être utilisée, en particulier dans le nord-ouest du Cameroun.

Nsawir et Ingram (2007) énumèrent les contraintes affectant le développement du marché de *P. africana* du Cameroun, à savoir le manque total de connaissance sur l'état et la quantité de *P. africana*, l'inexistence d'un marché, une bureaucratie coûteuse, l'absence de capacités de transformation et de capital disponible au Cameroun, le manque de contrôle de qualité, la mauvaise gouvernance et le manque de transparence. Ces auteurs recommandent les actions suivantes pour permettre une exploitation durable de *P. africana*: gestion durable des populations sauvages, respect des obligations découlant de la CITES pour garantir une exportation continue, promotion de la plantation nationale de *P. africana*, examen du système réglementaire pour *P. africana*, amélioration de la chaîne de commercialisation, collaborations et réseaux améliorés et renforcement des connaissances sur *P. africana* pour optimiser l'exploitation (Nsawir et Ingram, 2007).

Bien que Ingram *et al.* (2009) conseillent fortement de ne pas autoriser l'exploitation à l'intérieur des aires protégées au Cameroun, Ingram *et al*. (2015) déclarent que le prélèvement est autorisé dans de nombreuses aires protégées, y compris le sanctuaire de flore d'Oku et le mont Manengouba, tous deux situés dans l'ouest du Cameroun. Le Parc national du mont Cameroun, à l'ouest du Cameroun, serait, selon Tchouto *et al.* (2014, dans Ingram *et al.*, 2015) le seul site protégé bénéficiant de réglementations plus restrictives, grâce à un projet de gestion durable des forêts déjà ancien. Ingram *et al.* (2015) mentionnent des préoccupations relatives au taux de prélèvement dans les aires protégées indicateur de la persistance des pressions sur la population sauvage de *P. africana*.

Ingram *et al.* (2009) décrivent le plan de gestion national de *P. africana* pour le Cameroun, qui comprend l'introduction de quotas d'exploitation nationaux et d'Unités d'attribution de *Prunus* (UAP), une information sur les techniques de prélèvement durable et le renforcement des contrôles et du suivi. Ingram *et al.* (2009) reconnaissent aussi plusieurs faiblesses, y compris le manque de vérification de l'inventaire avant délivrance des permis, de nombreux détenteurs de permis dans la même région ce qui entraîne un prélèvement non durable et l'absence de responsabilité, l'absence de procédure officielle pour la collaboration quotidienne avec le Ministère des forêts et de la faune (MINFOF) et l'Agence nationale de développement des forêts (ANAFOR), et le fait que ce sont des organisations internationales qui mènent les initiatives et non le Cameroun. À propos de l'élaboration d'un plan de gestion de *Prunus,* le Gouvernement du Cameroun (2015) déclare que le Service du Parc national du mont Cameroun travaille avec les communautés locales pour l'appliquer, dans le cadre du système d'Unités d'attribution de *Prunus* (UAP).

Betti (*in litt.* to UNEP-WCMC, 2017) indique que le Gouvernement du Cameroun a fait des efforts pour promouvoir l'exploitation durable de *P. africana*, mais qu'il n'y a aucun inventaire dressé, que le

diamètre minimum pour les arbres exploités n'est pas observé et que l'on n'applique pas de bonnes techniques de prélèvement. Toutefois, Betti (*in litt.* to UNEP-WCMC, 2017) ajoute que l'organe de gestion CITES du Cameroun a soumis une proposition de projet pour la troisième phase du programme OIBT-CITES afin de remédier à l'absence d'application.

Aussi bien Betti (*in litt.* to UNEP-WCMC 2017) qu'Ingram *et al.* (2009) discutent des Unités d'attribution de *Prunus* mises en place par l'administration des forêts du Cameroun. Il s'agit de 15 zones de prélèvement où sont accordés des droits d'exploitation à long terme aux détenteurs de permis, sous réserve d'un inventaire et d'un plan de gestion. Les détails sur les localités et les détenteurs de permis de chaque Unité d'attribution de *Prunus* figurent dans le tableau 6 ci-dessous. Cunningham *et al.* (2014) ajoutent que l'Unité d'attribution de *Prunus* du mont Cameroun est le site le mieux géré.

Tableau 6: Unités d'attribution de *Prunus* au Cameroun (adapté d'Ingram *et al.* 2009)

Principaux paysages à *Prunus* au Cameroun	UAP proposées
Paysage d'Adamawa (divisé entre 5 détenteurs de permis pour une tonne par an accordée, dépendant de la vérification de la quantité relevée dans l'inventaire actuel) 5 563 434 ha >800m d'altitude	Adamawa 1
	Adamawa 2
	Adamawa 3
	Adamawa 4
	Adamawa 5
Paysage du nord-ouest (divisé entre 4 détenteurs de permis, chacun pour un tonnage/an accordé, à confirmer par un inventaire) 1 306 236 ha >800m d'altitude	Région nord-ouest 1 (Kilum-Ijim 18 forêts communautaires)
	Région nord-ouest 2 (en dehors de la région 1 et des plantations privées)
	Région nord-ouest 3 (Zone comprenant des plantations privées et des forêts communautaires)
	Région nord-ouest 4 (Zone comprenant des plantations privées et des forêts communautaires)
Paysage du mont Cameroun (divisé entre 2 détenteurs de permis, chacun avec un tonnage/an accordé, à confirmer par un inventaire) 335 422 ha >800m d'altitude	Mont Cameroun 1 (en procédure de publication pour le Parc national du mont Cameroun – limites pas encore finalisées)
	Mont Cameroun 2 (en dehors du Parc national du mont Cameroun)
Paysage du littoral et des montagnes Bakossi (divisé entre 2 détenteurs de permis, chacun avec un tonnage/an accordé, à confirmer par un inventaire) 159 707 ha >800m d'altitude	Région littoral et montagnes Bakossi 1
	Région littoral et montagnes Bakossi 2 (zones en dehors des réserves écologiques intégrales)

Dans son projet sur les législations nationales, le Secrétariat CITES a classé la législation nationale du Cameroun dans la catégorie 1, ce qui signifie que cette législation doit généralement permettre de remplir les obligations d'application de la CITES.

République démocratique du Congo

Distribution: Betti (*in litt.* to UNEP-WCMC 2017) et l'ICCN (2013) indiquent que l'on trouve *P. africana* dans quatre provinces de la RDC: province orientale, Katanga, Nord Kivu et Sud Kivu.

État et tendances de la population: Betti (*in litt.* to UNEP-WCMC, 2017) estime la population totale de *P. africana* en RDC à 109 314 arbres, dont 79 975 seraient exploitables. Une répartition plus détaillée de la densité et de la taille de la population figure dans le tableau 7. Le document de la CITES PC16 Doc. 10.2 décrit l'état de la population de *P. africana* en RDC comme "Données insuffisantes" compte tenu du prélèvement opportuniste et non réglementé. Le contrôle du prélèvement n'est pas jugé possible en raison du conflit armé et de la densité de la population dans la zone environnante, avec environ 300 personnes/km² (PC16 Doc. 10.2). Dans toute l'aire de répartition, Betti (*in litt.* to UNEP-WCMC, 2017) indique que des entreprises privées ont dressé des inventaires en

suivant la même méthode que celle du programme OIBT-CITES et ont conclu que la densité de *P. africana* est de 3,6 arbres par hectare, et que les arbres exploitables poussent à une densité de 2,7 arbres par hectare. Betti (*in litt.* to UNEP-WCMC 2017) calcule que, dans la province du Nord Kivu, il y a 30 089 hectares d'habitat disponible pour *P. africana*, ce qui correspond à 77,38% de la superficie totale de la province.

Tableau 7: Densité de population et nombre en RDC (Betti *in litt.* to UNEP-WCMC, 2017)

Site de production	Arbres / ha	Arbres exploitables / ha	Nombre total d'arbres	Nombre total d'arbres exploitables
Mwenda	7,2	3,1	4 316	1 867
Ibathaama	3,0	2,3	15 064	11 538
Lumé Nord	1,4	0,6	997	415
Lumé Sud	4,3	3,7	17 155	14 740
Mangurejipa Ouest	2,9	2,1	9 871	7 144
Mangurejipa Est	0,9	0,9	639	639
Walikalé I	3,2	1,9	8 851	5 465
Walikalé II	4,1	3,3	44 426	35 970
Ikumbi	1,6	1,2	2 988	2 224
TOTAL	**3,6**	**2,7**	**109 314**	**79 975**

Menaces: Selon Betti (*in litt.* to UNEP-WCMC 2017), l'on peut identifier quatre menaces pour *P. africana* en RDC: la réduction de l'habitat devant l'expansion agricole, le non-respect des directives du plan de gestion, les groupes rebelles dans le Nord Kivu qui facilitent l'exploitation illégale, et la faible demande du marché qui pourrait encourager les communautés locales à remplacer l'espèce par des plantations d'eucalyptus.

Commerce: La RDC a soumis tous ses rapports annuels à la CITES pour la période 2006-2015. La RDC a publié des quotas pour l'écorce, en fonction du poids, 2006-2008 et 2012-2016; les quotas publiés en 2012-2016 précisaient 'écorce sèche' (tableau 8). Le quota d'exportation pour l'écorce sèche semble avoir été dépassé en 2013, comme indiqué par les pays d'importation (tableau 8); une analyse des permis indique qu'une partie de cet excédent apparent pourrait être due à un commerce de fin d'année. Enfin, 132 556 kg d'écorce de *P. africana* sont déclarés par les importateurs, en 2013, comme ayant été commercialisés avec des permis décrits comme non déclarés par la RDC dans la notification CITES n° 2014/017. Une suspension du commerce a été émise pour tout le commerce de spécimens d'espèces inscrites à la CITES provenant de la RDC, le 19 mars 2015, pour défaut de soumission d'un plan d'action national pour l'ivoire (NIAP; CITES Notification No. 2015/012); la suspension a été levée le 15 avril 2015 (CITES Notification No. 2015/021).

Tableau 8: Quotas d'exportation CITES pour l'écorce de *Prunus africana* (kg) de la République démocratique du Congo, 2006-2017 et exportations directes globales déclarées par les pays d'importation et la RDC, 2006-2015. La RDC a soumis tous ses rapports annuels, de 2006 à 2015.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Quota: écorce* (kg)	1000000	1000000	1000000	-	-	-	72000	72000	102000	232000	232000	-
Déclaré par importateur	280000	90000	192480	30000	-	160000	-	273337	101660	-	-	-
Déclaré par RDC	380000	308000	631000	-	-	-	72000	72000	102000	102000	-	-

* La RDC a publié des quotas pour 'l'écorce sèche' de 2012 à 2016.

Selon les données de la base de données sur le commerce CITES, les transactions directes de *P. africana* de la RDC, 2006-2015, concernaient surtout de l'écorce d'origine sauvage à des fins commerciales avec 1 127 477 kg déclarés par les pays d'importation et 1 565 000 kg déclarés par la RDC (tableau 9). Le commerce de l'écorce de *P. africana* déclaré par la RDC a augmenté entre 2013 et 2014 mais il est resté inférieur au commerce déclaré par la RDC pour 2006-2008.

Tableau 9: Exportations directes de *Prunus africana* de la République démocratique du Congo, 2006-2015. Tout le commerce est de source sauvage et déclaré au poids (kg). La RDC a soumis tous ses rapports annuels, de 2006 à 2015.

Source: Base de données sur le commerce CITES, PNUE-WCMC, Cambridge, Royaume-Uni, téléchargé le 21/03/2017

Terme	But	Déclaré par	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
écorce	T	Importateur	280000	90000	192480	30000		160000		273337	101660		1127477
		Exportateur	380000	308000	631000				72000	72000	102000	102000	1667000
poudre	T	Importateur	30000										30000
		Exportateur											
spécimens	S	Importateur										4	4
		Exportateur											

Les transactions indirectes de *P. africana* originaire de la RDC étaient principalement composées d'écorce et d'extrait à des fins commerciales; des réexportations d'écorce ont été déclarées en 2008 et 2009 seulement, tandis que des réexportations d'extrait ont été déclarées toutes les années, de 2006 à 2015, avec un pic en 2014 (tableau 10).

Tableau 10: Exportations indirectes de *Prunus africana* (kg) originaire de la République démocratique du Congo, 2006-2015. Les quantités sont arrondies à des chiffres entiers, le cas échéant.

Terme	But	Source	Déclaré par	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
écorce	T	W	Importateur			22700	306000							328700
			Exportateur			22700								22700
produits	T	W	Importateur			300								300
			Exportateur		200	100	240							540
extrait	T	A	Importateur											
			Exportateur										27	27
		W	Importateur	688	417	299	599	140	2241	161	6263	6352	555	17715
			Exportateur	607	75	507	933	206	2896	1768	1867	4652	745	14255
	Z	W	Importateur				10							10
			Exportateur				10							10
médicament	T	W	Importateur											
			Exportateur										5	5
poudre	T	O	Importateur											
			Exportateur				2600	1744	2770					7114
		W	Importateur					81						81
			Exportateur									184		184

Source: Base de données sur le commerce CITES, PNUE-WCMC, Cambridge, Royaume-Uni, téléchargé le 21/03/2017

Gestion: La RDC est devenue Partie à la CITES le 20 juillet 1976 et l'entrée en vigueur de la Convention pour ce pays date du 18 octobre 1976.

L'ICCN (Institut congolais pour la conservation de la nature) et l'autorité scientifique CITES de la RDC (*in litt.* to UNEP-WCMC, 2017) indiquent que l'exploitation de *P. africana* et d'autres produits forestiers en RDC est réglementée par le Ministère de l'environnement et du développement durable. Le Ministère comprend deux départements: le Département de gestion des forêts qui traite des questions de gestion, transformation et exploitation des ressources et la Direction de la conservation de la nature qui traite de la conservation de la nature en dehors des aires protégées et des questions relatives à la gestion d'espèces en danger ou inscrites à la CITES, y compris la délivrance de permis CITES (ICCN and CITES SA of DRC *in litt.* to UNEP-WCMC, 2017). L'ICCN et l'autorité scientifique CITES de la RDC (*in litt.* to UNEP-WCMC, 2017) indiquent que les mesures de gestion suivantes sont en vigueur dans la province du Nord Kivu pour garantir que l'exploitation de l'écorce de *P. africana* ne soit pas préjudiciable à la survie permanente de la population: des inventaires annuels et une cartographie détaillée des zones d'exploitation prospective, des quotas pour chaque zone d'exploitation, exploitation

de l'écorce limitée à des troncs ayant un minimum de 30 cm de diamètre à hauteur de poitrine, autorisation de prélever l'écorce en deux panneaux opposés sur chaque tronc, entre la hauteur de poitrine et la hauteur à laquelle la première branche rejoint l'arbre, respect d'une rotation de huit ans entre chaque exploitation (ICCN and CITES SA of DRC *in litt.* to UNEP-WCMC, 2017).

Betti (*in litt.* to UNEP-WCMC 2017) déclare que le Gouvernement de la RDC a fait des efforts pour promouvoir l'exploitation durable de *P. africana*, mais qu'il n'y a pas eu d'inventaires dressés, que le diamètre minimum des arbres exploités n'est pas observé, et que l'on n'utilise pas de bonnes techniques de prélèvement. L'ICCN et l'autorité scientifique CITES de la RDC (*in litt.* to UNEP-WCMC, 2017) indiquent que quiconque souhaite exploiter *P. africana* doit être reconnu comme négociant et solliciter un permis annuel qui détaille la quantité et la localité du prélèvement autorisé. Une fois que le produit a été prélevé, un permis CITES doit alors être demandé à la Direction de la conservation de la nature (ICCN and CITES SA of DRC *in litt.* to UNEP-WCMC, 2017).

Cunningham *et al.* (1997) déclarent que, par le passé, l'écorce était prélevée dans les forêts afromontagnardes de la chaîne du Kivu dans la partie orientale du pays mais qu'en raison de problèmes politiques et infrastructurels plus récents dans la région, il est difficile d'évaluer le niveau et la structure du commerce de l'écorce. L'ICCN (2013) suggère d'interdire le prélèvement de *P. africana* dans les collines de Kateku et Buhimba, mais 30,12 tonnes d'écorce sèche par an peuvent être exploitées de manière durable à Kano, Kamuli, Kalongue kasopo et dans les collines de Runguta, en utilisant une rotation de 12 ans. L'ICCN (2013) ajoute que, pour veiller à la conservation de *P. africana* dans la province du Nord Kivu, il est nécessaire de faire d'autres travaux de recherche et de cartographie des sites de *P. africana*, d'élaborer un plan de gestion, une méthode de prélèvement approprié permettant à l'écorce de se régénérer et de mettre en place un programme de suivi et de recherche.

Dans son projet sur les législations nationales, le Secrétariat CITES classe la législation nationale de la RDC dans la catégorie 1, ce qui signifie que la législation permettrait généralement de remplir les obligations d'application de la CITES.

D. Problèmes identifiés n'ayant pas trait à l'application de l'Article IV, paragraphes 2 a), 3 ou 6 a).

Aucun.

E. Références

Betti, J. 2017. Dr Jean Lagarde Betti (University of Douala) *in litt.* to UNEP-WCMC, 21 March 2017.

Bodeker, G., Klooster, C. and Weisbord, E. 2014. *Prunus africana* (Hook.f.) Kalkman: The Overexploitation of a Medicinal Plant Species and Its Legal Context. *The Journal of Alternative and Complementary Medicine*, 20(11): 810–822.

Cable, S. and Cheek, M. (Eds.) 1998. *The Plants of Mount Cameroon; A Conservation Checklist*. Royal Botanic Gardens, Kew, UK.

Cheboiwo, J.K., Mugabe, R. and Langat, D. 2014. Review of conservation of *Prunus africana* and international trade opportunities for its bark in Kenya. *Journal of Emerging Trends in Engineering and Applied Sciences*, 5(6): 372–377.

Chupezi, T.J. and Ndoye, O. 2006. *Commercialisation of Prunus africana (African Cherry): impacts on poverty alleviation in Cameroon*. Yaounde, Cameroon. 9 pp.

Cunningham, A.B. and Mbenkum, F.T. 1993. *Sustainability of harvesting Prunus africana bark in Cameroon: a medicinal plant in international trade. No. 2*. Paris. 28 pp.

Cunningham, M., Cunningham, A.B. and Schippmann, U. 1997. *Trade in Prunus africana and the implementation of CITES*. Bonn, Germany.

Cunningham, T. 2008. Prunus africana: in situ conservation, sustainable management and governance. *Meeting at CITES*. Geneva. 59 pp.

Cunningham, A.B., Tientcheu, M.L.A., Anoncho, V.F., Nkuinkeu, R. and Sunderland, T. 2014. *Power, profits and policy: A reality check on the Prunus africana bark trade. Working Paper 153*. Bogor, Indonesia.

Cunningham, A., Anoncho, V.F. and Sunderland, T. 2016. Power, policy and the *Prunus africana* bark trade, 1972-2015. *Journal of Ethnopharmacology*, 178: 323–333.

Dawson, I., Were, J. and Lengkeek, A. 2000. Conservation of *Prunus africana*, an over-exploited African medicinal tree. *Forest Genetic Resources*, 28: 27–33.

Eben-Ebai, S. 2011. *Prunus africana management plan for the Mount Cameroon National Park and its support zone*. Buea, Cameroon. 36 pp.

FAO 1997. *Report. FAO Panel of experts on Forest Gene Resources*. Tenth Session. 9-11 September 1997. Rome, Italy.

Fashing, P.J. 2004. Mortality trends in the African cherry (*Prunus africana*) and the implications for colobus monkeys (*Colobus guereza*) in Kakamega Forest, Kenya. *Biological Conservation*, 120: 449–459.

Hall, J.B., O'Brien, E. and Sinclair, F.L. (Eds.) 2000. *Prunus africana A Monograph*. School of Agricultural and Forest Sciences, University of Wales, Bangor, UK. 104 pp.

ICCN 2013. *Potentiel sur pied de Prunus africana (Rosaceae) dans la zone de Walikake, province du Nord - Kivu en Republique Democratique du Congo, in projet « Avis de commerce non préjudiciable sur Prunus africana (Hook.f.) Kalkman en RDC»*. 56 pp.

ICCN and CITES SA of the DRC 2017. *The Congolese Institute for the Conservation of Nature (ICCN) and CITES Scientific Authority of the Democratic Republic of Congo in litt. to UNEP-WCMC,* 20 March *2017*.

Ingram, V., Awono, A., Schure, J. and Ndam, N. 2009. *National Prunus africana Management Plan for Cameroon*. Yaounde, Cameroon. 156 pp.

Ingram, V., Loo, J., Dawson, I., Vinceti, B., Duminil, J., Muchugi, A., Awono, A. and Asaah, E. 2015. *Perspectives for sustainable Prunus africana production and trade*. 10 pp.

Jimu, L. 2011. Threats and conservation strategies for the African cherry (*Prunus africana*) in its natural range - A review. *Journal of Ecology and the Natural Environment*, 3(4): 118–130.

Jøker, D. 2003. *Prunus africana* (Hook f.) Kalkman. *Seed leaflet*, 74.

Kadu, C.A.C., Schueler, S., Konrad, H., Muluvi, G.M.M., Eyog-Matig, O., Muchugi, A., Williams, V.L., Ramamonjisoa, L., Kapinga, C., Foahom, B. *et al.* 2011. Phylogeography of the Afromontane *Prunus africana* reveals a former migration corridor between East and West African highlands. *Molecular ecology*, 20: 165–178.

Kadu, C. a C., Parich, A., Schueler, S., Konrad, H., Muluvi, G.M., Eyog-Matig, O., Muchugi, A., Williams, V.L., Ramamonjisoa, L., Kapinga, C. *et al.* 2012. Bioactive constituents in *Prunus africana*: Geographical variation throughout Africa and associations with environmental and genetic parameters. *Phytochemistry*, 83: 70–78.

Kalkman, C. 1965. Rosaceae *Prunus africana*. *Blumea*, 13(33).

Katende, A.B. 1995. *Annotations to: WCMC printout of Trees of Uganda dated 23 Nov. 1995*.

Kiama, D. and Kiyiapi, J. 2001. Shade tolerance and regeneration of some tree species of a tropical rain forest in Western Kenya. *Plant Ecology*, 156: 183–191.

Mbatudde, M., Mwanjololo, M., Kakudidi, E.K. and Dalitz, H. 2012. Modelling the potential distribution of endangered *Prunus africana* (Hook . f .) Kalkm. in East Africa. *African Journal of Ecology*, 50: 393–403.

The Ministry of Forestry and Wildlife 2014. *The Management Plan of Mount Cameroon National Park 2015-2019*. Available at: http://documents.worldbank.org/curated/en/290571468007177234/pdf/E23260V30REPLA00Box391426B00PUBLIC0.pdf. [Accessed: 22/03/2017].

Muchugi, A., Lengkeek, A.G., Kadu, C.A.C., Muluvi, G.M., Njagi, E.N.M. and Dawson, I.K. 2006. Genetic variation in the threatened medicinal tree *Prunus africana* in Cameroon and Kenya: Implications for current management and evolutionary history. *South African Journal of Botany*, 72: 498–506.

Nkeng, P.F. 2009. *Sustainable management of Prunus africana (Hook.f.) Kalk. in Cameroon: an assessment of exploitation methods in Southwest, North-west and Adamaoua vicinities*.

Nkeng, P.F., Ingram, V. and Awono, A. 2010. *Assessment methods of Prunus africana bark exploitation methods and sustainable exploitation in the South west, North-West and adamaoua regions of Cameroon, in Project GCP/RAF/408/EC, « Mobilisation et Renforcement des Capacités des Petites*

et Moyennes Entreprises impliquees dans les filieres des produits forestiers non ligneux en afrique centrale ». FAO-CIFOR-SNV-World Agroforestry Center-COMIFAC, Yaounde, Cameroon. 55 pp.

Nkongmeneck, B., Nkenfack, A., Bindzi, I., Onguene Awana, N., Onana, J.M., Bekolo, B. and Mbarga, N.L. 2014. *Avis de commerce non prejudiciable (ACNP) du Prunus africana (Prunus africana (HOOK) Kalkmann) du Mont Oshie (arrondissement de Njikwa), dans le Prunus Allocation Unit (PAU) (North West Region)*. Yaoundé, Cameroon. 62 pp.

Nsawir, A.T. and Ingram, V. 2007. *Prunus africana*: money growing on trees? A plant that can boost rural economies in the Cameroon highlands. *FAO Nature & Faune Journal*, (22).

Oldfield, S., Lusty, C. and MacKinven, A. 1998. *The world list of threatened trees*. World Conservation Press, Cambridge, UK. 650 pp.

Orwa, C., Mutua, A., Kindt, R., Jamnadass, R. and Anthony, S. 2009. *Prunus africana*. Available at: http://www.worldagroforestry.org/resources/databases/agroforestree. [Accessed: 05/05/2017].

Schippmann, U. 2001. *CITES Project S-109: Medicinal Plants Significant Trade Study*. Bonn, Germany.

Smith, M.J., Benítez-Díaz, H., Clemente-Muñoz, M.Á., Donaldson, J., Hutton, J.M., Noel McGough, H., Medellin, R. a., Morgan, D.H.W., O'Criodain, C. and Oldfield, T.E.E. 2011. Assessing the impacts of international trade on CITES-listed species: Current practices and opportunities for scientific research. *Biological Conservation*, 144(1): 82–91.

Stewart, K. 2001. *The commercial bark harvest of the African cherry (Prunus africana) on Mount Oku, Cameroon: Effects on traditional uses and population dynamics*. Florida International University.

Stewart, K.M. 2003. The African cherry (*Prunus africana*): Can lessons be learned from an over-exploited medicinal tree? *Journal of Ethnopharmacology*, 89: 3–13.

Tchouto, P., Mbeng, H. and Lehrer, B. 2014. *Monitoring and evaluation report of Prunus africana harvesting activities in Block 1 during 2013, Mount Cameroon National Park PSMNR-SWR*. Buea, Cameroon. 12 pp.

Vinceti, B., Loo, J., Gaisberger, H., van Zonneveld, M.J., Schueler, S., Konrad, H., Kadu, C.A.C. and Geburek, T. 2013. Conservation priorities for *Prunus africana* defined with the aid of spatial analysis of genetic data and climatic variables. Vendramin, G.G. (Ed.). *PloS one*, 8(3): e59987.

World Conservation Monitoring Centre 1998. *Prunus africana*. Available at: http://www.iucnredlist.org. [Accessed: 22/03/2017].

Nardostachys grandiflora: Nepal

A. Summary

NEPAL:	Critically Endangered globally according to the IUCN Red List, with a population that is declining continuously and very rapidly. Widespread in Nepal, occurring mainly in west and central districts, but with higher densities in the west and a declining population in the east. Considered nationally 'threatened' in 2005. Main threats reported to be over-collection for domestic and international trade, as well as overgrazing. High and increasing levels of trade 2006-2015 in wild-sourced derivatives (870 746 kg) and oil (111 147 kg) as reported by Nepal only; 2016 exports were reported to be higher still based on Nepal's response to the consultation relating to the RST. Annual reports were submitted by Nepal for all years 2006-2015.District management plans are in place, allowing an annual harvest of 55 per cent of the growing stock, with harvest restricted to two months of the year, and inventories undertaken every 5 years. However, no details of comprehensive surveys were provided; it is unclear how harvest rates per district are calculated, and information on other management measures, such as length of rotation periods, is lacking. The basis for a robust non-detriment finding for this Critically Endangered species is unclear, and trade levels are likely to be impacting the species; therefore categorised as Action is needed.	RECOMMENDATION: Action is needed

RST Background

Nardostachys grandiflora was selected for the Review of Significant Trade (RST) as a priority species for review (all range States) at the 21st meeting of the Plants Committee, May 2014 (PC21 WG2 Doc. 1, PC21 ExSum. Cons.). *N. grandiflora* was identified as a species that met a high volume trade threshold 2007-2011 and a sharp increase in trade in 2011, on the basis of trade data presented in PC21 Doc. 12.4. At PC22 (October, 2015), responses to the Secretariat's consultation had been received from China and Nepal (PC22 Doc. 11.3 Annex). Bhutan, China and India were removed from the RST process (no exports), whilst Nepal was retained (PC22 Com. 3 (Rev. by Sec.), PC22 Sum. 5 (Rev. 1)).

N. grandiflora was previously included in the RST following CoP13 (2004). At PC15 (May, 2005), information on seven Asian medicinal species was considered in PC15 Doc. 10.2.2, and *N. grandiflora* was selected for review (PC15 WG2 Doc. 1 (Rev. 1), PC15 Summary Record). At PC16 (July, 2006), responses had been received from Bhutan, China and Nepal and the species was not retained in the RST process (PC16 Doc. 10.3 Annex 1, PC16 Summary Record).

B. Species characteristics

Taxonomic note: *N. grandiflora* was considered the only species in the genus *Nardostachys* (Olsen, 2005). Some literature, including the most recent IUCN assessment consider *N. grandiflora* to be a synonym of *N. jatamansi* (Ved *et al.*, 2015). In Inf PC10.2, TRAFFIC noted the need for clarity regarding the taxonomy of *Nardostachys grandiflora* with respect to *Nardostachys jatamansi* and

Valeriana jatamansi which also appeared to be used in Nepal. Where the literature used in this review uses a synonym, this is indicated by using square brackets.

Biology: *N. grandiflora* is a small, long-lived, perennial herb of between 10 and 60 cm with a stout rhizome (Singh *et al.*, 2013; Larsen and Olsen, 2008). A single plant produces one inflorescence and on occasion up to three, in August to September in Nepal (CITES Management Authority of Nepal *in litt*. to UNEP-WCMC, 2017). The fruiting season occurs from May until October (Ghimire *et al.*, 2008). Habitats include rocky outcrops, alpine meadows, juniper scrub, dwarf *Rhododendron* forests and open pine forests (Larsen and Olsen, 2008). The species occurs at around 4 000 meters above sea level, with a range between 2 200 m and 5 000 m above sea level (Larsen and Olsen, 2008; Ved *et al.*, 2015). Population density is at its lowest at an elevation of 3 300-3 400 m, and increases both above and below this range (CITES MA of Nepal *in litt*. to UNEP-WCMC, 2017). Within Nepal, it is found from east to west in the high mountains in the Himalaya region, at a 25-45 degree slope in alpine and subalpine zones (CITES MA of Nepal *in litt*. to UNEP-WCMC, 2017). Growth and recovery rates from perturbations were reported to be significantly higher in meadow habitat compared to rocky-outcrop habitat (Ghimire *et al.*, 2008).

C. Country review

Nepal

Distribution: *N. grandiflora* is endemic to the Himalayan mountain range, which passes through India, Nepal, southeast China (CITES MA of Nepal *in litt*. to UNEP-WCMC, 2017), southwest China, including Tibet, Yunnan and Sichuan, Myanmar and Bhutan (Larsen and Olsen, 2008; Singh *et al.*, 2013; Ved *et al.*, 2015). *N. grandiflora* occupies over 2000 miles (>5 000 km²) globally (Molur and Walker, 1998). It is found throughout the Himalayan region of Nepal, occurring in 25 districts (CITES MA of Nepal *in litt*. to UNEP-WCMC, 2017). It is present in Western Nepal in the Jumla, Humla, Mugu, Bajhang, Bajura, Dolpa, Kalikpt, Rukum, Rolpa, Jajarkot, Daliekh, Doti and Pyuthan regions (Singh *et al.*, 2013; CITES MA of Nepal *in litt*. to UNEP-WCMC, 2017). In Central Nepal, it is present in Manang, Dhading, Lamajung, Gorkha, Sindhupalchok, Baglung, Myagdi, Ramechhap, Nuwakot, Rasuwa (CITES MA of Nepal *in litt*. to UNEP-WCMC, 2017). No detailed information on distribution in Nepal is available (Olsen, 2005, *in*: CITES MA of Nepal *in litt*. to UNEP-WCMC, 2017). Occurrence in the country is provided in Figure 1.

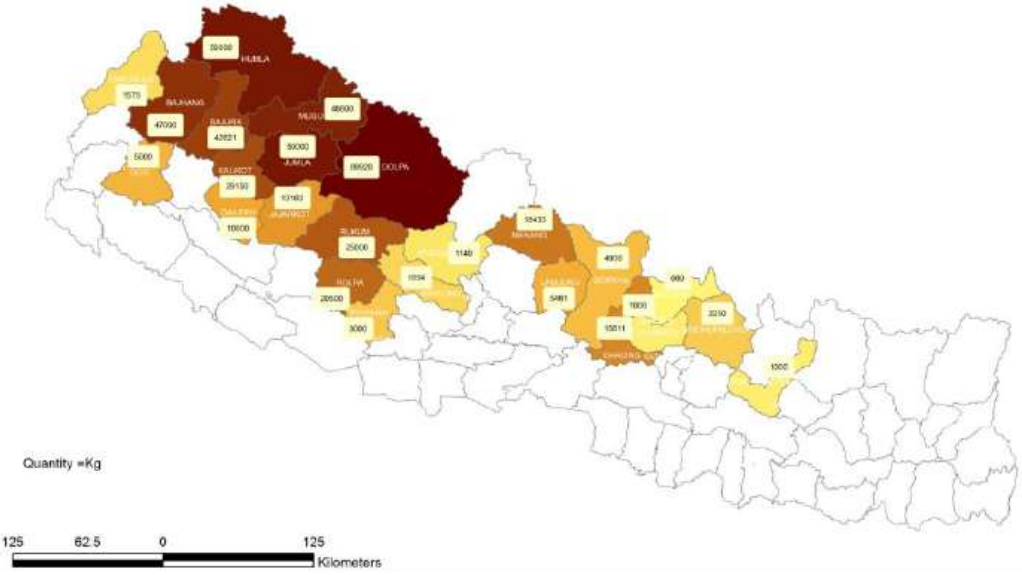


Figure 1. Distribution map of *N. grandiflora* in Nepal (CITES MA of Nepal *in litt*. to UNEP-WCMC, 2017). Shading represents population density, with darker shading representing higher densities. No key was provided.

Population status and trends: *N. grandiflora* [*Nardostachys jatamansi*] was categorised as Critically Endangered globally by the IUCN on the basis of overharvesting by medicinal plant collectors for commercial and smaller scale purposes, forest degradation and reduction in habitat size and quality (Ved *et al.*, 2015). The species was noted to be declining continuously and at a very fast rate on account of high demand and indiscriminate collection (Goraya *et al*., 2013, in Ved *et al.*, 2015), severely impacting the natural regeneration of the population (Ved *et al.*, 2015). This assessment stated that there are no extreme fluctuations or severe fragmentation in the population, but there is a decline in the area and/or the quality of the species habitat (Ved *et al.*, 2015).

A Conservation Assessment and Management Plan (CAMP) workshop which aimed to rapidly assess status of selected medicinal plant taxa of the north, north east and central India reported an observed population decline of 75-80 per cent in India for *N. grandiflora* 1997 to 2008 (Molur and Walker, 1998; Larsen and Olsen, 2008). The Nepali population declined by 30 per cent over a 10 years span before 2008 (Larsen and Olsen, 2008). *N. grandiflora* was classified as 'Critically Endangered' in northern India (Molur and Walker, 1998).

No further information on status in Nepal is available (Olsen, 2005, *in*: CITES MA of Nepal *in litt.* to UNEP-WCMC, 2017), although *N. grandiflora* was assessed as 'vulnerable' based on overharvesting (Olsen, 2005).

The greatest abundance of *N. grandiflora* in Nepal was reported to be in the Mid-Western Development Region with populations reported to be declining towards the east (Figure 1) (Amatya and Sthapit, 1994; CITES MA *in litt.* to UNEP-WCMC, 2017). Populations were reported to be concentrated in the districts of Jumla, Dolpa, Humla, Kalikot, and to some extent, the northern part of Gorka, Rasuwa and the southern part of Ganesh Himal (Nuwakot District) and Mustang (Amatya and Sthapit, 1994; CITES MA of Nepal *in litt.* to UNEP-WCMC, 2017).

According to Larsen and Olsen (2008), greater spatial and temporal monitoring was required in Nepal, and globally, to gain a more detailed account of the population and trends.

Threats: *N. grandiflora*, often referred to in trade as jatamansi, balchhad, bhulte (CITES MA of Forests Nepal, 2017), Indian nard, balchar and spikenard (Singh *et al.*, 2013) is considered to primarily be threatened by overharvesting of rhizomes and roots for traditional medicines, incense and aromatic oil, both for local use and for commercial export (Ghimire *et al.*, 2008). There has been a 'small but increasing' trade to Europe and North America for this purpose (PC15 Doc. 10.2.2). In 2000, an increase in demand was noted for herbal drugs, specifically from Himalayan medicinal plants, such *N. grandiflora* (Airi *et al.*, 2000). Overgrazing was noted as secondary threat in Nepal (Larsen and Olsen, 2008). Current market demand was reported to be 'sizable', with the level of exploitation noted to be high (Ved *et al.*, 2015).

N. grandiflora is used in Nepal for medicinal purposes, including to treat certain neurological and heart conditions (Larsen and Olsen, 2008), as well as an antibacterial, antifungal and anti-malarial (Singh *et al.*, 2013). During collection, whole plants are uprooted and disturbed (Ved *et al.*, 2015).

It has been noted there are three main forms of users of this species; the large scale commercial collectors, traditional medicine specialists for local use for medicine and incense and non-specialists, whose only use for this species is for incense (Ghimire *et al.*, 2008). It is estimated that 19 00 households gain 18-30 per cent of their income from the trade of this species and *Neopicrorhiza scrophulariiflora* (Larsen and Olsen, 2008).

Nepal was estimated to supply 82-87 per cent of rhizomes of *N. grandiflora* in the global trade (Olsen, 2005). Nepali *N. grandiflora* is primarily exported to India for use as an essential oil (Olsen, 2005). Despite being a leading exporter, Nepal was noted to import this species from Tibet (China) for the production of essential oils between 2001 and 2004 (Larsen and Olsen, 2008). A study of Nepali traders indicated that between 2005 and 2007, 2735 kg of dried *N. grandiflora* were exported from Nepal and generated on average 110 Nepalese rupees (ca. USD 1.42) per kilogram (Humagain and Shrestha, 2009). Annual trade of dried *N. grandiflora* in Nepal was estimated at 100-500 tonnes per annum (Larsen and Olsen, 2008). The export from Nepal of 21 tonnes of essential oils derived from *N. grandiflora* between 2000 and 2002 was also reported (Larsen and Olsen, 2008).

Within Nepal, non-selective harvesting by commercial traders was considered the greatest concern for species survival compared to the selective harvesting practise from the Tibetan medicine experts, the *amchi,* who do not exceed 10 per cent harvest rate, selectively harvest according to maturity, rhizome size and other factors and carry out cultivation and in situ management, such as seasonal harvests and wider ecosystem management (Ghimire *et al.*, 2008).

Other major threats affecting the species were reported to be habitat loss due to road construction, agricultural invasion and human settlements, as well as overgrazing by yak, sheep and cattle in high altitude areas (Ved *et al.*, 2015).

Trade: *N. grandiflora* was listed in CITES Appendix II on 18th September 1997. Nepal has submitted all CITES annual reports for the period 2006-2015 and has not published any quotas for the export of *N. grandiflora*.

According to data in the CITES Trade Database, direct trade in *N. grandiflora* from Nepal primarily comprised 870 746 kg of wild-sourced derivatives for commercial purposes, reported by Nepal only (Table 1). Direct exports of derivatives increased by more than four-times 2008-2014. Other products with notable levels of trade reported by Nepal were wild-sourced oil and roots reported by weight for commercial purposes. The CITES MA of Nepal (*in litt.* to UNEP-WCMC, 2017) reported that 330 589 kg of *N. grandiflora* derivatives and 5973 kg of oil were exported in 2016, higher than the annual quantities reported in trade for these products 2008-2015.

According to importers, direct exports from Nepal principally consisted of relatively low levels of wild-sourced oil reported by weight in 2014 and 2015.

In Nepal, oil was reported to be obtained from rhizomes at a yield of 1-2 per cent (CITES MA of Nepal *in litt*. to UNEP-WCMC).

Table 1: Direct exports of *Nardostachys grandiflora* from Nepal, 2008-2015. No trade was reported 2006-2007. Quantities rounded to whole numbers where applicable. Nepal has submitted all annual reports 2006-2015.

Term	Unit	Purpose	Source	Reported by	2008	2009	2010	2011	2012	2013	2014	2015	Total
derivatives	kg	T	W	Importer									
				Exporter	64501	74398	45026	41557	103570	128435	278872	237957	870746
extract	kg	T	W	Importer								15	15
				Exporter									
	-	T	W	Importer									

Term	Unit	Purpose	Source	Reported by	2008	2009	2010	2011	2012	2013	2014	2015	Total
				Exporter									
oil	kg	T	A	Importer								25	25
				Exporter									
			W	Importer							139	413	552
				Exporter	221	51	713	948	834	2609	3556	3163.5	11147.5
		-	-	Importer									
				Exporter					5				5
	-	T	W	Importer									
				Exporter								267	2664
roots	kg	T	W	Importer									
				Exporter				77380	83599				160979

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 21/03/2017

Indirect trade in *N. grandiflora* originating in Nepal comprised very low levels of commercial trade in wild-sourced and artificially propagated extracts and oils reported in 2011, 2014 and 2015 only.

Management: Nepal became Party to CITES on 18th June 1975, with entry into force on 16th September 1975, but has not yet ratified the Convention.

N. grandiflora was reported to be banned for export in Nepal by The Forest Act 1993 and Forest Regulation 1995, unless the species is included within a processed product (oil, derivatives) and permission of the Department of Forests has been granted (CITES MA of Nepal *in litt.* to UNEP-WCMC, 2017). Collection of the species takes place only in the west and central areas of the country (CITES MA of Nepal *in litt.* to UNEP-WCMC, 2017). Details of harvests (including actual area of collection, forest block, amount to be harvested, etc.) were reported to be compiled prior to collection permits being issued ensuring that that harvest only takes place from specific, pre-identified sites and only during October to November (CITEA MA of Nepal *in litt.* to UNEP-WCMC, 2017).

The Regional Forest Directorate Office monitors the status of *N. grandiflora*, trade and collection activities (CITES MA of Nepal *in litt.* to UNEP-WCMC, 2017). Officials of the Department of Forests were reported to visit collection sites and monitor activities (CITEA MA of Nepal *in litt.* to UNEP-WCMC, 2017). According to the CITES MA of Nepal (*in litt.* to UNEP-WCMC, 2017), the annual allowable harvest of *N. grandiflora* totals 487 838 kg across all 25 districts where *N. grandiflora* is present. The current annual harvesting quota is based on a maximum of 55 per cent of the growing stock in each region and is kept lower than the annual increment (CITES MA of Nepal *in litt.* to UNEP-WCMC, 2017). The actual available growing stock of *N. grandiflora* was not provided due to lack of availability of precise statistics (CITES MA of Nepal *in litt*. to UNEP-WCMC, 2017).

Medicinal and aromatic plants, thus including *N. grandiflora*, are managed by the Department of Forests through District Forest Management Plans, which require a resource inventory and stock take of forest species every five years within each district (CITES MA of Nepal *in litt.* to UNEP-WCMC, 2017). Of the districts with approved District Forestry Management Plans, *N. grandiflora* is harvested from 23 districts (CITES MA of Nepal *in litt*. to UNEP-WCMC, 2017). Annual allowable harvest (AAH) quantities per district are provided in Table 2. Wild collection was reported to mainly occur from government and community managed forests (Districts 1-23), with Shey Phoksundo National Parks being a Buffer Community Forest; Api Nampa Conservation Area was reported to have an approved management plan (CITES MA of Nepal *in litt*. to UNEP-WCMC, 2017).

On the basis that the total AAH was reported to be 487 838 kg and exports are lower, it was considered by the CITES MA of Nepal (*in litt*. to UNEP-WCMC, 2017) that export is "within the range of sustainability".

Table 2. Annual allowable harvestable (AAH) of *N. grandiflora* in Nepal, by district (CITES MA of Nepal *in litt*. to UNEP-WCMC, 2017).

	District name	Location within Nepal	AAH (in kg)
1	Jumla	West	50 000
2	Humla	West	50 000
3	Mugu	West	48 600
4	Bajhang	West	47 000
5	Bajura	West	42 621
6	Dolpa	West	39 920
7	Kalikot	West	29 150
8	Rukum	West	25 000
9	Rolpa	West	20 500
10	Manang	Central	18 433
11	Dhading	Central	15 811
12	Jajarkot	West	13 163
13	Dailekh	West	10 000
14	Lamajung	Central	5 461
15	Doti	West	5 000
16	Gorkha	Central	4 900
17	Pyuthan	West	3 000
18	Sindhupalchok	Central	2 250
19	Baglung	Central	1 654
20	Myagdi	Central	1 140
21	Ramechhap	Central	1 000
22	Nuwakot	Central	1 000
23	Rasuwa	Central	660
24	Shey Phoksundo National Parks	West	50,000
25	Api Nampa Conservation Area, Darchula	West	1 575
		Total	**487 838**

Each District's Five Year Management Plan was reported to include sustainable harvest mechanisms including harvesting techniques and rotation obligations (CITES MA of Nepal *in litt.* to UNEP-WCMC, 2017), although it was not clear exactly what these obligations relate to. According to the CITES MA of Nepal *in litt.* to UNEP-WCMC, 2017), status and trends of individual species including *N. grandiflora* are updated following forest inventories to update management plans of the District Forest Offices and the protected/conservation areas, and regular monitoring of the trade and status of medicinal aromatic plants takes place; however no specific information on the monitoring results and status of populations within districts was provided. According to the CITES MA of Nepal *in litt.* to UNEP-WCMC, 2017), wild collection is strictly regulated within government and community managed forests, and is backed by strong monitoring from community forestry user groups, district forest offices and Departments.

In accordance with the Environmental Protection Act 1996 and Environmental Protection Regulation 1997, an Initial Environmental Examination and an Environmental Impact Assessment is mandatory if a region collects more than 50 000 kg of *N. grandiflora* in a single year (CITES MA of Nepal *in litt.* to UNEP-WCMC, 2017). It was reported that the relevant studies have been approved for *N. grandiflora*, and detailed EIA studies were being conducting in Humla, Jumla, Manang and other districts, with

plans to carry out a detailed inventory of 10 high value medicinal/aromatic plants, including *N. grandiflora* in 2017 (CITES MA of Nepal *in litt.* to UNEP-WCMC, 2017).

N. grandiflora is present in some protected areas including the buffer zone area of Shey-Phoksundo National Park and Apinampa Conservation Areas which are under the jurisdiction of Department of National Parks and Wildlife Conservation, and up to 51 575 kg per year of *N. grandiflora* can be collected and traded from these areas (CITES MA of Nepal *in litt.* to UNEP-WCMC, 2017). A lack of enforcement and implementation of the Environmental Protection Acts of 1996 and 1997 was regarded as a concern by Larsen and Olsen (2008), who highlighted a need for greater capacity building (e.g. species-level training for police and customs officials), and a need to address institutional corruption.

There is evidence of management practises that allow sustainable harvest if less than 10 per cent of rhizomes are removed every five years in Nepal; however, this depends on the habitat as regeneration and growth rates vary (Ghimire *et al.*, 2008). Large scale harvesters for the commercial trade often employ unsustainable harvesting techniques, depending on value and market demand (Ghimire *et al.*, 2008).

Molur and Walker (1998) suggested that *in-situ* and *ex-situ* conservation was 'urgently needed' and recommend increased surveys, monitoring, ecosystem management, research into husbandry requirements and life history studies.

The Nepal National Biodiversity Strategy and Action Plan 2014-2020 outlined actions to conserve non-timber forest products and medicinal plants, including *ex-situ* propagation, but *N. grandiflora* was not specifically referred to (Ministry of Forests and Soil Conservation, 2014).

Through its national legislation project, the CITES Secretariat categorised the national legislation in Nepal as category 3, meaning legislation that is believed generally not to meet the requirements for the implementation of CITES.

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

Illegal exports of banned wildlife from Nepal were previously noted in the literature; it was estimated that 47 per cent of *N. grandiflora* exported from Nepal was illegal in 1997-1998 (Olsen, 2005). Trade between Nepal and India was not in line with CITES regulations as of 2005 (PC15 Doc. 10.2.2).

E. References

Airi, S., Rawal, R.S., Dhar, U. and Purohit, A.N. 2000. Assessment of availability and habitat preference of Jatamansi - A critically endangered medicinal plant of west Himalaya. *Current Science*, 79(10): 1467–1471.

Amatya, G. and Sthapit, V. 1994. A Note on *Nardostachys jatamansi*. *Journal of Herbs, Spices & Medicinal Plants*, 2(2): 39–47.

Banjade, M.R. and Paudel, N.S. 2008. Nepal: Economic Potential of Non-timber Forest Products in Nepal: Myth or Reality? *Journal of Forest Action*, 7: 36–48.

CITES Management Authority Department of Forests Nepal 2017. *A brief information on species subject to the CITES review of significant trade*. Kathmadu, Nepal. 1-17 pp.

Ghimire, S.K., Gimenez, O., Pradel, R., McKey, D. and Aumeeruddy-Thomas, Y. 2008. Demographic variation and population viability in a threatened Himalayan medicinal and aromatic herb

Nardostachys grandiflora: Matrix modelling of harvesting effects in two contrasting habitats. *Journal of Applied Ecology*, 45(1): 41–51.

Humagain, K. and Shrestha, K.K. 2009. Medicinal plants in Rasuwa district central Nepal: trade and livelihood. *Journal of Plant Science*, 6: 39–46.

Larsen, H.O. and Olsen, C.S. 2008. Towards Valid Non-Detrimental Findings for *Nardostachys grandiflora*. *NDF Workshop Case Studies, WG2-Perennials Case Study 3*, 1–16.

Ministry of Forests and Soil Conservation 2014. *Nepal National Biodiversity Strategy and Action Plan*. 1-226 pp.

Molur, S. and Walker, S. 1998. *Conservation assessment management plan workshop report for selected medicinal plants of northern, northeastern and central India (CAMP)*. Coimbatore, India. 62 pp.

Olsen, C.S. 2005. Trade and conservation of Himalayan medicinal plants: *Nardostachys grandiflora* DC. and *Neopicrorhiza scrophulariiflora* (Pennell) Hong. *Biological Conservation*, 125(4): 505–514.

Singh, U.M., Yadav, D., Tripathi, M.K., Kumar, A. and Yadav, M.K. 2013. Genetic diversity analysis of *Nardostachys jatamansi* DC , an endangered medicinal plant of Central Himalaya, using random amplified polymorphic DNA (RAPD) markers. *African Journal of Biotechnology*, 12(20): 2816–2821.

Ved, D., Saha, D., Ravkumar, K. and Haridasan, K. 2015. *Nardostachys jatamansi*. *IUCN Red List of Threatened Species*.

Bulnesia sarmientoi: Argentina and Paraguay

A. Summary

Global status	Endemic to the Chaco region of South America. Globally assessed by the IUCN as Lower Risk/conservation dependent (needs updating).	
ARGENTINA:	Occurs in three provinces in the north of the country. Commercially usable timber volume in Formosa province (where three quarters of all exports originate) was on average 5.3 m3 / ha in sample plots with presence of the species, although trees of a harvestable size were only present in a small proportion of plots surveyed. Over-exploitation is a threat. No export quotas have been published. High volume of exports 2008-2015 comprising >52 million kg of wild-sourced timber, plus additional trade reported by volume (converted to ~ 6 million kg) as reported by Argentina. Trade peaked in 2011 and has subsequently declined. Argentina has not yet submitted an annual report for 2014, but all other annual reports 2006-2015 were submitted. Argentina responded to the consultation relating to the RST. Management plans are a requirement of harvest; felled trees must be >35 cm DBH in Formosa. Some studies suggest that harvesting had not been suitably controlled, resulting in negative effects on the species and its habitat. Whilst some management measures are in place, the locations of permitted harvests and the volume of harvest in these areas was not provided. The basis for robust non-detriment findings for export in these locations is unclear and concerns relating to harvest management have been expressed, therefore categorised as Action is needed.	RECOMMENDATION: Action is needed
PARAGUAY:	Occurs in the west of the country in three departments. Considered an 'endangered' species in the country due to a number of factors, including rarity. Average abundance reported to be 23 individuals/ha for trees > 9.9 cm DBH, and 9 individuals/ha for trees > 30 cm DBH (minimum harvestable diameter), with an estimated average harvestable volume (trees > 30 cm DBH) of 7.1 m3/ha, although this harvestable volume is lower when considering trunks alone (1.73 m3/ha). Can be a dominant species where it occurs. Habitat loss, degradation, fire and over-exploitation are threats to the species. Export quotas of 250 000 kg of extract and 1.4 million kg of wood in 2014 only; trade in extract reported by Paraguay appears to have exceeded the quota. Exports 2008-2015 comprised > 2 million kg of wild-sourced timber, plus additional trade reported by volume (converted to ~ 900 000 kg). Notable	RECOMMENDATION: Action is needed

levels of trade in extract and oil were also reported. Trade peaked in 2011/2012 and has subsequently declined. Paraguay has not yet submitted an annual report for 2008, but all other annual reports 2006-2015 were submitted. Paraguay did not respond to the consultation relating to the RST. However, Paraguay submitted an NDF for this species to the European Commission in 2017, and this has been used extensively for this report. Management measures are in place, including a requirement for management plans in the location of harvest; felled trees must be >30 cm DBH. Quotas are calculated on the basis of a sustainable harvest level of 0.25 m3/ha/year, although it is unclear whether this is the most appropriate estimate to use when 0.1 m3/ha/year was derived from available tree growth rate information. The basis for the sustainability of this harvest rate, the locations where harvests are permitted and the volumes harvested in these areas are unclear. The basis for robust non-detriment findings for export in these locations is not clear; therefore, categorised as Action is needed.

RST Background

Bulnesia sarmientoi (Holy Wood) was selected for the Review of Significant Trade (RST) as a priority species for review (all range States) at the 21st meeting of the Plants Committee, May 2014 (PC21 WG2 Doc. 1, PC21 ExSum. Cons.). *B. sarmientoi* was identified as a species that met a high volume trade threshold 2007-2011, as well as in 2012, and a sharp increase in trade in 2011, on the basis of trade data presented in PC21 Doc. 12.4. At PC22 (October, 2015), responses to the Secretariat's consultation had been received from Argentina and Brazil (PC22 Doc. 11.3 Annex). The Plurinational State of Bolivia and Brazil were removed from the RST process (no exports), whilst Argentina and Paraguay were retained (PC22 Com. 3 (Rev. by Sec.), PC22 Sum. 5 (Rev. 1)).

B. Species characteristics

Biology: *B. sarmientoi* is a large tree with mature individuals reaching a height of 8-20 m and a diameter at breast height (DBH) of 30-70 cm (Waller *et al.*, 2012). The trees were reported to be xerophilous (TRAFFIC, 2010) and inhabit semi-arid parts of the Gran Chaco region which receives 600-900 mm rainfall per year (Waller *et al.*, 2012). *B. sarmientoi* was considered to grow in isolation or in small groves with good drainage (TRAFFIC, 2010). Navarro (1997, in CITES Scientific Authority of Paraguay *in litt*. to European Commission, 2017) noted the species preference for clay soils, which may indicate that the species develops in different conditions across the distribution.

B. sarmientoi is considered to be a slow-growing species, with an average growth rate estimated at 0.022-0.025 m^3/ha/ year (TRAFFIC South America, 2010) and trees reaching a basal diameter of 45 cm after 100 years (Giménez *et al.*, 2007). Their wood is aromatic (Waller *et al.*, 2012) and has a high-density of 1,280 g/dm^3 (Zerbatto *et al.*, 2009). The timber of *B. sarmientoi* is very hard and heavy (CITES SA of Paraguay *in litt*. to EC, 2017).

B. sarmientoi flowers between October and November and fruits between December and February, with seed germination in winter only; maturation is reached at around 20 years (Brack and Weik, 1994, in CITES SA of Paraguay *in litt*. to EC, 2017).

Distribution: *B. sarmientoi* is endemic to the Chaco region of South America (CoP15 Prop. 42) and can therefore be found in Argentina, Bolivia and Paraguay (Oldfield *et al.*, 1998) and marginally in Brazil (Taber *et al.*, 1997). The Gran Chaco is one of South America's most extensive biogeographical provinces, stretching from Santa Cruz in Bolivia (the northernmost extent) to Argentina's Chaco province in the south (Zerbatto *et al.*, 2009), and from the foot of the Andes mountains in the west to the tropical sub-humid forest and savannah of the Brazilian shield in the east, covering approximately 1 million km^2 in total (Taber *et al.*, 1997). The area contains heterogeneous vegetation with a variety of ecosystems (Taber *et al.*, 1997), and *B. sarmientoi* is mixed into the forest throughout 25 million hectares, but only sparsely distributed soil-specific plant communities provide adequate settlement conditions for the species (Waller *et al.*, 2012).

Population status and trends: *B. sarmientoi* was assessed by the IUCN Red List and classified as Lower Risk/conservation dependent (World Conservation Monitoring Centre, 1998). The Argentine Republic (2010) in UNEP-WCMC (2011) reported that there were no current quantitative population data for *B. sarmientoi*, but IUCN and TRAFFIC (2010) stated that the species had a wide range and apparently a very large global population.

Threats: *B. sarmientoi* was considered to be threatened by habitat destruction and by exploitation (TRAFFIC South America, 2010). The species is exploited for its fragrant wood (Oldfield *et al.*, 1998), essential oil (Waller *et al.*, 2012) and charcoal production (TRAFFIC South America, 2010). Traditional uses include burning the wood to act as an insect repellent, making fences or handicrafts, and brewing medicinal teas from its bark and leaves (Waller *et al.*, 2012) to treat a range of ailments (Mereles and Perez de Molas, 2008; TRAFFIC, 2010).

B. sarmientoi produces a fragrant essential oil called "lignum vitae oil", "guiac oil", "guayacol", "guajol", or "guayaco", which is obtained by steam distillation of wood chips and is widely used by the perfume and soap industries (Waller *et al.*, 2012), as well as in aromatherapy (Waller *et al.*, 2012). *B. sarmientoi* is a popular wood in the international timber trade for high quality furniture and floors; it was reported to have experienced a surge in trade at the beginning of the 21st century, with 100 tonnes exported from Argentina and Paraguay in the early 2000s, and with 40 000 tonnes exported in 2006 (TRAFFIC South America, 2010). Sawdust of *B. sarmientoi* can also be treated with solvents, which produces palo santo resin, which is used to make varnish, dark paints, and mosquito repellent coils (Waller *et al.*, 2012). The species produces quality coal that is easily ignited (CITES SA of Paraguay *in litt*. to EC, 2017).

Overview of trade and management: The Argentinian population of *B. sarmientoi* was listed in CITES Appendix III by Argentina on 12th February 2008 with the following annotation "Logs, sawn wood, veneer sheets, plywood, powder and extracts". On 23rd June 2010, *B. sarmientoi* was listed in Appendix II with the aforementioned annotation which was then updated on 2nd January 2017 as follows: "Logs, sawn wood, veneer sheets, plywood, powder and extracts. Finished products containing such extracts as ingredients of finished products, including fragrances, are not considered to be covered by this annotation."

According to data in the CITES Trade Database, global direct trade in *B. sarmientoi* predominantly comprised wild-sourced timber (reported by weight) for commercial purposes, with 42.6 million kg reported by importing countries and 53.3 million kg reported by exporting countries 2006-2015. Timber was also reported by volume. Based on an estimated weight of 1190 kg/m^3 (Meier, 2016), global trade in wild-sourced timber reported by volume comprised an additional 1.7 million kg timber (importers) and 7.1 million kg (exporters).

In 1997, Taber *et al.* found that 4.7 per cent of the Gran Chaco region is protected in various forms, including 3 441 000 ha in the Kaa-lya del Gran Chaco National Park and Integrated Management Area in Bolivia.

At CoP15, Argentina presented a proposal for inclusion of *B. sarmientoi* on Appendix II (CoP 15 Prop. 42), with all necessary requirements under CITES. The proposal was adopted and entered into force from June 2010 with annotation # 11, which designates logs, sawn wood, veneer sheets, plywood, powder and extracts.

C. Country reviews

Argentina

Distribution: *B. sarmientoi* was reported to occur in three provinces in Argentina: Chaco, Formosa and Salta, occupying an area of 8.3 million hectares, 1.7 million of which are its ecological optimum habitat (Waller *et al.*, 2012). Of these three provinces, Formosa and Salta are the main sources of *B. sarmientoi* timber, with Formosa producing 74 per cent of Argentina's *B. sarmientoi* annual exports (Waller *et al.*, 2012).

Population status and trends: Waller (2009) in CoP15 Prop 42 reported that *B. sarmientoi* populations in Argentina had been roughly estimated to occupy an area smaller than 25 000 km^2.

The CITES Management Authority of Argentina (*in litt.* to UNEP-WCMC 2017) reported that a survey of 193 plots of approximately 0.1 ha each was carried out in Salta and Chaco provinces in 2014 to monitor *B. sarmientoi* adult trees (diameter greater than 7.5 cm), with subplots of 0.02 ha for young 'regneration' trees (diameter less than 7.5 cm). The survey found that a relatively high proportion (6 per cent) of standing trees were dead in both provinces, with the health of the remaining trees generally better in Salta, where 65 per cent of standing trees in Rivadavía Department were considered healthy, compared to 52 per cent in Chaco in Güemes Department. A total of 717 adult trees and 184 young trees were recorded across all plots surveyed, giving an average of 39 adult trees and 49 young trees per hectare, equating to a total of 58 m^3 of timber with an average of 3.1 m^3 of timber per hectare. A previous survey at a study site in the Güemes Department (Chaco Province) resulted in a similar density estimate of 3.31 m^3/ha (Giménez *et al.*, 2007).

The CITES MA of Argentina (*in litt.* to UNEP-WCMC, 2017) reported that a similar survey was conducted in Formosa province also in 2014, with 128 plots of approximately 0.1 ha each to monitor *B. sarmientoi* adult trees (diameter greater than 7.5 cm), and subplots of 0.02 ha for young trees (diameter less than 7.5cm). A total of 320 adult trees in 55 plots, and 89 young trees in 20 plots were recorded, giving an average of 58 adult trees and 35 young trees per hectare, equating to an estimated average of 2.4 m^3 of timber per hectare, excluding branches (*i.e.* parts of the trees that can be used as sawn wood), and 5.3 m^3 of timber per hectare, including branches over 7 cm in diameter (*i.e.* parts of the trees that can be used commercially). Trees with a diameter over 30 cm, which is considered to be the minimum diameter used by the timber industry in the province of Formosa in practice (although 35 cm is the legal minimum), were present in only 37 plots, and healthy individuals of that size were only recorded in eight plots.

Threats: There was limited commercial use of *B. sarmientoi* until 2002, when demand from Asian countries drove its exploitation in Argentina (Zerbatto *et al.*, 2009). Exploitation was noted to be a general threat to the species across its range (TRAFFIC South America, 2010).

Trade: CITES annual reports have been submitted by Argentina 2006-2015 with the exception of 2014. Argentina has not published export quotas for *B. sarmientoi*.

According to data in the CITES Trade Database, direct trade in *B. sarmientoi* from Argentina predominantly comprised wild-sourced timber for commercial purposes, reported by weight, with 52 593 673 kg reported by Argentina and 40 711 694 kg reported by importers (Table 1). When considering trade reported by volume converted to weight (based on an estimated 1190 kg/m^3) importers reported an additional 1 664 798 kg and Argentina reported an additional 6 203 730 kg of wild-sourced timber.

Direct trade in *B. sarmientoi* from Argentina was first reported in 2008 (corresponding with the listing of the Argentinian population in Appendix III) and peaked in 2011 according to Argentina, and in 2012 according to importers (Table 1).

Table 1: Direct exports of *Bulnesia sarmientoi* from Argentina, 2008-2015. All direct trade was for commercial purposes. Quantities have been rounded to whole numbers, where applicable. Argentina has not yet submitted an annual report for 2014.

Term	Unit	Source	Reported by	2008	2009	2010	2011	2012	2013	2014	2015	Total
derivatives	kg	W	Importer			18952						18952
			Exporter									
plywood	kg	W	Importer									
			Exporter	1425								1425
timber	kg	A	Importer	129520	28220							157740
			Exporter									
		O	Importer	54280								54280
			Exporter									
		W	Importer	836103	631280	1870353	11920442	11980498	6960902	4575478	1936638	40711694
			Exporter	12327	9757	14368074	16117625	11940933	7992700		2152259	52593673
	m^2	W	Importer									
			Exporter					160				160
	m^3	A	Importer	21								21
			Exporter									
		W	Importer	426	101	219	490		68	78	16	1399
			Exporter	2187	703	955	917	63	30		358	5213
	-	W	Importer									
			Exporter	1716	1							1717
unspecified	kg	W	Importer									
			Exporter								28000	28000
veneer	kg	W	Importer									
			Exporter	13							1273	1286
	-	W	Importer									
			Exporter	2								2

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 20/04/2017

Indirect trade in *B. sarmientoi* originating in Argentina 2008-2015 comprised chips and derivatives reported by weight and timber reported by weight and volume (Table 2). All re-exports were for commercial purposes with the majority comprising wild-sourced trade.

Table 2: Indirect exports of *Bulnesia sarmientoi* originating in Argentina, 2008-2015. All indirect trade was for commercial purposes and quantities are rounded to whole numbers, where applicable.

Term	Unit	Source	Reported by	2008	2009	2010	2011	2012	2013	2014	2015	Total
chips	kg	W	Importer							22880		22880
			Exporter									
derivatives	kg	W	Importer				5142					5142
			Exporter									
timber	kg	A	Importer							25800		25800
			Exporter									
		W	Importer				12382		71080	68522		151984
			Exporter		40	1168						1208
	m^3	W	Importer							55800		55800
			Exporter					1				1

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 20/04/2017

Management: Argentina became a Party to CITES on 8th January 1981, with entry into force on 8th April 1981.

The CITES MA of Argentina (*in litt.* to UNEP-WCMC, 2017) outlined the multiple laws in Argentina that provide protection to native species such as *B. sarmientoi*. Resolution 1766/2007 states that all importation or exportation of products, by-products or derivatives of wild flora require documentation issued by the provincial authority. Law 26.331 establishes the minimum environmental protection

budgets for enrichment, restoration, conservation, use and sustainable management of native forests and the environmental services that they provide to society. This law is regulated by Decree 91, which suspends the possibility of authorising deforestation until territorial planning is completed and the national plan for the enrichment and conservation of native forests has been created. Resolution 393/2013 details the forest management requirements for exporting *B. sarmientoi* and states that the management plan must include information about the legal status of the forest, the owner, and the conservation category of the forest. The management plan also needs to include details of the current state of the forest, a history of the use and management of the forest, a forest inventory, details of planned activities for the forest including timber harvest, control measures for risks such as erosion and invasive species, and details of the expected future conditions of the forest (CITES MA of Argentina, *in litt*. to UNEP-WCMC, 2015).

Taber *et al.* (1997) found that by 1995, 0.2 per cent (96 118 ha) of Argentina's 500 000 km² of Gran Chaco had some form of protection in nine reserves.

Waller *et al*. 2012 reported that the Argentinian provinces of Formosa and Salta allow the harvest and transport of timber under a weak enforcement system predominantly composed of quotas, minimum log diameter restrictions, extraction permits and transport certificates. The main enforcement constraint in these areas was reported to be the lack of *in situ* control over the harvest and transport of *B. sarmientoi* (Waller *et al.*, 2012).

Zerbatto *et al.* (2009) found that a greater volume of trees were harvested by the timber industry than the volume of trees that remained in the forest, and in the six study sites investigated in central/ west of Formosa province that had recently been subjected to industrial exploitation, only 10 per cent of surviving trees with a diameter greater than 30 cm were healthy and fit for use, and in some areas no healthy trees remained. Zerbatto *et al.* (2009) suggested that the presence of large trees in the forest was a result of them being discarded by the timber industry, rather than the result of forest management. In one site in the western part of Formosa province, Zerbatto *et al.* (2009) were unable to find any healthy trees remaining after intervention by the timber industry. The authors stated that this suggested that the nature of exploitation under current circumstances was unsustainable. Zerbatto *et al.* (2009) reported that previous studies had found that the volume of abandoned trunks and thick branches in the forest was twice the volume of timber extracted by the industry; however in one hectare at one study site, Zerbatto *et al.* (2009) found that the volume of abandoned timber was equal to the extracted timber. Zerbatto *et al.* (2009) concluded that sustainable harvesting was not ensured at the provincial level in Argentina, and that the low levels of health of remaining individuals of *B. sarmientoi* after the timber industry have extracted their trees had a direct negative impact on the potential productivity of the forest.

Waller *et al.* (2012) stated that new legislation in Argentina was aiming to produce land management plans that would ensure forest persistence, and provincial management plans that would protect the most important forest regions. TRAFFIC South America (2010) stated that Argentina also has provincial laws that protect forest resources: Formosa province requires technical marking and a minimum cutting diameter for *B. sarmientoi* harvested individuals, and also requires 20 per cent of harvestable trees to be left standing; Salta province forbids the felling of *B. sarmientoi* on state land, but allows it on private land; Chaco province allows selective logging of *B. sarmientoi*; and Santiago del Estero province has banned the export of all untransformed forest products (TRAFFIC South America, 2010).

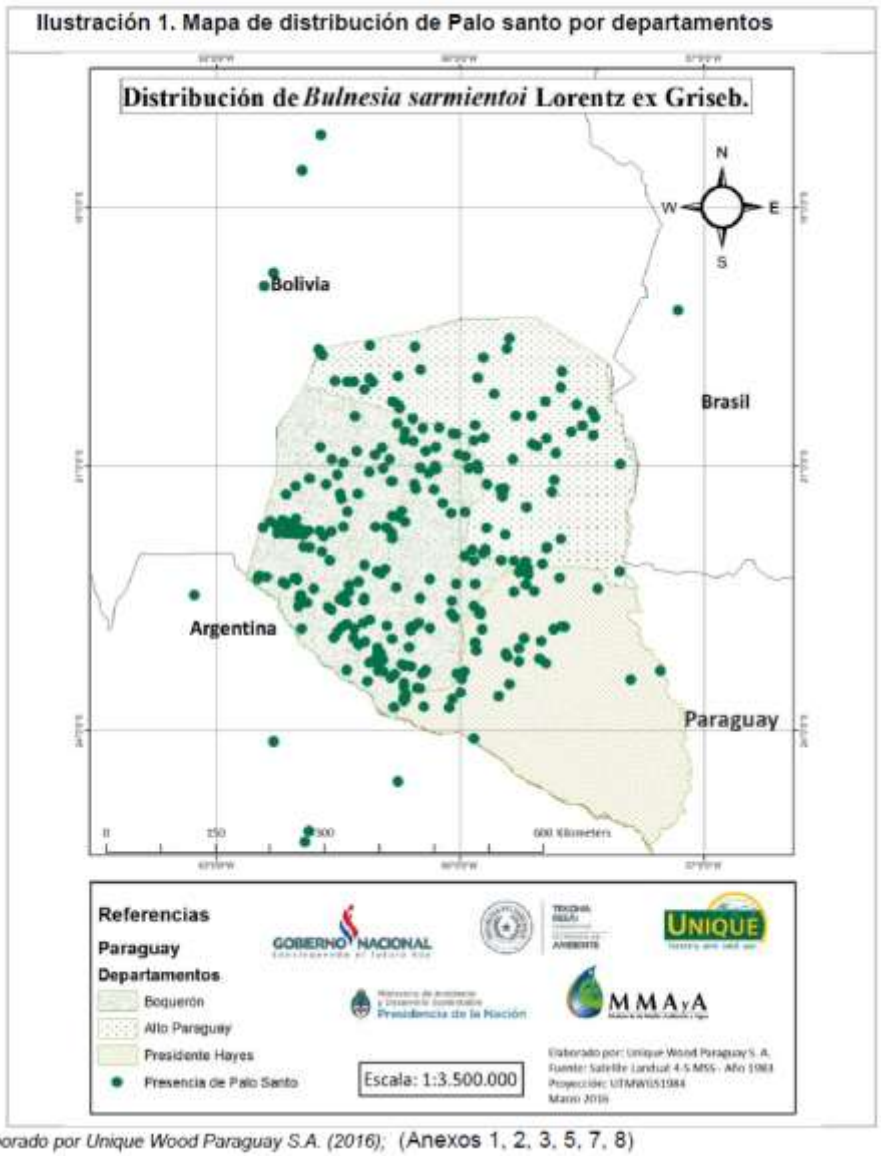
The CITES MA of Argentina (*in litt.* to UNEP-WCMC, 2017) stated that national legislations had been implemented to manage sustainable exports of *B. sarmientoi*. In 2013, Resolution 393 established the minimum requirements for sustainable harvest of *B. sarmientoi*, and required the production of management plans and land use change plans. The implementation of this legislation resulted in a decrease in the export of *B. sarmientoi* products from the provinces of Chaco, Salta and Formosa. In

2014, Resolution 585 was implemented, which banned the export of *B. sarmientoi* timber from areas that had land use change plans, as it was thought that there was insufficient information to assess whether allowing the harvest of species from these areas would be non-detrimental to *B. sarmientoi*. As a result of this, a regional forestry inventory was conducted in 2014 and Resolution 585 was extended in 2015 by Resolution 962.

Through its national legislation project, the CITES Secretariat categorised the national legislation in Argentina as legislation that is believed generally to meet the requirements for implementation of CITES.

Paraguay

Distribution: The species occurs in the west of the country in the Departments of Boquerón (9 166 900 ha), Alto (8 234 900 ha) and Presidente Hayes (7 290 700 ha) (CITES SA of Paraguay *in litt*. to EC, 2017). Although widely distributed within the Paraguayan Chaco, it was reported to have a homogenous distribution, being irregular and grouped (CITES SA of Paraguay *in litt*. to EC, 2017). Figure 1 provides a distribution map within the country.



Elaborado por Unique Wood Paraguay S.A. (2016); (Anexos 1, 2, 3, 5, 7, 8)

Figure 1. Distribution map of *B. sarmientoi* within Paraguay (CITES SA of Paraguay *in litt*. to EC, 2017).

Population status and trends: *B. sarmientoi* is included in the SEAM (Secretariat for the Environment) category 'N2N3' due to its rarity (6-20 localities, few individuals per hectare), or other factors rendering the species likely to disappear from the country or region, and at the national level the species is considered 'endangered' (CITES SA of Paraguay *in litt*. to EC, 2017).

In the Paraguyan Chaco, *B. sarmientoi* grows in dry forests where it thrives on loamy, well-structured soils that are brackish to salty and with a brackish to salty water table less than 6 m deep; in this environment it was reported to be the dominant species in the upper layer forming pure stands (CoP15 Prop. 42; CITES SA of Paraguay *in litt*. to EC, 2017).

According to the CITES SA of Paraguay (*in litt*. to EC, 2017) a number of inventories have taken place in different ecoregions in the country that surveyed individuals with a DBH of >9.9 cm (Table 3). Distribution of individuals by diametic classes is provided. An average abundance of 23 individuals/ha over 9.9 cm DBH was estimated (CITES SA of Paraguay *in litt*. to EC, 2017). The average volume estimated was 4.5 m^3/ha in the wet Chaco, 5.5 m^3 in the dry Chaco and 0.4 m^3 in Pantanal, but the overall harvestable volume was estimated at an average of 7.1 m^3 / ha (CITES SA of Paraguay *in litt*. to EC, 2017). Individual trees were estimated to grow at an average of 0.01 m^3 per year (CITES SA of Paraguay *in litt*. to EC, 2017). In their study of two forests in the Boqueron region of the Paraguay Chaco in north-west Paraguay, Mereles and Perez de Molas (2008) found that *B. sarmientoi* grew in an abundance of 11-46 trees per hectare.

Table 3. Abundance of *B. sarmientoi* in regions of Paraguay, according to diametic classes (CITES SA of Paraguay *in litt*. to EC, 2017).

Author	Ecoregion	Individuals / ha	Diametric classes					
			I (10-20)	II (20.1-30)	III 30.1-40)	IV (40.1-50)	V (50.1-60)	VI (>60)
Santacruz (2014a)	Humid Chaco	23	10	4	5	3		1
Moals (2011); Ferreira (2012)	Humid Chaco	31	15	14		2		
Duate (2013)	Humid Chaco	15	5	3	3	4		
Rempel (2007)	Dry Chaco	26	8	8	7	3		
Benitez (2010)	Dry Chaco	19	5	4	8	2		
Molas (2013)	Dry Chaco	24	13	8	2	1		

Threats: The CITES SA of Paraguay (*in litt*. to EC, 2017) recognised the main threats to the species in the country as habitat loss and degradation and fire. It was noted that 143 656 ha was deforested between August 2013 and January 2014, with the estimated rate of deforestation of 629 ha per day in the West Region (Chaco) and 35 ha per day in the East Region between January-July 2014 (CITES SA of Paraguay *in litt*. to EC, 2017). In the West region deforestation rates increased to 1008 ha per day between July 2014 to January 2015. Trade was not considered a threat by the CITES SA of Paraguay (*in litt*. to EC, 2017), who also reported that illegal trade was almost unknown.

The species is mainly utilized in Paraguay for its timber, but also the essential oil extracted from debarked wood that is used in cosmetics (CITES SA of Paraguay *in litt*. to EC, 2017).

Exploitation was noted to be a general threat to the species across its range (TRAFFIC South America, 2010). Waller *et al*. (2012) reported that 89 per cent of Paraguay's timber exports of *B. sarmientoi* from

2000 to 2004 were exported to China, and from 2000 to 2006, 67 per cent of *B. sarmientoi* timber exports were trunks in different stages of processing, and 33 per cent of exports were sawn wood. Mereles and Perez de Molas (2008) noted that Paraguay is the main producer of *B. sarmientoi* essential oil. Waller *et al*. (2012) stated that during the last decade, Paraguay exported 130-180 tonnes of essential oil per year, equivalent to approximately 5,000 tonnes of timber, with the main importers being France, Germany, US, India, Spain, UK, Korea, Netherlands and Switzerland. However, Waller *et al*. (2012) also reported that according to Paraguayan producers, most of the wood used in the oil distillation process is the by-product of timber extraction of land clearance activities such as fallen trees, branches and sawdust, and is therefore not a threat to *B. sarmientoi*. Despite this claim, Waller *et al*. (2012) considered that it still needed to be demonstrated that all wood used in oil distillation was a by-product of other activities.

Trade: CITES annual reports have been submitted by Paraguay for all years 2006–2015, with the exception of 2008. Paraguay published export quotas in 2014 for 250 000 kg extract and 1 400 000 kg wood. Trade in *B. sarmientoi* extract appeared to exceed the export quota value set in 2014, as reported by Paraguay (Table 3). The CITES SA of Paraguay (*in litt*. to EC, 2017) confirmed that a precautionary export quota of 1 400 tons/year of wood and 250 tons of extract was set for 2014 with a two year duration, but that with regular monitoring of the Scientific Authority could be changed.

Paraguay issued a voluntary moratorium on all trade in specimens of CITES-listed species in 2003 (CITES Notif. No. 2003/058); in 2009 this was lifted for Appendix III species and non-commercial trade (CITES Notif. No. 2009/036). The voluntary moratorium was further lifted in 2011 for, *inter alia*, essential oil and timber of *B. sarmientoi* (CITES Notif, No. 2011/009) and was completely lifted in 2014 (CITES Notif. No 2014/009). Trade in *B. sarmientoi* from Paraguay was reported 2009-2015 by Paraguay and 2008-2015 by importers (Table 4).

According to data in the CITES Trade Database, direct exports of *B. sarmientoi* from Paraguay was mainly in wild-sourced timber, reported by weight, for commercial purposes and reported without a purpose specified (2 343 394 kg wild-sourced timber according to Paraguay and 1 891 243 kg according to importers (Table 4). When trade reported by volume is converted to weight, Paraguay reported an additional 898 202 kg of wild-sourced timber while importers reported 53 187 kg of additional trade. When trade by weight is considered (including those reported by volume and converted to kilograms), exports peaked in 2011 according to Paraguay and 2012 according to importers. Notable levels of trade in extract and oil (by weight) were also reported by both Paraguay and importers 2008-2015 (Table 4). The CITES SA of Paraguay (*in litt*. to EC, 2017) stated that the waxed cyclinder was the most exported product from Paraguay.

Indirect trade in *B. sarmientoi* originating in Paraguay 2008-2015 predominantly comprised wild-sourced extract, oil and timber for commercial purposes (Table 5). Both importers and re-exporters reported an increase in indirect trade reported by weight 2008-2015.

According to the biennial reports of the CITES MA of Argentina, there were a number of seizures of *Bulnesia sarmientoi* in 2008 that totalled 199, 584 m² timber, 28 kg of logs, 730 logs and 20 pieces.

Table 4: Direct exports of *Bulnesia sarmientoi* from Paraguay, 2008-2015. Quantities rounded to whole numbers where applicable. Paraguay has not yet submitted an annual report for 2008.

Term	Unit	Purpose	Source	Reported by	2008	2009	2010	2011	2012	2013	2014	2015	Total
carvings	kg	T	W	Importer									
				Exporter					357730	189000			546730
		-	W	Importer									
				Exporter						27000			27000
			-	Importer			1890						1890
				Exporter									
	m^3	T	W	Importer									
				Exporter		16			40				56
chips	kg	-	W	Importer									
				Exporter							21531	26000	47531
derivatives	kg	T	W	Importer		190				4370			4560
				Exporter									
		-	W	Importer									
				Exporter								28	28
extract	kg	T	W	Importer	6300	5700	19550	62422	20130	26460	77613	82656	300832
				Exporter		104810	159274	347220		40256			651560
		-	W	Importer									
				Exporter							273006	60115	333121
	m^3	T	W	Importer									
				Exporter			1791						1791
	-	T	W	Importer									
				Exporter				18299					18299
live	kg	T	W	Importer								380	380
				Exporter									
oil	kg	T	A	Importer							1140		1140
				Exporter									
			I	Importer						35			35
				Exporter									
			W	Importer			30210	80960	38072	53365	57541	20595	280743
				Exporter					298240	90706			388946
		-	W	Importer									
				Exporter					39590				39590

Term	Unit	Purpose	Source	Reported by	2008	2009	2010	2011	2012	2013	2014	2015	Total
			-	Importer		3420	3430						6850
				Exporter									
	-	T	W	Importer									
				Exporter					4900				4900
timber	kg	T	W	Importer			4006	520580	674794	967	197184	493712	1891243
				Exporter			98983	500822	49249	59359			708413
		-	W	Importer									
				Exporter							1048377	586605	1634982
			-	Importer			560						560
				Exporter									
	m^3	T	W	Importer				40	4		1		45
				Exporter				672	83				755
	-	T	W	Importer									
				Exporter					596				596

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 20/04/2017

Table 5: Indirect exports of *Bulnesia sarmientoi* originating in Paraguay, 2008-2015. All indirect trade was for commercial purposes. Quantities rounded to whole numbers where applicable.

Term	Unit	Source	Reported by	2008	2009	2010	2011	2012	2013	2014	2015	Total
derivatives	kg	O	Importer									
			Exporter		155							155
		W	Importer			300	875					1175
			Exporter		190	1040	1273	185				2688
extract	kg	A	Importer							30		30
			Exporter							31		31
		O	Importer		25	100						125
			Exporter	1710	445	330		22				2507
		W	Importer		3230	5940	33580	6487	6699	14696	7570	78203
			Exporter		4750	16050	9291	9560	14592	20123	13524	87890
	l	W	Importer									
			Exporter				590	190				780
oil	kg	A	Importer									
			Exporter								215	215

Term	Unit	Source	Reported by	2008	2009	2010	2011	2012	2013	2014	2015	Total
		W	Importer		190	1175	2210	2571	7369	5084	9176	27775
			Exporter		1780	7868	8130	8656	15420	15196	19938	76989
	-	W	Importer						1			1
			Exporter									
timber	kg	W	Importer							70000		70000
			Exporter									

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 20/04/2017

Management: Paraguay became a Party to CITES on 15th November 1976, with entry into force on 13th February 1977.

Species that are classified as 'endangered' under the Paraguayan SEAM Resolution No 2243/06, including *B. sarmientoi,* cannot be harvested or used commercially unless areas of harvest have management plans approved by competent authorities and with relevant permits, under SEAM Resolution 2531/06 (CITES SA of Paraguay *in litt*. to EC, 2017)

Harvests were reported to be governed by the management plans of the National Institute of Forestry (INFONA), with a requirement for forest inventories that record trees greater than or equal to 10 cm DBH within plots of 2000 m^2, with commercial height and health of tree reported (CITES SA of Paraguay *in litt*. to EC, 2017). Species management plans and Land Use Plans are authorized by IFONA (CITES SA of Paraguay *in litt*. to EC, 2017). During 2011-2014, INFONA authorized the change of land use for 442 712 ha of forest containing *B. sarmientoi*; 201 335 m^3 of logs were subsequently extracted, although the documentation on possession represented only 19 823 m^3 (CITES SA of Paraguay *in litt*. to EC, 2017).

The CITES SA of Paraguay (*in litt*. to EC, 2017) reported that the plausible sustainable harvest for the species is from 0.10 to 0.40 m^3/ha/ year and by knowing the total area with forests of the species remaining, the total approximate increase in Paraguay can be derived. At the production stage, the annual extraction quota was calculated by multiplying the average range of sustainable harvest (0.25 m^3/ha/ year) to the estimated surface area of 62 641 ha/ year to calculate the gross harvestable volume of 15 660 m^3/ year (CITES SA of Paraguay *in litt*. to EC, 2017). The CITES SA of Paraguay (*in litt*. to EC, 2017) provided some information on the calculation of sustainable harvest rates. These rates were derived from calculations of volume produced per tree (0.0034 m^3 per year) multiplied by total number of trees per hectare (30 trees/ha), resulting in 0.1 m^3/ha/year; as well as from estimates of available harvestable (>30cm DBH) volume per hectare (average of 5.3 m^3/ha,), adjusted by the number of years (15 or 20) between harvests, resulting in 0.35 m^3/ha/year, although it is unclear how it was determined that these harvest cycles are sustainable.

Taber *et al.* (1997) found that by 1995, 3.1 per cent (1 100 000 ha) of Paraguay's 350 000 km^2 of Gran Chaco had some form of protection in three reserves. Waller *et al*. (2012) stated that new legislation in Paraguay was aiming to make land management plans that would ensure forest persistence, but noted that timber trade statistics in Paraguay are not sufficiently reliable to assess the volume of harvest.

Through its national legislation project, the CITES Secretariat categorised the national legislation in Paraguay as category 1, meaning legislation that is believed generally to meet the requirements for implementation of CITES.

The CITES Authorities in Paraguay were consulted as part of this review, but no response was received. However, Paraguay did submit a non-detriment finding for this species to the European Commission in 2017, and this has been used extensively for this report.

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

Waller *et al.* (2012) found that each Argentinian province had different taxes and rules regarding the processing of timber, which may have encouraged smuggling operations between provinces. Some illegal trade in Argentina was previously reported (see 'Trade').

E. References

CITES Management Authority of Argentina. 2017. *in litt.* to UNEP-WCMC, April 2017.

CITES SA of Paraguay. 2017. *in litt*. to the European Commission, 2017.

Giménez, A.M., Hernández, P., Gerez, R. and Rios, N. 2007. Diversidad vegetal en siete unidades demostrativas del Chaco semiárido argentino. *Madera y Bosques*, 13(1): 61–78.

IUCN and TRAFFIC 2010. *IUCN/ TRAFFIC analyses of the proposals to amend the CITES appendices*. Prepared by IUCN Species Programme, SSC and TRAFFIC for the Fifteenth Meeting of the Conference of the Parties to CITES. IUCN- International Union for the Conservation of Nature, Gland, Swizerland.

Meier, E. 2016. *Verawood*. Available at: http://www.wood-database.com/verawood/. [Accessed: 04/05/2017].

Mereles, F. and Pérez de Molas, L. 2008. *Bulnesia sarmientoi Lorentz ex Griseb., (Zygophyllaceae): estudio de base para su inclusión en el Apéndice II de la Convención CITES*. WWF Paraguay, Lambaré, Paraguay.pp.

Oldfield, S., Lusty, C. and MacKinven, A. 1998. *The world list of threatened trees*. World Conservation Press, Cambridge, UK. 650 pp.

Taber, A., Navarro, G. and Arribas, M.A. 1997. *A new park in the Bolivian Gran Chaco - an advance in tropical dry forest conservation and community-based management*. Wiley Online Library. 189–198 pp.

TRAFFIC South America 2010. *CoP15 Proposal 42 Analysis*. Available at: http://www.traffic.org/cop15-table [Accessed: 04/05/2017].

UNEP-WCMC 2011. *Review of Bulnesia sarmientoi from Paraguay*. Version edited for public release. UNEP-WCMC, Cambridge.

Waller, T. 2009. *Palo Santo (Bulnesia sarmientoi): Situación y tendencias en su explotación.* Informe inédito presentado durante la 18a Reunión del Comité de Flora de la CITES. 17 al 21 de Marzo de 2009. Buenos Aires. 20pp.

Waller, T., Barros, M., Draque, J. and Micucci, P. 2012. Conservation of the Palo Santo tree, *Bulnesia sarmientoi* Lorentz ex Griseb, in the South American Chaco Region. *Newsletter of the Medicinal Plant Specialist Group of the IUCN Species Survival Commission*, 15(May 2012): 4–9.

World Conservation Monitoring Centre 1998. *Bulnesia sarmientoi*. IUCN Red List of Threatened Species 1998. Avaliable from: http://dx.doi.org/10.2305/IUCN.UK.1998.RLTS.T32028A9675710.en. [Accessed 04/05/2017]. .

Zerbatto, M., Degano, W.A., Barros, M., Draque, J., Alvarenga, E. and Waller, T. 2009. *Situación de la especie Palo Santo (Bulnesia sarmientoi Lorentz ex Griseb) en la provincia de Formosa: estudio de sitios de extracción en los Departamentos Matacos y Bermejo.* Fundación Biodiversidad-Argentina, Formosa.