CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Twenty-second meeting of the Plants Committee
Tbilisi (Georgia), 19-23 October 2015

Interpretation and implementation of the Convention

Trade controls and marking

TIMBER IDENTIFICATION CAPABILITIES AT THE NATIONAL FISH AND WILDLIFE FORENSIC LABORATORY

This information document has been submitted by the CITES Management Authority of the United States of America in relation to agenda item 14.[1]

[1] *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

Timber identification capabilities at the National Fish and Wildlife Forensic Laboratory.

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Species identification of logs, planks, and veneers is difficult because they lack the traditional descriptors such as leaves and flowers. An additional challenge is that many transnational shipments have unreliable geographic provenance. Therefore, frequently the lowest taxonomic determination using traditional wood anatomy is genus, which allows unscrupulous importers to evade endangered species laws.

The National Fish and Wildlife Forensic Laboratory (Lab) is currently using traditional wood anatomy for determining genus of timber, and a novel tool, called Direct Analysis in Real Time (DART) Time-Of-Flight Mass Spectrometer (TOFMS), to determine species of wood evidence associated with criminal investigations.

To date the Lab has developed mass spectrometer databases for:

1) The identification of *Aquilaria* sp. (agarwoods) and look-alikes.
2) Distinguishing wild from cultivated *Aquilaria* sp.
3) The identification of *Dalbergia* sp. (rosewoods) and look-alikes from S. America, C. America, S.E. Asia, Africa and Madagascar.
4) The identification of *Swietenia* sp. (mahagony) and look-alikes.
5) The identification of *Cedrela* sp. (Spanish cedar) and look-alikes.
6) Distinguishing plantation grown (Africa) from wild *Cedrela* sp.
7) The identification of *Platymiscium* sp. (pernambuco) and look-alikes.

The published references to some of these capabilities are listed below:

i. Lancaster, Cady and Espinoza, Edgard. 2012. "Analysis of Select Dalbergia and Trade Timber

Using Direct Analysis in Real Time and Time-of-Flight Mass Spectrometry for CITES Enforcement". Rapid Communications in Mass Spectrometry. Vol. 26(9) pp. 1147-1156.

ii. Lancaster, Cady and Espinoza, Edgard. 2012. " Evaluating Agarwood products for 2-(2-phenylethyl)-chromones using Direct Analysis in Real Time Time-of-Flight Mass Spectrometry". Rapid Communications in Mass Spectrometry Vol. 26(13) pp. 2649-2656.

iii. Espinoza, Edgard O., Cady A. Lancaster, Natasha M. Kreitals, Masataka Hata, Robert B. Cody and Robert A. Blanchette. 2014. Distinguishing Wild from Cultivated Agarwood (*Aquilaria* spp.) Using Direct Analysis in Real Time (DART™) and Time-of-Flight Mass Spectrometry." Rapid Communications in Mass Spectrometry Vol. 28(14) pp.281-289.

iv. PJ.McClure, GD Chavarria and EO Espinoza. 2015. Metabolome chemotypes of CITES protected *Dalbergia* timbers from Africa, Madagascar and Asia. Rapid Communications in Mass Spectrometry. Vol. 29, pp.783-788.

v. Rabi A. Musah, Edgard O. Espinoza, Robert B. Cody, Ashton D. Lesiak, Earl D. Christenen, Hannah Moore, Simin Maleknia, 2015. A High Throughput Ambient Mass Spectrometric Approach to Species Identification and Classification from Chemical Fingerprint Signatures. Scientific Reports. 5:11520

vi. Espinoza, Edgard O, Michael C Wiemann, Josefina Barajas-Morales, Gabriela D Chavarria, and Pamela J McClure 2015. Forensic Analysis of CITES Protected Dalbergia Timber from the Americas. International Association of Wood Anatomists Journal. Vol. 36 (3), pp. 311-325.

vii. Eleanor Dormontt; Markus Boner; Gerhard Breulmann; Bernd Degen; Edgard Espinoza; Shelley Gardner; Phil Guillery; Gerald Koch; Soon Leong Lee; Anto Rimbawanto; Darren Thomas; Alex Wiedenhoeft; Yafang Yin; Johannes Zahnen; Andrew Lowe. 2015. Forensic timber identification: it's time to integrate disciplines to combat illegal logging. Biological Conservation. August 2015.