



# Identification of Timber Species and Origins Regional Workshop for Asia, Pacific & Oceania Report

20-21 August 2013, Beijing, China



Federal Ministry  
of Food, Agriculture  
and Consumer Protection

# Identification of Timber Species and Origins Regional Workshop for Asia, Pacific and Oceania Report

Beijing, China, 20-21 August 2013

Marius R.M. Ekué and Judy Loo

## Organized by

Bioversity International in collaboration with the Chinese Academy of Forestry (CAF) and the Asia Pacific Association of Forestry Research Institutions (APAFRI).

## Supported by

The Federal Republic of Germany

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**Bioversity International** is a world leading research-for-development non-profit organization, working towards a world in which smallholder farmers and rural communities in developing countries are thriving and sustainable. Bioversity's purpose is to investigate the use and conservation of agricultural and forest biodiversity in order to achieve better nutrition, improve livelihoods and enhance agricultural and forest sustainability. Bioversity International works with a global range of partners to maximize impact, to develop capacity and to ensure that all stakeholders have an effective voice.

Bioversity International is a member of the Consultative Group on International Agricultural Research (CGIAR) Consortium. CGIAR is a global research partnership for a food secure future.

The project "Identification of Timber Species and Origins" is a part of the CGIAR Research Program on Forests, Trees and Agroforestry: Livelihoods, Landscapes and Governance. This program has the clear objective of enhancing the management and use of forests, agroforestry and tree genetic resources across the landscape from forests to farms.

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Great Wall China - Ekúé MRM

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## ACKNOWLEDGMENTS

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The organizers wish to thank all participants for delivering presentations and contributing to the discussions.

We extend our warm thanks to all of our colleagues from the Chinese Academy of Forestry Bioversity-China and Bioversity-Malaysia and for their technical, administrative or logistic supports.

## ABBREVIATIONS

APO	Asia, Pacific and Oceania
BOLDSystems	The Barcode of Life Database
BMVEL	German Federal Ministry of Food, Agriculture and Consumer Protection
CAF	Chinese Academy of Forestry
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CRIWI	Research Institute of Wood Industry
FAO	Food and Agriculture Organization of the United Nations
GTTN	Global Timber Tracking Network
IAEA	International Atomic Energy Agency
Ibol	International Barcode of Life
ITTO	International Tropical Timber Organization
IUFRO	International Union of Forest Research Organizations
NIRS	Near Infrared Spectroscopy
SNPs	Single Nucleotide Polymorphism
TI	Thünen-Institut
TreeBol	Tree Barcode of Life
USDA	United States Department of Agriculture
WWF	World Wildlife Fund

## EXECUTIVE SUMMARY

The Regional Workshop for Asia, Pacific and Oceania for the project “Identification of Timber Species and Origins” was held in Beijing, China, 20 - 21 August, 2013. The project (Identification of Timber Species and Origins) was initiated to facilitate the practical application of timber species identification and timber tracking tools based on DNA and stable isotope markers for a number of priority timber species. The workshop brought together 78 participants concerned about illegal logging and related trade. The objectives were to:

- Inform stakeholders about aims and progress in the timber tracking initiative and gain their support,
- Provide an opportunity for information exchange about related projects and issues in the region,
- Identify interested experts and institutes in the region, and initiate discussions on their involvement in the network,
- Initiate discussions on the development and use of the GTTN database,
- Decide on the list of priority species in the region for the database.

The workshop was opened by Dr. Shirong Liu, Vice-President of the Chinese Academy of Forestry (CAF). The closing remarks were delivered by Dr. Jianxiong Lu, Vice Director of the Research Institute of Wood Industry (CRIWI) at CAF.

All presentations and additional information on the project are available on the GTTN website ([www.globaltimbertrackingnetwork.org](http://www.globaltimbertrackingnetwork.org)).

The report summarizes all discussions and new recommendations from the project planning phase (list of priority species, organization of GTTN in the region, contributions to the database and brainstorming on new collaborative projects ideas). The outcomes will be used by GTTN to adjust the project annual work plans and /or initiate new activities.

## BACKGROUND, OBJECTIVES AND OPENING

### BACKGROUND

Unsustainable and illegal logging, and trade in illegally harvested forest products causes many ecological, economic and social problems. It is estimated that up to 50% of wood exported from Amazon, Central Africa, Asia and Russia is illegally harvested.

Although instruments against such unsustainable and illegal practices have been established, there is a lack of practical control mechanisms to identify the origin of timber and wood products. Existing timber tracking systems use paper-based documentation of timber origin and use at all stages of processing. However, paper-based tracking of products is open to tampering. DNA fingerprints and stable isotopes use characteristics that are inherent to the timber instead of externally applied marks. This eliminates the possibility of falsifying accompanying chain-of-custody-documents and reduces possibility of laundering timber from illegal harvest.

The project, "Identification of Timber Species and Origins" led by Bioversity International, funded by Germany and guided by an international steering committee, aims to facilitate the practical application of such innovative timber tracking tools (genetic and stable isotope markers). At the project's Inception Workshop in Kuala Lumpur, Malaysia (24-25 April 2012), Bioversity International announced the creation of the Global Timber Tracking Network (GTTN).

GTTN will bring together scientists and key stakeholders concerned about illegal logging, the associated trade and their impacts on environmental and social sustainability. Our goal in creating the network, is to ensure legal timber trade and curb illegal and unsustainable logging by facilitating and promoting the integrated use of genetic and stable isotope fingerprinting techniques with the existing timber tracking systems, certification standards, regulations and legislation. The GTTN will develop and maintain a global online database with geo-referenced genetic and stable isotope data for priority commercial timber species. The database will facilitate accurate species identification for traded timber and provide tangible proof of the declared origin of wood and wood products.

### OBJECTIVES OF THE REGIONAL WORKSHOP

The main objective of the Regional Workshop was to build the GTTN by bringing together scientists and other key stakeholders in the region with a view to gaining their support and active participation in the project.

The workshop aimed to:

- Inform stakeholders about aims and progress in the timber tracking initiative and gain their support,
- Provide an opportunity for information exchange about related projects and issues in the region,



- Identify interested experts and institutes in the region, and initiate discussions on their involvement in the network,
- Initiate discussions on the development and use of the GTTN database,
- Decide on the list of priority species in the region for the database.

## PROCESS AND STRUCTURE OF THE REPORT

The workshop was divided into three parts: the first part aimed at introducing the GTTN to participants and the progress made in the implementation of the project "Identification of Timber Species and Origins". The second part presented relevant legal initiatives to stop illegal logging and their implications for all stakeholders concerned; and explored some case studies of the application of DNA and stable isotope techniques in species identification and timber tracking in the region. The last part was a participatory process dealing with the involvement of partners from the region in GTTN activities.

This report summarizes the discussions and new (not yet proposed during the regional workshop for Americas in Brazil organized in March 2013) recommendations.

## OPENING & CLOSING

The workshop was opened by statements from the Bioversity staff, key partner and host institutions:

- Dr. Zhang Zongwen East-Asia Coordinator of Bioversity International,
- Dr. Judy Loo, Theme Leader, Forest Genetic Resources Programme at Bioversity International,
- Ms. Shelley Gardner, Illegal Logging Programme Coordinator and Chair of the Steering Committee of the project "Identification of Timber Species and Origins"
- Dr. Heok Choh Sim, Executive Secretary of the Asia Pacific Association of Forestry Research Institutions (APAFRI),
- Mr. Thorsten Hinrichs (Deputy Head of Division "European and International Forest Policy - European and International Forest Policy, German Federal Ministry of Food, Agriculture and Consumer Protection (BMELV),
- Dr. Shirong Liu, Vice-President of the Chinese Academy of Forestry (CAF).

The closing remarks were delivered by Dr. Judy Loo and Dr. Jianxiong Lu, Vice Director of the Research Institute of Wood Industry (CRIWI), Chinese Academy of Forestry.

## PRESENTATIONS MADE AT THE REGIONAL WORKSHOP

22 PowerPoint presentations were made at the regional workshop. The presentations are available on GTTN website at <http://www.globaltimbertrackingnetwork.org/news-events/event/regional-workshop-for-asia-pacific-oceania/>.

## INVOLVEMENT IN GTTN ACTIVITIES

### RECOMMENDATIONS FROM THE PROJECT PLANNING

Following the presentations and discussions, participants were divided into three groups to discuss some specific issues. Recommendations emanating from the 3 groups are summarized here.

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### LISTING OF PRIORITY SPECIES

Seventy-six species or groups of species in the region were identified as having high (45), medium (25) or low (6) priority (Table 1) for the verification of geographic origin; some of these species are also priorities for identification.

Mapping the distribution range of each species and determining the threats related to illegal logging would be useful.

**Table 1:** List of priority species for Asia, Pacific and Oceania

N	Botanical name (s)	Common (trade) name	Need for DNA-aided species identification	Priority	CITES Appendices	IUCN red list category	
1	<i>Acacia catechu</i>	Khair	X	High			
2	<i>Acacia mangium</i>	Acacia	X				
3	<i>Afzelia xylocarpa</i>		X				EN
4	<i>Agathis borneensis</i>	Agathis	X				EN
5	<i>Agathis spp.</i>	Adiangu	X				16 species from LC to EN
6	<i>Anisoptera costata</i>		X				EN
7	<i>Aquilaria malaccensis</i>	Agarwood	X			II	VU
8	<i>Aquilaria spp.</i>	Agarwood	X			II	
9	<i>Chukrana tabularis</i>		X				
10	<i>Dalbergia cochinchinensis</i>	Thai rosewood	X				VU
11	<i>Dalbergia decipularis</i>	Brazilian tulip wood	X				
12	<i>Dalbergia latifolia</i>	Indian rosewood	X				VU
13	<i>Dalbergia oliveri</i>	rosewood	X				EN
14	<i>Dalbergia spp</i>	Rosewood	X				
15	<i>Diospyros spp.</i>	Ebony	X				
16	<i>Dipterocarpus costatus</i>		X				EN
17	<i>Dipterocarpus macrocarpus</i>		X				
18	<i>Eusideroxylon zwageri</i>	Borneo ironwood, billian or ulin					VU
19	<i>Gonystylus spp.</i> , <i>Gonystylus bancanus</i> (Miq.) Kurz, Syn.: <i>G. miquelianus</i> , <i>G. bancanus</i> , <i>Aquillaria bancana</i> <i>Gonystylus macrophyllus</i> <i>Gonystylus warburgianus</i>	Ramin					VU
20	<i>Gyrinops spp.</i>	Agarwood	X			II	
21	<i>Intsia spp.</i>	Merbau	X				
22	<i>Lagerstroemia spp.</i>	Banglang	X				

23	<i>Palaquium hexandrum, Palaquium hispidum, Palaquium impressinervium, Palaquium maingayi, Palaquium obovatum, Palaquium regina-montium, Palaquium semaram, Palaquium sumatranum, Palaquium walsurifolium</i>	Nyatoh	X			18 species assessed from LC to CR
24	<i>Pinus roxburghii</i>	Pine	X			LC
25	<i>Podocarpus parlatorei</i>	Parlatore's podocarp, Monteromero			I	NT
26	<i>Pterocarpus santalinus</i>	Red Sandalwood	X		II	EN
27	<i>Quercus mongolica</i>	Mongolian oak	X			
28	<i>Santalum album</i>	Sandalwood	X			VU
29	<i>Santalum spp</i>	Sandalwood	X			
30	<i>Shorea acuminate, Shorea dasyphylla, Shorea johorensis, Shorea lepidota, Shorea macroptera, Shorea parvifolia</i>	Light Red Meranti	X			Not assessed to EN
31	<i>Shorea acuminatissima, Shorea. Faguetiana, Shorea gibbosa, Shorea hopeifolia, Shorea multiflora</i>	Yellow meranti	y			LC to EN
32	<i>Shorea assamica, Shorea bracteolate, Shorea dealbata, Shorea hypochra, Shorea javanica, Shorea lamellate</i>	White meranti	X			Not assessed to EN
33	<i>Shorea atrinervosa, Shorea brunnescens, Shorea crassa, Shorea exelliptica, Shorea foxworthyi, Shorea glauca, Shorea havilandii, Shorea laevis, Shorea leptoderma, Shorea maxwelliana, Shorea materialis, Shorea seminis, Shorea submontana, Shorea sumatrana, Shorea superba</i>	Balau	X			LC to EN
34	<i>Shorea balangeran, Shorea collina, Shorea guiso, S. longipetala, Shorea kunstleri, Shorea ochrophloia</i>	Red balau	X			EN
35	<i>Shorea curtisii, Shorea hemsleyana, Shorea macrantha Brandi, Shorea pauciflora King, Shorea platyclados Shorea rugosa var. vuliginosa, Shorea singkawang, obtusa, farinosa</i>	Dark Red Meranti	X			LC - EN
36	<i>Shorea laevis</i>	Bangkirai, balau				LC
37	<i>Shorea leprosula</i>	Light red meranti				EN
38	<i>Shorea ovata or Shorea aqsaboensis</i>	Dark red meranti	X			EN
39	<i>Shorea robusta</i>	agrak	X			LC
40	<i>Taxus chinensis</i>	Chinese yew	X		II	EN
41	<i>Taxus cuspidata</i>	Japanese yew	X		II	LC
42	<i>Taxus fuana</i>	Chinese yew	X		II	EN

43	<i>Taxus sumatrana</i>	Chinese yew	X	Medium	II	
44	<i>Taxus wallichiana</i>	Himalayan yew	X		II	EN
45	<i>Tectona grandis</i>	Teak				
46	<i>Dalbergia sissoo</i>	Sissoo	X			
47	<i>Dalgeria paniculata</i>	Rosewood	X			
48	<i>Diospyros ebenum</i>	Ebony	X			DD
49	<i>Dipterocarpus alatus</i>		X			EN
50	<i>Hopea odorata</i>		X			VU
51	<i>Larix gmelinii</i>	Sibirian larch	X			LC
52	<i>Parashorea lucida</i>	Meranti gerutu				EN
53	<i>Pilgerodendron uviferum</i>	Pilgerodendron			I	VU
54	<i>Pinus Kesiya</i>		X			LC
55	<i>Pinus koraiensis</i>	Korean pine	X		III (Russian Federation)	LC
56	<i>Podocarpus elatus</i>					LC
57	<i>Podocarpus imbricatus</i>	Melur	X			LC
58	<i>Podocarpus neriifolius</i>	Black pine podocarp			III (Nepal)	LC
59	<i>Podophyllum hexandrum</i>	Himalayan may- apple			II	
60	<i>Pterocarpus dalbergoides</i>		X			
61	<i>Pterocarpus indicus</i>	Amboina				VU
62	<i>Pterocarpus macrocarpus</i>		X			
63	<i>Pterocarpus marsupium</i>		X			VU
64	<i>Taxus buccata</i>	Taxus	X			LC
65	<i>Terminalia arjuna</i>	Terminalia	X			
66	<i>Terminalia chebula</i>	Terminalia	X			
67	<i>Terminalia manii</i>	Terminalia	X			
68	<i>Terminalia myriocarpa</i>	Terminalia	X			
69	<i>Tetracentron sinense</i>	Tetracentron			III (Nepal)	
70	<i>Toona ciliata</i>	Toona	X			LC
71	<i>Dipterocarpus tuberculatus</i>		X	Low	LC	
72	<i>Endospermum moluccanum</i>	Sesendok				
73	<i>Pinus wallichiana</i>					LC
74	<i>Toona sureni</i>	Suren	X			

75	<i>Vitex spp.</i>	Leban	X		
76	<i>Xylia xylocarpa</i>		X		

DD = Data Deficient, LC = Least Concern, NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered

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## ORGANISATION OF GTTN IN THE REGION

The following points emerged from the discussions to strengthen GTTN especially in the APO region:

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### ROLE OF GTTN

The network should play a central role in standards and methods development as well as the promotion of the new timber tracking tools. GTTN should be the focal point for the:

- Collection of reference material and vouchers,
- Elaboration of a framework to certify labs
- Database development and improvement,
- Promotion of the use of innovative timber tracking methods to change the status quo.

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### RESTRUCTURE OF THE WORKING GROUPS

It was proposed to:

- Create a new working group incorporating the previous advocacy group and call it Policy and Advocacy Working Group (PAWG). The group can be a bridge between the policy makers at the country level and the technical experts, to help proactively plan intervention,
- To create in addition, a Wood Anatomy Working Group (WAWG): the creation of this group will help to bridge the gap with wood anatomy (many timber species can be accurately identified on the basis of wood anatomy),
- Define the objectives and the scope for each working group,
- Nominate two coordinators to lead each working group globally and within region (Asia, Africa, Americas, etc) and countries,
- Initiate WG activities linked to technical opportunities in the region.
- Organise an annual meeting of GTTN and/or a meeting in each region.

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### CAPACITY BUILDING IN PRODUCING COUNTRIES

The need to build capacity in timber producing countries allowing scientists there to use the methods at the beginning of the supply chain was reiterated by participants. In addition to training, there is also the need to:

- Support the development of the infrastructure in producing countries,
- Make methods accessible through the web.

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### LICENSING AND BENEFIT SHARING

Results from projects funded by public as well as by private money are useful for GTTN. We need to start developing a framework for operation with different partners (Government/NGO/NARS/Universities/Commercial labs, etc.) who are investing to develop the methods; including licensing and the benefit sharing.

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## IMPROVEMENT OF COMMUNICATION

- Articulate benefits of countries to join GTTN,
- Aggressively disseminate - especially in China - the information about the network and the technical opportunities for timber tracking existing within the APO region,
- Focused efforts on high priority countries (e.g. China, Russia) , to educate policy makers
- Immediately deploy a functional system for few species to prove the value of the approach,
- Document interesting case studies and early success stories about the approach; publish a regular GTTN Newsletter (email-reminder), RSS feed press releases, etc.

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## BRAINSTORMING ON JOINT RESEARCH & FUNDING OPPORTUNITIES

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### PRIORITIES FOR ADDITIONAL FUNDING

Future projects and additional funding should go primarily to:

- Wide scale sampling of priority species and the generation of reference maps and local barcodes to complete the database,
- Organise ring and blind tests,
- Continue to improve DNA extraction methods from highly processed wood products (e.g. veneer, plywood , pulp and paper) and optimize the gene marker development for many timber species,
- Capacity-building in producing countries.

GTTN should coordinate the development of collaborative proposals between participating institutions/researchers.

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### FUNDING SOURCES AND PARTNERSHIP

There are potential additional sources of funding available in the region that can support such studies in different countries (e.g. China, Japan, Korea, Australia, Malaysia, USA, etc.). Private enterprises (e.g. IKEA) can also be approached. Participants are encouraged to share any source of funding and specific calls to be posted on GTTN website.

## PANEL 1: EFFECTIVE INTEGRATION OF DIFFERENT METHODS OF TIMBER SPECIES IDENTIFICATION AND VERIFICATION OF GEOGRAPHIC ORIGIN

**Moderator: Shelley Gardner**

**Panellists: Andrew Lowe, John Hermanson, Markus Boner, Ma Lichao**

GTTN's goal is to facilitate and promote the *integrated* use of DNA and stable isotope technologies to reduce illegal logging.



The panel discussed ways to integrate efficiently the DNA and stable isotope based techniques (for species identification and verification of origins) with other methods (e.g. wood anatomy, NIRs etc.) to improve the transparency of the supply-chain.

The panel noted there is a variety of methods available either for direct field application (Wood Anatomy, Automated wood identification, NIRS, Sniffer dogs) or in labs (More complex automated wood id, DNA, stable isotopes, mass spectrometry). There is a great need to integrate them. Therefore, it was recommended to:

- Elaborate a framework for the integrated application of different methods of species identification and the verification of origins. Which methods to apply, when and where along the supply chain; for which product (e.g. solid woods, paper, etc.). The selection of methods is likely to depend on marginal profit (e.g. if wood anatomy is enough for species identification, then it is unnecessary to go for DNA barcoding which is more expensive).
- To have a risk assessment tools or maps (main focus should be on places where illegal logging activities are expected and on priority species)
- Add a database of research institutes (DNA, stable isotopes and wood anatomy) having the capability to use the methods on GTTN website.
- Present the technologies according to the need of different users (timber traders, government, NGO's etc.).

Joint publications (genetics, isotopes, wood anatomy, etc.) should be initiated to support the integration of methods. A case study related to the ITTO project in Africa in under way: samples from three species are analyzed by genetic and stable isotopes methods. Which conclusions to draw in cases where different methods gave conflicting results? How to interpret such results? What will happen in a court?

## PANEL 2: DEFINING PRIORITIES FOR THE FUTURE

**Moderator: Johannes Zahnen**

**Panellists: Yong-Pyo Hong, Akira Kagawa, Zheng Yongqi, Thorsten Hinrichs**

GTTN is currently implementing a three year project that will end in December 2014. Many new issues (capacity building at national level, involvement of the end-users, additional database development, fingerprinting of new timber species etc) are emerging from the regional workshops that should be addressed. The panel discussed regional priorities and how to mobilise existing resources and made the following recommendations:

- The priority activities listed above were again reiterated by the panel members,
- The need to generate more interest in the region on illegal logging and timber tracking
  - Keys countries such as China, Japan and Korea have not yet enacted new legislation comparable to the EU timber regulation, the Lacey Act or the Australian Illegal Prohibition Bills, and are likely not investing more to find

solutions to reduce the illegal logging and associated trade. We need to try to influence key decisions makers of those countries through various mechanisms:

- Participants to the regional workshop should reach out to key policy makers in their respective countries
- Also during joint bilateral meetings between countries (e.g. between EU-China, EU-Japan, USA-China), such issues should be on the agenda.
- The need to mobilize resources available in the region
  - Within the EU, Germany is leading the support for timber tracking activities and projects and is supporting GTTN. It would be useful that other countries also get involved.
  - At the national level, the creation of the *Centre of Competence for Timber Identification* in Germany is a model that can followed by others countries,
- The combination of different technologies was seen as important to convince potential donors and countries to support us.

## Annex 1: Regional Workshop Agenda

Tuesday 20 August 2013	
08:30-09:00	<b>Registration</b>
09:00-09:30	<b>Opening</b>
09:30-10:00	Tea & coffee break
10:00-10:20	<b>Overview of the project "Identification of timber Species and Origins" and introduction of the Global Timber Tracking Network (GTTN) - Marius Ekué</b>
10:20-12:30	<p><b>Session 1: Initiatives to fight illegal logging and role of new technologies</b>  <b>Chair: Heok Choh Sim</b></p> <ul style="list-style-type: none"> <li>• Importance of fingerprinting techniques: the example of Germany - <i>Thorsten Hinrichs (20 minutes)</i></li> <li>• Role of timber tracking technologies in implementing new consumer country measures - <i>David Gehl (20 minutes)</i></li> <li>• Overview of illegal logging in Laos and related trans-boundary trade - <i>Denis Smirnov (20 minutes)</i></li> <li>• Forestry Affirmation Policy of Legally-logging Timber in China – <i>Haiying Su (20 minutes)</i></li> <li>• WWF's contribution to control wood flow – <i>Johannes Zahnen (10 minutes)</i> <ul style="list-style-type: none"> <li>○ <i>Wood detection dog on GTTN website</i></li> <li>○ <i>Paper (see email) also on website</i></li> </ul> </li> </ul> <p><b>Discussion (30 minutes)</b></p>
12:30-13:30	Lunch break
13:30-15:00	<p><b>Session 2: DNA based technologies for wood &amp; wood product verification</b>  <b>Chair: Mengzhu Lu</b></p> <ul style="list-style-type: none"> <li>• Update on industry collaboration with DNA timber tracking - <i>Andrew Lowe (20 minutes)</i></li> <li>• Identification of Wood Sample Undergoing High-temperature Drying and Long-term Storage using DNA Barcode - <i>Yin Yafang (20 minutes)</i></li> <li>• Wood Identification of <i>Dalbergia odorifera</i> based on DNA Barcoding Sequences - <i>Shengquan Liu (15 minutes)</i></li> <li>• DNA barcoding for "Nanmu" (<i>Machilus</i> and <i>Phoebe</i>, Lauraceae) - <i>Shiliang Zhou (15 minutes)</i></li> </ul> <p><b>Discussion (30 minutes)</b></p>
15:10-15:40	Tea & coffee break
15:40-17:00	<p><b>Session 3: Stable isotopes based technologies for wood &amp; wood product verification</b>  <b>Chair: Qi Haiping</b></p> <ul style="list-style-type: none"> <li>• Isotope dendro-provenancing - a method for determining the precise geographic origin of wood - <i>Akira Kagawa (20 minutes)</i></li> <li>• Practical applications of stable isotope technologies for timber tracking - <i>Markus Boner (20 minutes)</i></li> <li>• Stable isotope identification of Mongolian oak - <i>Evgeny Chuvason (15 minutes)</i></li> <li>• <i>Determination of geographic origin for protected wood species by chemometric analysis of isotopic and elemental measurement data (Poster)</i></li> </ul>

	<i>Qi Haiping</i> <b>Discussion (30 minutes)</b>
17:00-18:25	<b>Session 4: Alternative methods for wood identification</b> <b>Chair: Yin Yafang</b> <ul style="list-style-type: none"> <li>• Utilization of xylarium for advanced wood identification - <i>Abe Hisashi (15 minutes)</i></li> <li>• A machine vision system for automated field-level wood identification - <i>John Hermanson (20 minutes)</i></li> <li>• Discrimination of three wood species by near-infrared spectroscopy - <i>YaNa Liu (15 minutes)</i></li> <li>• Discrimination of pine hybrids and their parents using near-infrared spectroscopy - <i>Qifu Luan (15 minutes)</i></li> </ul> <b>Discussion (30 minutes)</b>
19:00	Workshop dinner
<b>Wednesday 21 August 2013</b>	
08:30-09:30	<b>Session 5: Involvement in GTTN activities</b> <b>Chair: Judy Loo</b> <ul style="list-style-type: none"> <li>• GTTN database prototype &amp; Data sharing agreement - <i>Richard Bruskiewich / Judy Loo (30 minutes)</i></li> <li>• Priority species for Asia Pacific &amp; Oceania – <i>Marius Ekué / Lee Soong Leong (15 minutes)</i></li> <li>• Introduction to the group work – <i>Marius Ekué (15 minutes)</i></li> </ul>
09:30-10:00	Tea & coffee break
10:00-12:30	<b>Session 5: Involvement in GTTN activities (continued)</b> <b>Chair: Judy Loo</b> <ul style="list-style-type: none"> <li>• <b>Group work</b> Three parallel groups will discuss the following themes (non-exclusive) <ul style="list-style-type: none"> <li>○ Listing of priority species</li> <li>○ Contribution to GTTN</li> <li>○ Brainstorming project ideas</li> </ul> </li> </ul>
12:30-13:30	Lunch break
13:30-14:30	<b>Session 5: Involvement in GTTN activities (continued)</b> <b>Chair: Judy Loo</b> <ul style="list-style-type: none"> <li>• Group reports and discussion (<i>60 minutes</i>)</li> </ul>
14:30-15:45	<b>Panel 1: Effective integration of different methods of timber species identification and control of geographic origin</b> <b>Moderator: Shelley Gardner</b> <b>Panellists: Andrew Lowe, John Hermanson, Markus Boner, Ma Lichao</b>
15:45-16:15	Tea & coffee break
16:15-17:30	<b>Panel 2: Defining priorities for the future</b> <b>Moderator: Johannes Zahnen</b> <b>Panellists: Yong-Pyo Hong, Akira Kagawa, Zheng Yongqi, Thorsten Hinrichs</b>
17:30-17:45	Conclusion and Closing

## Annex 2: List of participants

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