Scientific methods for taxonomic and origin identification of timber

13 authors, including:

Victor Deklerck
Royal Botanic Gardens, Kew
21 PUBLICATIONS   **93** CITATIONS

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Gerald Koch
Thünen Institute
188 PUBLICATIONS   **2,672** CITATIONS

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Tereza Cristina Monteiro Pastore
Brazilian Forest Service
37 PUBLICATIONS   **613** CITATIONS

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Tahiana Ramananantoandro
University of Antananarivo
39 PUBLICATIONS   **212** CITATIONS

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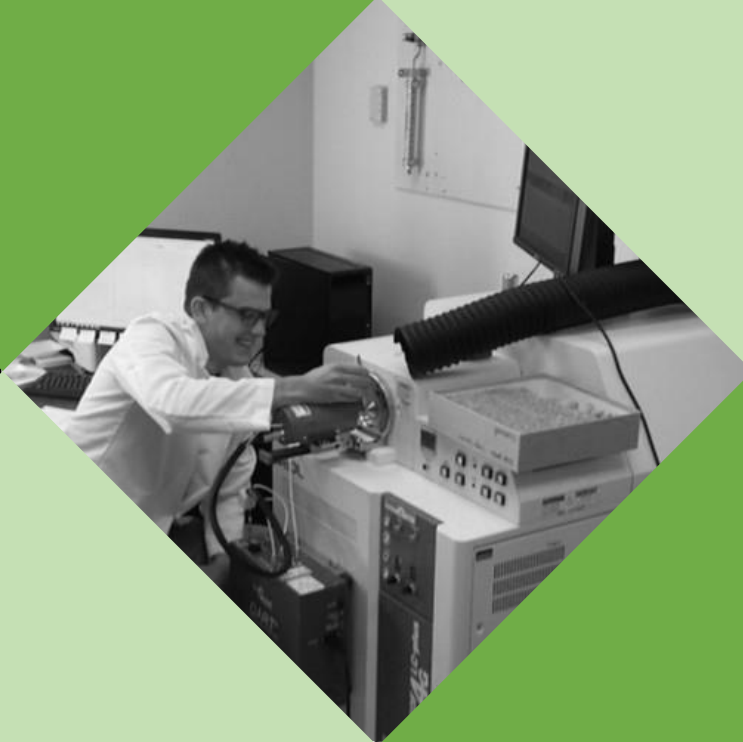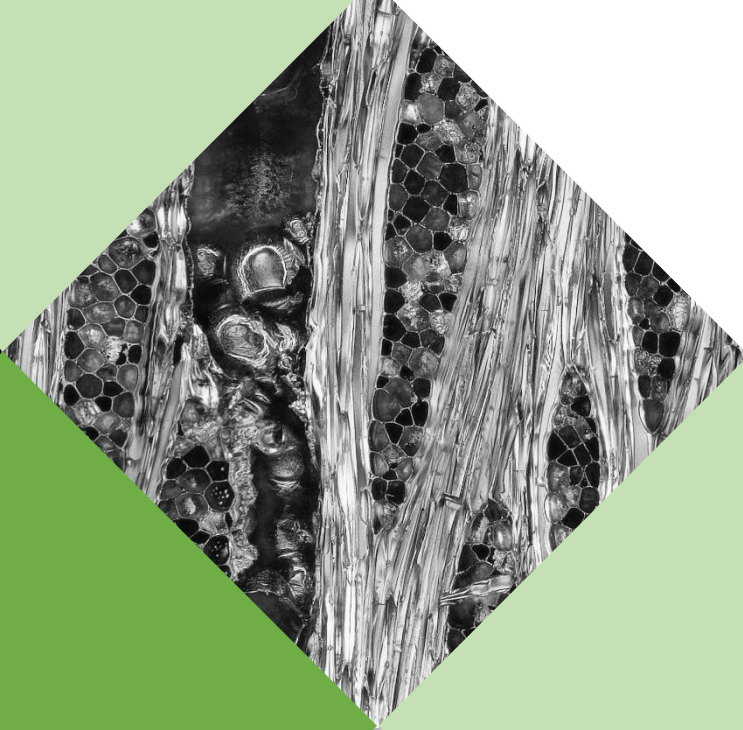Some of the authors of this publication are also working on these related projects:

Identification of wood species from charcoal/ briquettes as related to illegal logging   View project

INFORMAR (Integrated Forest Management Learning Architecture)   View project

GTTN
Global Timber Tracking Network

Scientific methods for taxonomic and origin identification of timber

June 2020

www.globaltimbertrackingnetwork.org

USERS OF THIS GUIDE:

Authorities, traders, importers and all others interested in the current capacity of timber tracking methods for the taxonomy and geographical origin of timber (products).

AIM OF THIS GUIDE:

Inform about the scientific methods available for timber tracking (taxonomy and origin) and on the laboratories offering these identification services. This guide is a concise version of the scientifically more detailed Timber Tracking Tool Infogram.

Find out more at

gttn@efi.int   www.globaltimbertrackingnetwork.org   @GTTNetwork

Scientific methods for timber tracking

WHAT ARE TIMBER TRACKING TOOLS & WHAT CAN THEY DO FOR YOU?

Scientific methods for the verification of the taxonomy and/or the origin of the timber based on anatomical, chemical or genetic characteristics of the wood.
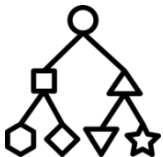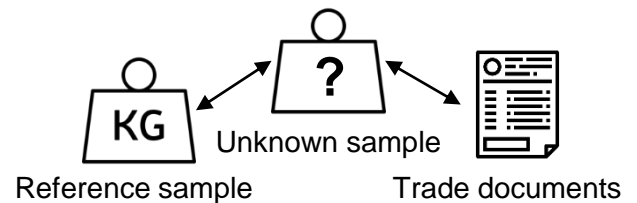
Taxonomic identification

Origin identification

Both

All timber identifications rely on having reference samples, and these specimens are the basis of determining if the trade documents list the correct taxonomic name(s) and geographic origin(s).

Essentials for a timber identification:

KG
Reference sample

?
Unknown sample

Trade documents

Wood anatomy

Anatomy: The cellular structure of wood varies between families, genera and sometimes even species. It can be investigated at macroscopic or microscopic level using standard sets of anatomical features or by digital image analysis.
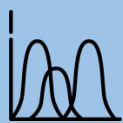
DART TOFMS

Stable isotopes

NIR Spectroscopy

Chemistry: The chemical contents of wood can be studied using Direct Analysis in Real Time (DART) Time-Of-Flight Mass Spectrometry (TOFMS), Near Infra-Red (NIR) Spectroscopy or stable isotopes. DART TOFMS looks at wood chemicals. NIR Spectroscopy looks at the surface of the wood, studying both wood chemicals and physical characteristics of the wood, which can vary both between species and origins. At this moment, however, DART TOFMS is only reliable for species identifications. Stable isotopes are linked to environmental conditions and hence only vary between origins of samples but not between species.
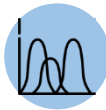
Genetics

Genetics: The DNA, present in the wood, can be investigated to identify the species, as well as the geographic origin and the individual.
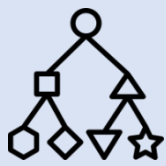
Anatomy | **DART TOFMS** | **Stable isotopes** | **NIR Spectroscopy** | **Genetics**

WHICH METHODS CAN ANSWER WHICH IDENTIFICATION QUESTIONS?

Taxonomic identification — Both — **Origin identification**

Family/genus/ species group identification

↓

Species identification

Country/ area of harvest identification

↓

Individual tree identification

WHAT WOOD PRODUCTS CAN BE IDENTIFIED BY WHAT METHOD?

Solid wood*

Charcoal

Particle board

Pulp, paper, fibreboard

* Including: raw wood, veneer, plywood, other manufactured solid wood

WHICH TOOL SHOULD I USE?

The factors that determine which method is most suitable for your case are:

- The **question** that needs to be answered (taxonomic identification at the family, genus or species level, geographic origin at the level of region or individual tree).
- The **type of wood product** (raw wood, veneer, plywood, other manufactured solid wood, charcoal, particle board, pulp, paper or fibreboard).
- The **size of the sample** that can be taken (smaller or bigger than 1 cm³).

PRACTICALITIES

Key resource

The online service provider directory guides you through the above questions and offers you a **list of the possible laboratories** that can perform the analysis. You can contact the lab(s) of your choice and get an **estimate of the costs and time** that will be needed for your specific case.

To get a geographic overview of the laboratories offering authentication analyses for timber, you can consult the service provider map.

Coordinating partners

With support from

Federal Ministry
of Food
and Agriculture

by decision of the
German Bundestag

www.globaltimbertrackingnetwork.org

The objective of the Global Timber Tracking Network (GTTN) is to promote the operationalization of innovative tools for wood identification and origin determination, to assist the fight against illegal logging and related trade around the globe. GTTN is an open alliance that cooperates along a joint vision and the network activities are financed through an open multi-donor approach. GTTN phase 2 coordination (2017-2019) is financed by the German Federal Ministry of Food and Agriculture (BMEL). GTTN phase 2 (2017-2019) is coordinated by the European Forest Institute with the technical support from the Thünen Institute.