Asia-Pacific
Economic Cooperation

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Agenda Item: 5

Advancing Wood Species Identification and Diagnostic Techniques through the Establishment of Wood Specimen Database

Submitted by: Korea

APEC 2025
KOREA

Dialogues and Mini-Exhibition on Enhancing Enforcement and Legal Timber Trade through Stakeholder Collaboration and Innovation
Incheon, Korea
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Advancing Wood Species Identification and Diagnostic Techniques through the Establishment of Wood Specimen Database

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Advancing Wood Species Identification and Diagnostic Techniques through the Establishment of Wood Specimen Database

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1. Backgrounds
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3. Establishment of a Reference Database for Wood Specimens
4. Future plans

1. The Verification System on Timber Legality in the Republic of Korea

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A regulatory framework to enhance transparency and accountability in timber supply chains

- Following the revision of the "Act on the Sustainable Use of Timber," the system has been in operation since October 1, 2018. Documentary assessment of timber legality is carried out by the Korea Forestry Promotion Institute, the designated inspection agency
- By participating in international efforts to address the climate crisis, Korea seeks to safeguard its domestic industries from the negative impacts of illegal logging.

1. Necessity of Wood Species Identification in the Implementation of the Timber Legality Verification System

Enhancement of Legal Timber Harvesting Oversight

- Ensure **consistency** between declared documents and physical timber
- Detect **regulatory weaknesses** and potential **illegal logging risks** in exporting economies
- Protect **legitimate domestic industries** from unintended damage
- Facilitate **smooth exports** of processed wood products from Korea
- Under the **EU Deforestation Regulation (EUDR)**, the following are mandatory:
    - Scientific name of timber species
    - Verified geographic origin
- Both **CITES** and **EUDR** require advanced **wood species identification technologies**

2. Implementation Framework for Wood Identification Technologies

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Enhancing Korea's National System for Wood Species Identification

- **Select key species** by economy and product category; establish **identification standards** through **international technical cooperation**
- Advance **identification techniques** through **anatomical**, **biological**, and **chemical methods**
- **Secure authenticated reference specimens** of key export species in collaboration with **exporting economies**
- Conduct **cross-verification** between **customs-declared imported species** and **certified reference databa**

Priority species list
Select key species
Product category

→

International Cooperation
Reference specimens
Technical collaboration

→

Reference database
Identification standards for imported species

→

Technology development
Diversity and advance identification

Domestic reference specimens
Specimens of key species from exporting partners

+

Imported species verification
Cross-check imported species information with reference specimen database

2. Establishing Anatomical Profiles and Microscopic Imagery of Wood Species

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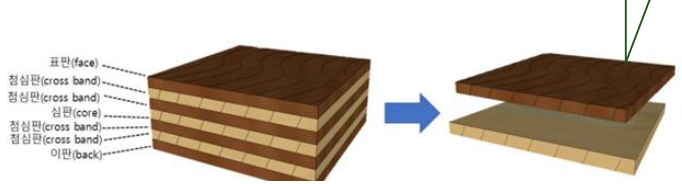
Analysis of anatomical characteristics for wood species identification on commercial plywood in Korea

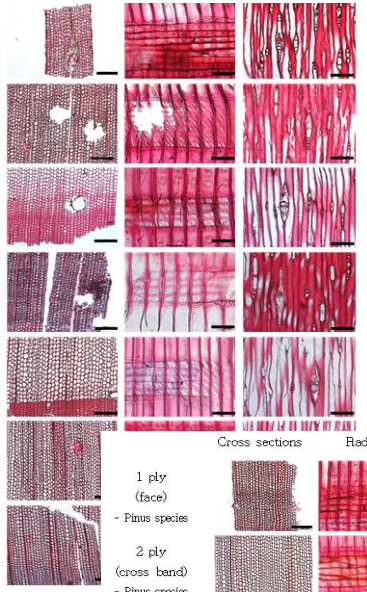
Four companies supplying softwood plywood in Korea.

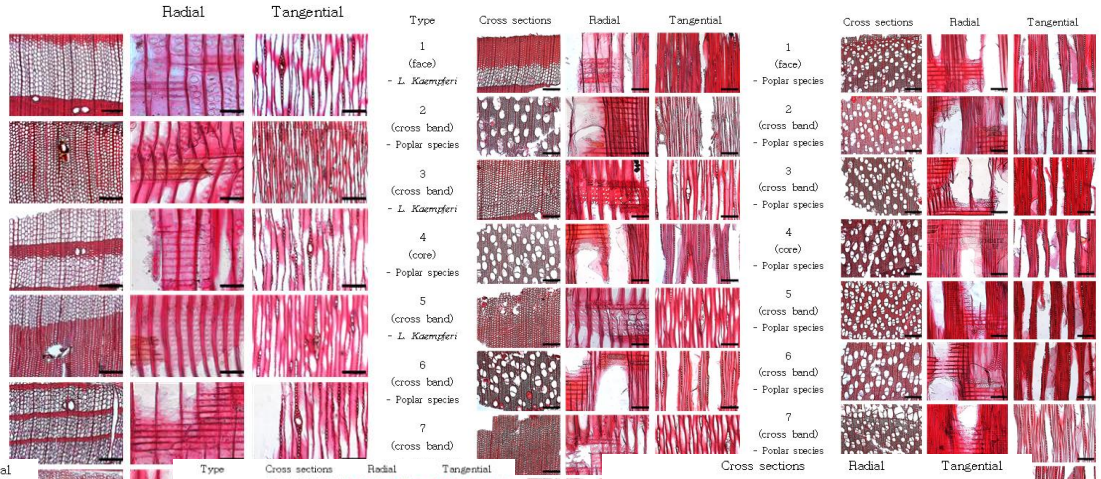
Company	Type	Douglas fir plywood(purchase)	Type	Larix plywood(purchase)
A	1	7ply	1-1	7ply
B	2	9ply	2-1	9ply
C	3	7ply	3-1	9ply
D	4	7ply	4-1	7ply

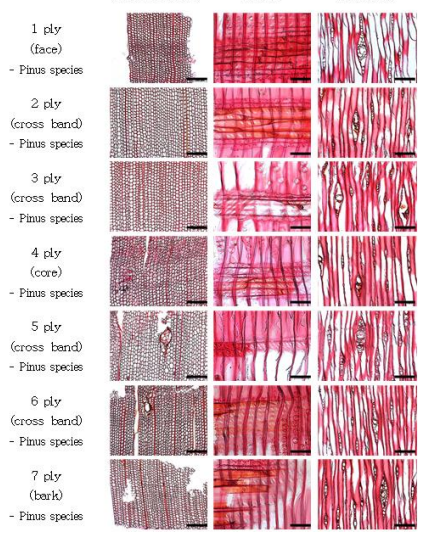


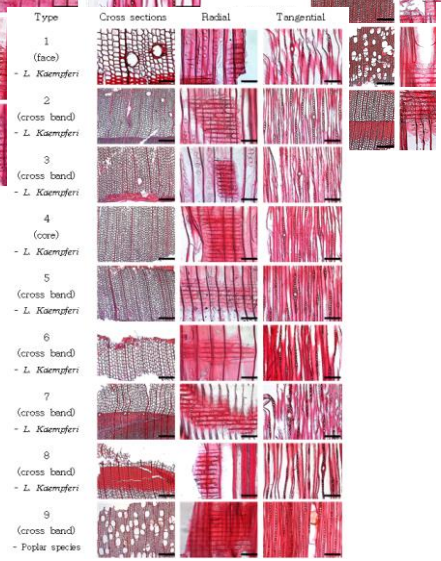
Plywood separation

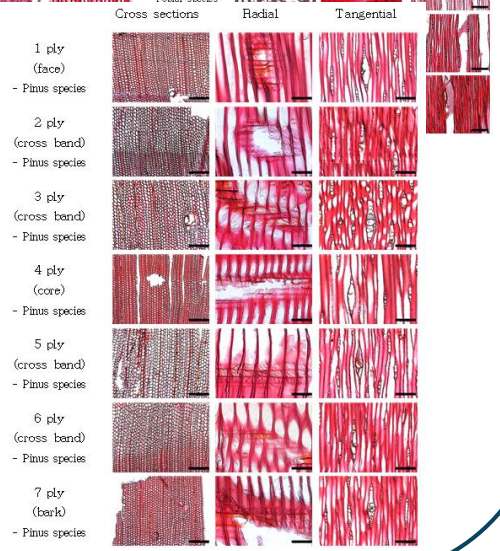
Light microscope images on the plywood 3 sections











2. Establishing Anatomical Profiles and Microscopic Imagery of Wood Species

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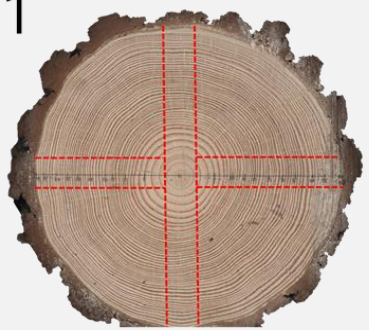
Among the Research Project – Evaluation and Database Development of Physical and Chemical Properties of Major Domestic Wood Species (2021–2025)

- **Anatomical Characteristics: Measurement of features such as vessel elements, tracheid, width, and cell wall thickness**

1



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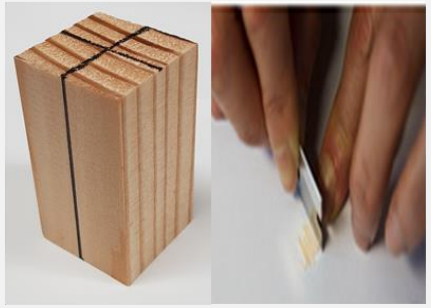

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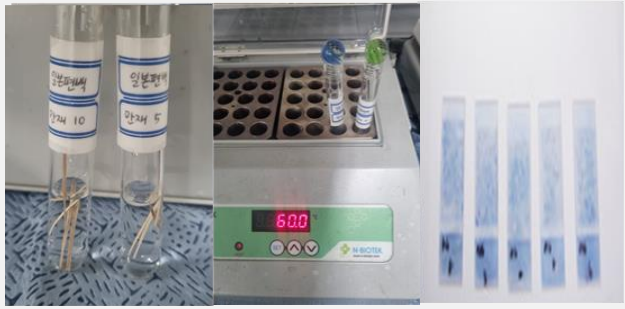

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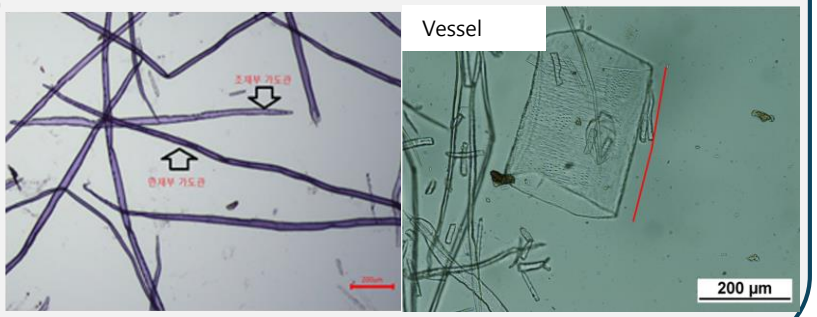

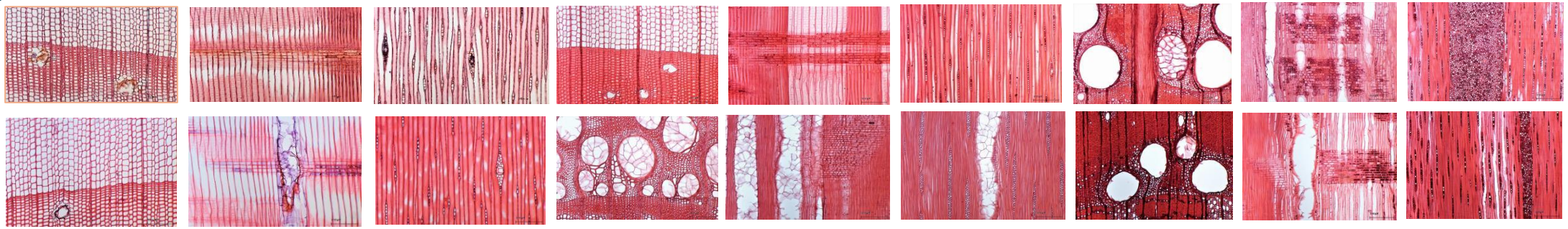

Pinus rigida, Pinus koraensis, Larix kaempferi, Robinia pseudoacacia, Quercus acutissima, Quercus mongolica

2. Establishing Anatomical Profiles and Microscopic Imagery of Wood Species

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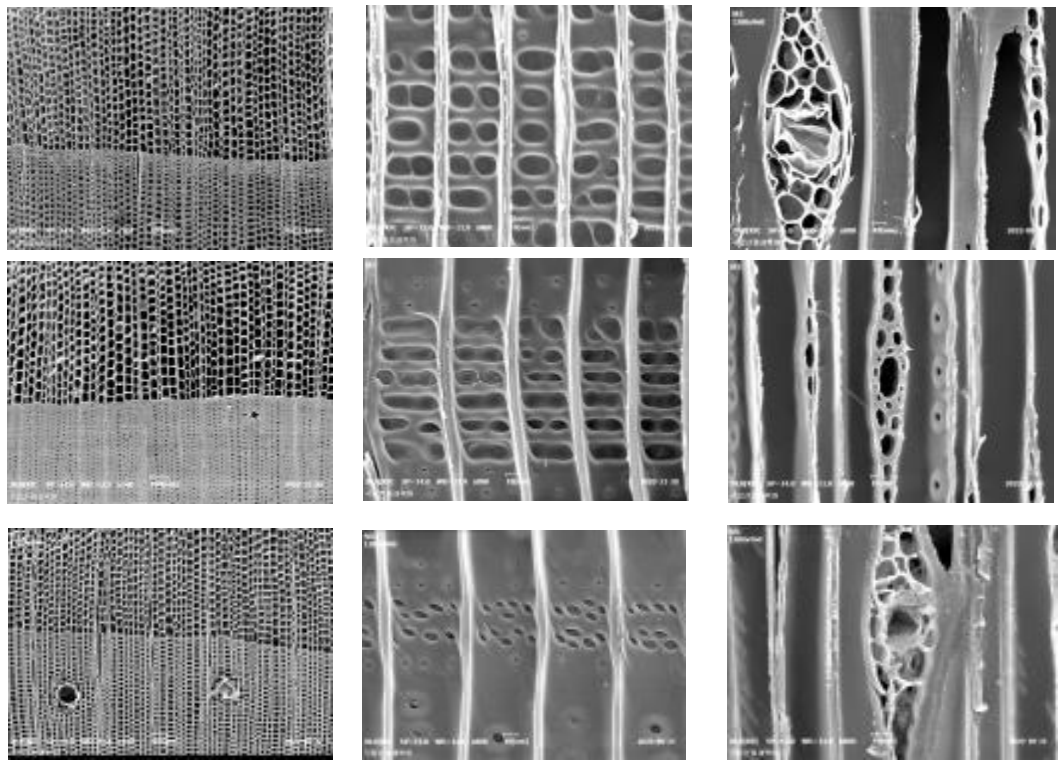
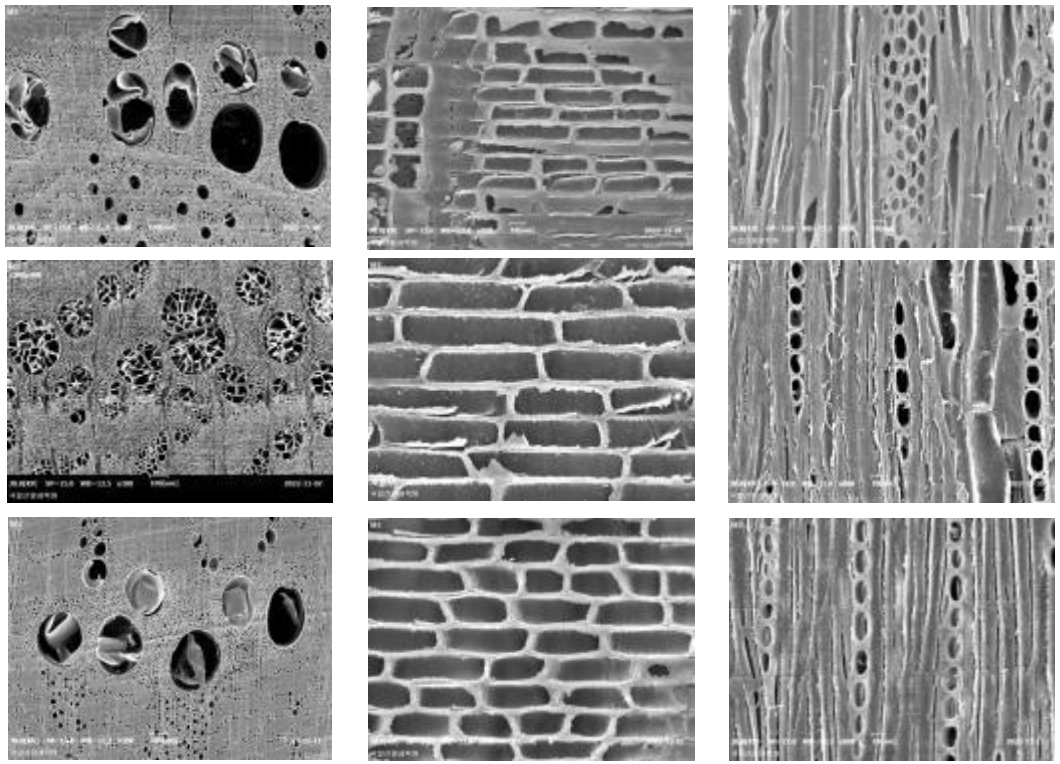
Among the Research Project – Evaluation and Database Development of Physical and Chemical Properties of Major Domestic Wood Species (2021–2025)

- **Anatomical Characteristics: Scanning Electron Microscope Images**



SEM images



Pinus koraensis, Larix kaempferi, Pinus rigida, Robinia pseudoacacia, Quercus acutissima, Quercus mongolica

2. Utilization Strategies by Wood Identification Technology

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Implement stepwise wood identification considering time and financial costs as well as applicability of each technique.

Wood Anatomy,
(Dr. LEE HyunMi)

Verification with Documentation

- More suitable for raw materials such as logs and sawn timber
- Rapid application possible during on-site field inspections
- Capable of processing large volumes of data through automatic identification
- Relatively low-cost equipment allows for private sector use
- Verify customs classification and CITES status

DNA and Chemical Fingerprinting,
(Dr. AHN JiYoung)

Wood species-Level Identification

- Applicable to processed and composite products such as board materials
- Conduct precise laboratory analysis based on field investigation results
- Verify customs classification and CITES (Convention on International Trade in Endangered Species) status
- Ensure legality and certification of exported wood products

Wood Identification & technologies

Anatomical Identification, DNA, Mass Spectrometry, and Stable Isotope Analysis

3. Establishment of a Wood Properties Database

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Current Status of Wood Specimens

나라	일반명	기존 학명	최종 학명	침엽수재	활엽수재
Philippine	Ayangili	A			
Philippine	Babulo	A			
Philippine	Bagaering	B			
Philippine	Bagalunga	M			
Philippine	Bagilumbang	A			
Philippine	Bagras	E			
Philippine	Bagtikan	P			

나라	일반명
Sud-est asiatique	(버어 있음)
Taiwan	
Taiwan	Actinodaphne nantoen
Taiwan	Acuminate-leaved Neo
Taiwan	African tulip tree
	Ailanthus prickly ash
	Alishan machilus
	Alishan nan
	Almond-leaved tanoak
	Arishan hornbeam
	Arjan terminalia
	Armand pine
	Armand's pine
	Bayur tree
	Beilschmiedia phloia
	Bishop wood
	Bread fruit tree
	Cajupat tree
	Camphor
	Carpinus kawakame
	Castanopsis longicaud
	Castanopsis uraiano
	Caudate-leaved chinka
	Ceylon olive
	Chin kan li
	China berry
	China fir
	Chinaberry-tree
	Chinese cedar
	Chinese cryptocarya
	Chinese elm.
	Chinese guger-tree
	Chinese hemlock
	Chinese meliosma
	Chinese pistuche
	Chiung yai hai tang
	Common elaeocarpus
	Common engelhardtia
	Common schefflera
	Criptomeria

나라	일반명	기존 학명	최종 학명	침엽수재	활엽수재
Brazil	Ipe	Tabebuia			
Brazil	Freijo	Cordia g			
Brazil	Jacareuba(brazilian rose)	Calophyll			
Brazil	Urucurana	Sloanea			
Brazil	Cabbage angelintree	Andira in			
Brazil	Sucupira	Bowdichi			
Brazil	Cassia sp.	Cassia s			
Brazil	Hauri caspi	Cedreling			
Brazil	Cedrorana	Cedreling			
Brazil	Cedrorana	Cedreling			
Brazil	Cumarurana	Dipteryx			
Brazil	Cumaru	Dipteryx			
Brazil	Tamboril	Enterolob contortis			
Brazil	Alaarrobo blanco	Prosopis			
Brazil	Angieo	Piptaden			
Brazil	Pau mulato	Peltogyn			
Brazil	Macacauba	Platymis			
Brazil	Timbauba	Enterolob			
Brazil	Arruda rajada	Swartzia			
Brazil	Muirajiboia	Swartzia			
Brazil	Tachi	Sclerolob			
Brazil	Faveira	Vataireop			
Brazil	Angelim	Pithecell			
Brazil	Angelim rajado	Pithecell			
Brazil	Cupiuba	Goupia g			
Brazil	Louro aritu	Licaria a			
Brazil	Imbuia	Phoebe p			
Brazil	Louro vermelho	Ocotea r			
Brazil	Castanha jacare	Corythop			
Brazil	Tauary	Couratar			
Brazil	Mata-mata	Eschweil			
Brazil	Cardeiro	Scleron			
Brazil	Cangerana	Cabralea			
Brazil	Andiroba	Carapa g			
Brazil	Andiroba	Carape g			
Brazil	Gito	Guarea t			
Brazil	Tatajuba	Bagassa			
Brazil	Burra leiteira	Brosimu			
Brazil	Burra leteira	Brosimu			
Brazil	Guariuba	Clarisia r			

나라	일반명	기존 학명	최종 학명	침엽수재	활엽수재
Brazil	Ipe	Tabebuia sp.	**Handroanthus sp.**		1
Brazil	Freijo	Cordia goeldiana	**Cordia goeldiana**		1
Brazil	Jacareuba(brazilian rose)	Calophyllum sp.	**Calophyllum sp.**		1
Brazil	Urucurana	Sloanea floribunda	**Sloanea floribunda**		1
Brazil	Cabbage angelintree	Andira inermis	**Andira inermis**		1
Brazil	Sucupira	Bowdichia nitida	**Bowdichia nitida**		1
Brazil	Cassia sp.	Cassia sp.	**Cassia sp.**		1
Brazil	Hauri caspi	Cedrelinga catenaeformis	**Cedrelinga cateniformis**		1
Brazil	Cedrorana	Cedrelinga catenaeformis	**Cedrelinga cateniformis**		1
Brazil	Cedrorana	Cedrelinga cateniformis	**Cedrelinga cateniformis**		1
Brazil	Cumarurana	Dipteryx alata	**Dipteryx alata**		
Brazil	Cumaru	Dipteryx odorata	**Dipteryx odorata**		2
Brazil	Tamboril	Enterolobium contortisiliquum	**Enterolobium contortisiliquum**		1
Brazil	Alaarrobo blanco	Prosopis alba	**Neltuma alba**		1
Brazil	Angieo	Piptadenia rigida	**Parapiptadenia rigida**		1
Brazil	Pau mulato	Peltogyne paniculata	**Peltogyne paniculata**		1
Brazil	Macacauba	Platymiscium ulei	**Platymiscium pinnatum var. ulei**		3
Brazil	Timbauba	Enterolobium schomburgkii	**Robrichia schomburgkii**		1
Brazil	Arruda rajada	Swartzia fasciata	**Swartzia euxylophora**		1
Brazil	Muirajiboia	Swartzia sp.	**Swartzia sp.**		1
Brazil	Tachi	Sclerolobium sp.	**Tachigalisp.**		1
Brazil	Faveira	Vataireopsis sp.	**Vataireopsis sp.**		
Brazil	Angelim	Pithecellobium racemosum	**Zygia racemosa**		1
Brazil	Angelim rajado	Pithecellobium racemosum	**Zygia racemosa**		1
Brazil	Cupiuba	Goupia glabra	**Goupia glabra**		2
Brazil	Louro aritu	Licaria aritu	**Licaria guianensis**		2
Brazil	Imbuia	Phoebe prosa	**Ocotea porosa**		1
Brazil	Louro vermelho	Ocotea rubra	**Sextonia rubra**		1
Brazil	Castanha jacare	Corythophora rimosa	**Corythophora rimosa**		2
Brazil	Tauary	Couratari pulchra	**Couratari guianensis**		1
Brazil	Mata-mata	Eschweilera truncata	**Eschweilera truncata**		2
Brazil	Cardeiro	Scleronema micranthum	**Scleronema micranthum**		2
Brazil	Cangerana	Cabralea cangerana	**Cabralea canjerana**		1
Brazil	Andiroba	Carapa guianensis	**Carapa guianensis**		1
Brazil	Andiroba	Carape guianensis	**Carapa guianensis**		1
Brazil	Gito	Guarea trichilioides	**Guarea guidonia**		2
Brazil	Tatajuba	Bagassa guianensis	**Bagassa guianensis**		1
Brazil	Burra leiteira	Brosimum potabile	**Brosimum potabile**		1
Brazil	Burra leteira	Brosimum potabile	**Brosimum potabile**		1
Brazil	Guariuba	Clarisia racemosa	**Clarisia racemosa**		2

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Total: 57 economies

Approx. 1,000 species of **domestic wood**
Approx. 4,000 species of **imported wood**
Approx. 600 species of **others**
-> specimen size : 15cm × 7 × 1

3. Advancement of Wood Identification Laboratory Management Software

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Website Setup

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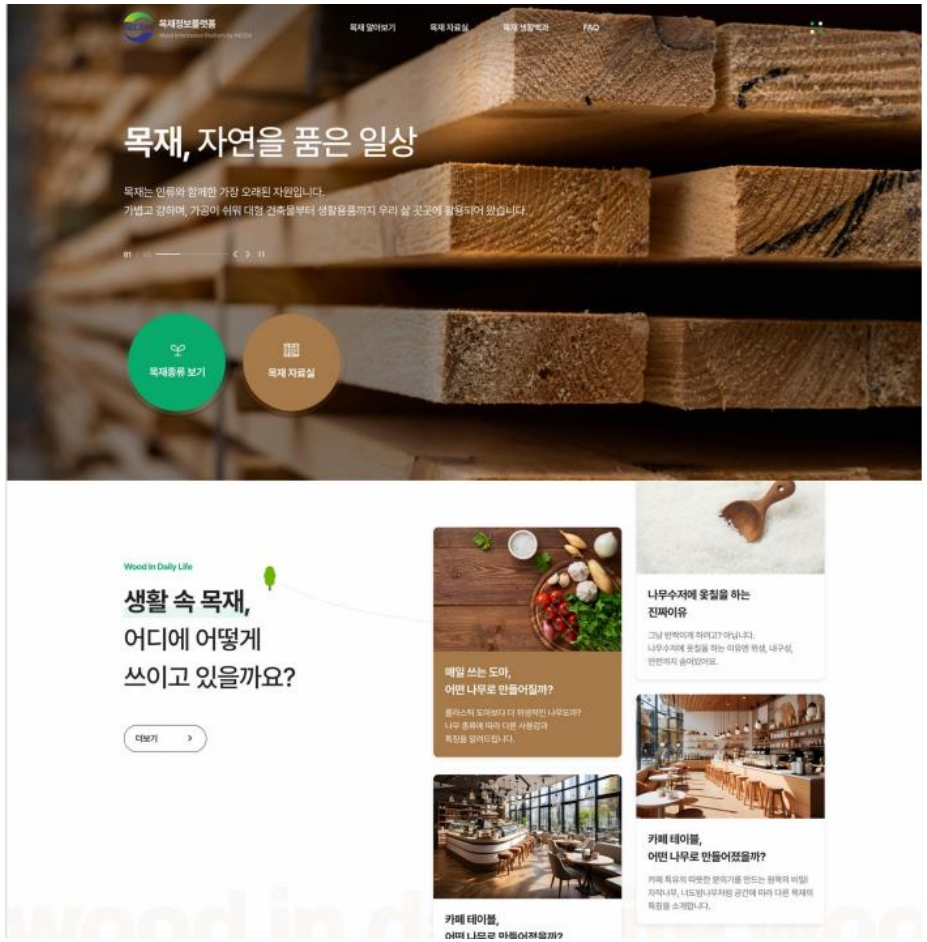

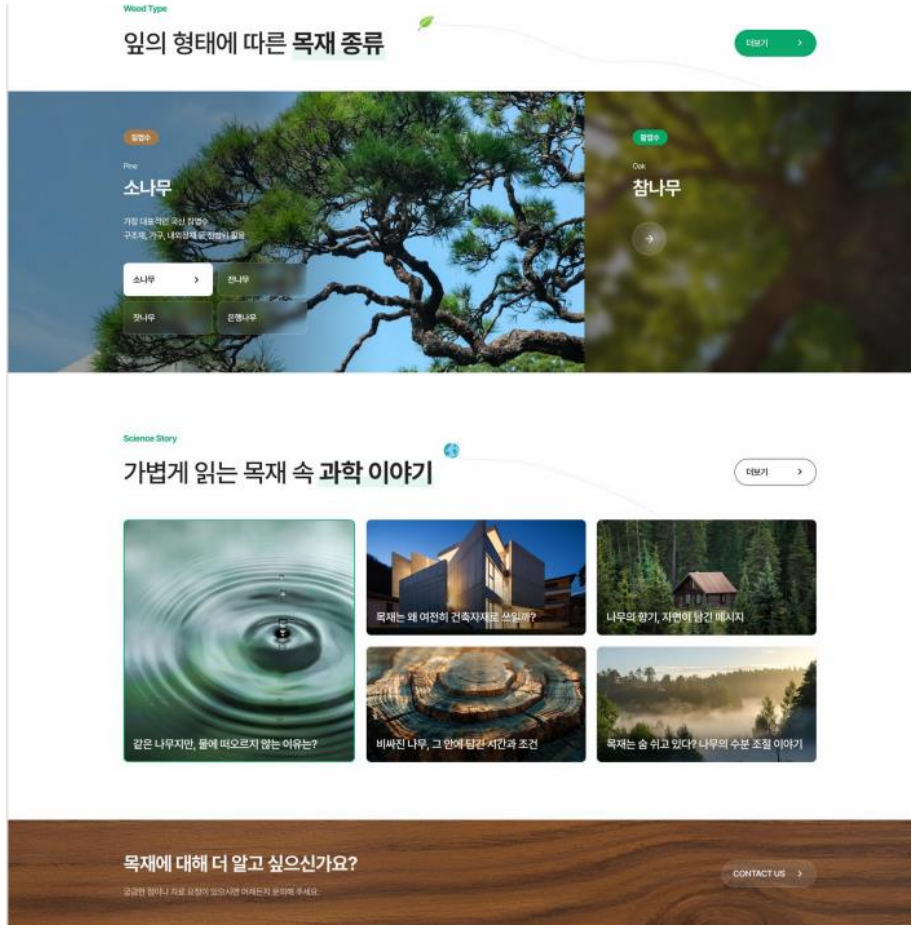

3. Advancement of Wood Identification Laboratory Management Software

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Website Setup

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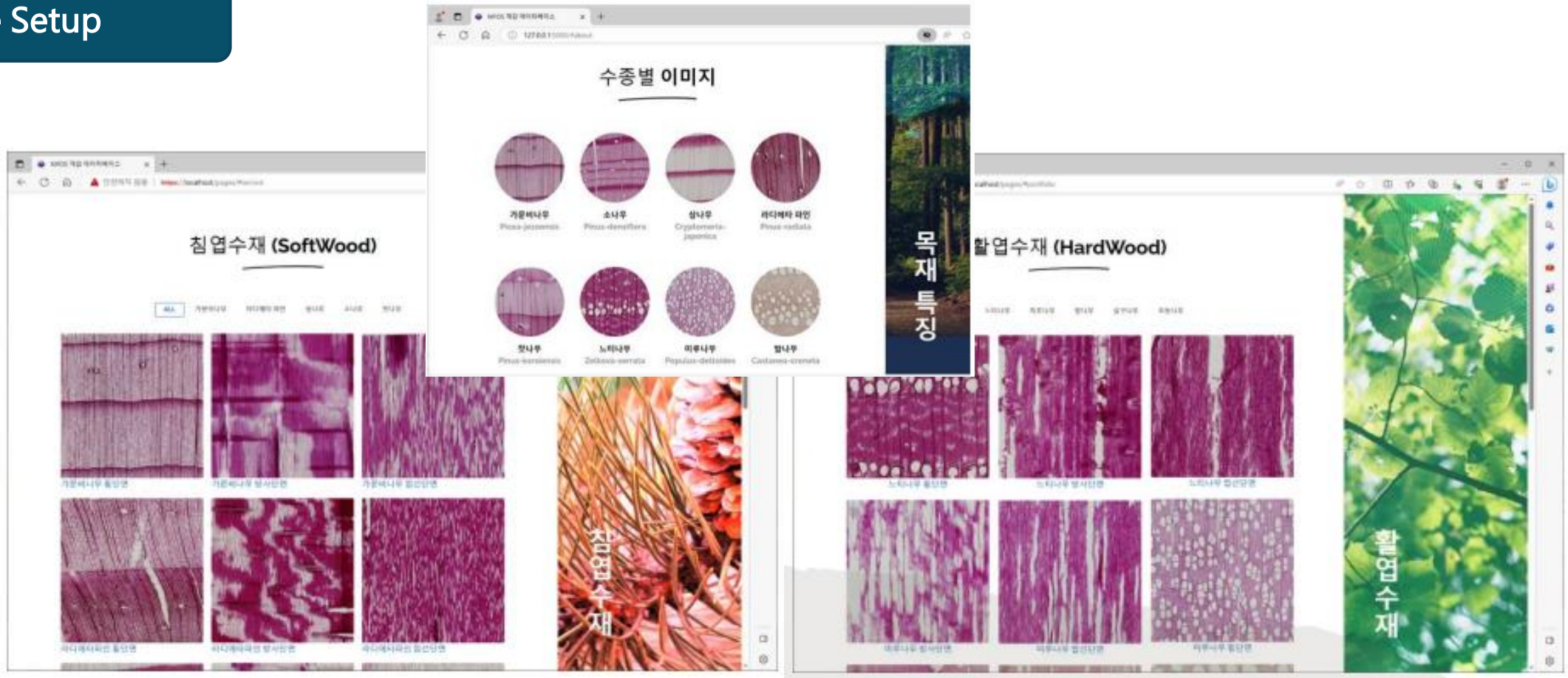

4. Species-Level Wood Identification and R&D

- **Expansion of Certified Wood Sample DB for Imported Timber and Enhancement of Technical Capacity**
- Establishment of a network for collecting certified wood samples from major timber-importing economies through international cooperation such as APEC
  - **Cooperation for establishment a wood species identification database**
- Securing diverse forms of reference specimens to advance wood identification technologies
- Development of species identification techniques in response to legality verification requirements for imported timber
- Proactive measures using AI automation technology
  - **Establishing a cooperation system through AI automation research by the National Institute of Forest Science (scheduled for 2026)**

* The next presentation will cover the current status of AI technologies for wood identification.

Thank you