



OUR REFERENCE  
exp\_494 - 496

YOUR REFERENCE  
Film-faced plywood

SERVICE  
Wood Biology

DATE  
24-04-2024

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CONCERNS  
EXPERTISE

## ENFORCE – Centre for Forensic Wood Research

# Report Expertise

This report concerns the macro- and microscopic wood identification and origin detection of the sample received with references listed below.

Reference: exp\_494, exp\_495, exp\_496

Date received: 25-01-2024

Date report: 24-04-2024

Name client: Murielle Feyen

Contact: Murielle.feyen@vansteenbergeinvest.be

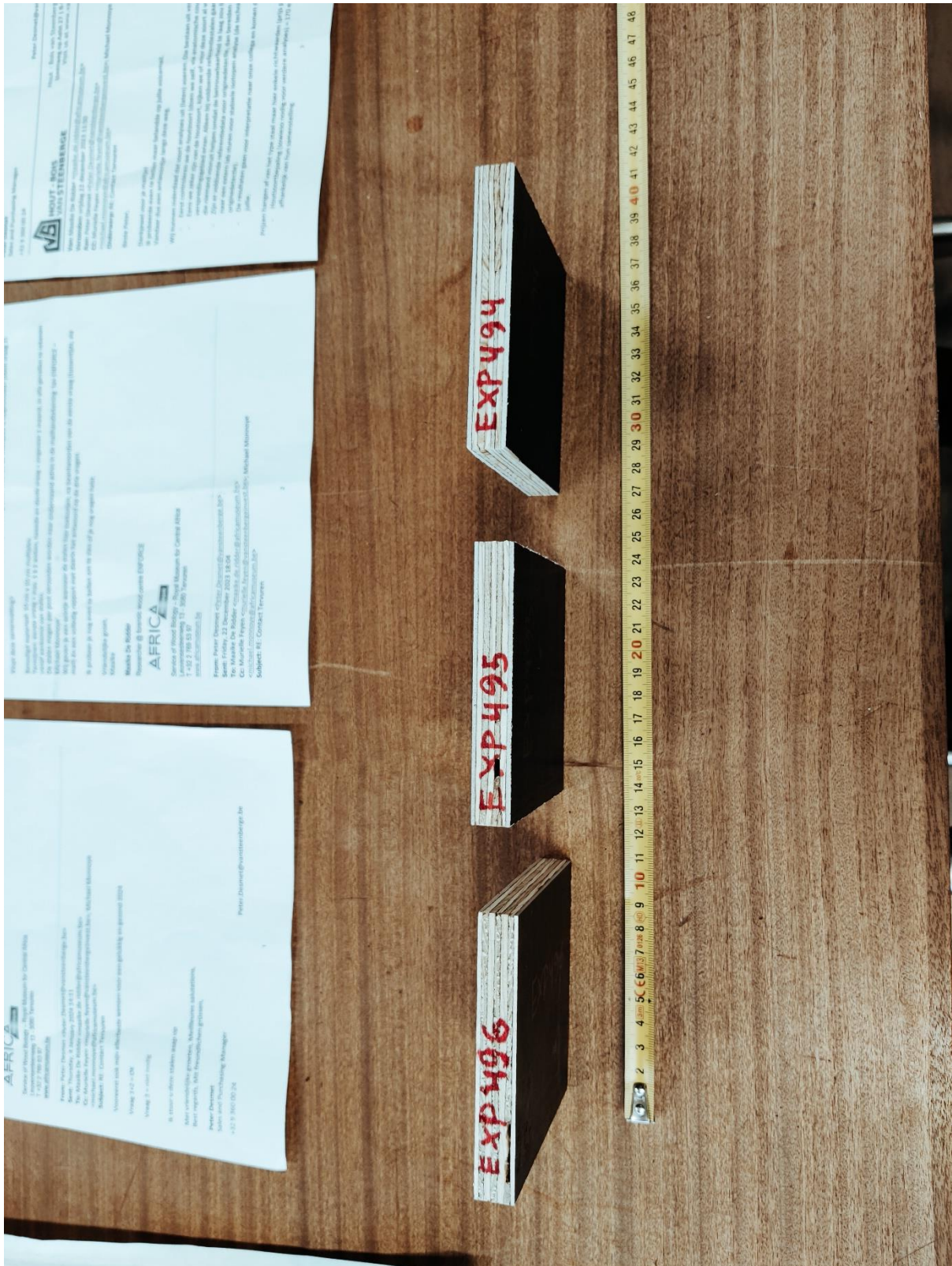
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## Sample Description

Three plywood samples, each 7 layers. Declaration: 100% Pine Plywood. Request for species verification and, in case of presence of birch, origin detection (verification of Ukrainian origin) of birch layers.

See picture(s) listed below:



## Treatment

### Identification:

A small cube of around 1 cm<sup>3</sup> was taken of each of the three plywood samples and softened in an oven at 70°C (ref. Lab Protocol). Thin sections were made in transversal, tangential and radial plane using a microtome. These were stained with Safranin 0 and Alcian Blue. The anatomical features (ref. IAWA List) of each of the 13 layers were studied with an optical microscope and an electron microscope. These features were compared with reference material online (ref. InsideWood) and in the xylarium of the Service of Wood Biology.

### Origin detection:

After communication with the client, the identification procedure was expanded with an analysis of the origin of the two *Betula* sp. layers present in the wood of exp\_494. The stable isotopes ratios method was employed for this analysis and the analysis was performed in collaboration with two partner institutes. The concentrations of the stable isotope ratios of hydrogen ( $\delta^2\text{H}$ ), oxygen ( $\delta^{18}\text{O}$ ), and carbon ( $\delta^{13}\text{C}$ ) were determined and related to the concentrations in reference material from the relevant regions (Ukraine, Russia) (ref. A framework for tracing timber).

## Conclusion identification

The species identification results are equal for the three samples (exp\_494, exp\_495, exp\_496):

Layer 1 & Layer 7:

The macroscopic and microscopic anatomical features fully correspond with the botanical genus *Betula sp.* (trade name birch).

The declaration (Pinus sp.) is incorrect for these layers.

Layer 2 - 6:

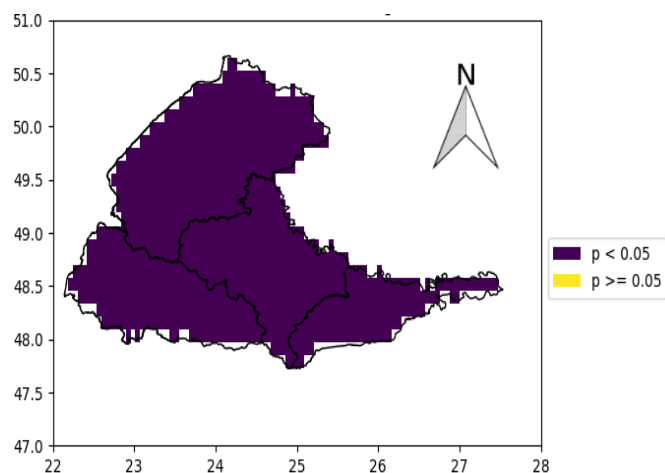
The macroscopic and microscopic anatomical features of the veneer fully correspond with the botanical genus *Pinus sp.* (trade name pine).

The declaration (Pinus sp.) is correct for these layers.

## Conclusion origin detection: exp\_494 Layer 1

Verification exp\_494 Layer 1: Ukraine

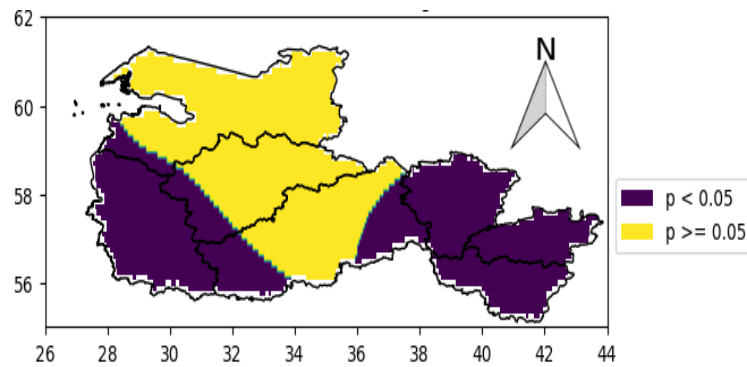
The stable isotope ratios exclude an origin from Ukraine.



Map of the possibility (p-values) of Ukrainian origin of birch present in exp\_494 Layer 1. The map shows Ukrainian regions where birch is present. Yellow areas cannot be excluded as a possible origin, purple areas can be excluded. (© World Forest ID).

### Verification exp\_494 Layer 1: Russia

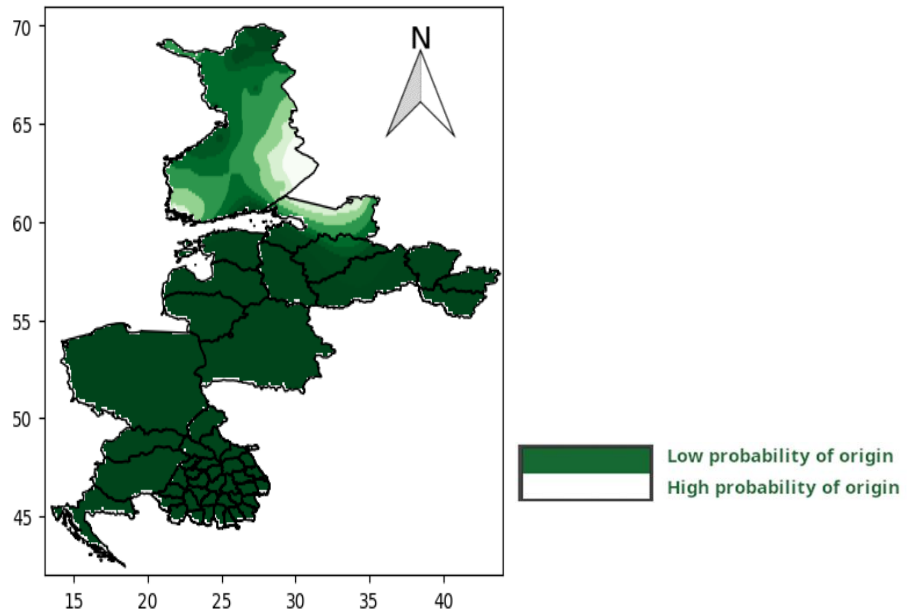
The stable isotope ratios exclude the Russian regions of Pskov, Yaroslavl, Ivanovo and Vladimir. The Russian regions of Leningrad, Novgorod and Tver cannot be fully excluded as logging area.



Map of the possibility (p-values) of Western Russian (Pskov, Tver, Novgorod, Leningrad, Yaroslavl, Ivanovo, Vladimir regions) origin of exp\_494 Layer 1. Yellow areas cannot be excluded as a possible origin, purple areas can be excluded. (© World Forest ID).

### Determination exp\_494 Layer 1

The determination of the origin of exp\_494 Layer 1 is visualized in the map below. It indicates that the most likely origin is from Finland to Northwestern Russia (Leningrad region).

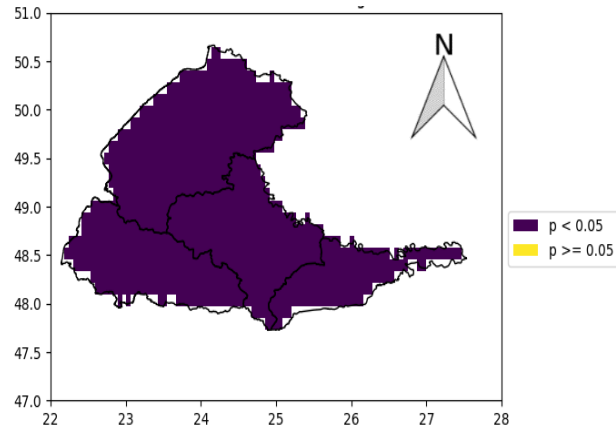


Map of the likelihood of the origin of *Betula* sp. in exp\_494 Layer 1 in the Baltic states, parts of Eastern Europe, parts of Russia and Finland (© World Forest ID).

## Conclusion origin detection: exp\_494 Layer 7

### Verification exp\_494 Layer 7: Ukraine

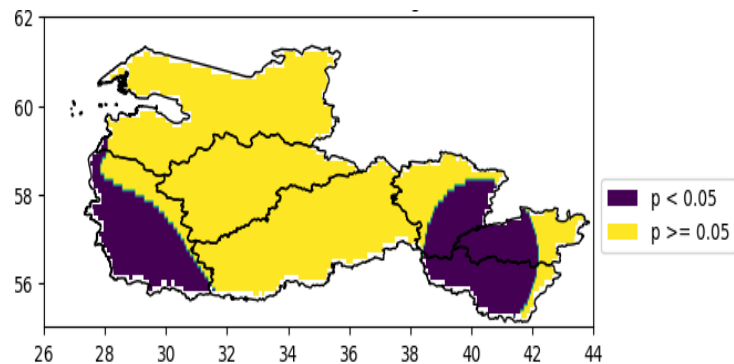
The stable isotope ratios exclude an origin from Ukraine.



Map of the possibility (p-values) of Ukrainian origin of birch present in exp\_494 Layer 7. The map shows Ukrainian regions where birch is present. Yellow areas cannot be excluded as a possible origin, purple areas can be excluded. (© World Forest ID).

### Verification exp\_494 Layer 7: Russia

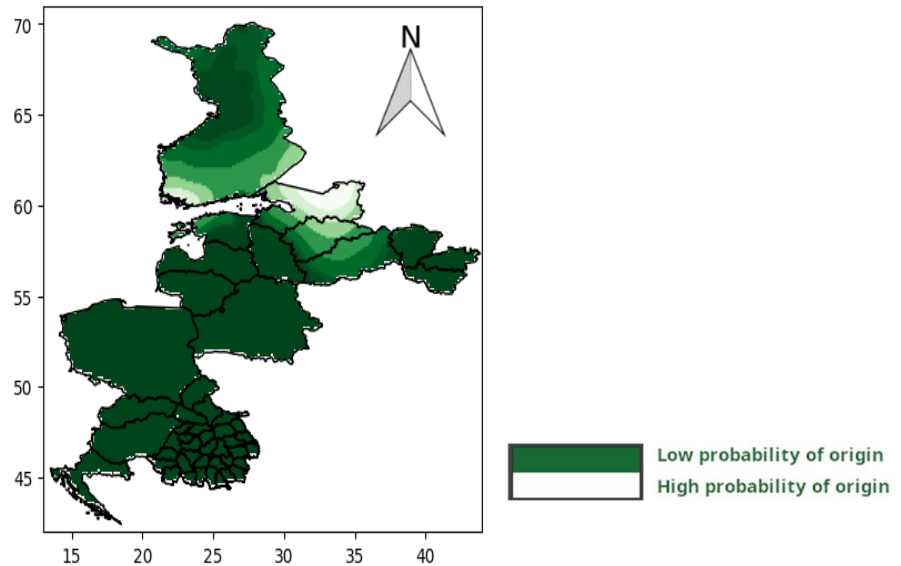
The stable isotope ratios exclude the Western part of the Russian regions of Pskov, Ivanovo and Vladimir, as well as the Eastern section of the Russian region Yaroslavl. The Russian regions of Leningrad, Novgorod and Tver cannot be fully excluded as logging area.



Map of the possibility (p-values) of Western Russian (Pskov, Tver, Novgorod, Leningrad, Yaroslavl, Ivanovo, Vladimir regions) origin of exp\_494 Layer 7. Yellow areas cannot be excluded as a possible origin, purple areas can be excluded. (© World Forest ID).

### Determination exp\_494 Layer 7

The determination of the origin of exp\_494 Layer 7 is visualized in the map below. It indicates that the most likely origin is from Finland to Northwestern Russia (Leningrad region and neighbouring regions). Northwestern Estonia also has a small probability of origin.



Map of the likelihood of the origin of *Betula* sp. in exp\_494 Layer 7 in the Baltic states, parts of Eastern Europe, parts of Russia and Finland (© World Forest ID).



## References

Schmitz, Nele. (2010). Lab protocol for basic wood anatomy procedures: making and staining of micro-sections of wood samples.

Wheeler, Elisabeth & Baas, Pieter & Gasson, Peter. (1989). IAWA List of Microscopic Features for Hardwood Identification. IAWA journal / International Association of Wood Anatomists. 10. 219–332.

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Mortier, T., Truszkowski, J., Norman, M. *et al.* A framework for tracing timber following the Ukraine invasion. *Nat. Plants* (2024). <https://doi.org/10.1038/s41477-024-01648-5>