		SERVICE Wood Biology
OUR REFERENCE exp_516	YOUR REFERENCE Plywood	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_516 (plywood, 13 layers)
Date received: 05-03-2024
Date report: 24-04-2024

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Sample Description

2 blocks of a multiplex, 13 layers. Declaration: Birch originating from Latvia. Request: origin detection, verification of Birch origin from Latvia (if not Latvia, check Russian origin).

See picture(s) listed below:

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Service of Wood Biology
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3080 Tervuren, België

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Treatment

Identification:

A small cube of around 1 cm^3 was taken 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 Safranine 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:

The identification procedure was expanded with an analysis of the origin of *Betula* sp. present in the wood. A subsample was taken of Layer 5. 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 (δ^2H), oxygen ($\delta^{18}O$), and carbon ($\delta^{13}C$) were determined and related to the concentrations in reference material from the relevant regions (Baltic States, Russia) (ref. A framework for tracing timber).

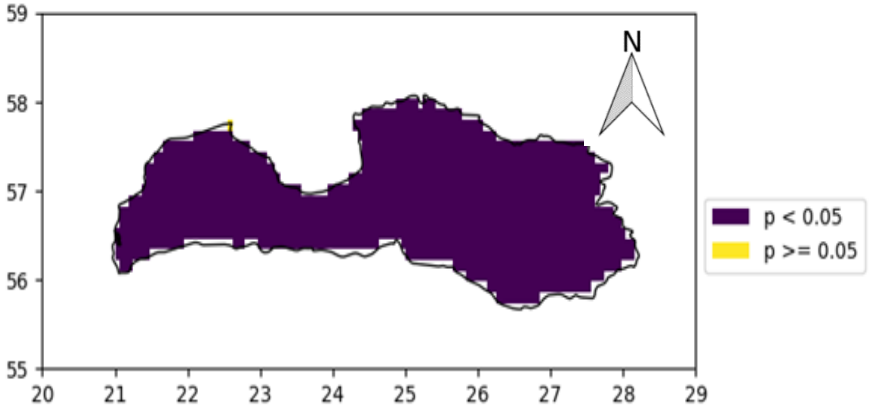
Conclusion identification

The macroscopic and microscopic anatomical features of all layers present in the plywood fully correspond with the botanical genus *Betula* sp. (trade name birch).

Conclusion origin detection

Verification: Latvia

The stable isotope ratios exclude the vast majority of Latvia. The only region in Latvia that cannot be fully excluded as logging area is a minute area in the north-west. This makes an origin from Latvia extremely unlikely.



Map of the possibility of Latvian origin of exp_516 layer 5. Yellow areas cannot be fully excluded as a possible origin, purple areas can be excluded. Whole-area p-value: 0,05216 (© World Forest ID).

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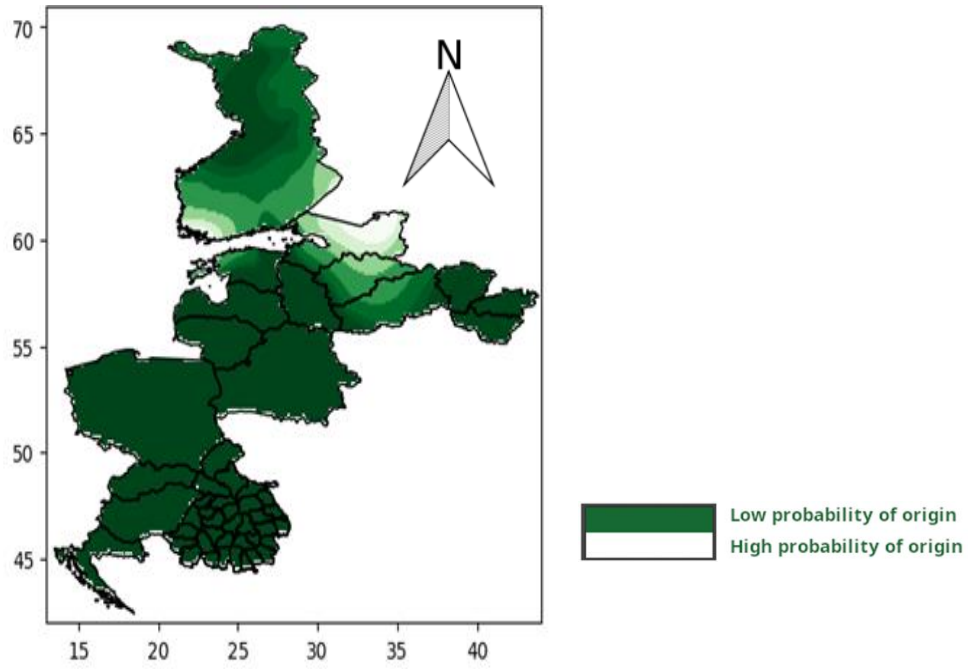
Determination:

The determination of the origin of exp_516 is visualized in the map below. It indicates that the most likely origin is Finland to the Leningrad region (Russia) and neighbouring regions in Russia.



Map of the likelihood of the origin of *Betula* sp. in exp_516 layer 5 in the Baltic states, parts of Eastern Europe, parts of Russia and Finland (© World Forest ID).

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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 Microcopic Features for Hardwood Identification. IAWA journal / International Association of Wood Anatomists. 10. 219–332.

InsideWood. 2004-onwards. Published on the Internet. http://insidewood.lib.ncsu.edu/search

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

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