



OUR REFERENCE  
exp\_435-438

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ENFORCE

CONCERNS  
EXPERTISE

YOUR REFERENCE  
PLAAT 2A, 1B, 3A, 4A

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25-08-2023

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## ENFORCE – Centre for Forensic Wood Research

# Report Expertise

This report concerns the wood identification and provenancing of the samples received with references listed below.

Reference: exp\_435 (Plaat 2A), exp\_436 (Plaat 3A), exp\_437 (Plaat 4A), exp\_438 (Plaat 1B)  
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### Sample Description

Four plywood samples, each 13 layers. Request: Are the samples birch originating from Ukraine, in particular the region Zjytomyr/Bucha?

See picture(s) listed below:



## Treatment

**Identification:** A small cube of around 1 cm<sup>3</sup> was taken of each plywood sample and softened by shortly boiling (ref. Lab Protocol). Thin sections were made in transversal and radial plane using a microtome. These were stained with Safranin 0 and Alcian Blue. The anatomical features (ref. IAWA List) were studied with an optical microscope. These features were compared with reference material online (ref. InsideWood) and in the xylarium of the Service of Wood Biology.

**Provenancing:** A sample of exp\_435 layer 3, exp\_436 layer 2, exp\_437 layer 2 and exp\_438 layer 2 were analysed by a third party using the stable isotope method. The concentrations of the stable isotopes 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. The results found by the third party are summarised below.

## Conclusion Identification

The macroscopic and microscopic anatomical features of all layers of the four samples fully correspond with the botanical genus *Betula spp.*

## Conclusion Provenancing

The stable isotope concentrations of hydrogen and oxygen are depleted in the samples, which differs from Ukrainian reference material.

Exp\_435: The hydrogen ratio is outside the 98% percentile of the Ukrainian reference database. The oxygen ratio is on the border of the 98% percentile of the Ukrainian reference database. Thus, the sample is unlikely to originate from Ukraine.

Exp\_436: Both the hydrogen and oxygen ratios are outside the 99% percentile of the Ukrainian reference database. An origin from Ukraine is excluded with a probability of more than 99.8%.

Exp\_437: The hydrogen ratio is outside the 99% percentile of the Ukrainian reference database. The oxygen ratio is still in range of the 95% percentile and 99% percentile. Thus, the sample is unlikely to originate from Ukraine.

Exp\_438: The hydrogen ratio is outside the 99% percentile of the Ukrainian reference database. The oxygen ratio is still in range of the 95% percentile and 99% percentile. Thus, the sample is unlikely to originate from Ukraine.

The concentrations of isotopes are in line with what is to be expected in Russia, particularly for exp\_436.

## Final Conclusion

The four plywood samples are birch unlikely to originate from Ukraine (including the region Zytomyr/Bucha). There is a high risk of an origin from Russia. In particular, the sample of exp\_436 is excluded to originate from Ukraine.

## 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.

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