

FRAGMENTS OF WALL PAINTINGS FROM A ROMAN VILLA IN SIPČINA (Croatia)

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SITE OVERVIEW

The archaeological site of Sipčina, located in the Municipality of Križ in northwestern Croatia, has been known to experts since the mid-20th century. Situated on slightly elevated terrain, the site has been used for grazing and agriculture since antiquity. Beginning in the 1950s, ploughing activities revealed fragments of construction materials and ceramic artifacts. Despite early recognition, systematic archaeological investigations began in 2012, when the Croatian Conservation Institute initiated a long-term research project. These efforts have been made possible through the financial support of the Ministry of Culture and Media of the Republic of Croatia, the Municipality of Križ, and Zagreb County.

Archaeological surveys and excavations covered a total of 4.35 hectares (via geophysical prospection) and 2,770 m² (through systematic excavation) uncovering the remains of a Roman rural villa, known as a *villa rustica*, dating back to the 2nd and 3rd centuries AD. Such villas typically functioned as multifunctional agricultural estates, combining residential and economic buildings.

The villa at Sipčina comprised several structures, each serving a specific function. Structure 1 was identified as a bathhouse, covering 134 m² and featuring a Roman hypocaust system for underfloor heating. Structure 2, only partially excavated, is believed to have been the estate's main residential building. It contained richly painted walls and mosaic-decorated floors. Both buildings were constructed using stone and brick masonry bonded with mortar, demonstrating advanced Roman engineering techniques such as the hypocaust system. These elements reflect the sophistication and comfort characteristic of Roman domestic architecture.

Unfortunately, the site has experienced significant deterioration over time. Today, most remains are preserved only at the foundation level, with original walls largely collapsed or degraded. What remains are primarily negative impressions of walls and fragments of structural elements such as the lower floors of the hypocaust system.



Fig. 1 Fragments of frescoes.

RESEARCH AND ANALYSIS

Among the most remarkable discoveries during the excavations are fragments of wall paintings, floor layers, and mosaics. Although often found in secondary contexts - as infill within collapsed walls - they provide invaluable insight into the artistic and cultural life inside the Roman villa. Conservation-restoration research, including detailed fragment analysis and laboratory testing, confirmed that these are remnants of Roman wall paintings. Their provenance corresponds with the villa's archaeological context. Analysis of the pigments found on the painted fragments was carried out using X-ray fluorescence spectroscopy (XRF). The results revealed the presence of the pigments such as organic black, green earth, azurite (a blue pigment), calcium carbonate, and iron oxides (ochre and red pigments). All are of natural mineral origin and commonly used in fresco painting. Fourier-transform infrared spectroscopy (FTIR) confirmed lime as the binding agent in the painted layer, further supporting the use of the *fresco* technique. This ancient method involved applying pigments mixed with water directly onto fresh plaster, allowing the colors to bond with the wall for lasting vibrancy. At the Sipčina site, the *fresco* fragments are painted with a white background, while visible lines and traces of ornamental motifs are executed in ochre, red, black, green, and blue hues - likely decorating the villa's living and bathing areas.

CONSERVATION-RESTORATION WORK

Conservation and restoration efforts were undertaken on these fragments to preserve them and enhance our understanding of their historical significance and artistic value. The work included detailed documentation and recording of decorative feature, test cleaning and cleaning of fragments, consolidation of the materials, sorting and partial reconstruction of fragments.

During the cleaning process, no aggressive solvents were used, and the original structure of the painted layer was not altered by the introduction of chemical substances. Test cleanings were carried out on both the painted and plastered areas of the fragments. Due to the porous and uneven surfaces of some fragments, pressurized steam cleaning was applied with great caution to avoid damaging the painted layer.

The painted layer was not consolidated using natural or synthetic adhesives, which are often non-removable and can permanently alter the chemical structure of the painted surface and plaster layer. Instead, improved cohesion between the layers was achieved by applying a fine coating of pure limewater.

In the final phase of the project, the most representative fragments of the wall painting were selected for further study and potential display. Based on layer stratigraphy, four distinct groups of painted fragments were identified: three included combinations of pink and light gray plaster layers, while the fourth group shows only light gray plaster layers. A partial reconstruction of the fragments



Fig. 2 (a, b, c, d) Cleaning of fresco fragments using distilled water and cotton swabs.; Fig. 3. Detail of a cross-section of a fragment.

was initiated, guided by the similarities in painted motifs, plaster types, and technical features. To maintain flexibility for future research and potential new discoveries on site, the fragments were not permanently joined, allowing for ongoing reinterpretation and exhibition.

MOSAICS AND FLOORING

In addition to wall paintings, several floor fragments were uncovered. Some featured mosaics made of black, white, and grey stone *tesserae*, while others were simpler floors without decorative patterns. These mosaics served both decorative and symbolic functions, reflecting the wealth and cultural connections of the villa's inhabitants. Even the modest fragments reveal a refined standard of living and connection to wider Roman artistic traditions.

One particularly noteworthy find was a corner fragment of flooring bearing plaster impressions—likely remnants of a simply painted wall. The thickness and structure suggest it was part of the hypocaust system, highlighting the technological sophistication of Roman domestic architecture.

CONCLUSION

Though fragmentary, these remains of wall paintings, floors, and mosaics from the Sipčina site provide important evidence of Roman culture, architecture, and daily life in continental Croatia - a region whose ancient past continues to unfold. As research and conservation continue, each fragment contributes to a richer understanding of the aesthetics, technology and lives of the people who once inhabited this Roman estate.

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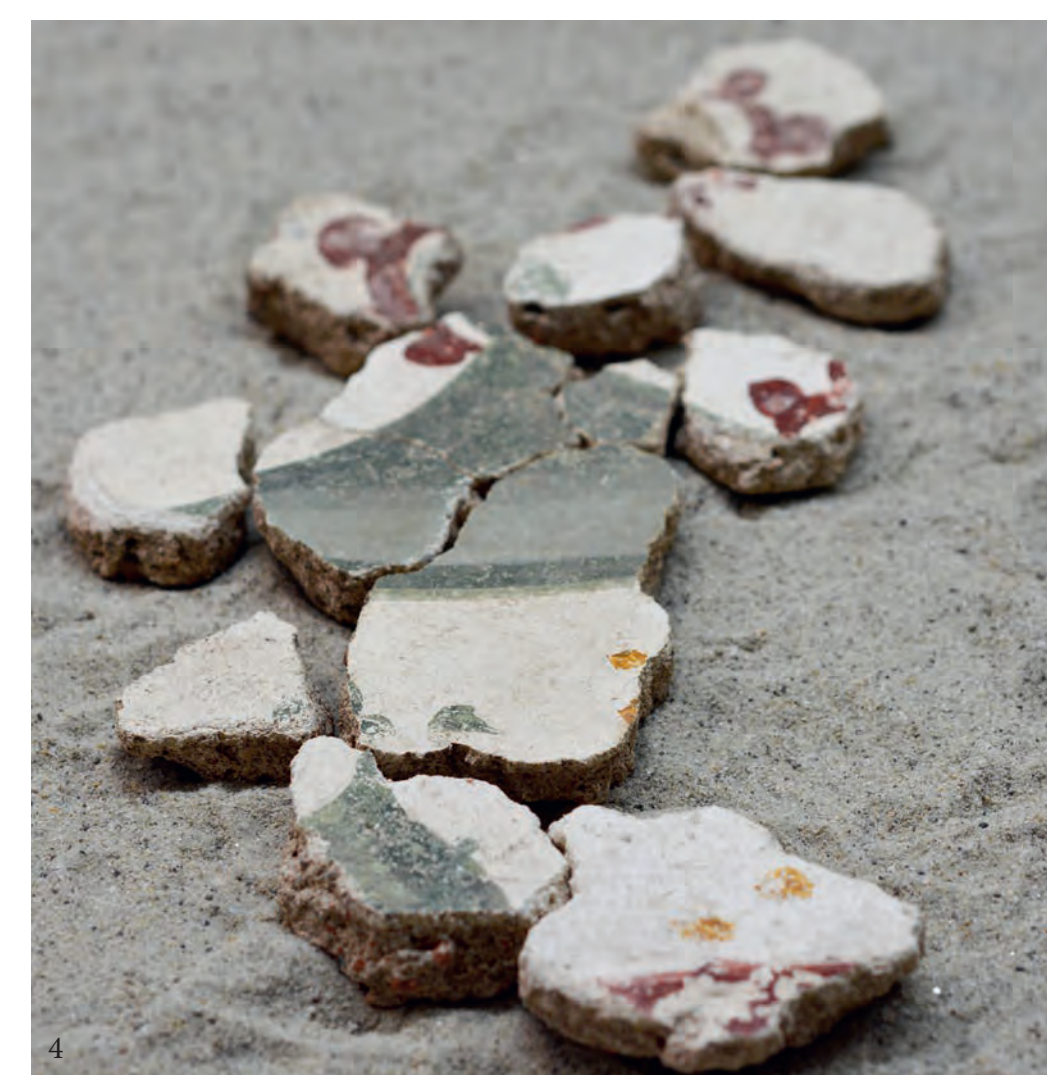
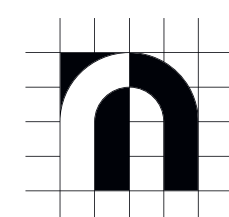


Fig. 4 Joining fragments of a fresco.

Fig. 5 Reassembled fragments showing a floral ornament.

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