

# The Study of Biological Decay with Church Icons on Wooden Support in Romania

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## Abstract

The icons on wooden support are widely spread in Romania. In our research we analysed a number of 200 icons from museum, church and private collections and presented the type of wood and their biological decay. The types of wood identified with the supports studied are: fir, spruce, lime, evergreen oak, beech, maple.

The biological attack with the most widespread occurrence is that of the insects *Anobium punctatum*.

The occurrence of fungi attacks is reduced and we identified only *Coniophora puteana* *Antrodia sp.* *Coprinus sp.*

## 1.INTRODUCTION

Church icons on wooden support are widely spread all over the East-European area.

In the Romanian Provinces, the icons were important as worship items, as they constituted church iconostases, separating the apse of the altar from the nave (figure nr.1 and 2). Icons used to adorn the rich interiors of the voivodes palaces, of the episcopal residences, the houses of the small landlords and boyars, or the modest peasant homes [4].



Figure nr. 1 Iconostasis



Figure nr. 2 Icons on pronaos

Their origin comes down to us from the Byzantine space and the manufacturing performance has been perpetuated throughout the centuries. Brought out of the monastery workshops, where they used to be manufactured at the beginning, icons came to be painted by folk manufacturers of churches or icon painters.

The folk craftsmen formed their own style by combining the Byzantine tradition and the Transylvanian genuineness.

This type of folk art was achieved with cheap materials and simple technical tools [3]. In order to make them accessible to a larger number of believers, whose financial possibilities were limited, the craftsmen ignored the required quality of materials used and the panelling techniques.

## 2. SUBMISSION

Our research, covering more than 400 churches and monasteries, gave us the possibilities of observing a large number of icons and assess their state of preservation. We could only make further research on icons restored within restoration programmes in the Restoration laboratories of the museums, some private laboratories, BA graduation projects of students of the *Restoration and Conservation Studies* at Lucian Blaga University of Sibiu.

A number of 200 icons from museum, church and private collections were considered, in order to highlight the problems of this type of cultural goods.

With these icons, the way the supports had been made were studied, the types of wood and their biological decay throughout the time were identified.

The identifications of the types of wood were based on the macro- and microscopic characteristics, by cross, tangential and radial sections, where needed. The clues of identification used were those of Ghelmeziu's (1958) and Berti's (2006).

The supports under discussion can be classified as:

1. panel made of one chunk of wood, with no traverses, radially or tangentially debited (figure nr.3);
2. panel made of one chunk of wood, with one wide traverse in its central area, of the same wood or a different one;
3. panel made of one chunk of wood or two, with a traverse in its central area and another one at each end, of the same wood or a different one;
4. panel made of two or three chunks, with two traverses, of the same wood or a different one (figure nr.4).



(a)

(b)

Figure nr.3 Panel made of one chunk: (a) with no traverses; (b) with two traverses.

Woodworking can be handmade, using a chisel, or machine made, using the sawmills. The supports made of one chunk of wood and without traverses are usually smaller in size and thicker, as a result of radial debitation, in order to prevent distortions and cracking.

The two bigger dimensions are made of two or three chunks, debited tangentially and having sleepers.

The types of wood identified with the supports studied are:

1. fir (*Abies alba*), in 24% of the cases;
2. spruce (*Picea abies*), in 15% of the cases;
3. lime (*Tilia sp.*), in 38% of the cases;
4. poplar (*Populus sp.*), in 8% of the cases;
5. evergreen oak (*Quercus petraea*) and chestnut oak (*Quercus robur*) in 6% of the cases;
6. beech (*Fagus silvatica*), in 4% of the cases;
7. maple (*Acer campestre*), in 5% of the cases.

The lime panels occurred most frequently. In Romania, there are three species of lime growing, *Tilia cordata*, *Tilia plathyphyllos* and *Tilia tomentosa*. The microscopic characteristics of the three species are very much alike and it is quite difficult to distinguish among them.

The lime was preferred because of its softness, being easy to work and having a fine, smooth structure.

Among the softwood types, the fir was favourite, because it has no pouch of resin, it is soft and smooth in structure.

From the point of view of biological decays, those caused by the wood-boring insects are prevalent.

Chart no.1 displays the insects identified and the number of panels affected, function of the type of wood.

The most widespread occurrence is that of the *Anobium punctatum*, in 59% of the cases. Insects prefer lime, occurrent in 26% of the cases, fir, occurrent in 10,5% of the cases, spruce and poplar, in 8% of the cases.

The intensity of the decay varies between 2-5, up to 130-145 flight holes/sqcm. The number of flight holes is considerably higher on the rear side of the panels, where the wood is not covered by other layers. On the front side of the panel, where the layer of preparation and paint has faded, multiple flight holes are occurrent.

Of the total number of panels identified with decay, in 27% of the cases the decay was still active (figure no.4.) Most of these panels were localized in churches or warehouses lacking heat and ventilation, and high relative humidity of the air.

The decay can be differentiated with the icons made of the same type of wood, kept in the same church, and in the same position. With the very same panel, made of two or three chunks, and the same type of wood, the decay can be found in one part only. These observations indicate that the main cause of the decay is the quality of the wood, i.e. the area of growth and the place where it was debited. The wood which is richest in nutrient substances is preferred.

The track of the insects' galleries can be seen after removing the frames or under the layers of paint and preparation lost (figure no.5).

The panels can break to pieces and some part of the wood material can be lost if the decay is highly intense (figure no.6 and 7).



Figure nr.4 Panel, still active *Anobium* attack



Figure nr.5 Insects' galleries after frame



Figure nr.4 and 5 Panel break to pieces and the wood material partly lost

*Xestobium rufilosum* has a low frequency with icon panels and prefers hardwood, soft, such as the lime and the poplar. The number of flight holes varies between 2-8/100 sqcm. With the icons under study, decays were no longer active and were associated with those of *Anobium punctatum*.

*Ptilinus pectinicornis* was only identified with a number of beech icons.

Fungal attacks on panels are not numerous and occurred in 6% of the cases under study. The items with which they were present were kept in spaces with a high level of humidity or where pluvial water infiltrations were present, as in the case of some wooden churches. The highly degraded single cover were not replaced and water infiltrated for longer periods of time. Species of fungi identified were: *Coniophora puteana*, *Antrodia sp.* and *Coprinus sp.*

With the *Antrodia*, sporiferous bodies grown on the lime panels were noticed, but no spores were found. (Photo no.)

With the *Coprinus*, the specific yellow mycelium helped identifying the genre.

With a part of the panels, only types of rot and losses of materials were found.

## Conclusions

The icon masters of the 17-19 c. on the Romanian territory preferred to manufacture the panels from softwood, specific of the geographical area and easy to work with (lime, poplar, fir, spruce).

The manufacturing technique of the panels is quite simple, with or without traverses, handmade or machine made.

The most frequent biological decays are caused by the wood-boring insects of the *Anobia punctatum* species, able to produce weakening, fragmentation and loss of some parts of the icon panels.

Fungal attacks are more rare, but can cause the irretrievable loss of some parts of the wood support.

In the future, we would like to extend our research to a larger number of icons and to imply the students in the research of the causes favouring biological decay occurrence.

Chart no. 1 Occurrence of wood-boring insects decay with icon panels

No.	Insects attack	Types of wood							Total
		Fir	Spruce	Lime	Poplar	Maple	Oak	Beech	
		47	28	76	19	10	12	8	200
1.	<i>Anobium punctatum</i>	21	16	52	16	8	2	3	118
2.	<i>Xestobium rufovillosum</i>	-	-	12	8	3	3	-	26
3	<i>Ptilinus pectinicornis</i>	-	-	-	-	-	-	2	2

## References

1. Berti, R.N. (2006), La struttura anatomica del legno, CNR-IVALSA, Trento.
2. Ghelmeziu N.G., Suci P.N. (1959) Identificarea lemnului, Ed. Tehnică, București.
3. Nicolescu, Corina (1976): Icoane vechi românești, Ed. Meridiane, București.
4. Porumb, M. (1998): Dicționar de pictură veche rămânească din Transilvania sec.XIII, Ed. Academiei Române, București.