

## WOODEN SCULPTURES FROM XVII AND XVIII CENTURIES IN THE REGION OF ASTI (ITALY): SCIENTIFIC IDENTIFICATION OF THE SPECIES.

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### *Abstract*

*This paper deals with the scientific identification of species utilized for the production of wooden sculptures collected into an exhibition of statues dated back to XVII – XVIII centuries, coming from the city of Asti and the surrounding region (Northwest Italy). Problems in sample drawing are analyzed, together with the results, described per period and author on the basis of the identified species. Almost all the statues were made of poplar or willow wood, except two, made of walnut wood. This paper also describes the principal technological characteristics of identified woods, considering specifically their utilization for carving.*

**Keywords:** *wooden sculptures; species identification; baroque period; northwest Italy; poplar wood.*

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### **Introduction**

Wooden sculptures are an important aspect of the whole of Italian artworks. They are recorded more in the provinces of the country than in big capitals of the several Italian kingdoms of the past. One can assume many reasons for that. We can propose two examples: less wealthy customers and the shading presence in big cities of statues or other artworks made with more precious materials.

In any case wooden statues were considered, even in the past, humbler than metal or stone (marble) statues and this can be testified by the fact that most of the Italian wooden statues were made by unknown artists, while the sculptors that created bronze or marble statues are widely renowned ones.

But the production of wooden statues involved large fortunes, over all the periods of the Italian history. The large and cheap availability of the material, its lightness and workability, the possibility of surface decoration [1] and finishing even with a thick preparation, that allows a further modelling, made wood the perfect material for the production of devotional statues.

Saints, Madonnas, and Christs, Crucified or Deposed, at 1:1 scale are present in almost all Italian churches and monasteries, perfectly suitable to be carried and exposed in processions.

Despite that, or also due to that, the publications on this topic are quite rare (no scientific paper is available on the identification of wood species from statues) and in most cases it is

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made of exhibition catalogues, where short files describe the artefacts, together with the restoration notes and the analyses made on the preparation and painted layer [2].

The wood species and the eventual decay problems are indeed disregarded in most cases. In the few sheets where the information file shows the species, “experts” frequently made the identification macroscopically, in a unreliable way [3]. Other authors used optical microscopy and X-ray tomography to identify anatomical elements of old wood [4].

In fact, in most of the permanent or temporary exhibitions of wooden statues the information plates only specify “wood” and not the species, while a marble statue is always known as marble and not as “stone”. Is it due to the fact that even for the artists the wood species didn’t matter? Recent works by Fidanza [5], Macchioni and Lazzeri [6] show that the choice of wood was not random and only few wood species were utilised in the past for woodcarving [3, 7].

The exhibition “Il Teatro del Sacro” (“The Theatre of the Holiness” - wooden sculptures in Asti and the surrounding area during XVII and XVIII centuries) gave the possibility to scientifically identify the species utilised by several artists during a specific period in a restricted area.

The aim of the paper is to describe the methodologies of sampling and the analyses for the determination of the species on a series of 41 carved artworks, out of which 38 statues and 3 wooden altar elements. A discussion on the relationship author – species will follow the analysis of the results.

### ***The starting point: the exhibition “The Theatre of the Holiness”***

The scientific research on the identification of wood species presented here has its beginning in the exhibition “The Theatre of the Holiness. Wooden sculpture of seventeenth and eighteenth centuries in the region of Asti”, organized in the spring of 2009 by the Superintendence for the Historical, Artistic and Ethno-anthropological Heritage of Piemonte (North-west Italy), in collaboration with the Fondazione Cassa di Risparmio di Asti and the Diocese of Asti, Casale Monferrato and Acqui.

The exhibition is part of a local program that consisted of over five years of small and large projects converging around the wooden sculpture of the seventeenth and eighteenth centuries; all the projects were linked to a cultural geography, to the restorations made and was largely supported by the Foundation [1].

The results obtained and presented during the exhibition had a prerequisite in the ministerial work of cataloguing, which, in combination with the census work promoted by the Italian Episcopal Conference, allowed the identification of the artefacts on which current restorations and studies focus.

Almost sixty sculptures have been restored, forty of which studied and exhibited. Parallel to this work, an important careful archive research activity was performed, aimed at dating the artefacts, at defining and identifying authors and clients, with particular regard to the workshop of Michele Enaten [8], and to reconstructing the history of individual statues; all this work helped in finding the correct restoration choices.

The exhibition allowed collecting samples of wood carving artefacts of the seventeenth century, which led to a revaluation of the period through the rediscovery of the role of the Baroque in the region of Asti, due to the workshop of Michele Enaten [8], and the important restorations of some artworks of seventeenth and eighteenth centuries that were returned to their original form, found under heavy repainting.

The liturgical function that these valuable and complex artefacts had affected over time their conservation status: the frequent handlings, the burns and the drips of wax caused by the flames of the candles, the attack of organisms such as mould and woodworms, but particularly changes in humidity and temperature that caused the movements of wood, with cracks and consequent loss of colour and gilding, imposed more than once renovations and repainting,

which in most cases have profoundly altered the original appearance of these sculptures [9]. Moreover we should not forget the damages that these artworks were sometimes subjected to due to theft, with removal of items, often resulting in arbitrary reworks.

It is clear that the sacredness attributed to these statues over the centuries on the devotional aspect, has diminished the awareness of their artistic value and the wooden statues have come to be "abused", with the best intentions, something that would never happen to paintings or marble statues.

The documents preserved in the archives provide little evidence to the changes made to sculptures, but frequently visible signs remain on individual artefacts, allowing the restorer and the expert to trace back their history and vicissitudes. The results of the renovation works carried out on wooden sculptures from the seventeenth and eighteenth centuries preserved in churches and confraternities of the province of Asti are documented in the exhibition catalogue [10].

## Materials and methods

The guidelines for sampling and identification of the species complied with the Italian Standard UNI 11118:2004 (Cultural Heritage - Wooden artefacts - Criteria for the identification of the wood species).

The standard states that the following steps, starting from the macroscopic observation, by naked eye or through a low magnification lens, allow the determination of a species. If the observed features are not enough to reach a satisfying level of characterisation, it will be necessary to extract samples for the anatomical characterisation of wood through microscopic observation. A recent work by Ruffinatto et al. [11] proposes a new methodology for the direct identification by a contact light microscope, but this is not applicable to painted surfaces.

Samples must be enough in number, meaning that if the macroscopic observation let one suppose that the species could be more than one, it is necessary to take additional samples; moreover the dimensions of the samples must be large enough to reveal the three anatomical directions of wood. The impact of the sampling on the artefact must be minimised as much as possible, thus the area of the artefact already partially damaged, hidden, or without decorations must be preferred.

In any case the possibility of sampling is always subject to the authorisation of the authority responsible for the artefact.

The application of the guidelines to statues is conditioned by the two characteristics of the analysed statues: they are covered by a preparation layer and by a painted layer and they are, in most cases, made of more than one piece through an assembling scheme.

Most of the statues are made of a single stem, excavated on the back of the statue in order to prevent the opening of the shrinkage cracks, and all the components of the figure that cannot be included on the projection of the stem are carved on external wooden parts, jointed with mechanical connections, strengthened by organic glue (Fig. 1). For example, the principal figure of a crucifix is made from a single stem, but the arms are jointed; a standing figure is made from a single stem, but frequently arms or hands are made from different elements, jointed to the principal stem; on almost all Virgin and Child statues, the Child and the hands of the Madonna are carved of different wood pieces.

Hence, the samplings made for this study were frequently taken from the back or the bottom of the statues. In the first case when the back was accessible and when the stem was excavated to stabilise the statue, in the second, when turning over the statue revealed that the base included the original stem (as for the statue in Fig. 1). The figure of Saint Bartholomew was carved from a single stem.



Fig. 1. Saint Bartholomew showing his own skin, by Ignazio Perucca (around 1780).

The left arm, the right hand, the skin and part of the red mantle in figure 2.A were carved from separate wooden elements, jointed to the principal stem.

Difficulties always arose for extracting samples from the jointed parts, because there was always the risk of destroying the decorated layers (Fig. 2.A). Therefore, in a few cases the sampling was not authorised. Two completely gilded statues pertaining to the exhibition were not sampled because it was impossible to find visible wooden parts, not covered by the decorations. This fact suggested that it would be better to sample during the restoration works, because more part would be accessible and the eventual small damages could be repaired or hidden.

Samples were cut with a simple razor and put into a vial, marked with the reference number of the statue, noting the position of sampling and taking a picture of each sample.

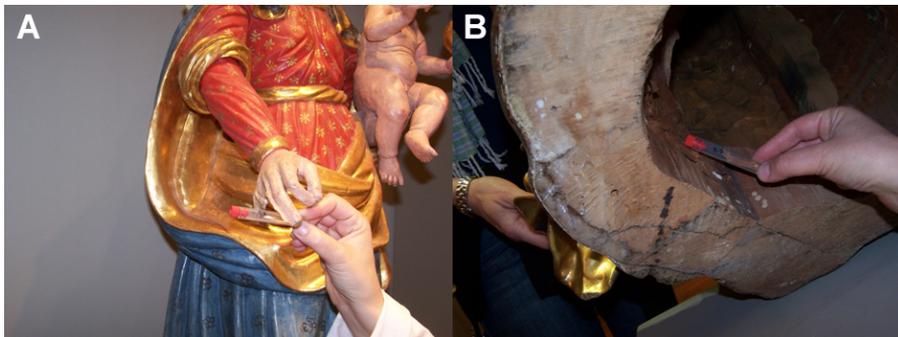


Fig. 2. The examples of non-destructive, low-impact sampling: A - a jointed arm where some fingers were damaged and wood was uncovered by the decorations; B - sampling of the principal stem from an excavated back;

The dimensions of the samples were very small and it was then decided to analyze them by a Scanning Electron Microscope. After a gold coating, the anatomical features and characteristics of each sample were observed and compared to the anatomical features of the collection of SEM images of IVALSA and with a reference atlas [12].

The total amount of extracted, observed and identified samples is 82, an average of two samples per artefact.

## Results and discussion

In Table 1 are presented the number of identified samples.

**Table 1.** Wood species identified on all 82 samples from the 41 artefacts

Wood species	Identified samples
Poplar ( <i>Populus</i> sp.)	56
Willow ( <i>Salix</i> sp.)	10
Walnut ( <i>Juglans regia</i> )	3
Maple ( <i>Acer</i> sp.)	1
Lime ( <i>Tilia</i> sp.)	1
Poplar/Willow	11
<b>Total samples</b>	<b>82</b>

In fact in only one case it was possible to really identify the species, for walnut wood (*Juglans regia* L.), in all the other cases only a “group of species” was identified or, more specifically, a *Genus*. The anatomical features of the wood of the genus *Populus* do not allow precise identification of different species belonging to the group. The three most diffuse species, *P. alba*, *P. nigra*, *P. tremula* are too similar, but not only from the anatomical point of view. The technological features of the wood of those three species are very close and the eventual lack of information deriving from lack of knowledge of the correct species is negligible [13]. We can make the same considerations for the species belonging to *Salix*, *Acer* and *Tilia* genera. In 11 cases we couldn't find the peculiar small difference between willow and poplar. The two genera belong to the same family (*Salicaceae*) and differ only in composition of the parenchymatic rays (Fig. 3), which are homogeneous for poplar and heterogeneous for willow [12].



**Fig. 3.** A - a tangential section of a sample from the statue of St. Roch (made of willow wood) and B - a tangential section of a sample from the Virgin of the Rosary (made of poplar wood). The difference is in the apical cell of the parenchymatic rays. Scale bars 50  $\mu$ m.

All the statues were made of poplar/willow wood, except for two, made of walnut wood.

A candle-holder has the carved part made of lime wood and the structure of poplar. Maple wood was utilised for the structural part of a frontlet.

18 statues out of 41 (44%) were made by unknown artists from different cultural circles. For those statues it is impossible to find any relationship with the utilised wood species.

The Artist most represented in the exhibition is Michele Enaten (who lived between the end of XVI century and 1696) and his workshop. Ten artworks were shown in the exhibition, in which the two wood species, poplar and willow, are utilised both for the principal part of the body and for the joined elements. In some statues the two woods are mixed together, as in St. Margaret (Fig. 4A), mostly made of poplar wood, but one of the joined pieces of the dress is of willow.

According to relevant publications [8] in 1636 Michele Enaten carved the Madonna della Concezione in Carmagnola, using willow wood, thus confirming the utilisation of this wood species.

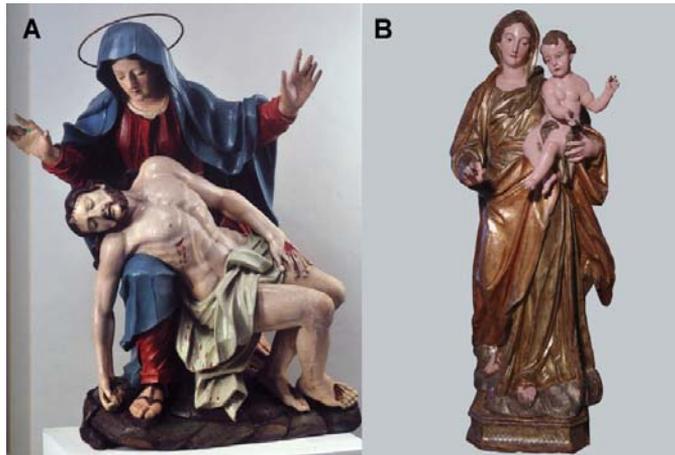
In any case poplar is always present: the Madonna (from Isola d'Asti, Fig. 4.B), mainly made of willow, has a basement made of poplar boards.



**Fig. 4.** A - St. Margaret (Asti, church of Santa Maria Nuova) and B - Madonna (Isola d'Asti, church of Beata Vergine Assunta) both from Michele Enaten and his workshop.

We cannot say the same for the engraver and wood sculptor Carlo Giuseppe Plura (Lugano 1655, Torino 1737), whose four works (one frontlet and three statues) are only made of poplar wood (Fig. 5). Documents confirm the preference of that artist for this timber [14], which he used for the altar of the Sant'Uberto church in Venaria Reale and its model at the parish of Agliè [15].

The same stands for the two artworks of Stefano Maria Clemente (Torino 1719 – 1794) made of poplar wood, as confirmed (Garabelli, 2006 *in verbis*) on the complex of about ten statues at San Lorenzo church in Collegno, also made of the same wood.



**Fig. 5.** A - Carlo Giuseppe Plura, Pietà (Pralormo, church of San Donato) and B - Stefano Maria Clemente, Madonna del Rosario (San Donato Scarampi, parish church)

For sculptures the only exception from *Salicaceae* wood are the two statues made by Francesco Borello (1636 – 1706) for the composition of the Calvary, Saint John and the Virgin (Fig. 6), both made of walnut (*Juglans regia*) wood. The documents about this author are not many and no information is available about the utilised wood species.



**Fig. 6.** Two statues by Francesco Borello of the composition of the Calvary: A - The Virgin and B - Saint John.

Two altar furniture items carved by Francesco Maria Bonzanigo (II – III quarter of eighteenth century) and Giuseppe Maria Bonzanigo (Asti 1745 – Torino 1820) have a typical structure made of poplar and the precious carved elements are made of lime wood (*Tilia* sp.).

Lime wood was among the most utilised woods for carving in the past and particularly in Central Europe.

According to publications, poplar wood was largely utilised in the past in Italy for the production of artworks. In particular, the Italian painting school traditionally used this timber for panel paintings [16], but also for wood carving and statue production [5, 6].

The poplar wood, at present largely available on the market, derives from the artificial plantations of clones, normally obtained by breeding European and American species, selected in order to have light (both in weight and colour) wood from fast growing trees. The wood in the above mentioned sculptures is not at all comparable with the wood produced by the quoted poplar species.

This timber is characterised by a diffuse porous tissue, in which the vessel diameter slightly changes from early to latewood. The colour is pale white, with a yellowish tone and the rings are slightly visible, the texture is fine. The density at 12% of moisture content is around 0.500 g/cm<sup>3</sup>.

Willow wood is very similar to poplar wood. Similar to poplar, the tree species belonging to the genus *Salix* cannot be precisely distinguished from each other by their wood anatomy, thus, on the basis of wood we could not say which one among the principal species (*Salix alba*, *S. caprea*, *S. cinerea*, *S. purpurea*) was utilised by the artists. But comparing the diameters normally reached by the trees to the dimensions of the statues we can argue that the white willow (*Salix alba*) was probably the one most available on the market for those purposes.

Willow timber has a diffuse porous tissue with ring boundaries not well distinct. As for poplar the colour of wood is pale white, but with a pinkish tone, with a slightly evident vein and a fine texture. The density at 12% moisture content is around 0.450 g/cm<sup>3</sup>.

Both timbers come from trees living along the water courses or in fresh and humid environments, with a high water availability in the soils. Willows and poplars were and still are largely available all over Italy and their timbers were among the cheapest on the market.

An important aspect of poplar wood is its natural tendency to suddenly chip during graving, which could be an important disadvantage for sculpture production. On the contrary, willow wood doesn't show this tendency [17].

At the opposite pole, we could say, is the walnut wood, which is characterised by clearly distinct sapwood (white colour) and heartwood (from grey to brown). Rings (and consequently the vein) are evident, due to a gradual reduction of the vessel diameter from early to latewood, and the texture is from average to fine. The average density of walnut wood is around 0.720 g/cm<sup>3</sup>.

Walnut trees are not natural in Italy, but were cultivated from very ancient times for fruit production, particularly in rich soils. Walnut timber has always been considered among the most valuable woods, appreciated for any decorative use. Its use for statues is recorded, but not frequently.

Lime (*Tilia* sp.) is the most appreciated and utilised wood for carving all over Europe, thanks to its anatomical characteristics (diffuse porous, very fine texture) and aesthetical features (white colour, slightly visible vein). In particular, in central and Northern Europe lime wood was almost the only wood utilised for devotional sculptures. Thus it is a peculiar situation that artworks exposed in the present exhibition made by artists having a Flemish culture didn't utilise lime wood.

Probably the inexpensiveness of the raw material and the limited wealthiness of the customers suggested or forced the use of cheaper timbers, such as poplar and willow.

The wood species most utilised for engraving and carving are always characterised by a specific anatomical feature: they are diffuse porous species. Consequently the wood surface shows a fine texture and the vein is not clearly evident. Vasari wrote that lime wood "has even pores on every side and easily obeys the file and the chisel". Poplar (and willow) wood also

shows similar characteristics, which allows the sculptors to work on a uniform material with metal tools. Moreover, poplar, willow and lime are relative light woods, easy to work and finish.

According to the studies of Fidanza [5] poplar wood frequently caused problems for the artists during the carving of minute details, like hair, beard, small flowers, due to its tendency to chip. To overcome the problem the artists used to roughly work poplar wood details were produced through the moulding of a thick preparation layer, made of a gypsum/glue mixture, on which the final decoration layer was finally applied. Thus he demonstrated that the lime sculptures were characterised by a thin preparation layer, whereas the poplar sculptures always showed a thick preparation layer.

Our analyses couldn't observe this feature because we were forced to sample during the exhibition, after restoration. The thickness of the preparation layer can only be observed before or during the restoration.

## Conclusions

The scientific work reporting the sampling methodology and the results for the identification of wood species utilised in the production of carved wooden artefacts and, more specifically, of statues are very rare. More frequently the species are not mentioned or have been identified in a "superficial" way through a visual analysis made by "experts".

This paper is aimed at defining a complete methodology for sampling and identifying the species utilised for the production of a large series of statues, showed in a recent exhibition in Italy. All the artworks pertain to the same period (seventeenth and eighteenth centuries), which culturally coincides with the Baroque period.

The majority of the statues were made of poplar or of willow wood, both pertaining to the same botanical family, *Salicaceae*. Only two other statues were made of walnut wood, while the wood species most utilised in Europe for devotional statues, the lime tree (*Tilia* sp.) was only found in a candle-support.

Our paper also analyses the eventual presence of a relationship between species and authors (or workshops), finding that the Michele Enaten's workshop didn't make differences between poplar and willow wood, while the other authors used to be more specific.

The anatomical and technological characteristics of the species used for carving are generally the same: fine texture, uniform density, lightness, workability. Partially excluding walnut wood, all the identified species show these features.

The knowledge of the species is essential for wooden artworks [7]. It allows a correct and complete planning of the restoration, but this paper also confirms that it allows a more complete description of the artworks and of the cultural and social background of the artists.

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