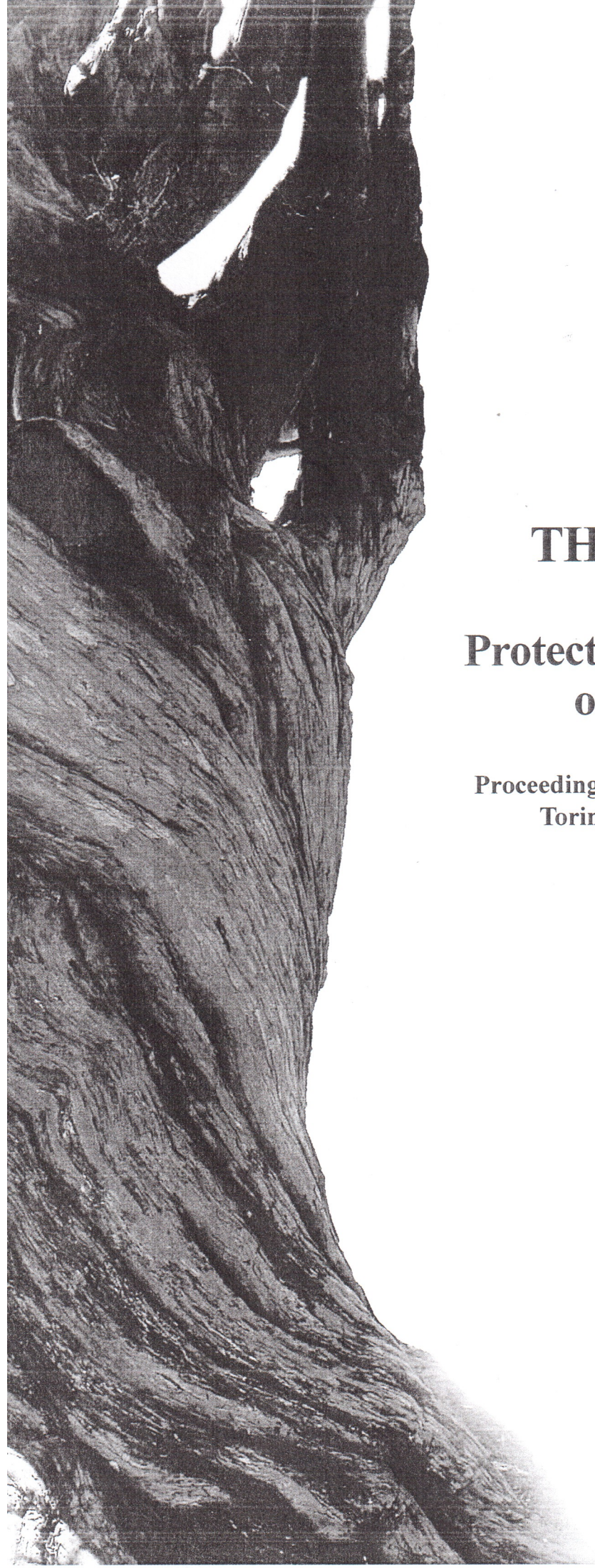




Università di Torino



THE TREES OF HISTORY

Protection and exploitation of veteran trees

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THE "PRODIGIOUS" CYPRESS OF SAN BENEDETTO IL MORO

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1. Introduction

In the Mediterranean culture, the cypress is traditionally a sacred tree, often with funeral meaning. The Etruschi, the Greek and the Romans used to represent it on the funeral urns. The cypress was devoted to Plutone and was planted in front of the doors as mourning, the funereal crowns had been woven with leafy branches of myrtle and cypress. As funeral trees, the cypress is remembered by Plinio and sung by Ovidio and Virgilio (CHIU SOLI, 1979). The sacredness of the cypress is confirmed by an old imposing exemplar, considered as the oldest tree in Palermo (PINTAGRO, 1992). It is located next to the fifteenth-century convent of *Santa Maria di Gesù* in the outskirts of the city. According to the tradition, cypress is sprouted miraculously from a fixed baton in the ground by *S. Benedetto il Moro*, born of Ethiopian slaves in 1524. He lived for a long time like a hermit and therefore, since 1562, lived in the convent, with the exception of a brief permanence in the convent of *Sant'Anna* in *Giuliana*, up to 1589. He was considered a holy thaumaturge man, he was patron of Palermo and he was known through the Franciscan Order and the Spanish Court also in Spain and in Latin America. He was canonized by Pio VII in 1807. His body is conserved in the Church of *Santa Maria di Gesù* and it is still today an attraction of pilgrimage (DELL'AIRA, 2003; FIUME, 2000).

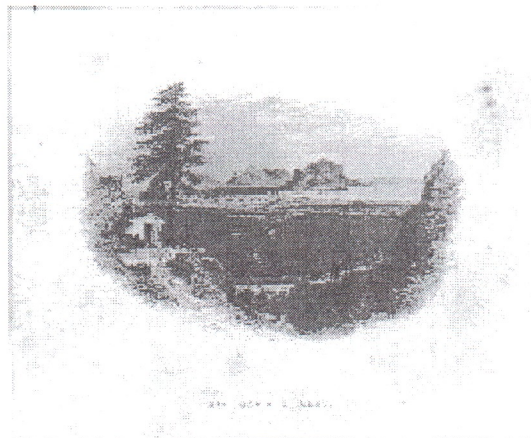


Figure 1 - The cypress of *San Benedetto il Moro* with the *Conca d'Oro* in a press of 1840 (drawn from "Pictures from Sicily", London)

According to the legend about the veneration of the Saint, the thriving cypress - next to the chapel where Benedetto stopped for praying, located not very far from the convent along a path of the slopes of Mount Grifone which is used for celebrating of the via crucis - had been grown through a baton used by him. The exceptionality of the cypress is testified also by a *habitus* considered unusual for the disposition of the principal branches on the stem that is derived from the fact written in 1612 by the great Spanish dramatist Lope de Vega, "*il frate nero piantò (il bastone, ndr) capovolto nel terreno prima di morire. I suoi rami non spiovono intorno come quelli degli abeti comuni. Si allargano verso il cielo, alla rovescia*" (DELL'AIRA, 1995). The cypress is either important for its great historical and religious meaning, or for its presence connected to the cult of a very popular and revered Saint. It is surely a monumental tree for its age, dimensions, visibility in the landscape, history and religious values (PAVOLINI, 1999). The dating and the analysis Visual Tree Assessment (VTA) of the cypress, further to have a religious value, (the necessity of the miracle would be denied by a non compatible age with the years of the permanence of the Saint in the convent), constitutes an important contribution to the knowledge of the richest vegetable patrimony of a city, whose suburban territory (the *Conca d'Oro*) is known to the historians of the environment and the agriculture as "*di antico e quasi mitico predominio dell'albero*" (BEVILACQUA, 1996). For the dating of the tree has been carried out a dendrochronological analysis. Through the dendrochronological approach with the simple determination of the number of rings of growth in the stem is, in fact, possible to determine the age of the tree investigated and to quantify, potentially, the relationships between plant and environment (CORONA, 1980).

2. Location, environmental and botanical aspects of the study area

The cypress of *San Benedetto* is located in the park of pertinence of the convent and the monumental cemetery of *Santa Maria di Gesù* at an altitude of 190 m a.s.l. and at slopes of Grifone Mount, in the southern part of the city of Palermo (Fig. 2).



Figure 2. View of the Convent and of the monumental Cemetery of *Santa Maria di Gesù*.

The area represents a roughed morphology with superior inclinations over 40% and with exposure N-NW. The climate is characterized by mild temperatures and precipitations like those regional. According to the Rivas-Martinez bioclimate classification the climate is upper Thermo-mediterranean-subhumid. The local primary vegetation probably was a mixed Mediterranean oak forest dominated by *Quercus virgiliana* and *Quercus ilex*, while the areas characterized by shallow soil and a warmer climate were probably characterized by an evergreen sclerophyllous maquis. Despite the strong human impact on the territory, on the NW slopes of Grifone Mount grow different species of the *Rhamno alaterni-Quercetum ilicis*, an evergreen plant community typical on limestone slopes of the coastal area of Palermo Mounts (BRULLO and MARCENÒ, 1985; GIANGUZZI *et al.*, 1996) (Fig. 3).



Figure 3. Shrub community near the cypress of *San Benedetto il Moro*

On the slopes along the path which from the sanctuary takes to the cypress, it is possible to notice some pre-forest vegetation fragments belonging to *Oleo-Ceratonion siliquae* alliance, grassland features belonging to *Hyparrhenion hirtae* alliance, as well as rocky cliffs communities referable to *Dianthion rupicolae* alliance.

The actual landscape is characterized by rock outcrops and by xeric and poor grasslands, dominated by *Hyparrhenia hirta*. Elsewhere are present several species quite common in open maquis (*Oleo sylvestris-Euphorbietum dendrolidis*), such as *Olea europaea* var. *syvestris*, *Euphorbia dendroides*, *Ceratonion siliqua*, *Prasium majus*, *Asparagus albus*, *Calicotome infesta*, *Ruta chalepensis*, *Teucrium fruticans*, and many species of the more mature maquis communities (*Rhamno alaterni-Quercetum ilicis*), such as *Fraxinus ornus*, *Pistacia terebinthus*, *Rhamnus alaternus*, *Asparagus acutifolius*, *Rosa sempervirens*, *Rubia peregrina*, etc.

In the recent past these semi-natural and subnatural communities have been overlapped with *Pinus halepensis*, *Pinus pinea*, *Cupressus sempervirens* and *Acacia saligna* plantations. Despite their high density, within them it is possible to observe quite remarkable processes of early naturalization stages. Near the convent and inside the cemetery there are different monumental individuals of cypress (*Cupressus sempervirens*). The most imposing one is actually the cypress of *San Benedetto* (*C. sempervirens* var. *horizontalis*), which grows isolated on the slopes of *Grifone Mount* near the chapel dedicated to the Saint (Fig. 4): its circumference is 3.50 m (at 2 m above ground) and its height is 23 m.

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Figure 4. The cypress of *San Benedetto il Moro* today. The background which remains of *Conca d'Oro*

The crown shows some empty spaces because of the desiccation of different branches, especially in the basal part. The stem also is damaged probably caused by fires and buttresses typical of old trees.

3. Dating and stability of the cypress of *San Benedetto il Moro*

3.1 Methodology

For the dating has been taken out a tree core with the incremental borer of Pressler in a height of around 25 cm from the ground. In laboratory the tree core has been pasted on a wood support with a central groove. In order to examine the transversal section, there has been performed the pasting of the core taking care of that the woody fibres which were put in orthogonal way on the plan of support. The tree core has, finally, been smoothed with a thin abrasive paper (100, 250 and 400), in order to underline the growth rings and to make easier their reading and measurement (Fig. 5).

The preliminary phase of analysis of the sample was the cross-dating (FRITTS, 1976) which means giving the exact forming year of every single ring. This operation has been performed with a stereoscope dating the series beginning from the last ring that is formed under the bark. The dating has been performed comparing the series with another of a near cypress of inferior age.



Figure 5. Pasted and smoothed tree core, ready to be analyzed

The comparison has been effected considering the total thickness of the rings (characteristic rings), the thickness of the zone with the spring and summer wood, the mean vase dimension and the presence of possible scars (SCHWEINGRUBER *et al.*, 1978). The individualization of characteristic rings has a fundamental importance to resolve doubtful cases and to individualize absent or double (false) rings. The dating has been very difficult because of the irregular rhythm of growth of the species that often determines the formation of false rings. The cypress, for such reason is considered by dendrochronologists a trouble-making species. For these reasons the cypress is a low studied species, although in Italy have been done some short chronologies and well cross-dating on trees located in the southern *Appennino* (Salerno and Potenza) by CORONA (1970).

The individualization of false rings has been, in our case, difficult because was examined only a small section of the plant (only one tree core, not being able to withdraw others for the presence of an adjacent wall on the base of the stem) so it hasn't been possible to verify if there were vanished false rings which are absent in the whole circumference. In

order to recognize the absent rings it has been necessary to start from the consideration that they differ from those true. The true ones showed an early thick and a late thread-like zone. Furthermore, in the true rings, the limit between the late and early zone is marked but that one between the early and late zone is a little vanished. In the conifers generally the false rings are separate from those true because of their external part which is less intensely coloured (UZIELLI E NARDI BERTI, 1979; GIORDANO, 1981) (Fig. 5).

The thickness of rings has been measured with the dendrochronograph LINTAB 3. The measures have been performed with a precision of 1/100 mm beginning from the first ring at the centre of the tree. Considering that the cypress of *San Benedetto* is a monumental tree, we have also effected, in sight of possible protective interventions, an analysis of the stability according to the criterions of evaluation established by the methodology VTA (MATTHECK E BRELOER, 1998) and according to the suggestions by the "Protocol ISA on the Evaluation of the Stability of Trees ©" that provide a visual and instrumental examination. The data sampled has been transcribed on a special card, which will constitute a general updating of informative base for the following instrumental analyses e/o for the evaluation of the level of stability in order to define the possible necessary interventions and the periodicity recommended for the following controls.

The instrumental examination has been performed using the Resistograph (model F400 S) and the fractometer. The research has been assembled at the base of the stem, and from a first visual investigation, has been underlined a light camber, a possible symptom of inside degradation. There have been effected 5 tests in order to investigate the whole circumference of the stem. The tests with the fractometer (3 measurements) have been performed on a tree core, withdrawn in correspondence of the resistograph survey n. 1, with the purpose to determine its moment of breaking.

3.2 Results

The Cypress of *San Benedetto* is 426 years old and, therefore, it is born in 1577. In the figure 6 are represented the elementary chronology of the tree. Being formed from a single ring series, it can be suffered from errors due to the individuation of false rings.

Its annual mean growth has been of 87,88 cents of mm; after a first short period of slow growing, and then about two hundred years of sustained growth followed by a slowdown. However there is large variability in tree-ring width probably due to exceptional climatic events e/o troubles of human origin, mainly fires. The progress of the broken one is sufficiently homogeneous and typical of isolated tree.

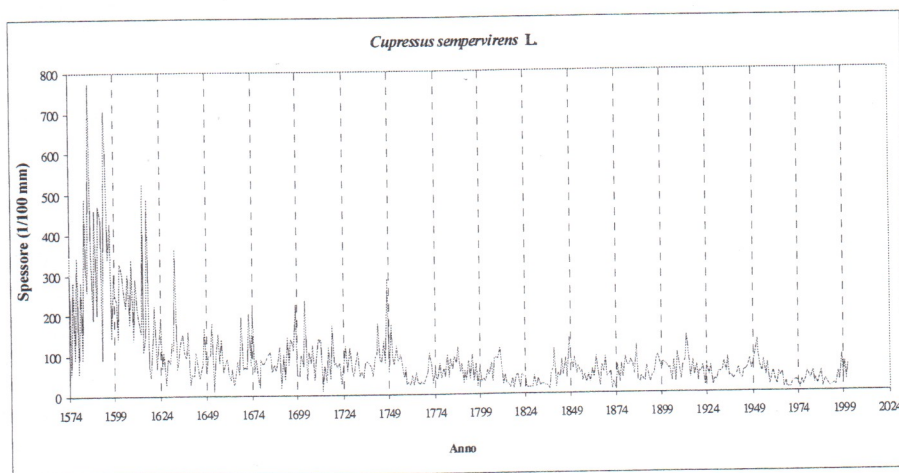


Figure 6 - Elementary chronology of the cypress of *San Benedetto* il Moro

The resistograph profiles don't clearly underline the growth intervals because the transition between early and late zone is gradual. However it has not been possible to compare the profiles with the graph derived by the dendrochronological study of a tree core withdrawn immediately on the resistograph profile n. 1 (Fig. 7). For the analysis of the stability, the graphs got with the Resistograph showed, along their length, a regular progress. The increasing progress of the graph from the outside of the stem toward the inside is caused by a greater content of extracted. This helps to increase the density of the heartwood in comparison to the sapwood. The investigations with the resistograph and with the fractometer have not underlined wood degradation.

The fractometer tests performed on the tree core have underlined values of the parameters

(moment of fracture and angle of fracture) comparable with the safety limits drawn by field studies on trees of the same species.

Visual analysis has, in fact, pointed out light defects of form and small anomalies. The risks of the crashing down are referable to those of the class A. The light morphological anomalies can get worse in the time. From the visual analysis have not been found, however, symptoms of degradation in the stem and in the principal branches. A light torsion of fibres noticed on a branch, as light lines on the stem, take part of the morphological characteristics of the species and they are common in old trees.

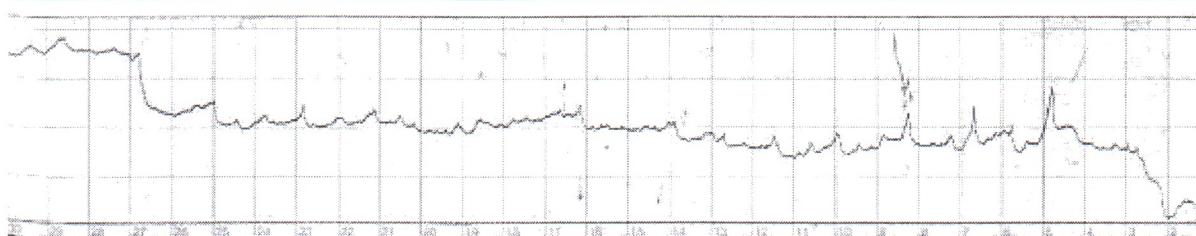


Figure 7 - Profile n. 1 of resistograph analysis

4. Conclusions

Dating performed using dendrochronology analysis has allowed to certify that the tree is about 426 year old. Going back for an equivalent period of time, we reach 1577 that is almost in the mean of the period of permanence of the Saint in the convent (1567-1589). Beyond every fideistic approach it is possible that *San Benedetto* has transplanted in that place, less probable - for the difficulty of the cypresses to take root by cutling - that originates from the Saint's baton! Its crown shape (Fig. 4) considered "strange" and its old age, in fact, are perfectly compatible with the fact that the tree belongs to the variety of *horizontalis*. In fact, the historical image goes back to 1840 and shows a typical cypress of this variety; following alterations which could have been caused by winds, lightnings and fires. The research has surely confirmed the elevated historical-religious value of the monumental tree which in the future merits to mostly be protected and respected. The analysis of stability has also allowed to give useful indications to its safeguard. On the stem has been observed, died fragments caused by precedents badly cuts susceptible of degradation. It is advisable, therefore, the trimming of the same to avoid that the agents of degradation can pass to the healthy portions of the wood inside the stem. Furthermore, on the internal part of crown there are different died ramifications of first and second order that makes opportune pruning practice. Besides, the pruning is important to decrease the resistance of the crown against the wind.

Dealing with a subject of the crashing down risk belonging to the class A, it is necessary a biennial visual analysis and an instrumental verification after three years. The results encourage to keep on studying the dendrochronology of the cypress in order to draw information on the climatic history and on the quality of the air of Palermo.

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