# The Botanical Garden of Padua, a UNESCO World Heritage Site:
# five hundred years of university research and teaching.

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The Botanical Garden of the University of Padua was founded in 1545 as a medicinal Horto, annexed to the Padua University, for the cultivation of indigenous and exotic medicinal plants for scientific and educational purposes.

At the time of its establishment, the Garden was entirely dedicated to growing medicinal plants, which then represented the main therapeutic resource and entered into the composition of almost all the medicines. However, at that time there were many uncertainties regarding the identification of the various plants described by the ancient Greek, Latin and Arab doctors, and there were frequent mistakes in good faith, with the consequent therapeutic use of wrong, ineffective and often harmful plants. Furthermore, the uncertainties about the identity of the plants created favorable conditions for the spread of fraudulent practices of sophistication of many drugs, especially the exotic ones imported from the East, which were expensive and little known.

The Medicinal Horto allowed medical students to directly examine the characteristics of the plants, facilitating the identification of the genuine dry drugs versus the frequent sophistications. The foundation of the Botanic Garden was therefore an initiative aimed at protecting public

health, but also a promotional tool for the Padua firm, as it allowed a significant leap in the quality of teaching. It also marked an important moment in the history of science because it represented the beginning of the application of the experimental method to the botanic field.

The Botanic Garden of Padua has exerted, since the sixteenth century, a deep influence on the scientific environment, both national and European. For the foreign students who attended Padua University and for the scholars traveling to Italy, the Botanical Garden of Padua represented a model to look at for the establishment of similar structures in their homeland. For this reason, the Botanical Garden of Padua is often defined as "the mother" of all the botanical gardens in the world.

The Botanic Garden occupies an area of about two hectares, within which the *Hortus Cinctus* is inserted. The structure is enclosed by a circular wall and it is divided into 16 sectors, of which the main four are called *quarters* or *spalds*.

The Botanic Garden of Padua is the oldest botanical garden in the world which has maintained practically unaltered the same location and also the characteristics of the original plant. As a matter of fact, over the centuries the structure has been enriched with new architectural elements (the four monumental entrance doors, the elegant balustrade) and functional elements (greenhouses, irrigation systems), which however have not significantly altered the configuration and the authenticity of the site. It has also always maintained its functions as a

center for scientific research and educational tool, continually adapting these functions to the changing needs imposed, over the centuries, by the progress of the scientific disciplines in general, and of the botanical ones in particular.

With the evolution of botany from a discipline applied to medicine to pure science articulated in various specialist branches, even the collections of the Garden underwent profound changes, in order to meet the ever new needs of research and teaching. So, the entire surface of the Garden was no longer solely dedicated to the cultivation of medicinal plants, and systematic collections of plants representative of particular environmental conditions were introduced.

At the beginning of the eighteenth century the structure of the Garden underwent some embellishment, and the design of the flower beds was also modified, increasing their number. In the nineteenth century, in addition to the old mobile "thecas", the brick greenhouses were built, equipped with state-of-the-art heating, and a classroom for lessons (the "botanical theater"); a herbarium and a library were also created. In the twentieth century, research laboratories and classrooms for practical exercises were added.

In the Garden there are plants of particular historical and scientific interest, including the oldest plant, a palm (Chamaerops humilis) over four hundred years old, which inspired Goethe an essay on the metamorphosis of plants; an oriental plane tree (Platanus orientalis) over three centuries old, with a characteristic hollow trunk; an imposing

specimen of ginkgo (Ginkgo biloba) and a magnolia (Magnolia grandiflora), dating back to the second half of the 18th century, considered to be among the oldest trees in Europe.

Each collection of plants has a special relevance: the medicinal plants (digitalis, gentian, rhubarb, licorice, vinca rosa) and the poisonous plants (hellebore, colchicum, hemlock), the insectivorous plants (flycatchers, dionea, nepente) and the sensitive plants (mimosas), the aquatic plants (water hyacinth, lotus flower, papyrus, water lilies) and the succulents (cactus, prickly pear, agave, aloe), the plants of the Euganean Hills and those of the Veneto coast. The vegetation of some environments such as the Mediterranean bush, the Alpine rock and the peatbog is also re-proposed in the Garden.

Since its foundation, the Botanical Garden of Padua has been at the center of a dense network of international relations, with intense exchanges of plants, seeds and scientific material of all kinds. The Garden became an important study and research center, at the forefront of the cultivation and acclimatization of exotic plants. So it was that some exotic plants, which are very common today due to their ornamental interest (lilac, hyacinth, Spanish jasmine, freesia, etc.) or food relevance (sunflower, sesame, potato), were grown in Padua for the first time - first in Italy and in some cases also in Europe. Some of them spontaneously spread to the point that today they characterize the landscape of some areas of the national territory, such as the American agave, the false acacia and the ailanthus. The tradition of introducing exotic species and of the international exchanges has never stopped,

and today the Garden has regular seed exchanges with nearly nine hundred scientific institutions all over the world.

Many of the botanists who succeeded one another in the position of Prefect of the Garden were people of great prominence, and enjoyed esteem and admiration for their erudition, so much so that numerous species of plants, genera and even entire families were dedicated to them. For example, the genus Alpinia, to which ornamental plants or plants used as flavoring belong ( eg galangal), is dedicated to the doctor Prospero Alpini from Marostica, who was Prefect of the Garden from 1603 to 1616 and who is also known for having introduced the use of coffee in Italy. The Pontederiacee family is dedicated to Giulio Pontedera from Lonigo, who was Prefect of the Garden from 1719 to 1757. Important works of medical nature and decisive contributions to the knowledge of medicinal plants and their activity, and of the flora not only of Italy (and of the Venetian regions in particular) but also of the islands of the eastern Mediterranean, Egypt, Dalmatia, Bosnia and Montenegro, were written by botanists from Padua. At the beginning of the twentieth century, the Botanic Garden of Padua had a wide international reputation for mycological studies: Pier Andrea Saccardo's work and mycological collection still constitute a reference point, and are object of consultation by scholars from all over the world.

In recent times, the development of new research trends with the need for the related instrumentation, the increase in the number of courses and in student population have forced Paduan botanists to leave the premises annexed to the Garden, now completely inadequate. Despite

this move, the Botanical Garden continues to play an important didactic role; in particular, it carries out specific scientific researches in the field of medicinal plants, also giving a significant contribution to issues considered to be a priority today, such as the conservation of biodiversity. To this end, a Germplasm Bank has been recently created in the Botanical Garden, which has been a member of the R.I.B.E.S. (Italian Network of Germplasm Banks for Ex situ Conservation of Italian Spontaneous Flora) since 2006. In this bank the seeds of rare and threatened species of north-eastern Italy are stored for a long period using the cryopreservation technique.

In December 1997 the Botanical Garden of Padua was included, as a cultural asset, in the UNESCO World Heritage List. This list includes those cultural and / or natural assets to which an "exceptional universal value" is recognized due to their remarkable quality, and which represent priceless and irreplaceable assets not only of one nation but of the whole of humanity.

The Botanical Garden of Padua was included in the UNESCO World Heritage List in consideration of both the fact that it is the oldest botanical garden in the world, and of its exceptional scientific and architectural value. It testifies an exchange of considerable influences in the cultural area of botany, and it represents a unique or at least an exceptional example of a centuries-old cultural tradition, as it can be seen from the motivation:

"The Botanical Garden of Padua is the origin of all the botanical gardens in the world and it represents the cradle of science, of scientific exchanges and of the understanding of the relationship between nature and culture. It has largely contributed to the progress of numerous modern scientific disciplines, and in particular of botany, medicine, chemistry, ecology and pharmacy ".

As a World Heritage Site, the Botanical Garden of Padua deserves a particular protection, in order to ensure its conservation and transmission to future generations.

The main dangers for the structure derive from the fact that it is now completely incorporated into the urban context, with a serious impact not only on the landscape but also on the environment.

Only recently, after a dramatic demonstration of the vulnerability of the Garden and of its living collections due to some reckless building interventions in the surrounding areas, it was possible to acquire a portion of the neighboring *3 Pini* area. In this way, an albeit limited buffer zone around the Botanical Garden was created, allowing to increase the greenhouses and the collections through the creation of a "satellite" botanical garden, and facilitating the upgrade of scientific and didactic activities to the qualitative standards which are required for a university botanical garden in the third millennium.