The Forest Botanic Garden (Arboretum) at the Aristotle University of Thessaloniki, Greece (TAU): Ex situ conservation of trees and shrubs

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Abstract
The Forest Botanic Garden of the Aristotle University of Thessaloniki (TAU) was established under the auspices of the Forest Botany Institute (today Institute of Forest Botany - Geobotany) of the Faculty of Forestry and Natural Environment. The Garden is located in the eastern suburbs of Thessaloniki, less than 1 km from the seashore, occupying a flat area of 6.2 ha (inclination 1-2%) at an altitude of approximately 15 m a.s.l. The land was acquired through expropriation in 1964. Prior to the designed planting of trees and shrubs which started in autumn 1970, a cypress ‘windshield’ was already established, along the Garden’s periphery, where cypress trees were closely planted in two rows in order to provide protection to future planted taxa. Today the garden hosts 121 native and non-native woody taxa (trees and shrubs) which belong to 75 genera, while 24 of them are gymnosperms and 97 angiosperms (3 Monocotyledones and 94 Dicotyledones). The Greek woody species on display are 81 (about 22% of the total native woody taxa), of which 14 are gymnosperms and 67 angiosperms. Each taxon is represented by one or more individuals (a total of c. 460 individuals). The woody flora of the Garden is an assemblage of mainly Mediterranean (37) and Sub-Mediterranean (27) species and to a lesser degree of Asiatic (18), Nord-American (11), Eurasiatic (10) and other species.

Background
The Forest Botanic Garden of the Aristotle University of Thessaloniki [1] is located in the suburb of Finikas (eastern Thessaloniki), near the ‘Macedonia’ international airport. The TAU Garden was established under the auspices of the Forest Botany Institute (today Institute of Forest Botany - Geobotany) of the Faculty of Forestry and Natural Environment in the place where the old Mikra airport was located. The land was acquired through expropriation that took place in 1964 with the efforts of Prof. Ioannis Papaioannou. The designed planting of woody taxa started in autumn 1970. From the first stages of its establishment in the year 1966, along the Garden’s periphery cypress trees were closely planted in two rows in order to form a
‘windshield’ for the protection of the plants [2]. The TAU Garden hosts two greenhouses of 110 m$^2$ and 50 m$^2$.

The Faculty of Forestry and Natural Environment has been operating in the TAU Garden over the last 20 years (a fact that has upgraded the Garden’s status), as a primary facility for the education of the students of the Faculty. At the same time it offers the opportunity to students of all educational levels (primary/secondary schools, technical education institutions etc) to go on docent-led tours of the Garden. Such tours include visits to the Natural History Museum, which is housed in one of the buildings of the Faculty. The Garden also offers the possibility of scientific research [3].

**Methods**

**Characteristics of the area occupied from the Garden**

The Garden occupies a flat area of 6.2 ha (inclination 1-2%) which is located less than 1 km from the seashore, at an altitude of approximately 15 m a.s.l.

Geologically, the area belongs to the Paeonia zone [4] and is dominated by sandstones varying from friable to quite compact and locally microconglomerates with cross-bedding are interbedded. At places there are marl horizons [5].

The Garden’s soil, whose depth exceeds 3 m, is intensely disturbed and immature and consists of alluvial deposits. It is poor in organic matter, rich in CaCO$_3$, and contains moderate amounts of total nitrogen. Its reaction (pH) is neutral to moderately alkaline and the texture is mainly loamy [6].

Based on data available from the meteorological stations (MS) of Thessaloniki (1954 - 1990, 32 m a.s.l.), Mikra (1959 - 1999, 3 m a.s.l.) and Loutra Thermis (1978 – 1997, 10 m a.s.l.), the climate is classified as ‘Csa climatic type’ according to Koeppen’s classification system, representing continental Mediterranean climate with ‘very hot and dry summers and mild winters’. The dry period lasts approximately 4 months a year (mid-May to mid-September). Mean air temperatures are 15.8 °C in Thessaloniki MS, 15.9 °C in Mikra MS and 15.5 °C in Loutra Thermis MS; the hottest and coldest months are July and January, respectively. Mean precipitation in the three stations is 470 mm, 450.5 mm and 410 mm respectively. According to data from the Thessaloniki MS, mean relative humidity is 70% and the prevailing winds are high winds blowing at a speed of about 40 km/h in N, SW, NE, S and E directions in January, February, March and June.

A limiting factor to the growth of certain species is the geographic location (sea level) and mainly the Garden’s insufficient physical and chemical soil properties, for the improvement of which repeated soil amelioration works have taken place.

An inventory of the total woody flora (trees and shrubs) was carried out in May/June 2011 whereby the number of individuals of all taxa was registered, as well as notes on the chorology of each taxon.

The species nomenclature follows THE EUROPEAN GARDEN FLORA [7-12] and The World Checklist of Selected Plant Families [13].

**Results**

Greek indigenous woody species (trees and shrubs) as well as a number of non-indigenous ones grow in the Garden today (see Appendix). In total, it contains 121
taxa, which belong to 75 genera. Of these, 24 are Gymnospermae and 97 Angiospermae (3 Monocotyledones and 94 Dicotyledones). The indigenous species on display are 81 (66.94%) (c. 22% of the total indigenous woody taxa of Greece), 14 of which are Gymnospermae and 67 Angiospermae. Each taxon is represented by one or more individuals resulting in a total of c. 460 individuals.

The chorological spectrum of the woody flora of the Garden (Figure 1) is dominated mainly by Mediterranean (37) and Sub-Mediterranean (27) taxa, followed by Asiatic (18), Nord-American (11), Eurasian (10) and other taxa. The taxa Campsis x tagliabuana, Populus hybrids, Prunus x domestica subsp. insititia, Rosa spp. are not included in the chorological spectrum.

The woody flora of the Garden includes one Greek endemic (Zelkova abelicea) and five Balkan endemics (Abies x borisii regis, Aesculus hippocastanum, Pinus leucoderms, P. peuce, Rhamnus saxatilis subsp. rhodopea).

The identity of the Garden
THESALONIKI (TAU): Forest Botanic Garden
Aristotle University of Thessaloniki, Greece

Address: Aristotle University of Thessaloniki
          Faculty of Forestry and Natural Environment
          Institute of Forest Botany – Geobotany
          54124 Thessaloniki, Greece

Local address: Forest Botanic Garden
Ilia Chatzakou (ex Mouschoundi) 59
GR 55134, Thessaloniki, Greece

Telephone / Fax +30 2310 992765 / +30 2310 992773

Status: University

Date of foundation: 1966

Area: 6.2 ha

Lat.: 40°34’

Long.: 22°58’

Alt.: 15 m

Rainfall: 450 mm

Special collections: Forest trees and shrubs of Greece
Conservation collections: None
Special gardens: Aromatic and pharmaceutical plants (under construction)

Number of horticultural staff: 2
Greenhouses: 2 comprising 110 m² and 50 m²
Arboretum: Inside garden
Associated nature reserves: None
Natural vegetation in garden: None
Herbarium: 14,000 specimens
Horticultural herbarium: No
Research facilities: Institute of Forest Botany – Geobotany
Research: Forestry
Seed list: No
Seed bank: No
Publications: No
Catalogue: No
Records system: No
Other facilities: Library
Education programme: Courses for school children, students of Forestry and other students; display labels; public lectures
Training courses: No
Society of Friends: No
Open to public: Not open to the public
Number of visitors: Unknown, entrance free charged
Director: Prof. A. Gerasimidis
Curator: Assoc. Prof. K. Theodoropoulos
Scientific staff: Assis. Prof. E. Eleftheriadou, Lecturer S. Panajiotidis
Gardeners: E. Taskos, N. Ouzounidis

References

Figure 1. The chorological spectrum of the woody flora of the Forest Botanic Garden of the Aristotle University of Thessaloniki, Greece.
FLORISTIC CATALOGUE (TREES AND SHRUBS) OF THE FOREST BOTANIC GARDEN

GYMNOSPERMAE

Pinaceae

*Abies alba* Mill.
*Abies x borisii regis* Mattf.
*Cedrus deodara* (Roxb.) G. Don
*Cedrus brevifolia* (Hook. f.) A. Henry
*Pinus halepensis* Mill.
*Pinus halepensis* Mill. var. *brutia* (Ten.) Elwes & A. Henry
*Pinus leucodermis* Antoine
*Pinus nigra* J. F. Arnold var. *caramanica* (Loudon) Rehder
*Pinus peuce* Griseb.
*Pinus pinea* L.
*Pinus radiata* D. Don
*Pinus sylvestris* L.

Cupressaceae

*Chamaecyparis lawsoniana* (A. Murray) Parl.
*Cupressus arizonica* Greene
*Cupressus sempervirens* L.
*Juniperus excelsa* M. Bieb.
*Juniperus foetidissima* Willd.
*Juniperus oxycedrus* L.
*Juniperus oxycedrus* L. subsp. *macrocarpa* (Sm.) Ball
*Thuja orientalis* L.
*Thuja plicata* D. Don

Taxodiaceae

*Sequoia sempervirens* (Lambert) Endl.
*Sequoiadendron giganteum* (Lindl.) Buchh.
*Taxodium distichum* (L.) Rich.

ANGIOSPERMAE

DICOTYLEDONES

Aceraceae

*Acer campestre* L.
*Acer negundo* L.
*Acer platanoides* L.
*Acer sempervirens* L.

Anacardiaceae

*Cotinus coggyria* Scop.
*Pistacia atlantica* Desf.
*Pistacia lentiscus* L.
*Pistacia terebinthus* L.

Apocynaceae

*Nerium oleander* L.

Araliaceae

*Hedera helix* L.

Betulaceae

*Alnus glutinosa* (L.) Gaertn.
*Alnus orientalis* Decne.
*Carpinus betulus* L.
*Carpinus orientalis* Mill.
*Corylus avellana* L.
Bignoniaceae  
Ostrya carpinifolia Scop.

Caprifoliaceae  
Campsis × tagliabuana (Vis.) Rehder
(C. grandiflora × C. radicans)
Catalpa bignonioides Walter

Celastraceae  
Lonicera xylosteum L.
Viburnum tinus L.

Cornaceae  
Cornus mas L.
Cornus sanguinea L.

Elaeagnaceae  
Elaeagnus angustifolia L.

Ericaceae  
Arbutus unedo L.

Fabaceae  
Albizia julibrissin (Willd.) Durazz.
Ceratonia siliqua L.
Cercis siliquastrum L.
Gleditsia triacanthos L.
Robinia pseudoacacia L.
Spartium junceum L.

Fagaceae  
Quercus coccifera L.
Quercus ilex L.
Quercus infectoria G. Olivier
Quercus macrolepis Kotschy
Quercus pubescens Willd.
Quercus robur L. subsp. pedunculiflora (K. Koch) Menitsky
Quercus troiana Webb

Hippocastanaceae  
Aesculus hippocastanum L.

Juglandaceae  
Juglans regia L.

Lamiaceae  
Lavandula angustifolia Mill.

Lauraceae  
Laurus nobilis L.

Moraceae  
Ficus carica L.
Morus alba L.

Myrtaceae  
Eucalyptus camaldulensis Dehnh.
Myrtus communis L.

Oleaceae  
Fraxinus oxycarpa Willd.
Fraxinus excelsior L.
Fraxinus ornus L.
Fraxinus pallissiae A. J. Willmott
Ligustrum japonicum Thunb.
Ligustrum lucidum W. T. Aiton
Olea europaea L.
Phillyrea latifolia L.

Pittosporaceae  
Pittosporum tobira W. T. Aiton

Platanaceae  
Platanus orientalis L.

Punicaceae  
Punica granatum L.

Ranunculaceae  
Clematis flammula L.
Clematis vitalba L.
Rhamnaceae  
* Paliurus spina-christi * Mill.  
* Rhamnus alaternus * L.  
* Rhamnus saxatilis * Jacq. subsp. rhodopea (Velen.) Aldén  

Rosaceae  
* Chaenomeles speciosa * (Sweet) Nakai  
* Cotoneaster franchetii * Boiss.  
* Crataegus monogyna * Jacq.  
* Prunus armeniaca * L.  
* Prunus cerasifera * Ehrh. var. * divaricata * (Ledeb.) L. H. Bailey ‘Pissardii’  
* Prunus x domestica * L. subsp. * insititia * (L.) Bonnier & Layens  
* Prunus dulcis * (Mill.) D.A. Webb  
* Prunus laurocerasus * L.  
* Prunus mahaleb * L.  
* Pyracantha coccinea * M. Roem.  
* Pyrus communis * L.  
* Rosa canina * L.  
* Rosa spp.  
* Sorbus domestica * L.  
* Sorbus torminalis * (L.) Crantz.  

Rutaceae  
* Citrus aurantium * L.  
* Citrus sinensis * (L.) Osbeck.  

Salicaceae  
* Populus alba * L.  
* Populus nigra * L.  
* Populus hybrids  

Sapindaceae  
* Koelreuteria paniculata * Laxm.  

Simaroubaceae  
* Ailanthus altissima * (Mill.) Swingle  

Styracaceae  
* Styrax officinalis * L.  

Tiliaceae  
* Tilia tomentosa * Moench  

Ulmaceae  
* Celtis australis * L.  
* Ulmus glabra * Huds.  
* Ulmus procera * Salisb.  
* Zelkova abelicea * (Lam.) Boiss.  

Verbenaceae  
* Lantana camara * L.  

Vitaceae  
* Vitex agnus-castus * L.  

ANGIOSPERMAE MONOCOTYLEDONES  

Liliaceae  
* Ruscus aculeatus * L.  

Palmae  
* Chamaerops humilis * L.  
* Phoenix canariensis * Chabaud.  

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The Red List included an ex situ survey, to assess the coverage of Nothofagus species within botanic gardens, arboreta and seed banks, using BGCI’s PlantSearch. It revealed that only 54% (20 species) of Nothofagus are in ex situ collections. Of the threatened taxa, 45% (5 species) are in ex situ collections. Nothofagus forest in the Andes. Associated resources. The Red List of Nothofagus. You can support our plant conservation efforts by sponsoring membership for small botanic gardens, contributing to the Global Botanic Garden Fund, providing corporate sponsorship, and more! Find out more. Become a Member. Be part of the largest network of botanic gardens and plant conservation experts in the world by joining BGCI today! Find out more. Footer.