Article

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Trees and shrubs in the city of Bari (Italy)

Abstract

Gargano, M. L., Di Gristina, E., Domina, G. & Venturella G.: Trees and shrubs in the city of Bari (Italy). — Fl. Medit. 31: 23-30. 2021. — ISSN: 1120-4052 printed, 2240-4538 online.

The authors recorded in the city of Bari 221 specific and infraspecific taxa, used as onramentals, belonging to 126 genera of 64 families with a prevalence of exotic species over native ones. The study is preparatory to the redevelopment of urban green areas concerning the recent Municipal Regulation on green spaces in the city. The flora investigated is rich in elements native to Italy. Anyway, the most common species are commonly used as ornamental also in the other regions of Italy. *Argania spinosa*, *Ceiba speciosa*, *Cyperus papyrus*, *Euphorbia ingens*, *Ficus rubiginosa*, and *Jacaranda mimosifolia* are species less commonly used and noteworthy, because at their climatic limit.

Key words: street trees, shrubs, green cities, sustainability, Apulia.

Introduction

In the last years, several authors published comprehensive inventories of the urban flora and vegetation in European and extra-European cities (Chocholoušková & Pyšek 2003; Celesti-Grapow & al. 2013, Östberg & al. 2018; Muzafar & al. 2018; Domina & al. 2019; Çoban & al. 2020).

Other studies consider city trees as a significant component of the urban landscape, with multiple ecological roles and socio-economic functions (Caneva & al. 2020).

Cities host a variety of trees and shrubs that are mainly planted solely for street beautification without rational reasoning about their future growth, ecological needs, and maintenance.

Age and species of trees, space requirements, soil type, root asphyxiation, inadequate pruning, automobile damage, pollution levels, and the socioeconomic level of a neighborhood are the primary factors that potentially become the reasons why street tree and shrub problems occur (Kadir & Othman 2012).

In the city of Bari, we recently started a census of the trees and shrubs that characterize the urban environment.

The study area

Bari is located on the Adriatic coast of Apulia on a plane of about 115 km^2, the so-named "Conca di Bari" (41°07′31″N 16°52′00″E), which is delimited by the Adriatic Sea and the Carbonate Mountains (Murge). Bari falls within the "Apulian Lowlands Section" of the "Alupian-Hybleam Foreland Province" as defined by Blasi & al. (2014, 2018).

The area of the city of Bari has been constantly inhabited since prehistoric times but the main development of the city was carried out in the 40 years after the end of the Second World War (Borri & al. 1980). The settlement of the city is almost flat with a difference in elevation from the sea level to 100 m a.s.l. The territory of the Conca di Bari is crossed by "lame", ancient fossil rivers and stream beds, which descend from the Murge to the Adriatic Sea. In the city of Bari actually there are only two artificial surface watercourses: the Lamasinata canal at the north-western edge of the investigated area and the Japigia canal at the south-east. The population of Bari is about 313,000 (Istat 2020).

According to Passarella & al. (2020), the bioclimate of Bari is "Dry subhumid Mediterranean". The climate is characterized by minimum temperatures that rarely fall below 0ºC during winter and quite frequent summer maximum temperatures between 38 and 40ºC. The average temperature of January and February is 4.9 and 4.8ºC, respectively. There is high air humidity (71.3% on average) both in winter and in summer thanks to the sea breezes. The lithological substrate is carbonatic and the most common types of soil are: Xerorthent, Xerochrepts and Lithic Rhodoxaralfs (De Pascalis & De Pascalis 2010). The area considered in this study extends over 61.4 km^2 and includes the city centre and the former suburban agricultural areas, and is bounded by the Adriatic sea and by the Bari ring road, the state road no.16 (Fig. 1).

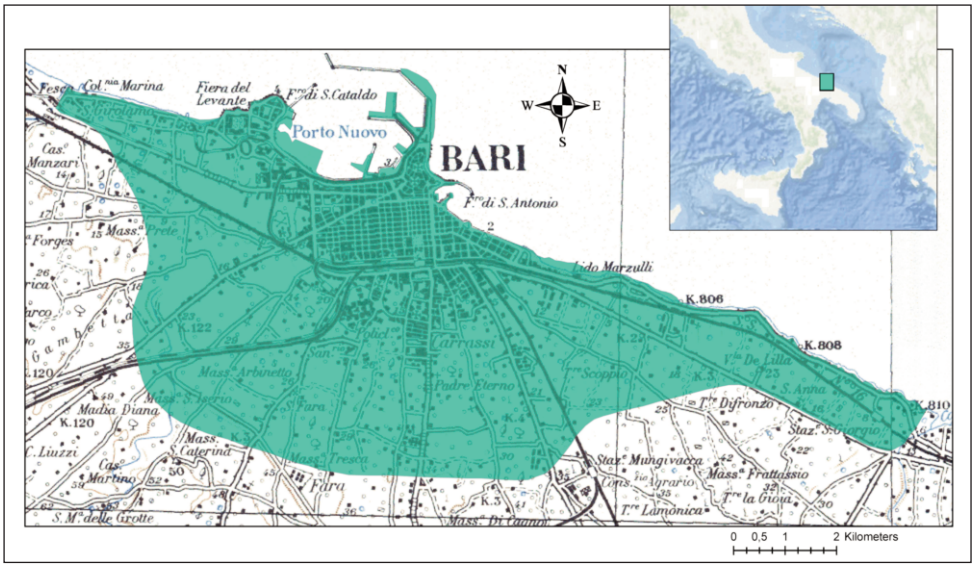

Fig. 1. The study area including the city center of Bari.

Materials and methods

In 2019, we carried out periodic observations on the presence of trees and shrubs along the streets of the city of Bari, including public and private gardens. The taxa have been identified based on their main morphological characters. In some cases, reference was made to specific contributions [e.g. Speciale & Domina (2016) for *Strelitzia* and Gargano (2018) for *Tamarix*]. The scientific names refer to Bartolucci & al. (2018) and Galasso & al. (2018) for taxa that grow spontaneous in Italy and to Graf (1980) and "The plant List" (2021) for taxa that are only cultivated.

Results

The census of trees and shrubs in the city of Bari revealed the presence of 221 taxa included in 147 genera belonging to 73 families. The list of recorded taxa is reported in the Electronic Supplementary File (ESF1). The families with a larger number of taxa are *Rosaceae* (14), *Fabaceae* (13taxa), *Arecaceae* (12), *Pinaceae* (12), *Asparagaceae* (11), *Cupressaceae* (11), and *Oleaceae* (10). The largest number of taxa is found in the genera *Pinus* L. (6), *Prunus* L. (6), *Cupressus* L. (5), *Quercus* L. (5), *Ficus* L. (4), and *Tilia* L. (4).

The most common biological forms are scapose phanerophytes (107 taxa, 48.2%) and bushy phanerophytes (68, 30.6%), followed by nanophanerophytes (19, 8.5%) (Fig. 2a).

The exotic component clearly predominates over the native species. The subtropical features of the cultivated flora is highlighted in the spectrum of Fig. 2b. This figure shows that the predominant chorotype is Asiatic (52 taxa, 23.4%) followed by South American (22 taxa, 9.9%), and North American (15 taxa, 6.7%). The Steno-Mediterranean component is represented by 15 taxa (6.7%). The flora investigated is rich in elements native to the Italian territory such as: *Anthyllis barba-jovis* L., *Carpinus orientalis* Mill., *Celtis australis* L., *Ceratonia siliqua* L., *Chamaerops humilis* L., *Cornus sanguinea* L., *Corylus avellana* L., *Euphorbia dendroides* L., *Fraxinus excelsior* L., *F. ornus* L., *Ilex aquifolium*

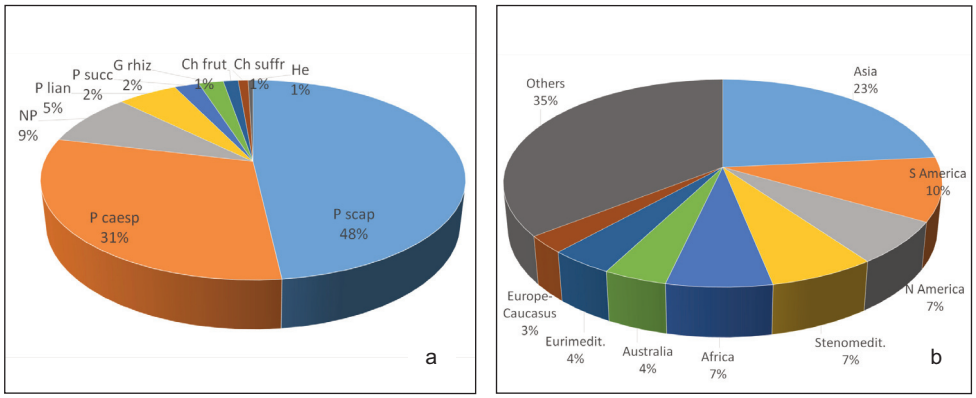

Fig. 2. a) Biological and b) chorological spectra of the investigated flora.

L., *Myrtus communis* L., *Ostrya carpinifolia* Scop., *Pistacia lentiscus* L., *P. terebinthus* L., *Prunus mahaleb* L., *P. webbii* (Spach) Vierh., *Pyrus spinosa* Forssk., *Quercus cerris* L., *Q. ilex* L., *Q. pubescens* Willd., *Rhamnus alaternus* L., *Salvia rosmarinus* Spenn., *Spartium junceum* L., *Teucrium fruticans* L., *Ulmus canescens* Melville, *U. minor* Mill., *Viburnum tinus* L., *Vitex agnus-castus* L. etc. Although most of the individuals observed come from commercial channels, it is possible that some, especially among the large trees, come from the multiplication of local native plants.

As expected, the species commonly used as ornamental in the other regions of Italy prevail, such as *Aloe arborescens* Mill., *A. vera* (L.) Bunn., *Cedrus atlantica* (Endl.) Carrière, *C. deodara* (D. Don) G. Don, *Cestrum parqui* L'Her., *Pittosporum tobira* (Thunb.) W.T. Aiton, *Platycladus orientalis* (L.) Franco, *Pyracantha coccinea* M. Roem., *Salix babylonica* L., *Schinus molle* L., *Strelitzia reginae* Banks, *Viburnum lucidum* Mill., *Washingtonia filifera* (André) de Bary, *Yucca gigantea* Lem., etc. (Figs. 3a, 3b, 4).

Fig. 3. a) Row of *Cupressus sempervirens* in Parco Don Tonino Bello; b) traffic divider with pine trees in Viale Ghandi.

Fig. 4. Partial view of the recreational Parco 2 Giugno.

Fig. 5. *Argania spinosa* cultivated within the Department of Agricultural and Environmental Science of the University.

Less common species, noteworthy, because to the limit of their use for the climate of the locality are: *Argania spinosa* (L.) Skeels (Fig. 5), *Ceiba speciosa* (A. St.-Hil.) Ravenna, *Cyperus papyrus* L., *Euphorbia ingens* E. Mayer, *Ficus rubiginosa* Desf., *Jacaranda mimosifolia* D. Don, etc. These reports testify the acclimatization to South Italy of species native under warmer climates.

Discussion

With a resolution of the Municipal Council of 25 May 2020, the Municipal Regulation of Urban Green Areas of the City of Bari was approved. The regulations contain a non-exhaustive list of recommended species for use in green areas of the city.

The census here provided is preparatory to the improvement of the management of urban green by the municipal administration and the creation of paths within the urban perimeter characterized by native species.

Trees and shrubs in cities play a key role in mitigating climate change and are responsible for 80% of greenhouse gas emissions and 50% of total waste production. Cities are also a source of wasted energy, food, and water. The cities of the future must focus on resource efficiency, resilience, circularity, inclusiveness, and sustainability. The application of good green practices is the real bet for the future in cities. But a change of mentality is needed among citizens so that they understand that planting trees in the city is not just a matter of aesthetics and decoration but also concerns the quality of life and the air they breathe.

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