

CANON DE BELLOCH

Catalogue of Urban Trees



SANTA & COLE

Fertile Eyes

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Introduction to the second edition

When we published the first edition of *Canon de Belloch: Catalogue of Urban Trees* in 2015, it seemed to us to be a necessary work. We wanted to select the forty most suitable street tree species for Mediterranean cities based on scientific, measurable criteria, as opposed to quirks of fashion or fads. Now, almost ten years later, we reiterate our purpose in this second, refined and expanded edition.

In compiling this edition, it occurred to us that, rather than being constrained to street tree species, we could extend the same research and methodology to include the most suitable trees for parks and gardens, squares and green areas. The concept is essentially the same, but the species are not, with fifteen species being identified as the best for such applications. Accordingly, this edition features the right trees for all the various urban spaces.

Given the new climate scenario and the gradual emergence on our streets of little known species, we decided to explore other areas of the world with a Mediterranean climate to see which trees are commonly planted in some of their major cities and why. This additional work, also commissioned to ERF, has yielded some interesting results. The first, and

an especially welcome finding, is that the forty species initially selected in the *Canon* are the most common in cities with a Mediterranean climate. The second, and no less important, is that there are myriad species well suited to the Mediterranean climate and used as urban trees, which are rarely present in our cities, if at all, and which can and should broaden our range of suitable species. In sum, this proved to be a vindication of species that are unjustly overlooked simply because they are non-native.

We would like to thank the readers of the *Canon* for their many comments that have helped us in compiling this revised second edition.

Finding better trees for our cities: that is what drives us daily.

Trees for people

Belloch is a historical estate located in the municipality of La Roca, 30 km north of Barcelona, in the heart of an area that has been dubbed “*la Pistoia catalana*” because of its similarities with the famous region of Tuscany in terms of its large-scale nursery production. Nowadays, the estate covers some two hundred hectares and is the location for a number of educational and social activities, as well as of Belloch Forestal’s tree nurseries.

Since 2005 our nurseries’ commercial activity has shown us that there is no consistent criteria among decision-makers when it comes to selecting which tree species to plant in our towns and cities. Places only a few kilometres apart choose different trees for no compelling reason other than their different ornamental approach to the urban landscape. Even in the same municipality, when governments change from one election to the next, the planting criteria change just as swiftly, and species are swapped out in response to what seems to be a desire to satisfy personal tastes or simply to harness good prices and market opportunities. Naturally, we believe the choice of the most suitable species and cultivars for growing in harsh city environments, brightening up our lives and benefiting people for decades to come, deserves more informed reflection.

That was what sparked the idea of producing a catalogue of urban trees, published in 2015 under the title *Canon de Belloch*, the second, revised and expanded edition of which is now in readers' hands. Our aim has always been to offer substantiated criteria, demonstrable by empirical experience, regarding what might be the best choices in urban arboriculture for use within the Iberian Peninsula, maximising the services and functionalities of our green spaces and obtaining the best results in terms of avenue alignment.

To conduct this scientific research, we approached Estudi Ramon Folch i Associats (currently ERF Energia & Sostenibilitat – Wattega), led by the eminent biologist, ecologist and botanist. They were immediately captivated by the idea we were pursuing. A consultation of multiple international databases soon revealed that there is no ordinal list of optimal species or varieties for urban growth, based on a discrete list of functional criteria.

Accordingly, the first task was to determine certain basic criteria that should guide the replenishment of trees in cities (ultimately, these criteria were flexibility, resilience, green infrastructure, impact on human health, functional efficiency and air pollutant removal) and then applying them by means of twenty-seven parameters that measure the tree's tolerance to different types of soil, its resistance to pests, allergenicity, reduction of energy consumption in buildings or suspended particulate matter removal, to name a few.

After weighing the relevance of these parameters and evaluating each species or variety in respect of each of them, sometimes through estimates in the absence of better objective data, the result is an ordinal list, classification or catalogue featuring the tree species best suited for use in the cities of the Iberian Peninsula.

This 2024 edition, in collaboration with ERF Energia & Sostenibilitat – Wattega, contains a revised list of avenue tree species, adding some new ones and discarding some of the original ones. It also features fifteen new species especially suited for use in parks and gardens (beyond avenue trees that could also be suitable here), and presents updated and expanded content on forestry management, mainly in terms of promoting biodiversity.

At first glance, it may seem that a biological palette of fifty-five species or varieties is too few to express the many subtleties that any good urban landscaping project should aspire to. Not so. In fact, Madrid uses around two hundred species of trees, and Barcelona and Zaragoza some one hundred and fifty, although in all three cities the predominant species barely number more than ten.

Consequently, in our view, the selection we present in the *Canon* not only protects and stimulates biodiversity, promoting the use of species acclimated to our territory (fourteen of which are native), but also guarantees the best benefits for people.

When we first launched the business venture of Belloch Forestal (2004), our nurseries grew as many as three hundred different species and varieties. Gradually we realised that many were unnecessary or even arbitrary. Accordingly, after the results of the first study, we limited production to the forty most optimal species, with the aim of producing only the fifty-five varieties in the *Canon*, always striving to offer the best specimens in each one, through specialist care and devotion.

A tree in every place, a place for every tree

In 1990 the first edition of the Granada Standard, a method for evaluating trees and shrubs devised and drafted by a committee of the Spanish Association of Public Parks and Gardens (AEPJP), was published. Gradually earning widespread acceptance since its publication, it has now become a commonly used standard. And it is a ubiquitous reference precisely because it provides a timely response to a relevant question: how much is a living tree worth, aside from its value as timber? However, other questions remain unanswered in the field of arboriculture, especially urban arboriculture. Not least among them: Which species is best suited to a particular location?

Belloch Forestal has been asking this question for some time. This canon or catalogue aims to provide an answer, or at least an approximation. Belloch Forestal passed the question on to ERF and since then we have been working together to find the right solution, which we have revised and expanded in this second edition. Urban streetside tree species are often chosen too randomly, based on subjective preferences or circumstantial availability, as if any tree could live and perform properly anywhere. This is simply not the case. Not every species can cope with

every environmental condition, and not every species can fulfil every urban function.

All too often, trees, especially streetside trees are managed as if they were street furniture. The desired projection of their crown is sketched on plans to embellish the architectural project and the saplings are chosen with no other criterion than their imagined aesthetic impact. Trees add beauty, no doubt, but more than anything else, they live. They live in cities just like we do, often enduring adverse conditions, and they provide a valuable environmental service that should be the object of careful planning: protection or screening from sunlight, acoustic shielding, pollutant removal, generation of gratifying green areas, etc. It is therefore advisable to select an appropriate range of species for each climatic environment, to identify the performance and requirements of each of them, and to evaluate the dedication and cost of maintenance required. A tree is not an inert ceramic object. It is a living being that demands and gives back, and that also changes as it grows.

This new edition of the *Canon* aims to narrow down the broad spectrum of choice to include only those species, or even varieties, which best respond to what is expected of them and which can withstand the conditions they will encounter. The first task is to identify these functions, which in itself is a propitious exercise on the part of the planner. Secondly, end-users must be provided with a range of typologies compatible with these functions. It is not really a complicated exercise provided you have sufficient information, knowledge and judgement. This *Canon* is aimed at compiling all this expertise into a single volume.

This project has involved every department of ERF, with the special dedication of Josep M. Palau, an expert biologist who has spent more than twenty-five years working on the territorial and urban dimension of naturalistic knowledge, with the invaluable input of Carla García, an environmentalist with over a decade of experience. Frederic Ximeno, an urban biologist, and I, as a socio-ecologist, contributed our socio-ecological and urban planning expertise and generally oversaw the first edition of this work, published in 2015. All of this, needless to say, in close collaboration with the technical experts and managers of Belloch Forestal.

It has been a real privilege to have carried out this work. We are convinced that this new edition of the *Canon de Belloch*, which we hope and predict will become a benchmark comparable to the Granada Standard, will make it easier to properly plant our streets and parks with trees. We are delighted and of course honoured to be a part of this.

Interest and purpose of the *Canon de Belloch*

The Canon de Belloch (hereinafter, Canon) is a unique catalogue of urban trees providing a selection of species that are especially suitable and functional for our cities.

The dictionary published by the Royal Spanish Academy defines the Spanish term “canon”, among other things, as a rule or precept, but also a catalogue or list. The *Canon* is unquestionably a catalogue of selected species, but it also aims to serve as a benchmark. The idea is to provide a methodological guide that, free of any dogma, helps to highlight trees as a valuable and necessary element of the urban environment, for which suitability and functionality criteria can be established.

This amounts to a sea-change in the traditional view of trees as mere embellishment of a city’s buildings and other constructed elements. Aesthetic values (which are always subjective) may be taken as a necessary, but by no means sufficient, condition when it comes to choosing urban tree species. There are a number of other issues that need to be considered, which can be broadly grouped into three categories:

- Adaptability to a changing and demanding environment
- Ease of maintenance and minimisation of potential risks
- Provision of socio-environmental services

Based on these premises, this second, revised and expanded edition of the *Canon*, takes a novel approach compared to other catalogues, as it was conceived as a true selection of high-performing species for tree cover in the city. The *Canon* makes a distinction between those species that are especially suitable for use in avenues or street alignment—and by extension in paved areas—and others whose ideal application is in parks and

gardens. Species that are suitable for streets are assumed to be at least as suitable for unpaved green spaces.

These days, such an approach is not only desirable but necessary. Cities are densely populated and concentrate numerous environmental and social dysfunctions. Therefore, urban environments are a priority area for integrating sustainability principles and criteria. Against this backdrop, trees—as a key element of urban green infrastructure—must, to the extent possible, be part of the solution rather than of the problem. Consequently, choosing tree species on the basis of purely aesthetic or commercial criteria essentially means leaving to chance the integration of sustainability and functionality considerations in an urban element that will be present in our streets, avenues, squares, gardens and parks for decades to come. This is by no means a trivial issue and this canon is precisely intended to help promote a conscious and informed choice, based on criteria established specifically for the urban environment.

The canon's approach, while perhaps obvious, is quite innovative, at least in our geographical context (in the United States this type of approach is more common). Typically, catalogues of ornamental tree species are based on more or less comprehensive fact sheets, which provide basic information on morphological and ornamental aspects, as well as additional information on the type of climate or soil in which the species can thrive. While this approach certainly allows for using basic parameters to select species that can be planted in the urban environment, it does not facilitate the selection of species on the basis of a combination of adaptability, ease of maintenance and urban functionality criteria.

It is worth noting that the originality of the approach outlined above lies not so much in the type of information used—which already exists, although it is not always known—but in the way it is processed and integrated. It is how the available information is combined that makes it possible to offer tools that facilitate decision-making, not only by those responsible for planning or managing urban green spaces, but also by urban planners or landscape architects, or even, as in this case, for programming nursery production. This approach, which does not exclude ornamental criteria, therefore goes beyond the strict field of gardening to factor in matters relating to the tree's functional integration in the city. After all, it is only from this perspective that trees' contribution to improving urban sustainability and the quality of life of a city's inhabitants can be understood and strengthened.

The main new features of this second edition over the first are as follows:

- General approach broadened to include urban trees as a whole, not only in terms of their street placement but also their placement in parks and gardens.
- Review, reconfiguration, expansion and updating of the content of the original publication.
- Review of the original species list selected for street placement and extension to include park and garden species.
- Renewal of the format of the species fact sheets and illustrations, including new fact sheets for new species. The arrangement of species in the fact sheets by scientific name, rather than by score, to make them easier to find and reinforce the idea that no single species is optimal from every standpoint.
- Development of new content to present, among other topics, the results of parallel work on urban trees used in other cities with a Mediterranean climate around the world.

First part

Selected species and cultivars

How were the species selected?

1

Purpose and methodological considerations

The main objective of the canon is to establish a limited range of tree species and cultivars that are especially suited the urban environment, maximising the provision of socio-environmental services and minimising any adverse effects.

To achieve this objective, we adopted the following premises:

- Consider species used—or perfectly adaptable—in our geographical context (meaning the Iberian Peninsula, although taking into account the significant weight of Mediterranean climatic conditions).
- Include both morphological and physiological parameters in the assessment, always from the perspective of the urban environment where they are to be placed.
- Establish higher-order selection criteria that combine and aggregate a number of simple parameters.
- Combine and weight the usual parameters with others that are much less known or used, often only available in specialised scientific literature.
- Assume that no species is optimal from every standpoint, so the value of the catalogue should be understood more as a whole than in terms of specific individuals.
- Ensure a balanced final selection including species of different sizes, capacities and urban functionalities.
- Provide a reasonable diversity of genera and families, to avoid excessive concentration in a few taxonomic groups. Promoting such

biodiversity is also advisable to reduce the risk of health problems (such as pests affecting a limited group of botanically related species).

- Ensure at least a minimum percentage of native species and avoid the presence of species clearly known to be invasive to the natural environment (such as *Ailanthus* or tree of heaven).

Selecting the species for the canon has proved to be a complex but rewarding task. Selecting means prioritising some species over others, and this means establishing assessment criteria and tools based on objective parameters. The aim is not to provide an apposition of unconnected data, but to integrate that data into a global matrix that translates simple isolated parameters into higher category criteria. This, in turn, should make it possible to identify species that are particularly significant from the urban functionality standpoint. For example, it is not the same to analyse a species' heat and drought tolerance separately as it is to use these data to establish a criterion for the species' adaptability in a climate change context.

The inclusion of a limited number of species in the canon is the result of a compromise between providing a discrete number of prominent species—otherwise there would be no real selection involved—and ensuring sufficient diversity and representativeness of typologies and functions.

In line with the above objective and premises, the working methodology adopted can be summarised in the following five stages:

- a) Compiling an initial list of species for potential inclusion in the *Canon*
- b) Identifying reference documentation sources
- c) Establishing assessment parameters and criteria
- d) Weighting the various parameters and criteria
- e) Selecting the final list of optimal species

The scope and considerations applied for each of these stages are provided in the form of an annex (see *General methodological approach*, on page 213).