STREET ALIGNMENT, STRUCTURAL, FUNCTIONAL AND AESTHETIC COMPONENT OF URBAN LANDSCAPING

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Abstract

By using the repetition of an identical or similar component in the landscape, the designer has the possibility of creating a unique planting scheme. This desire is given by the designer's experience, by the efficiency with which the created "environment" addresses the needs of the people and the functional requirements of the site, the way of selecting the appropriate plants and their association, the economic advantages related to the maintenance requirements, all these combined contribute to the aesthetic success of the project, to the realization of a pleasant design throughout the year.

In this paper we have proposed to present different types of street alignments, the way we select the species of ornamental trees and shrubs, the aesthetic and functional principles that underlie the choice of rhythm, as a principle and element of landscape design, with the aim of it facilitates the perception of the composition, increasing the expressiveness of the ensemble and the integration of these connecting corridors in the general urban ensemble.

In conclusion, we can say that the street alignments represent an integral part of the cultural heritage, they define the aesthetics of the street representing true transit corridors within the urban fabric. Because they have a climatic, economic, structural, protective, functional and aesthetic role, their lack leaves cities with structure, rhythm and coherence, a sustainable development strategy. When choosing the species of ornamental trees and shrubs, the aesthetic value, the specific requirements regarding pedoclimatic conditions, the design of the landscaped space and the basic principles such as: order, harmony and proportion are taken into account. Rhythm is the main tool in ordering alignments, which facilitates the correct planning of green spaces.

Keywords: alignment, rhythm, trees, shrubs, aesthetics.

INTRODUCTION

From a landscape point of view, the surrounding environment is represented by our physical surroundings, by the world outside the built environment, by the landscape that surrounds us, a complex environment that dissolves into a network of relationships, connections, and continuities of physical, social conditions, and cultural, which circumscribe human actions and responses, which give form and content to it and which represent life itself. As a result of accelerated urbanization, currently almost 55% of the population lives in urban areas, and by 2050 it is estimated that this ratio will increase to 68% (Onose D.A. et al, 2012), a fact that can produce negative consequences for life and biodiversity, and on a global scale, urban activities directly influence climate change [Dodman D., 2027]. Urbanization has an enormous impact affecting all the components of the environment, which, in turn, influence the quality of the population's health [Capcelea V., 2019].

The environment represents the result of mind-body dualism, a place we contemplate and should live in harmony with, a space that is an intimate part of our lives. While the landscaped green space reflects the experience of an immediate, more special location, characterized by specific elements incorporated in a distinct way and emphasizing the human presence as an activator of perception. We have to admit that through its activity of transforming the environment, human influence is not always beneficial, sometimes it can end up offending us in various ways: by destroying identity and affecting places, by disrupting architectural coherence or other situations that can reach to the idea of an environment hostile to life.

Next, I will present some of the advantages that urban green spaces, whether they are small in size, for example street alignments, bring to the environment. It is known that plants contribute to the support of biological diversity in the urban environment, providing refuge and food for various species of insects, birds and other small animals [Scoott Catherine., 2015], which has a positive impact on the urban ecological balance by ensuring pollination, organic matter, also an essential role in pest management. It should be noted that the street alignments are true biological corridors that allow the movement of many species.

The presence of ornamental trees and shrubs in the street alignments bring numerous benefits in the urban environment with multiple effects on air quality, thus a leaf surface of 25

square meters provides the necessary oxygen for a person during a day [Scoott Catherine., 2015]. Woody vegetation plays an important role in reducing pollution, sequestering carbon dioxide and other pollutants as well as dust, a process that helps reduce air pollution and improve air quality in cities.

Trees and shrubs contribute to reducing the urban heat island effect, by shading and evaporating water, by transpiration they contribute to increasing the relative humidity of the air (Radomska M. et all, 2017) and lowering temperatures by 2 -3°C, on summer days (Harris et all, 1999). Street alignments mark and delineate functional areas, but at the same time unify different spaces in the vast urban network of cities, create corridors and access areas.

Depending on the height, alignments, especially double ones, are a barrier to winds without creating the "wall effect", which creates harmful eddies behind it, for example a more frequent alignment can reduce wind speed by up to 50% thereby protecting buildings or public spaces by limiting damage in the event of a storm or strong wind.

The presence of street alignments has a direct effect on water quality and soil protection. In fact, they regulate the water regime by slowing down the speed of water circulation on the soil surface, favoring its infiltration into the soil, a fact that also limits the soil erosion process. Improves soil quality in particular, plants with rich roots can help strengthen the soil and prevent erosion. They can also filter and absorb pollutants from the soil. In the urban environment, noises reach intensities between 40 and 80 decibels (Vidican, 2021), trees and shrubs help to mitigate them by absorbing and dispersing the sounds.

The integration of plants in the design and management of cities can bring multiple benefits, having a positive impact on the environment and the quality of life of the inhabitants who benefit from places of relaxation and refuge, areas associated with the reduction of stress, anxiety and depression. Also, urban green spaces are ideal places for recreation and relaxation, providing an oasis of tranquility in the urban environment, serving as places for physical activities, encouraging people to go out into nature and practice outdoor sports, thus contributing to physical health and their mental.

Not to be overlooked is the aesthetic function of street alignments created specifically to enhance the physical appearance of the urban environment, to add beauty and stimulate the visual senses of visitors. A good design allows the choice and association of plant species that bring a varied palette of shapes, colors and textures able to print a special decorative value, appreciated by the satisfaction that man achieves with nature (Dee, 2012), which enhances visual appeal and creates a dynamic and changing environment throughout the year.

MATERIAL AND METHOD

According to Law 24/2007 on the regulation and administration of green spaces in urban areas, the green space represents a harmonized architectural system, made up of elements of the intra-village and extra-village landscape complexes of urban and rural localities (natural landscapes, sectors of water courses and water basins, road constructions, horticultural, residential), important from an aesthetic, biological and ecological point of view, which usually includes a community of vegetation (woody trees, shrubs, flowers and herbs). Looking objectively at the situation of green spaces in big cities, we notice that the creation of large green areas in urban centers is often unfeasible, due to the physical lack of space inside cities (Onose D.A, et all, 2021). A practical solution could be the creation of vegetal groves or corridors, holistically integrated in the urban landscape, which link urban ecosystems together. These smaller green spaces are represented by squares, gardens and street alignments (Zhang et al., 2020).

Nature offers us multiple solutions. It is important to deepen and study the informational flow of data on the urban area, its history and dynamics, so that we can achieve strategic planning in which local priorities are given priority. The expansion in an accelerated dynamic of urban areas to the detriment of the reduction of green spaces inside them has made street alignments, small green spaces, to constitute an architectural alternative capable of contributing to the evolution and prosperity of humanity, but also to ensure the biodiversity of the ecosystem.

In this paper, I have highlighted the importance and the criteria that are the basis of the choice of tree and ornamental shrub species in the realization of street alignments. I extracted the examples from my undergraduate work, which consisted in the arrangement of a section of a

public park on an area of 30000 m2 and the current semester project in which I detailed, in my own vision, the way of realization, the importance, planning and design of street alignments.

RESULTS AND DISCUSSIONS

The man-made landscape represents an aesthetic work in practice, which reflects local cultural traditions and the distinctive character of the place. The management of urban green spaces is not limited only to visual pleasure, but also represents an essential aspect in the creation of attractive, viable cities, oriented towards the well-being of the inhabitants, for which special attention is paid to the correct transposition into practice of the planning principles specific to green spaces (Vidican I.T., 2011).

Street alignments represent an essential component in the development and planning of cities and urban areas with direct implications on the quality of life in the built environment. Current policies involve, in this complex process, the joint decision-making of all concerned parties: urban planners, landscapers and engineers, with the aim of conceiving the safest, practical and aesthetic design and optimal long-lasting results.

In our work, we will only refer to the activity in which the landscape engineer is involved in order to realize some street alignments, the plants used and the criteria underlying their choice, so as to promote biodiversity in the urban environment. A right choice, an attractive design can encourage outdoor activities, provide people with a pleasant place for relaxation, recreation and socialization, balancing the hectic pace of daily life.

In presenting the criteria that are the basis for choosing the type of alignment and the plants used to create them, I will use examples from my undergraduate thesis, which consisted in the design of a park sector on an area of 30,000 m2, and from the semester project that is in completion course, specifically that I used the alignments both in the areas designed according to the rigor of the formal style, and the free ones characteristic of the informal or mixed style.

At the basis of the aesthetic design of a green space unit are certain basic principles such as order, harmony and proportion, and in the present case, the rhythm or repetition that expresses the periodic placement of species or groups of plants. The rhythm facilitates the perception of a composition that it makes accessible to understanding, used properly it increases the expressiveness of the ensemble, its integrity and quality, thus ensuring a recreational framework in which the aesthetic aspects become more meaningful (Vidican I.T., 2012).

Repetition does not always create a pattern, sometimes it is simply the same element or shape being used repeatedly throughout the landscape. In a landscape arrangement, repetition can be achieved most easily by overlapping the constituent materials. Repetition must be used carefully, because too much creates monotony and too little can cause confusion, a delicate balance is necessary to achieve a functional and aesthetically attractive design. When used effectively, repetition can lead to rhythm, focus or emphasis.

The rhythm can be: static, dynamic, simple, compound, linear, shape, color, and of course combinations of these variants.

The static rhythm is achieved by the succession, the planting, at equal distances from each other, of identical plant elements, using within the alignment specimens of the same species, which have the same crown shape, the same height, etc (fig.1). In the case of my projects, I chose this type of alignment to delimit the landscaped space so it becomes visible and easy to spot by the beneficiaries, ensuring both the aesthetic effect and the necessary shade. When choosing leafy plants, the following will be taken into account: the use of species with regular bearing, with a long period of leafing and short leaf fall, which do not pollute the street with flowers or fruits. In the formally arranged area, we chose alignments made of topiary plants characteristic of the style, which give the space elegance and sophistication.

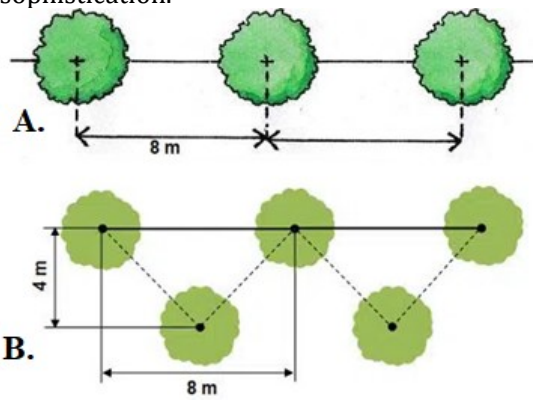

Figure 1. Alignments planted using static rhythm, where: A-on a row; B- in two rows.

The dynamic rhythm obtained by alternating the component elements, which differ from each other in shape, height and other visible characters or are placed at unequal intervals. The diversity of species, colors and heights of plants removes the monotony and artificiality specific to topiary forms. Dynamic repetitions are used when the aim is to gradually increase the expressiveness of rhythmic elements in order to focus attention on a certain object (fig.2). The choice of plants involves both trees and ornamental shrubs, the combination of which will take into account height, crown shape, stem color, leaf color in the growing season and autumn, the period and duration of flowering, as well as the color and abundance of flowers, as an element decorative. In the case of my project, I chose this type of rhythm in the informally arranged area, in the space that delimits the pedestrian alleys in the middle, using as a tree *Magnolia soulangeana* for the extremely decorative aspect of the flowers that open very early in spring, and a decorative shrub, *Photinia red robin* impressive, medium-sized, with a pyramidal crown, tall and compact, but distinguished by the characteristics of extremely attractive leaves in shades of green and red with a glossy surface. In autumn, the foliage gradually changes to intense shades of red, orange and yellow. Flowers in the form of white bouquets, intensely fragrant. In the formal space to delimit the main alleys, we used topiary plants in combination with small trees. When combining different species, it is essential to take into account the space that will be occupied, in the end, by each species so that the roots and branches have enough space not to penetrate the traffic lanes.

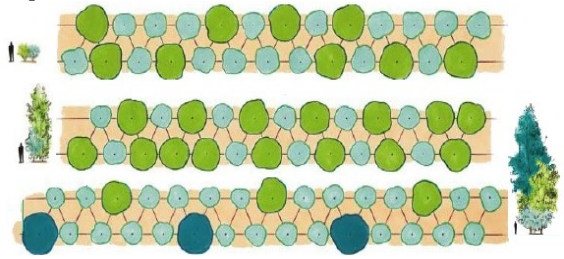

Figure 2. Street alignments planted in dynamic rhythm.

The simple rhythm represents a variant of the static rhythm that involves the constant repetition of the same elements or groups of elements, while the compound rhythm is not noticeable by the regularity of the alternation, because it is masked, being perceived through intuition, made from groups similar in terms of composition and species association, which are repeated periodically.

The linear rhythm is highlighted by vertical repetitions, in which case the emphasis is on the color or shape of the stems or the use of species with a columnar crown. Being a variant of the static rhythm, in my projects I used this type of rhythm using species of *Betula alba*, an extremely decorative tree that is defined by the color of the pronounced white bark with large gray and yellowish plates on the rhythm.

The shape rhythm is highlighted by the repetition of elements similar in shape or volume (fig.). Knowing that the shape represents an important quality in the designed landscape, we will use plant species that are differentiated by this quality, thus to give the space maximum visual weight, we will choose columnar or pendulous species, the vertical crowns add height to the space, while the small, horizontal shapes it directs the gaze along the horizon and adds width to the space. The shape of the plants defines the space, so choosing vertical shapes will dominate the space while plants with large, arched branches will create an open space (Vidican I.T., 2015).

The rhythm of color or lighting is achieved by regular alternation, in a predetermined order of elements of different colors, shades or light intensities, such as for example: alternate planting of specimens with red, silver or light green leaves and dark green, or of specimens with a thick crown or a transparent crown, the choice of alternation, during the vegetation period of the plants that make up the composition (Vidican I.T., 2015).

The final form of a green space is conditioned by the anotomo-functional characteristics and pedo-climatic requirements of the plant material, but also by the structure of the materials from which the architectural and semi-architectural elements are constituted. For this reason, obtaining aesthetic forms involves a complex process determined by the contouring of certain content structures, certain ratios between the various plans, lines and surfaces, certain volumes. This makes the very aesthetic appreciation of shapes relatively more complex than in the case of colors, for example.

In creating plant alignments, the balance between function, form and structure is a necessity, in which the correct use of rhythm also participates as a principle of arranging green spaces, but it is not the only criterion. The choice of species depends on other factors

related to the dynamics of the land, the degree of resistance of the species to noxes, the requirements for pedo-climatic conditions, the role they are to fulfill in the landscaped, functional space: providing shade, screening or aesthetics. For free forms, it is good to choose species that do not require severe cutting, it is also important that when choosing the tree species, take into account their sizes at maturity, but also the shape of the crown in relation to the space it will occupy it, so that we obtain the desired effects (fig.3). In this balance, the function expresses the destination of the product, the form expresses the configuration in which they appear and the structure expresses how the elements that compose the arrangement and the cohesion between them are arranged. In landscape design we must always take into account the approach of integrating the landscaped area into the wider context of the urban habitat.

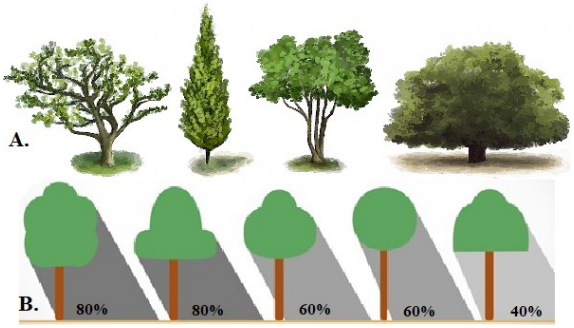

Figure3. Plants used in street alignments, where: A- by crown shape; B-after the shadow they cast on the ground.

An important element in the choice of plants is the texture that affects the perception of distance and scale, so this aesthetic value depends on what is in the immediate vicinity, it can change depending on the season or the distance from which the plant composition is observed, it can oscillate and depending on the dimensions of the composition, the shape and density of the foliage. To make a space appear larger, plants with fine textures will be placed along the outer perimeter, medium textures in the middle area, and coarse ones will be found closest to the viewer. The small size and fine texture of the plants make the space to be perceived as deeper. To visually reduce the space, coarse textures will be placed along the outer perimeter, and fine textures as close as possible to the viewer, details of a coarse texture make the plant seem closer and the space smaller (fig.4).

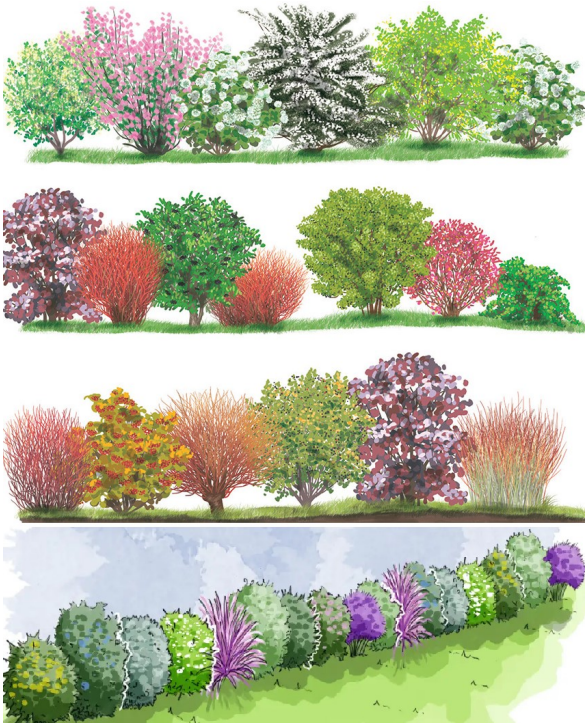

Figure 4. Street alignments in which the color and texture of plants is used.

CONCLUSIONS

The street alignments constitute an integral part of the cultural heritage, through their linearity, regularity and volume, they define the aesthetics of the street representing true transit corridors within the urban fabric;

Basic principles such as: order, harmony and proportion serve for the correct planning of a green space, and rhythm is the main tool in ordering alignments;

The rhythm gives order and coherence to the space, facilitates the perception of the composition and defines the aesthetics of the landscape;

The choice of ornamental trees and shrubs is made according to their aesthetic value, the specific requirements for pedoclimatic conditions and the design of the landscaped space;

Alignments fulfill multiple functions within a habitat: climatic, economic, structural, protective, functional and aesthetic;

The lack of street alignments robs cities of structure, rhythm and coherence, of a sustainable planning strategy, of the benefits they bring and last but not least, of the quality of a design with significant aesthetic aspects.

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