

THE SELECTION OF WOOD SPECIES FOR GREEN SPACES FROM TOWN ORADEA

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Abstract

The green spaces our part of the environment of our life, they are an attribute of our civilization level. The expertness with which they are projected, grounded, groomed, restored and transformed, make the different categories of green spaces to exercise their ecological, re-creative and esthetical function in our benefit. These are representing an important protection instrument for the people and their environment.

In this work it is presented the study of selection of wood species for the green spaces from town Oradea from the separation bands of the traffic bands from the main roads. These bands, even if they occupy a small territory from the total surface of the green spaces, being situated at the entrance of the town they contribute to its general image.

Key words: green spaces, separation bands by the traffic directions, the functions of the green spaces, management principles, the selection of the wood species.

INTRODUCTION

Green spaces represent managed territories on the structural surface or outside of it, having their dominant fund constituted from vegetation, to which it is associated some equipments with utilitarian, recreational or cultural character, destined to accomplish different functions, but mainly the sanitary, re-creative and decorative functions (Negruțiu, 1980).

The plants are essential components of the natural ambiance; these constituting the living material and mainly green material of an infinite diversity, which covers the soil and associates with the building elements.

The functions of the green spaces, which contribute to the quality of life in an urban environment, are: to ameliorate the urban microclimate, to purify the atmosphere and to minimize the phonic pollution.

Among the categories of urban green spaces situated on the structural part of the location, are taking part also the green spaces afferent to the traffic roads.

MATERIAL AND METHODS

The separation bands of the traffic senses are part of the category of green spaces afferent to the urban traffic roads. These are having a great role in the green system of the town, being projected to create an attachment between squares, gardens, parks and other categories of green spaces, with the aim to realize a good function for environmental protection. Near this function these are having other roles too: in reducing the pollution of the atmosphere, in ameliorating the local microclimate (through the partial shadowing of the road, but also by the evaporation process of the leaves) and to create architectural effects in association with alignment of buildings of the streets.

In this work there were studied the axial green spaces situated on Boulevard Dacia, Calea Clujului and Calea Aradului, which constitute in the same time the main access roads to the city from Borș (direction Hungary), Cluj-Napoca and Arad.

The inventory of the species from these bands was made. To recommend species to be introduced to the compositions of these studied bands, special studies were made (Stănescu et al., 1997; Ciocârlan, 2000; Vlad, 2001; Mateescu, 2002; Iliescu, 2003, 2005) and numerous observation were made for the green spaces of Oradea. Beginning from the principle of compatibility applied by the selection, association and management of the species, after documentations and observations of the territory, there was analyzed the favorability level of the main ecological factors for these species.

Respecting the principle of biodiversity, first of all the autochthonous species were kept, considering the ascertainments from the literature and from the observations made, that the flora of the country has a great diversity.

RESULTS AND DISCUSSION

The arrangement system of the green spaces from town Oradea is a mixed one, under the form of bands and spots, a system which has the advantage that the green spaces are all over the territory and they are creating bindings with the suburban green spaces, and the spots, having larger territories are accomplishing better the re-creative, decorative and sanitary functions. In town Oradea the green spaces adherent to the streets are 5,7% from the total territory of green spaces of the town (Smit and Giurcă, 2004); even if the proportion is not so large, these territories are also participating at the norm of green spaces which is 10,6m²/inhabitant.

The separation bands of the traffic directions taking into consideration in this study are situated on the most important streets of the city: Boulevard Dacia, Calea Clujului si Calea Aradului, being projected with a width which permits an ulterior enlargement of the road.

On these three bands we can find the following species: *Thuja occidentalis* L., *Thuja orientalis* L., *Pinus nigra* L., *Catalpa bignonioides* Walt. (*Bignonia catalpa* L.), *Morus alba* L. var. *Pendula*, *Prunus cerasifera*, *Hibiscus syriacus* L. In these three zones there are used an alignment from a single row of trees. Usually these rows of trees are being created from different species, even if it is recommended to use a single one. It is recommended to have leafy essences which are corresponding to the requests and conditions of this type of plantation.

It is allowed the change of species only by the change of direction or by an intersection with another traffic road.

The arid, damaged ones must be replaced, and the free spaces must be filled with species which already exist there. Because of esthetical reasons it is better to treat unitary or use similar species from the point of view of height, the form of leaves and ecological behavior. This way the rearrangement of the band from Boulevard Dacia one can make with: *Acer platanoides* L. and *Paulownia tomentosa* (Thunb.) Steud. (sin. *P. imperialis* S&Z), on two distinct zones, one until the gyratory direction from the boulevard and the other one until the gyratory direction from the intersection with street Coposu.

For the plantations of these types one must assure spaces which can satisfy the necessities of development of these arbors and to reduce the immediate neighborhood with the passable for vehicles (because of the injury risks of the block) and the pollution of the soil with anti-snow solutions.

By projecting and realizing the plantations on the separating bands of the traffic directions one must also take into consideration the minimal distances toward the underground installations. This way, it is recommended for arbors 4 m towards the water

and canalization pipes, 3 m towards the gas pipes with low pressure, 2 m towards the gas pipes with high pressure and the entrenched electric cables.

The selection of species for the free zones of vegetation will be made according to some criteria (Iliescu, 2003):

- these must have middle waist, regular outlook, straight block and the canopy must be at least at 2,5 m height, the root system must be deeply developed (not to lift the asphalt);
- long-lasting foliation, short period of falling;
- avoidance of species with flowers or fruits which can dirty the road.

Near these criteria one must chose species characterized by a good adaptation capability to the climate of the region and with good biological resistance in the urban zone, where the appearance of multiple stress factors is highly possible like: draught, the caloric radiation of the asphalt, air and soil pollution, illnesses and damages, etc.

At the same time the arrangement of the separation bands of the studied traffic directions will be based on principles with general character, originating from the domain of landscape architecture: functional principles, esthetic-compositional principles, ecological principles, technical principles, economical principles (Iliescu, 2003).

This way:

- on the separation bands of the traffic directions, situated between streets with agglomerated traffic there are arranged green spaces with esthetic function and with the function to ameliorate the urban microclimate and to create some architectural effects through the volume of plantations.

- the details of the composition perfects the general solution through the selection of adequate species, forms, dimensions and colors and through the revealing of the details arranged in space. The esthetic-compositional functions are attached with those functional. The arrangement of the separation bands between traffic directions takes into consideration the creation of some ambiances which express beauty, order, pleasant physical characteristics.

- the knowledge of the ecological behavior of the plants allows a scientific treatment of arrangement of the vegetal landscape. It is taken into consideration not only the vital necessities of the plants, but the mutual relations between them, the rhythm of growth, the future transformation of the vegetation and its longevity.

- the functional, esthetical, ecological, technical aspects are embracing those economical.

It is taken into consideration the maximal use of the possibilities offered by the territory. By the arrangement of the separation bands of the traffic directions one can chose solutions to diminish the costs.

For the selection of species for the separation bands of the traffic directions one must know the landscape qualities of the plants, their biological character, the ecological requests and the functional requests.

These criteria and principles will be the basis for the selection of species for these three separation bands. These can be introduced in the zone of bands with a width of 15 m, where there is no vegetation in the moment.

There are presented some of the chosen species for these separation bands in the study:

Picea pungens Engelm – the silver pine supports well dryness in air and soil. It is highly resistant to industrial smog and dust (Ciocârlan, 2000; Doniță et al., 2004), being cultivated with success in the city.

At the medium annual temperature of 10,3°C (Smit, 2008) the silver pine will be at the limit of its ecological resistance; the medium annual rainfall of 635 mm(Smit,2008) will situate it under its optimal ecological limit.

Picea pungens var. *glauca* Reg. It can be introduced to the separation band from Calea Aradului, being a highly decorative arbor and through the green and blue nails.

Acer platanoides L.- the maple supports well dryness, prefers fertile, profound soils, but tolerates relative compact soils too, with reduced humidity (Ciocârlan, 2000).

At the medium annual temperature of 10,3°C the maple will be at its optimal limit of ecological resistance and the medium annual rainfall of 635 mm will situate it at its optimal ecological situation. As an ornamental arbor it is better to plant it on the studied separation bands of Oradea, because it has a beautiful aspect, mostly in the autumn, when its leaves are yellow. Even more, it is easily and surely cultivated (Stănescu et al., 1997).

Acer saccharicum L. (*A. dasycarpum* Ehrh.)-the American silver maple is not so highly resistant to draught, but it's resistant to frost, it grows on the argillaceous and humid soils. It is very appreciated as an ornamental tree for his form and for the color of its leaves (Doniță et al., 2004). In the city of Oradea it will be at its optimal ecological situation.

Acer negundo L. – the American maple is no so pretentious when it goes about climate and soil; it prefers humid, profound and rich soils, where it can easily grow. It is very cultivated on green spaces because of its form and the color of its leaves, of its fruits which are remaining along the winter, for its quick growth and because it can be cut, so that it can have a geometrical form (spherical, etc.). It present forms and variations even more decorative, for example the variation *variegatum* (Iliescu, 2005), with leaves with white spots and this has some exemplars, except those with green leaves with white spots, which have completely green or completely white leaves.

Betula pendula Roth (*Betula verrucosa* Ehrh.) – the birch, a pioneer specie, it presents a great decorative importance through its airy crown with thin branches and its white bark (Iliescu, 2005).

Analyzing the level of favorability of the most important ecological factors from the studies zone, results that: at a medium annual temperature of 10,3°C, the birch will be at the limit of its ecological resistance and at a medium annual rainfall of 635 mm it will be under its optimal ecological limit.

It is specie a little bit pretentious when it goes about climate and soil. It resist very well to frost and tolerates well intense heat and it will live well on soils with light texture.

Rustic specie, the birch can be introduced to the band from Calea Clujului, on it's larger part near the railway bridge.

More decorative are the variations and forms obtained by grafting, like *Betula pendula* var. *purpurea* (André) Schneid, with purple leaves; *Betula pendula* var. *tristis* (Beiss.) Schneid, with tabular crown.

Quercus rubra L. (*Q. borealis* Michx.) – the red oak, the American red oak resists well to winter frosts and to spring freezes. The rainfalls from the studied zone are often and in the same time, it is not a pretentious specie when it goes about soil; the rich types of soil with light texture will accentuate its quality as a quickly growing specie (Stănescu et al., 1997).

The ornamental value of the red oak is given mostly by its autumn color (red or orange), by the richness of its leaves. It is recommended in alignments, little groups (3-5 exemplars) (Vlad, 2001) to the band from Calea Aradului in the zone with a width of 15m.

The indigene species of Quercus, common oak (*Quercus petraea* (Matt.) Liebl. Ssp. *petraea* (Liebl.) Soo), Dalmatian oak (*Quercus petraea* ssp. *dalechampii* (Ten.) Soó), Transilvanian oak (*Quercus petraea* ssp. *polycarpa* (Shur) Soó, pedunculate oak (*Quercus pedunculata* Ehrh.), (*Quercus cerris* L.), (*Quercus frainetto* Ten.) are highly decorative too.

Paulownia tomentosa (Thunb.) Stend. – *Paulownia* was proved to be highly sensitive to frost and most of all to early freezing (Stănescu et al., 1997), but in the regions with summery climate and long seasons of vegetation (like in case of Oradea) the effects of the lower temperatures can be avoided..

It actively lives on fertile, profound soils with enough humidity. Its ornamental qualities are appreciated because of its abundance and the color of the flowers, like because of the large leaves.

Sorbus aucuparia L. – *the service tree*, manifests little pretensions when it goes about climate and soil.

Specie of ornamental interests, having a great outlook, beautiful leaves in autumn and colorful fruits, big flowers, etc., it can be used separately or in groups on the band from Calea Aradului, or Clujului, preferring the variation *fastigiata*.

Prunus cerasifera var. *pisardii* (Carr.) C.K. Schneid. (*P. pisardii* Carr., *P. cerasifera* var. *atropurpurea* Dipp.) – *the red mirobolam tree* is a not very pretentious tree and its is very frequent on the green spaces.

It is highly decorative with relative large leaves of red or red-purple color, pink flowers and red fruits.

Koelreuteria paniculata Laxm. – *koelreuteria* prefers climates without great amplitudes of temperature (as the case of the studied zone) and this way it can be planted to rich soils.

It captures attentions because of its yellow flowers, grouped in long panicles and trough its fruits – capsules, with reddish hulls and which are remaining for the winter.

Catalpa bignonioides Walt. (*Bignonia catalpa* L.) – *Catalpa* can be cultivated on rich, profound and airy soils.

It impresses through its leaves, flowers and big, interesting fruits which are remaining for the winter.

CONCLUSIONS

The arrangement of the separation bands of the traffic directions studied will be based on some principles with general character originating from the domain of landscaping architecture.

The selection of the species for these bands implies the knowledge of the landscaping character of the plants, of the biological character, of the ecological and functional necessities of these. It will be analyzed the favorability level of the main ecological factors for the species chosen for the arrangement of these bands.

The chosen species will present varieties with narrow pyramidal or columnar outlook to accommodate as much as possible to the landscape and to correspond as much as possible from the functional point of view.

Near these studied bands in Oradea more bands like these exist which must be arranged or rearranged. It is recommended to chose arborescence species, because these are corresponding better form the point of view of the landscape and these are having a larger covering surface.

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