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Research Article

PLANT GROUPS AS KEY FACILITIES LANDSCAPE DESIGN

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ABSTRACT

In the formation of landscape objects, protective and spatial organizing function of green spaces. Vegetable groupings are the main component in the spatial modeling using landscape design tools.

KEYWORDS

Plant groupings, climatic features, trees, shrubs, green spaces, plant group, favorable conditions.

Introduction

Creation of favorable conditions for the existence of green spaces has a positive effect on the urban environment, improving climate terrain features, adjusting humidity, air composition, wind mode, etc. (Fig. 1).

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Vegetation is divided into three types: trees, shrubs, herbaceous plants. Trees have a crown, trunk, root system. Shrubs and herbaceous plants have above-ground and underground parts. Trees, depending on the height, are divided into three groups: the first, second and third magnitude. Shrubs and herbaceous plants. From trees, shrubs and herbaceous plants a wide variety of groups are created [1].

MATERIALS AND METHODS

Plant groups are selected based on biological properties plants, their architectural and artistic characteristics.

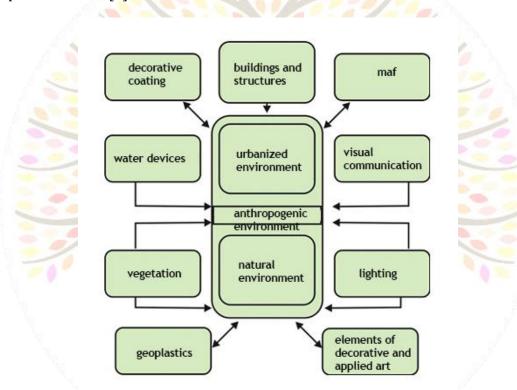


Figure 1. Means of landscape design and their main nomenclature elements

First of all, when selecting plants, the climatic region is taken into account, soil conditions, relation to air humidity, insolation, speed growth. Consideration should also be given biocompatibility plants. The general tendency of

mixing different species should be aims to create biosustainable plant communities neighboring plants do not have a detrimental effect on each other each other, but contribute to the growth and decorativeness of species located

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close. Biophysical mutual influence is reflected in exactingness plants to light, heat, food, moisture. Biochemical interaction occurs as a result of exposure to substances secreted by organs plants. So, for example, deciduous secretions of warty birch negatively affect the photosynthesis of Scotch pine and honeysuckle Tatar, but positive for English oak. Alsomicro-soil conditions must be taken into account. So, on dry soils pine successfully competes with birch, and birch excels in wet conditions, since pine is smaller than birch, demanding on moisture. In addition, harmful the influence of birch on pine stops if the distance between them increases to 5-6 m. When creating groupings, one should take into account the speed growth and longevity. In this regard, fast-growing species cannot be planted next to slow-growing and photophilous, it is impossible plant light-loving shrubs under the canopy of densely-blooded trees. The age characteristics of trees and shrubs should also be taken into account. So, red elderberry oppresses the oak at a young age, but later, when the oak overtake elderberry, promotes its growth. Promotes larch growth thuja western and green ash. Elm roots damage oak roots. Roots pine and oak change directions and diverge when they meet. In the young aged oak is oppressed by shrubs: white turf, honeysuckle Tatar and red elderberry. Excretions from red elderberry roots are dangerous for pines.

The following tree plantings are recommended according to biological compatibility:

With warty birch - Norway maple (on rich soils), linden small-leaved (on podzolized soils), Scotch pine (on carbonate). The distance between species is on average 4-7 m.

With common elm - Norway maple, small-leaved linden and larch. The distance between them and the elms is from 4 to 6 m.

With pedunculate oak - Norway maple, smallleaved linden, larch and warty birch. The distance between them is within 4-8 m, depending on the soil.

With common spruce - Norway maple, smallleaved linden and large-leaved. The distance between species is within 4-6 m.

With Norway maple - linden, larch, pedunculate oak, birch, spruce prickly and common, Scots pine, elm and many shrubs. The distance between trees is 4-6 m.

Most types of trees get along with small-leaved linden and shrubs.

With larch - linden, maples, pines, birches and spruces.

With Scotch pine - small-leaved linden, Norway maple, spruce ordinary at a distance of 4-7 m, oak pedunculate and red – at distance of 6-9 m.

Particular attention in the formation of landscape compositions it is necessary to pay attention to the ratio of tree and shrub plantations to insolation, as well as take into account the growth rate. Subject to map analysis insolation in well-lit

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areas of any territory should be design lightloving species (birch, oak, maple, ash, poplar, pine common, black alder, etc.).

Shade-tolerant plants should be placed in shady areas (horse chestnut and Tatar, spruce, linden, plane tree, hawthorn, honeysuckle, viburnum, etc.).

To achieve a quick decorative effect, you should design predominantly fast-growing green spaces: birch, elm, maple, weeping willow, green ash, prickly spruce, Scotch pine, acacia white, privet, hawthorn, elderberry, mock orange, honeysuckle, sucker, currant golden, etc. To design relief geoplastics, one should design plants with a developed root system in such areas, forming a large number of processes. Among these plants include: field maple, Tatar, yellow acacia, common hazel, cotoneaster, hawthorn, narrowleaved sucker, honey locust, etc.

When performing protective landscaping, it is recommended to apply the following tree and shrub species [5]:

- For noise protection maple, common elm, linden small-leaved, common spruce, Siberian larch, honeysuckle Tatar, yellow acacia, Siberian hawthorn:
- For gas protection maple, hazel, gledichia, gray and black poplar, Canadian thorn, white acacia, white mulberry, Cossack juniper, ordinary privet, etc.;
- For dust protection elm, white weeping willow, horse chestnut, maple silver, Tatar, field, holly, canadian poplar, poplar Bolle,

- white mulberry, green and common ash, yellow acacia, common privet, narrow-leaved sucker, Vann-Gutta spirea:
- For windproof landings and shading of the territory are selected plants with the most dense crown - horse chestnut, maple, spruce, pedunculate oak, small-leaved linden, etc.

When selecting plant groups, architectural and artistic properties of plants: height, crown shape and character foliage. First of all, it is necessary to take into account the contrast in height and shape crowns of various trees.

Trees are divided into the following groups according to their height:

- Trees of the first magnitude high (over 25 m): Siberian cedar, spruce Scots pine, English oak, maple holly, large-leaved linden;
- Trees of the second size medium (from 10 to 25 m): field maple, chestnut
- Horse, black alder, American ash, etc.:
- Trees of the third magnitude low (below 10 m): maple, crimson, willow,
- Common juniper, etc.

For decorative and compositional reasons, trees below 5 m high can be attributed to the same group with shrubs that have a height of 0.5 up to 5 m (bush amorpha, white derain, euonymus).

Shrubs in height can also be divided into three groups:

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- Shrubs of the first magnitude high (3-5m): hawthorn, Tatar maple, viburnum ordinary, etc:
- Shrubs of the second size medium (1-3m): privet, lilac, euonymus, Vann-Gutta spirea, etc;
- Shrubs of the third size low (0.5-1m): Japanese spirea, lavender and others.

Landscape compositions are formed according to the principle of contrast or nuance [2]. Plants are finally selected in landscape compositions taking biological, functional and account architectural and artistic requirements. When forming objects of landscape design, most often the following tree and shrub groupings are used: arrays, landscape groups, loners (tapeworms), avenue plantings, live hedges, vertical gardening, flower decoration.

Arrays - a combination of single-species or multispecies trees and shrubs growing over a large area. arrays like as a rule, have insulating and functions. used for protective are dismemberment of the territory, masking, creating a background for decorative accents and are selected from fast-growing species (maple holly, oaks, ash-trees, firs, pines). There are two types of arrays - simple and complex.

A simple array consists of trees of uniform height with common decorative features. Such an array can be made up of ash common, English and red oak, Scots pine, maple holly.

A complex array consists of trees of various heights with various decorative properties. The two-tier array consist of the following groupings:

birch in the first tier and spruce ordinary in the second; Scotch pine in the first tier and linden small-leaved in the second; pedunculate oak in the first tier and in the second - hornbeam common with an undergrowth of hazel, elder, euonymus. When calculating planting density in the array should be based on the fact that each instance must have conditions for free formation, i.e. trees must placed approximately 4-8 m apart.

Landscape group - an independent composition of trees and shrubs. There are woody, shrubby and mixed groups. At the composition of the group includes from 2-3 to 10-12 plants. The group may be contrasting or single-breed, dense or see-through. Wide grouping possibilities make them one of the main elements landscape compositions. The composition of the group depends on the nature of the soil, grass cover and can be clean, i.e., composed of a single breeds, and mixed - from several breeds. By way of distribution trees and the selection of species they are divided into openwork and dense. openwork groups most often formed from birch, maple. mulberry. etc. Dense groups predominantly made up of oak, horse chestnut and prickly spruce. It is recommended to enter an odd number of trees in the group and avoid exact chess placement. The distance between trees in groups at shallow material 1.5 ... 2 m and with large-age 3 ... 4 m and 5 ... 10 m. Optimal the number of trees in the group is 3.

A group of three trees can be a compositional center small space. It can be single-species birch) and heterogeneous (spruce,

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combinations spruce and birch, willow and poplar, etc.). Named groups are well perceived from all sides of the projected area, they can also accentuate the entrance to any site, for example a quiet rest area, a playground or a playground. The number 3 is established from the conditions of perception of this group from all points, in form is very compact and compositionally integral. These

qualities are saved for all variants with an odd number of instances - 3, 5, 7, 9, 11. Moreover, a group of 9 trees is theoretically defined as a limit group size. Thus, in any territory, the most landscape compositions of 3, 5, 7 and 9 trees are appropriate (Fig. 2) [3].

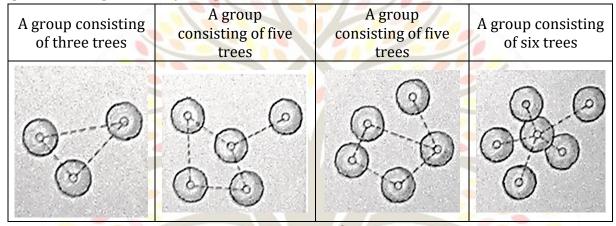


Figure 2. Arrangement of trees in a group

According to the composition of trees, these groups are also divided into pure and mixed (Figure 3) [4]. In pure small groups, there are usually several trees of the same species, these groups are distinguished by a clear silhouette.

Groups can be decorated with an edge of beautifully growing shrubs for creating a smooth transition to the lawn.

Groups are also divided into single-row and multi-row with the preservation the leading value of one of the breeds. Multi-row groups are created from trees of the 1st and 2nd size with the inclusion of shrubs and can be designed to protect against wind, noise, etc. [5]

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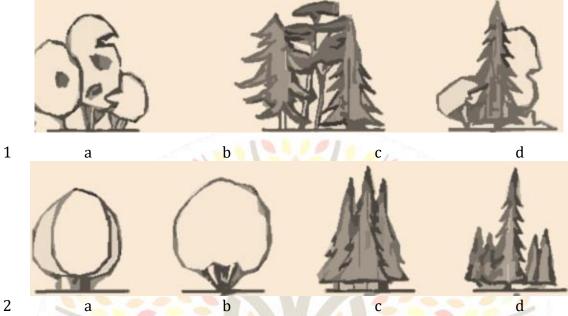


Figure 3. Classification of groups according to the composition of rocks: 1 pure groups: a, b - deciduous, c, d - coniferous; 2 - mixed groups: d deciduous, e - coniferous, w - mixed

Bouquet groups are very effective at recreational sites. Such groups of several trunks (ash, poplar, birch, linden, chestnut, oak) form a beautiful dense crown of large diameter and are natural parasol to protect from the sun. The round dance group can be used to fix a small space, creating a feeling its "isolation" in order to organize a small recreation area. False the group can be used to decorate unsightly objects (garbage bins, parking lots, etc.).

The shape of the group is one of the main decorative qualities. She is influences the nature of the landscape and depends on the selection of wood shrub plants and their arrangement. From plants with regular and irregular type of crowns are arranged groups with symmetrical and asymmetrical balance, spherical, peaked and

contrasting (single-tier simple and multi-tier complex). With appropriate arrangement of plants, the group changes shape depending on the species point (up to 3-5 options). Silhouette of large groups (with the participation of tall trees with pyramidal, columnar shape) is built with 2-3 verticals. The most interesting in landscape parks are asymmetric groups with greater height in relation to width and well-defined silhouette.

The architectonics of the group is determined by the type of branching, the thickness of the branches, the location of the foliage, the size and shape of the leaf blades of woody plants. There are groups with coarse, medium, fine and mixed structure. The background is most often trees that are close in structure. The arrangement of groups is determined by their purpose in the landscape.

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For increase depth perspective to the fore trees are planted with a rough structure, and on the back - with a thin one [5].

The colorfulness of a group depends on its component species and is very an important quality, on which the effect sometimes completely depends compositions. In the parks, there are monophonic groups (50-70%)both contrasting (30-35%) in color. The group color effect is usually calculated for different seasons of the year.

By appointment in the landscape stand out:

- Groups that are the main compositional center of the park paintings. They are placed in the so-called pockets, in clearings, complete the perspective, fix the turns of the paths, near the water;
- Groups that create a background for a structure or other accents:
- Groups as a transition from the array to open space;
- Groups that form park scenes «frames» delimiting space into separate views groups that create multifaceted perspectives;
- Groups at the edge of the array or curtains, highlighted as accents.

All the considered properties of tree groups must be taken into account when analysis and evaluation. In this case, as a rule, first of all, it is perceived the degree of brightness of the group, its size, height, shape, structure and colorfulness. In some cases, only one quality stands out in particular embossed and produces an effect - size, shape or color. At the complex impact of these qualities picturesqueness and expressiveness groups are growing.

Age of tree and shrub groups. The composition of rocks determines group longevity. L. Rubtsov[6] subdivides rocks by durability into 3 categories: small, medium and large. Trees of low durability begin to grow decrepit in the second half of the first century, for example, many poplar, birch, apple, pear. Medium longevity trees - from the second centuries of life, these include spruce, fir, maple. Trees big durability - starting from the third century, these include oak, ash, Manchurian walnut, larch.

CONCLUSION

When designing parks, it is necessary to take into account the duration life of the species that make up the groups. Various durability constituting a group of plants leads to the destruction of the structure intended artistic composition. Fastgrowing tree species are more likely to reach the climax of their age and stop growing, and slowgrowing - later. Adverse habitat conditions (soil compaction, trampling, lack of nutrients, etc.) lead to growth retardation, the appearance dry top, premature death of plantings, especially large the amount of nutrients needed during a period of enhanced growth (in 10-40 years), when the main mass of branches and leaves is formed.

Thus, when planting plants, you need to know the basic characteristics, ways of the neighborhood of plants, their compositional design.

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