Using coniferous plants in the landscape design of Absheron

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Abstract. In improving the environment, one of the main and decisive factors is landscaping. Among them, evergreen trees and shrubs play an important role. They form the basis for protecting the environment from industrial pollution and creating conditions for cultural recreation of the population. The protection of the biosphere from pollution that negatively affects human health, the protection of natural resources and their rational use in the modern era has acquired serious importance and, as a problem of national importance, worries the public. It was revealed that landscaping has a high dust-collecting capacity. Coniferous, evergreen trees and shrubs especially have this ability. Currently, in the gardens and parks of Baku there are a significant number of species and forms of plants that can be successfully used for further landscaping of the city. But this number of tree and shrub species that are stable under these conditions is absolutely insufficient for the growing area of green spaces every day. It is necessary to expand introduction work in this area, paying special attention to the introduction of new evergreen species and forms of trees and shrubs into culture. For this purpose, research work is being carried out in the ?Landscape architecture?? laboratory.

1 Introduction

Coniferous plants make up a large assortment among other plants and are widely used in landscape design. These plants include pinus, abies, cedrus, picea, juniperus, thuja, chamaecyparis, cupressus, biota and etc. In the winter season, many deciduous plants lose their decorative properties, conifers make up the landscape of the garden. In other seasons, conifers contrast with deciduous trees and shrubs and give the garden a sense of "permanence" at any time of the year. Pruning of plants such as pinus, abies, cedrus, picea, juniperus, thuja, chamaecyparis, cupressus, biota and etc. gives special beauty to parks and gardens due to the variety and accuracy of their forms.

Landscape architecture allows you to create an external environment favorable for recreation and life of the population not only in urban, but also in rural areas and cultural areas. In this case, environmental, functional, aesthetic and technical and economic requirements must be taken into account. The primary objects of landscape architecture are

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natural materials (relief, soil, reservoirs, vegetation), which form landscapes with the inclusion of anthropogenic components [1].

Evergreen plants remain highly decorative throughout the year, pleasing the eye with young light shoots in the spring, shading light deciduous plantings with their darker needles in the summer, contrasting with the surrounding trees and shrubs in yellow and orange shades in the fall, and in winter flaunting still green needles and dark cones on background of snow cover [2].

Young thuja, pine, blackberry, etc. some species of the genus do not survive the severe frosts of Absheron, but they regenerate themselves in spring and summer. In order to avoid damage, this type of coniferous plants should be cleared of snow during the winter. In Absheron, all conifers are propagated by seeds.

In the second half - end of the twentieth century. a new type of garden appears, different from the previous ones. It has absorbed both traditionalism and international influences. Glass, metal and synthetic materials found their way into the garden just as they found their way into other areas of visual art. A new tendency has emerged to impose a distinct human imprint on nature [3].

Golden, silver, bluish-blue forms of conifers have been known in ornamental gardening for a very long time. However, these unusual colors are of a different nature. In some cultivars they are constant, in others they can change with the seasons. And this is always taken into account by landscape architects.

2 Materials and Methods

In the scientific work, various types of coniferous trees and shrubs were studied using research materials. When conducting research, studying the taxonomic composition, origin of plants, creating compositions, methods of local and foreign scientists were used [1-4, 7, 8, 10].

3 Results and Discussion

Coniferous plants are widely used in landscaping Absheron. The fact that they are evergreen in winter and summer is convenient for their use in landscape design. Species belonging to the genera pine, cypress, fir and thuja regulate the sound mode better than deciduous ones (trees and shrubs).

Most conifers are considered evergreen because they do not shed their needle-shaped foliage every year. In fact, the young branches of these peculiar plants perform the function of leaves. In northern regions with frosty winters, only Larix changes its needles every year, remaining completely bare in winter. “Foliage” on coniferous plants lasts from 2 to 40 years. Most often in nature, the needles have a dark green color – this helps the needles absorb maximum light energy from the sun in high latitudes or in the shade of other trees [4].

*Cupressus* are widely grown along streets and in squares. The blue forms of *Picea* look beautiful in parks and gardens, on the boulevard. Cones of different sizes and shapes decorate coniferous plants.

Coniferous trees and shrubs have been present in gardens and estates from time immemorial. In summer they create the backdrop for a riot of flowers, while in winter they become the “solosists” of the garden and the main characters of the holidays. And to this day, despite all their familiarity, conifers are familiar strangers, capable of surprising and making the garden exquisitely luxurious [5].

Coniferous trees and shrubs are mainly used in single and group plantings, hedges and planted in rows along streets and squares.
To date, the species composition of woody plants is being actively studied both in individual cities and in regions as a whole. Decorative properties of surrounding plants the person is given special attention. Urban landscaping has undergone significant changes over its centuries-old history [6].

In Absheron, the demand for evergreen decorative plants in the construction of parks and gardens is increasing day by day. Especially in recent times, evergreen trees and shrubs are often found in greening around newly built highways and bridges in Baku. These plants are a permanent resident of the garden among the plants that shed their leaves in autumn and reflect its evergreen characteristics throughout the year. In modern times, the staggered placement of evergreen trees in urban planning and landscape design reflects the wide layout of those areas.

Since these trees and shrubs are evergreen in spring and winter seasons, their placement in various compositions makes the garden permanent. In recent years, evergreen trees and shrubs introduced to the Republic of Azerbaijan from different countries of the world are of special importance in the landscape architecture of the city [7].

Coniferous trees and shrubs will grow best in diffuse partial shade so that they are protected from direct sunlight during the hottest afternoon hours. The rest of the daylight hours they should be well lit by the sun. This is especially important for coniferous plants with colored needles. It will be brighter in the sun than in partial shade.

Coniferous plants are the best background for deciduous shrubs. Thus, light-loving plants form the first tier, and shade-tolerant plants are placed under their canopy. Plants that require acidic and alkaline soils, moisture-loving and drought-resistant cannot be nearby [8].

Some of the compositions studied in Absheron parks and gardens, in which coniferous plants are grown, are shown in Fig. 1.

![Fig. 1 Compositions.](image)

The taxonomic structure and origin of some conifers are presented in table 1.
<table>
<thead>
<tr>
<th>№</th>
<th>Family</th>
<th>Genus</th>
<th>Specie</th>
<th>Homeland</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pinaceae Lindl.</td>
<td>Pinus L.</td>
<td><em>Pinus eldarica</em> Medw.</td>
<td>Europe, Asia</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td><em>Pinus silvestris</em> L.</td>
<td>Scandinavia, Europe</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Abies Mill.</td>
<td><em>Abies nordmanniana</em> Spach.</td>
<td>Caucasus, Turkey</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Cedrus Mill.</td>
<td><em>Cedrus deodarata</em> Laws.</td>
<td>Algeria, Morocco</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td><em>Picea ajanensis</em> Fisch.</td>
<td>North America</td>
</tr>
<tr>
<td>6</td>
<td>Cupressaceae F.W. Neger</td>
<td>Juniperus L.</td>
<td><em>Juniperus communis</em> L.</td>
<td>Big and Little Caucasus</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td><em>Juniperus horizontalis</em> Moench.</td>
<td>North America</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Thuja (L.)</td>
<td><em>Thuja occidentalis</em> L.</td>
<td>Japan</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Chamaecyparis Spach.</td>
<td><em>Chamaecyparis nootkatensis</em> Spach.</td>
<td>North America</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td><em>Chamaecyparis lawsoniana</em> Parl.</td>
<td>Northern California</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Cupressus L.</td>
<td><em>Cupressus arizonica</em> Greene</td>
<td>California, Arizona, Mexico</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td><em>Cupressus leylandii</em> A.B.Jacks.</td>
<td>Netherlands</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td><em>Cupressus sempervirens</em> L.</td>
<td>Asia Minor, Mediterranean sea countries</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td><em>Cupressus for. pyramidalis</em></td>
<td>California</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td><em>Cupressus for. horizontalis</em></td>
<td>Crimea, Asia, Iran, Cyprus</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>Biota D.Don</td>
<td><em>Biota orientalis</em> Endl.</td>
<td>China, Manchuria</td>
</tr>
</tbody>
</table>
The Cupressaceae Bartlett family is one of the largest families of the Conifer class, including up to 20 genera and 145 species of evergreen trees and shrubs, which have a large number of decorative forms that differ in shape, density and texture of the crown, growth form, type, size and color of leaves [9].

One hectare of green space can store 10-40 tons of dust. This feature is more important in coniferous and some evergreen trees and shrubs. It has been determined that any noise makes a person tired, dulls the mind, reduces work activity and labor productivity, and increases ervousness. Multi-row green trees in the city are especially important in the fight against them [10].

The group of modern gymnosperms includes more than 700 species. Despite the relatively small number of species, they have conquered almost the entire globe: in the temperate latitudes of the Northern Hemisphere, over vast areas, they form coniferous forests called taiga [11].

In the territory of the Seaside National Park, forms of pruning of coniferous trees and shrubs have been studied:
1. *Cupressus* - square, rectangular, cone, tiered
2. *Picea* - conical
3. *Thuja* - spiral

Some forms of pruning of coniferous trees and shrubs are shown in fig. 2.

![Fig. 2. Pruning forms of plants.](image)

In recent times, conifers are widely used in newly built parks and gardens, roads and bridges in Baku city. In conifers, pines and cypresses are used to build live fences, thuja trees are used to build borders, rockeries, and flower beds.

Gardens and parks are associated with certain styles. Historically, they developed in close connection with philosophy, music, literature, architecture, and folk traditions. Through landscape art in every era, people have sought to express their attitude towards nature. In the stylistic direction of the appearance of gardens and parks, two main planning directions have emerged - regular and landscape [12].
Coniferous plants introduced in Absheron conditions are resistant to environmental factors and are the main types of plants widely used in greening. In Absheron, all conifers are propagated by seeds.

Garden plants that grow in the light shade of pine trees are mostly shade-tolerant. They were given a good start in life by planting them in large planting holes, after removing the “native” soil [13].

Most of the conifers are resistant to severe cold, and during the winter they are protected from snow by a natural cover. For the transient months of the year (October, November and April), the decorative importance of these plants is very important.

4 Conclusion

During the research work, the cultivation of coniferous plants in the conditions of Absheron was studied. It turned out that various species of the following genera are mainly grown: *Pinus* L., *Abies* Mill., *Cedrus* Mill., *Picea* Dietz., *Juniperus* L., *Thuja* (L.) Tourk., *Chamaecyparis* Spach., *Cupressus* L., *Biota* D. Don. Pruning forms have been studied in *Cupressus* - square, rectangular, cone, tiered, *Picea* - conical, *Thuja* - spiral. The origin of conifers is mainly Europe, Asia, Scandinavia, the Caucasus, Algeria, North America, Canada, Japan, Northern California, Crimea, Iran, Cyprus, Mexico, Morocco. In the compositions, coniferous plants are successfully combined with small architectural forms, for example, with sculptures, lanterns, benches, pots, baskets of plants, various figures of animals, gnomes. Coniferous plants in compositions are mainly planted in the middle, and low-growing shrubs and herbaceous plants are located along the edges. Green and blue coniferous plants look beautiful in compositions at all times of the year. Volatile substances, phytoncides, released by coniferous plants into the environment kill pathogenic microbes. To increase the range of coniferous plants used in landscaping Absheron, it is necessary to propagate the local species used and introduce new species from various regions of Azerbaijan and foreign countries to the conditions of Absheron. It is simply impossible to imagine any landscape design without these amazingly beautiful and useful plants with the resinous smell of pine needles, which also have healing properties.

As a result of research work, it was revealed that coniferous plants successfully adapt to local conditions; their propagation and cultivation in parks and gardens of Absheron is recommended.

Authors' contribution


References