

Comprehensive aesthetic assessment and optimization of green spaces in the landscape and decorative park of the Stavropol Botanical Garden

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Abstract. The work examines the stages of creation and the current state of the landscape and decorative park of the Stavropol Botanical Garden. The species composition, sanitary and aesthetic condition of growing plants was analyzed. A comprehensive assessment of the recreational potential of the territory is given, with the definition of the class of recreational value. The reasons for the deterioration of the condition and aesthetic qualities of plantings have been identified. Recommendations have been formed to prevent the destruction and loss of plant populations, as well as to improve their architectural, landscape and functional efficiency.

1 Introduction

The landscape and decorative park, also known as the park of introduced species, is located in the north-eastern part of the Stavropol Botanical Garden and has an area of 6.12 hectares. Most of these green spaces, including alleys, groups of trees and groves, were planted in two time periods: 1964-1965 and 1968-1971. The park was distinguished by its diverse plant ensembles, including an alley of silver maple, groves of walnut and black nuts, linden, hackberry, poplars, as well as simple groups of eastern beech, almond, warty birch and 66 mixed decorative groups, which included 75 species of trees and shrubby plants. 35 species of decorative perennials were planted in groups under the canopy of trees: Caucasian hellebore, Voronov's bird's-eye grass, snowdrop, Siberian scilla, beautiful colchicum, chickweed, wild garlic, etc.

These plantings were planted for scientific study of their growth and development of woody plant communities, educational and cognitive demonstration of these expositions to students, landscape and architectural organization of the territory that meets aesthetic requirements, improvement of the human environment, creation of recreational areas, conservation of endangered plant species and solutions to other social problems.

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The purpose of the work is to study, in the conditions of the city of Stavropol, the state of artificial plantings in the park of introduced species. The novelty lies in obtaining new data on the life of plants in new soil and climatic conditions and assessing the decorative value of the created plantings.

2 Materials and methods

All planting material used to create the park was produced in the botanical garden nurseries. The assessment of the current state of tree and shrub plantations was carried out on the basis of external signs using a point scale [1]. In this case, the following gradation of assessment of their condition was used:

- "Good". Woody plants are healthy, with a well-developed crown and branches, without any noticeable damage, with normal foliage.
- "Satisfactory". Woody plants are healthy in appearance, but with an incorrectly developing crown, with significant but not life-threatening damage or wounds, with a slightly bent trunk, with branches with dry shoots (up to 10...15%); shrubs with the presence of shoots.
- "Unsatisfactory". Woody plants that do not meet their functional purpose, with a deformed crown, with the presence of dry shoots and branches, with small and pale foliage, with a curved trunk, with signs of fungal diseases with infestation of pests that threaten their lives. Shrubs have growth, dry shoots, small foliage, and a depressed appearance;

The aesthetic state of vegetation in the surveyed area was determined according to the V.A. scale. Frolova [2]:

- "Highly aesthetic". The plant is located in a clearly identifiable type of landscape gardening and performs its functions; proportionally developed, exhibits aesthetic qualities corresponding to its species and current phenophase; there are no dry branches in the crown, or they are present in small quantities, resulting from natural growth processes; mechanical damage to the trunk and branches does not damage the appearance of the plant; there are no visible signs of disease damage, visible damage by pests does not cause negative emotions in the observer;
- "Aesthetically". The plants have the qualities of aesthetic plants, but the first signs of a decline in their aesthetic qualities are being observed. Near the plant, the presence of factors that can negatively affect its aesthetic condition over the next 1-3 years is recorded;
- "Reversibly (temporarily) unaesthetic". Plants do not fulfill their functions in the planting, the type of gardening plantings is not visible, there are deviations in development: trunk tilt, crown asymmetry, the number of dry branches is more than 30%, mechanical damage to the trunk or crown, visible traces of damage by pests and diseases;
- "Irreversibly unaesthetic" - the plant has completely lost its aesthetic qualities, the restoration of which is impossible

The recreational potential of the introduced plant park was assessed using the methodology of L.P. Rysina, S.L. Rysin [3].

3 Results

An alley of silver maple (*Acer saccharinum* L.) 190 meters long was planted in the fall of 1963, connecting the central part of the botanical garden with a birch forest. The establishment of a grove of common almonds (*Prunus dulcis* (Mill.) D.A. Webb,) in the

central part of the landscape and decorative park was started at the end of 1963 and completed in the spring of the following year, however, the experiment as a whole was unsuccessful, the plants suffered greatly from frost, the grove was eventually reduced to two groups of 5 and 16 plants and finally died in the winter of 1970.

In 1964, walnuts (*Juglans regia* L.) were planted on an area of 0.85 hectares in the amount of 485 seedlings, and in 1971 the plantings had to be thinned out. An attempt to create a grove of black walnut (*Juglans nigra* L.) was also generally unsuccessful. Planted in the spring of 1964, in 1978 it was almost completely uprooted, only a few trees were left that retained their decorative properties. In the fall of 1964, western hackberry (*Celtis occidentalis* L.) was planted on an area of 1.5 hectares.

In April 1965, a populetum was planted on an area of 0.4 g, which included 21 hybrid forms of poplar. The possibility of their use in creating decorative groups and performing curly haircuts was investigated. In the spring of 1965, Amur velvet (*Phellodendron amurense* Rupr.) was planted in the park in the amount of 238 pieces on an area of 1.6 hectares. In subsequent years, the group was significantly reduced and by 1970 only 142 seedlings remained in two smaller areas.

A group of Canadian cercis (*Cercis canadensis* L.) did not last long in the park, planted in May 1965 in the amount of 80 seedlings on an area of 0.4 hectares; in 1970 it was uprooted. In the spring of 1967, a linden grove of 286 plants.

In the winter of 1968, eastern beech (*Fagus orientalis* Lipsky) was planted; two groups were formed: 79 plants between the populetum and the linden grove, and 16 plants between the populetum and the decorative forest belt. During the same period, in a clearing bordered by populetum, linden and birch groves, groups of beech, hackberry and birch, 20 specimens of western thuja, 10 cypress trees, 4 hamata pines, 9 Banks pines, two Crimean pines, 6 ordinary spruces were planted in decorative groups, 1 sitka spruce. Not all of them took root; subsequently, one western thuja and 4 cypress trees fell out.

In spring and autumn, planting in this area continued. In the clearing appeared 100 specimens of oriental beech, 40 specimens of Thunberg barberries, 30 specimens of mock orange and Spirea Van Gutta, 20 specimens of chokeberry and forsythia, 15 specimens of Japanese quince, 10 specimens of small-fruited chokeberry, 6 species of lilacs and deutzia rough, 5 each of red oaks, almond, larch, bitter mountain ash, brilliant cotoneaster, red pear, Siberian barberry, Florida weigela, 3 specimens of Amur velvet and oriental plane tree, as well as 42 rose bushes of various varieties. In 1968-1969, herbaceous plants were planted alongside the trees and shrubs: irises, daisies, chailardia, alpine clover, rice grass and feather grass.

To the east of the planted clearing there is a second clearing, which occupied an area of about 5 hectares and is limited by a spruce alley. Plowing, harrowing, and planning were carried out in this area. After all the preparatory work, 16 decorative groups were planted, consisting of 36 species of trees and shrubs.

In 1970, thujas, junipers, deutzia, lilacs, mock orange, weigela, Thunberg barberry, and Sitka spruce were planted in the group. And in 1971 - decorative perennials, yucca, chamomile, irises, muscari, kniphofia, lychnis, perennial aster, erigeron, sedum, antericum, penstemon, asparagus.

By 1970, the plants in the created groups had not yet developed well enough and therefore did not produce full-fledged, dense spots [4]. However, preliminary assessment was given to some groups. As an example, three groups are characterized.

The first group, consisting of Crimean pine (2 pcs.), Thunberg barberry (18 pcs.), Vann-Gutta spirea (20 pcs.), and species irises planted against the backdrop of a birch grove. This group looks good in the spring, when white spirea flowers bloom, yellow barberries and blue irises bloom. In autumn, against the yellow background of birch leaves, the red fruits and leaves of barberry and the burgundy foliage of spirea look very good. In winter, the

greenery of pine trees against the background of white birch trunks is spectacular. In the summer, this group did not form a colored spot and therefore it was necessary to supplement it with flowering plants, for example, by planting lupine, chamomile or some other plants here.

The second group, consisting of Crimean pine (2 pcs.), Van Hutt's spirea (15 pcs.), Deutia rough (15 pcs.), weigela (20 pcs.), chokeberry (20 pcs.), Japanese quince (20 pcs. pcs.), chamomile, muscari, planted against the backdrop of a linden grove, decorative in all seasons of the year. In spring, forsythia, muscari, spirea, deutzia, chokeberry, weigela, and Japanese quince bloom; chamomile blooms in summer; in autumn the multi-colored leaves of deutia and the dark greenery of pine trees are especially beautiful; In winter, the greenery of pine needles combines beautifully with the different colors of the stems of shrubs from dark gray to light yellow. This group is basically already formed and needs only a small addition with summer flowering plants.

The third group of *Thuja occidentalis*, *gaillardia*, red oak, planted against the background of populetum, has significant disadvantages, since in the spring there is no color spot in it, and in the fall, red oak planted with tapeworm does not yet create a sufficiently significant spot, since it is still small in size. The winter green spot is, to a certain extent, created by *thujas*. Only in summer, thanks to the great colorfulness of *gaillardia*, this group stands out against the background of the entire edge. In general, we need to work on improving the group and give it a final assessment after the oaks and *thujas* reach large sizes.

In the process of studying the decorative qualities of the created groups, in 1972, the botanical garden staff came to the conclusion that it was necessary to remove some species. For example, in group No. 23, which is located near the main road, 2 *diervila* bushes grow in the foreground. Its foliage turns reddish-brown in autumn and for a short period (1.5-2 weeks) the bushes are decorative. The rest of the year, these bushes do not have any decorative value. Therefore, it is advisable to move them to a group located some distance from the main road, especially since they look better from afar than up close.

In group No. 28, the roses are planted close to the creeping juniper and greatly interfere with it. Similar negative qualities are already appearing in some other groups, despite the fact that the plants have not yet developed well enough.

In 1972, new groups were not created, but were planted with existing groups, trying to provide the groups with color spots in all seasons of the year. The following tree and shrub plants were planted: powdery rowan - 20 pcs., trifoliate *ptelea* - 10 pcs., bitter rowan - 10 pcs., chokeberry - 30 pcs., felt cherry - 30 pcs., holly mahonia - 30 pcs., Chinese St. John's wort - 40 pcs.

Compilation of the species composition of the groups was not completed. In some groups, some species were supposed to be removed due to the fact that they do not combine with other species; in others, on the contrary, add some color, creating a color scheme. The final plantings were to take place in 1973.

In the spring of 1974, a road was built along the border of the park of introduced species and vegetation formations of the Stavropol Territory with access to the promising location of the main entrance to the botanical garden. In 1974, a large amount of black soil was brought from the bypass road into the territory of the introduced park. The lawn was sowed late in the fall, due to a long drought in the fall, which did not allow this work to be done earlier.

In 1975, on the territory of the landscape and decorative park, an alley of red oak was planted along the border of the park along the future fence adjacent to the bypass road in the amount of 125 pieces, chokeberry - 300 pieces and horizontal cotoneaster - 300 pieces. The soil was prepared for sowing the lawn from the bypass road to the round forest and the latter was sown with perennial ryegrass. In addition, the lawn adjacent to the large birch

grove was sown with ryegrass, which will serve as a seed bed in 1976. Red fescue is also sown along the road to the future main entrance.

Before sowing the lawn, in the spring of 1975, groups were planted in this area: rowan ash - 7 pcs., false sycamore maple - 8 pcs., red oak - 21 pcs., bird cherry - 10 pcs., Arnold hawthorn - 10 pcs., spirea Van Gutta - 36 pcs., securinegi - 14 pcs., blood red currant - 31 pcs., mock orange - 25 pcs.

In 1976, on the territory of the landscape and decorative park, ephemeral geophytes were planted: beautiful saffron, mouse hyacinth, bellivalia, etc. along the lawn from the frame grove deep into the park to the central circle of chokeberry. The eastern spruce hedge was repaired and 20 plants were planted there. In group No. 17, the wolfberry, which has lost its decorative value, is replaced by 5 broom plants (*Cytisus scoparius* (L.) Link.).

In 1977, the following work was carried out on the territory of the landscape and decorative park: group No. 11, formerly consisting of flowering weigela, was replaced by a thuja of the western spiral form (5 pieces), all plants took root. In group No. 4, two Japanese larch trees and 7 pcs. thuja occidentalis. One plant of western thuja and larch have taken root. Group No. 36 added 15 pcs. thuja western f. golden, one plant did not take root. Groups No. 25, 26 are supplemented by four columnar-shaped plants of common juniper. Group 26a was replenished with three specimens of western thuja f. golden-tipped. Poplar Bolle is planted in group No. 28 - 3 pieces, in group No. 33 - 5 pieces. and from 11 pcs. A separate group has been created for this species, all plants have taken root.

Some of the Thunberg barberry plants were removed from some groups, because During the observations, it turned out that this species loses its decorative effect when thickened.

In 1978, plants were removed from the territory of the landscape park, which were severely damaged in the fall of 1976 and by the summer of 1978 either completely dried out or lost their decorative value. These include: pear - 2 pcs., Babylonian willow - 11 pcs., plum - 5 pcs., alder - 1 pc. In 1979, 8 blue spruces aged about 30-35 years were transplanted to the future main entrance. New plants were planted in the following groups to make them more attractive: No. 3 – 15 thuja plants, western form youthful golden-leaved; No. 18 – one Cossack juniper, variegated form; No. 22 – five specimens of thuja of the western form Govea; No. 26 – 2 specimens of columnar juniper; No. 28 – 5 specimens of mountain pine; No. 29 – 3 specimens of mountain pine; No. 32 – 5 specimens of western spiral-shaped thuja; No. 39 – 3 copies of Lawson cypress. In 2015, for the 70th anniversary of the Victory in the Second World War, an alley of 44 pieces was planted. We ate common sprouts and all the plants took root well. The results of assessing the condition of tree plantations and their decorative qualities are presented in Table 1.

Table 1. Condition of tree plantations in the landscape and decorative park.

Species name	Current state	Aesthetic condition
<i>Ailanthus altissima</i>	satisfactory	reversibly unaesthetic
<i>Prunus cerasifera</i>	unsatisfactory	reversibly unaesthetic
<i>Prunus nigra</i>	unsatisfactory	reversibly unaesthetic
<i>Amorpha fruticosa</i>	unsatisfactory	reversibly unaesthetic
<i>Berberis thunbergii</i>	unsatisfactory	reversibly unaesthetic
<i>Betula pendula</i>	good	highly aesthetically pleasing
<i>Betula pubescens</i>	good	highly aesthetically pleasing
<i>Crataegus laevigata</i>	satisfactory	reversibly unaesthetic
<i>Crataegus arnoldiana</i> Sarg.	satisfactory	reversibly unaesthetic
<i>Crataegus laevigata</i>	satisfactory	reversibly unaesthetic
<i>Fāgus orientālis</i>	good	highly aesthetically pleasing
<i>Prunus tomentosa</i>	unsatisfactory	reversibly unaesthetic
<i>Ginkgo biloba</i>	unsatisfactory	irreversibly aesthetically pleasing
<i>Carpinus betulus</i>	satisfactory	reversibly unaesthetic
<i>Pyrus caucasica</i>	satisfactory	aesthetically pleasing

Species name	Current state	Aesthetic condition
<i>Quercus hartwissiana</i>	good	aesthetically pleasing
<i>Quercus rubra</i>	good	aesthetically pleasing
<i>Quercus robur</i>	good	aesthetically pleasing
<i>Picea orientalis</i>	satisfactory	reversibly unaesthetic
<i>Picea abies</i> - alley	good	aesthetically pleasing
<i>Picea abies</i> 5 pieces. row	satisfactory	aesthetically pleasing
<i>Picea pūngens</i>	good	aesthetically pleasing
<i>Lonicera tatarica</i>	unsatisfactory	reversibly unaesthetic
<i>Labūnum anagyroides</i>	unsatisfactory	reversibly unaesthetic
<i>Labūnum anagyroides</i>	unsatisfactory	reversibly unaesthetic
<i>Salix caprea</i>	unsatisfactory	reversibly unaesthetic
<i>Salix pentandra</i>	unsatisfactory	reversibly unaesthetic
<i>Amelanchier canadensis</i>	unsatisfactory	reversibly unaesthetic
<i>Caragana arborescens</i>	unsatisfactory	reversibly unaesthetic
<i>Céltis caucásica</i>	good	reversibly unaesthetic
<i>Catalpa hybrida</i>	unsatisfactory	reversibly unaesthetic
<i>Castanea sativa</i>	satisfactory	aesthetically pleasing
<i>Cotoneaster lucidus</i>	unsatisfactory	reversibly unaesthetic
<i>Chamaecyparis lawsoniana</i> 'Alumii'	satisfactory	reversibly aesthetically pleasing
<i>Acer Trautvetteri</i>	satisfactory	aesthetically pleasing
<i>Acer ginnala</i>	satisfactory	reversibly unaesthetic
<i>Acer ginnala</i> Maxim.	satisfactory	reversibly unaesthetic
<i>Acer monspessulanum</i>	satisfactory	reversibly unaesthetic
<i>Acer platanoides</i>	satisfactory	aesthetically pleasing
<i>Acer campestre</i>	satisfactory	aesthetically pleasing
<i>Acer saccharinum</i>	unsatisfactory	reversibly unaesthetic
<i>Corylus avellana</i>	satisfactory	reversibly unaesthetic
<i>Tilia cordata</i>	satisfactory	reversibly unaesthetic
<i>Larix gmelinii</i>	satisfactory	reversibly unaesthetic
<i>Larix sibirica</i>	satisfactory	reversibly unaesthetic
<i>Juglans nigra</i>	satisfactory	reversibly unaesthetic
<i>Populus tremula</i>	satisfactory	irreversibly unaesthetic
<i>Prunus mahaleb</i> L.	satisfactory	reversibly unaesthetic
<i>Platanus orientalis</i>	unsatisfactory	irreversibly unaesthetic
<i>Ptelea trifoliata</i>	unsatisfactory	reversibly unaesthetic
<i>Physocarpus opulifolius</i>	unsatisfactory	reversibly unaesthetic
<i>Sorbus aria</i> Magnifica	satisfactory	reversibly unaesthetic
<i>Sorbus aucuparia</i>	unsatisfactory	reversibly unaesthetic
<i>Sorbus mougeotii</i>	satisfactory	reversibly unaesthetic
<i>Aronia melanocarpa</i>	satisfactory	reversibly unaesthetic
<i>Sorbus latifolia</i>	satisfactory	reversibly unaesthetic
<i>Syringa</i>	satisfactory	reversibly unaesthetic
<i>Syringa josikaea</i>	satisfactory	reversibly unaesthetic
<i>Syringa vulgaris</i>	satisfactory	reversibly unaesthetic
<i>Syringa vulgaris</i> "Buffon"	satisfactory	reversibly unaesthetic
<i>Syringa reflexa</i>	satisfactory	reversibly unaesthetic
<i>Symphoricarpos albus</i>	satisfactory	reversibly unaesthetic
<i>Pinus banksiana</i>	satisfactory	reversibly unaesthetic
<i>Pinus mugo</i>	satisfactory	reversibly unaesthetic
<i>Pinus nigra</i> subsp. <i>pallasiana</i>	good	highly aesthetically pleasing
<i>Pinus sylvestris</i>	good	aesthetically pleasing
<i>Pinus ponderosa</i>	good	aesthetically pleasing
<i>Pinus sylvestris</i>	good	aesthetically pleasing
<i>Pinus strobus</i>	good	aesthetically pleasing
<i>Spiraea</i> sp	unsatisfactory	reversibly unaesthetic
<i>Spiraea</i> L. sp1	unsatisfactory	reversibly unaesthetic
<i>Spiraea</i> L. sp2	unsatisfactory	reversibly unaesthetic
<i>Spiraea arguta</i>	unsatisfactory	reversibly unaesthetic
<i>Spiraea bumalda</i>	unsatisfactory	reversibly unaesthetic
<i>Spiraea</i> × <i>vanhouttei</i>	unsatisfactory	reversibly unaesthetic

Species name	Current state	Aesthetic condition
Spiraea lasiocarpa Kar.	unsatisfactory	reversibly unaesthetic
Spiraea hypericifolia	unsatisfactory	reversibly unaesthetic
Spiraea trilobata L.	unsatisfactory	reversibly unaesthetic
Rhus typhina L.	satisfactory	reversibly unaesthetic
Populus x canadensis	satisfactory	reversibly unaesthetic
Populus x canadensis	good	aesthetically pleasing
Populus nigra var. italica	satisfactory	reversibly unaesthetic
Thuja orientalis Aurea Nana 2 pcs.	satisfactory	reversibly unaesthetic
Thuja occidentalis	satisfactory	reversibly unaesthetic
Thuja occidentalis Golden Smaragd	satisfactory	reversibly unaesthetic
Thuja occidentalis Aureospicata	satisfactory	reversibly unaesthetic
Thuja occidentalis Fastigiata	satisfactory	reversibly unaesthetic
Forsythia x intermedia	satisfactory	reversibly unaesthetic
Diospyros kaki	satisfactory	aesthetically pleasing
Cercis canadensis	good	aesthetically pleasing
Philadelphus coronarius	satisfactory	reversibly unaesthetic
Philadelphus caucasicus	satisfactory	reversibly unaesthetic
Rosa rubiginosa	satisfactory	reversibly unaesthetic
Malus purpurea	unsatisfactory	reversibly unaesthetic
Fraxinus excelsior	satisfactory	reversibly unaesthetic

4 Discussion

We combined the entire set of criteria that determine the recreational attractiveness of the territory under consideration into three groups. First of all, these are factors characterizing the state of the forest stand, such as age, species composition, and the presence of undergrowth. The second group of factors is primarily due to anthropogenic impact: recreational disturbance, various types of pollution and noise. The third position includes geomorphological characteristics: soil texture, water regime, surface slope, etc. Each of the factors taken into account was given a score in accordance with the chosen methodology (Table 2).

Table 2. Comprehensive assessment of the recreational potential of a landscape and decorative park.

Indicators by groups					
Attractiveness	point	Comfort	point	Sustainability	point
age	3	relief	1	age	3
height	4	habitat humidity	3	water regime	3
decorativeness	2	availability	3	soil texture	3
litter	3	air pollution	2	thickness of the humus horizon	3
mosaic	2	presence of noise	1	turf power	4
species composition of the planting	2	presence of blood-sucking and disturbing insects	1	litter capacity	3
recreational impairment	3	distance to a reservoir of recreational value	0	presence of undergrowth	2
sanitary condition	2	condition of the road and path network	0	presence of undergrowth	3
breed mix	3			surface slope	4
tiering	3			resistance to trampling of the main rock	4
				stability of lower layers of vegetation	2
Total	27	Total	11	Total	34

Attractiveness coefficient $AC = 27/40 = 0.68$; comfort coefficient $CC = 11 / 32 = 0.34$; coefficient of resistance to recreational loads $CR = 34 / 40 = 0.85$.

Analysis of the data obtained allows us to classify the territory as Class III recreational value (RCV), that is, the recreational use of the landscape and decorative park should be carried out with certain restrictions.

In our opinion, the main reason for the deterioration of the condition and aesthetic quality of plantings is the increased planting density. Under conditions of light and nutrient deficiency, plants become elongated, their crowns acquire obvious asymmetry, the number of dry branches increases, and their decorative quality generally decreases. The grass cover is also thinned out and its uniformity is lost. The microclimate in such plantings also worsens, reducing the level of insolation and air exchange. In general, dense plantings lead to degradation of the volumetric-spatial structure in general and types of gardening plantings in particular.

The landscape and decorative park was laid out as a park of introduced plants, and not all planted plants successfully underwent acclimatization. Thus, some tree species could not withstand the cold period in new conditions. The almonds and black walnuts froze in the first winter after planting and soon fell out. Plane trees also do not tolerate frost well; there are many dry-topped plants in the plantings; annual growths often freeze slightly. Silver maple has a significant number of dry skeletal branches as a result of severe infestation by the semi-parasitic plant mistletoe.

At the same time, oriental beech, red oak, Crimean pine, and Canadian cercis feel great. The plants are healthy, with a well-developed crown and branches without any noticeable damage, with large, juicy green leaves. This year's growth is normal for these species and age. The appearance of the plantings is good. According to the decorative scale, the condition of the plants can be assessed as "excellent".

Surviving shrubs, such as Vann-Gutta spirea, crown mock orange, and intermediate forsythia, need rejuvenating pruning. Perennial flowering plants are completely replaced by perennial grasses and are practically not found in the park.

It should be noted that premature aging of introduced woody species is typical for arid areas. The Stavropol Botanical Garden is located in a zone of unstable moisture. Thus, even recognized decorative species, such as the common horse chestnut, in our conditions may not provide the desired decorative effect during the planned period of their existence.

5 Conclusion

The shape and composition of parklands depend on the growing conditions. The better they are, the richer the species composition and the more complex the planting form. To prevent the destruction and loss of plant populations, as well as to improve their architectural, landscape and functional efficiency, it is necessary to carry out significant measures to restore their vital activity. These activities include practical work on caring for plantings and carrying out a set of measures aimed at maintaining their condition. Some types of woody plants (silver birch, sugar maple) have already entered ripe and overripe age. In these created groups, regenerative felling is necessary in order to plant young plants of other valuable species, since planting seedlings of the same species within groups will be doomed to failure due to allopathic interaction between plants. Low visitation of the site by tourists leads to increased resistance to recreational loads.

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