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**PERSPECTIVE DIRECTIONS OF INCREASE OF EFFICIENCY
OF USE OF EVERGREENS IN THE DESIGN OF SCHOOL INTERIORS
OF VARIOUS FUNCTIONAL APPOINTMENTS
IN THE REPUBLIC OF BELARUS**

The studies have shown that the range of evergreens, which are being farmed in the interiors of school educational institutions of Minsk has mostly the same type. The diversity and compositional techniques which were used are also the same. All evergreens were created on the basis of their landscaping elements and as mostly have expressed the ideas and concepts. There was given the range of aesthetic evaluation elements of interior floral decoration. It is based on the analysis of modern domestic and foreign practice in the field of interior design. In the article there was suggested zoning interiors school educational institutions. Also there was formulated the modern approaches to the creation of interior elements of landscaping school educational institutions, including the principles of perspective assortment of evergreens. It would be useful to ensure their stable and decorative expressed phytosanitary activities; modern compositional techniques, perspective interiors for gardening school for various applications.

Key words: interior, school, planting of greenery, evergreens, ornamental composition, aesthetic evaluation.

Introduction. In today's world of technology and engineering people more and more suffer from a lack of the natural environment in their surroundings. Urban air space in addition to the usual dust often contains exhaust gases, an increased amount of chemicals, emitted by construction and other materials, as well as pathogens.

Phytodesign, as a scientific aspect, originated in the late 70s – early 80s XX. The concept of phytodesign and the theoretical basis of his applications was given by Grodzinsky in 1981 as “the use of plants to improve habitats in artificial systems” [1].

Biologically active volatile substances phytoncids produced by plants, able to kill or suppress the growth and development of microorganisms, play an important role not only in plant immunity and relationships of organisms in ecosystems, but also in the rehabilitation of human external environment. Use of phytorecreation for the prevention and treatment of infectious diseases is a special movement – medical phytodesign [2, 3].

The aim of the research is the development of promising areas of use of evergreens in planting of greenery in interior of school educational institutions of the Republic of Belarus, ensuring the realization of their aesthetic and sanitary functions. The objectives of the study are:

- the assessment of the current state of planting of greenery in interior of school educational institutions by the example of the city of Minsk;
- the development of principles of formation of long-term range of tropical and subtropical plants with high decorative qualities and pronounced sanitizing effect for planting of greenery in interior of school educational institutions;
- identification of the modern methods of forming the compositions of plants with tropical

and subtropical flora of long-term range and taking into account the functional zoning of the internal spaces of the school building.

Main part. Interiors school educational institutions differ from other interiors in the variety of its functions: training, recreation, transit, etc., that determines the characteristics of their formation.

The studies were conducted on the basis of the seven school educational institutions of Minsk: SEI “Secondary School No. 70 named after L. N. Gurtev”, SEI “Secondary school No. 85 of Minsk”, SEI “Gymnasium No. 11 of Minsk”, Resource education center for sustainable development SEI “Gymnasium 19 of Minsk”, SEI “Gymnasium No. 18 of Minsk”, SEI “College of Arts named after I. O. Akhremchik”, SEI “Secondary school No. 20 of Minsk”.

The research included the study of:

- the functional zoning of the internal spaces of the school building;
- the range used for the planting of evergreens;
- type of plant compositions with evergreens;
- the presence of compositional ideas, concepts and visual integrity of the composition;
- the use of small architectural forms, and other elements of improvement, as well as various types of containers for growing evergreens in planting of greenery in school interiors;
- aesthetic evaluation of the compositions in planting of greenery in school interiors according to our 5-point scale (see Table 1).

During the research it was found that evergreen plants grown in the interiors of schools belong to different groups: decorative and deciduous (60%), decorative and flowering (20%), ampelnye and climbing plants (10%), as well as cacti and other succulents (10%).

Table 1

The scale of the aesthetic assessment of elements of flower-decorative composition of interiors

The range and condition of evergreens, peculiarities of compositions with them	Point of aesthetic assessment
The range of plants is monotonous, many of them are severely damaged or killed; the compositions are placed randomly, there is no compositional idea or concept	1
The range of plants is variable, there is a strong inhibition of growth and development of plants, the signs of disease and damage are expressed to a large extent; there is no compositional idea or concept	2
The range of plants is not diverse enough, and is formed without regard to ecological and decorative features of the plants; the inhibition of growth of plant is observed, the signs of damage by diseases and pests are pronounced; composite idea and concept are poorly expressed, the composition looks inharmonious	3
The range of plant is diverse, but the ecological and decorative features of the plant is not fully taken into account in its selection; there is a slight of inhibition of the growth and development of plants; the composition formed in accordance with a certain idea, a concept, but it is not implemented to the full extent	4
The range of plants is diverse, plants are selected taking into account their ecological and decorative features; plants are healthy, they form a beautiful top; there is no damage of the plants caused by diseases and pests; there is a pronounced compositional plan, plant composition is complete and harmonious	5

The most common evergreens in planting of greenery in interior of Minsk schools are *Hibiscus rosa-sinensis*, *Dieffenbachia maculata*, *Dracaena marginata* and *deremensis*, *Saintpaulia ionantha*, *Spathiphyllum wallisii*, *Euphorbia lophogona*, *Scindapsus aureus*, *Chlorophytum comosum*.

Decorative flowering plants used in school educational institutions often have flowering periods transit between the seasons: winter and spring (*Hippeastrum hybrids*, *Clivia miniata*, *Schlumbergera truncatus*, etc.) and summer – autumn (*Spathiphyllum wallisii*, *Kalanchoe blossfeldiana*, *Nerium oleander*, etc.). The evergreens flowering for three seasons or year round are used less commonly. In general, most decorative flowering evergreen plants grown in the interiors of school educational institutions of Minsk reach the highest degree of decorativeness in the period from April to September. They range is dominated by white, pink, red, purple and yellow color of flowers.

Large-sized plants (more than 1 m high) – 10%, medium-sized plants (up to 1 m in height) – 30% and small-sized plants (up to 40 cm in height) – 60% are grown in the interiors of the surveyed school educational institutions

Plants in the interiors of schools are usually placed on the window sill (15%), in containers on the floor (40%), the metal stands (30%) and wood stands (10%), rarely (5%) – in hanging pots.

Clay pots (3%), ceramic pots with glaze (20%), plastic containers (70%), hanging pots (5%) and wooden containers (2%) are used for planting evergreens in school interiors Minsk.

In carrying out the research, functional zoning of the internal spaces of buildings of school educa-

tional institutions was developed, according to which the following zones can be singled out:

- entrance – represented by the lobby;
- administrative – includes teacher's and the principal's office;
- recreational – special area or separate areas intended for recreation;
- transit – corridors, staircases;
- training – group of rooms intended for non-physical, mental labor;
- cultural and educational work – the library, assembly hall, nature corners, winter gardens;
- public services – in closet, toilets, maintenance;
- catering – canteens, snack bars;
- health and fitness – recreational rooms, sports hall, fitness center, locker rooms.

Studies have shown that the most landscaped functional area in the interior of school educational institutions of Minsk is recreation zone – 50%, followed by training zone – 30% and administrative zone – 10%. Cultural and educational work – 5%, transit – 3% and input – 2% zones are characterized by the lowest degree of landscaping. In the design of the other functional areas of landscaping elements were not identified.

In the interior planting of greenery plants can be placed individually, in groups, in separate groups, in group placing of potted plants in decorative containers, indoor gardens, green walls, gardens in the bottle, florariums can also be created.

The interiors of the surveyed school educational institutions of Minsk the following composition of potted plants can be found: single plants (solitaire) – 15%, potting group – 30%, fragmented

group – 50%, group placing of potted plants in a decorative container – 5%.

The aesthetic assessment of the majority of surveyed plant compositions, especially in the interior of administrative, cultural, educational and sports and recreational areas of the school building, corresponded to 3 points on a 5-point scale. A lower score of aesthetic evaluation (2 points) there was received by a flower-decorative compositions in gardening of entrance zones in some school buildings and a higher score (4 points) was given to the decorating of areas, carrying out recreational and educational functions.

On the basis of the results promising areas of optimization of planting of greenery in the interior of the school building were identified.

The main criteria for selection of the range of evergreen plants for planting of greenery in the interiors of school educational institutions are the following:

- safety of plants in terms of toxicity of substances contained therein, as well as the safety of certain plant organs and their parts in contact with the skin, mucous membrane, in contact with the gastrointestinal tract of a human even in small quantities;

- expressed phytoncidal properties of evergreens;

- the variety of evergreens, including the signs determining their decorative effect (decorative and flowering, decorative deciduous, ampelnye and creepers, cacti and other succulents);

- expressive decorative qualities of plants in general, as well as their individual organs (vegetative and generative);

- the use of the range of decorative and flowering evergreens having different periods of flowering with a pronounced dominance of species of plants, flowering in spring and autumn and winter periods;

- the use of not only the species of evergreens, but also their shapes and varieties that will contribute to the individualization of appearance of different functional areas of the school building;

- selection and placement of evergreens in accordance with their requirements to the ecological factors of the environment;

- availability of evergreen plants in greenhouse farms and shopping centers on the territory of the Republic of Belarus and their relatively low cost;

- ease of reproduction and care of plants in the interiors of school educational institutions, their unpretentiousness in species;

- good possibilities of using plants to create different types of herbal compositions in the interiors and placing them in different functional areas of the interior space of the school building.

In developing the range of evergreens the results of the study of their phytoncide properties should be taken into account, including those received by employees of the SSI “Central Botanical Garden of NAS of Belarus” [4]. The following

plants have the most pronounced phytoncide properties: *Psidium cattleyanum*; lemon; *Myrtus communis*; *Buxus sempervirens*; *Ochrosia elliptica*; *Pelargonium odoratissimum*, *Pelargonium grandiflorum*, *Pelargonium grandiflorum hybridum* and *Pelargonium zonale*; *Rosmarin usofficinialis*; *Ficus benjamina*; *Chlorophytum comosum*; *Schefflera octophylla* and some other evergreens.

Among the plants that are not recommended to be grown in the school educational institutions the following should be mentioned: *Alocasia amazonica*; *Anthurium andraeanum* and *Anthurium scherzerianum*; *Aucuba japonica*; *Euonymus japonicus*; *Dieffenbachia maculata*; *Codiaeum variegatum*; *Senecio mikanioides*, *Senecio macroglossus*, *Senecio falcatus*; *Crinum mmorei*; *Euphorbia lophogona*, *Crinum amabile*; *Nerium oleander*; *Opuntia Bergeriana*; *Hedera helix* and some others.

Taking into account the functional zoning of school interiors suggested by us and the results of the analysis of modern approaches to the formation of flower-decorative compositions, we have developed recommendations for the use of long-range techniques for planting of greenery in various functional areas of the internal space of the school building (Table 2).

Table 2

Long-term techniques of the use of ever greens for plant in gin the school interior of different functional purpose

Functional zones of the internal space of school building	Compositional techniques of planting of greenery						
	Solitaire	Group	Fragmented group	Winter garden	Florarium	Vertical planting	Indoor garden
Administrative	+	+	+	-	-	+	+
Entrance	-	+	-	-	+	+	-
Cultural and educational	+	+	+	+	+	+	+
Public service	+	-	-	-	-	+	+
Catering	-	-	-	-	-	+	-
Recreational	+	+	+	+	+	+	+
Transit	-	-	-	-	-	+	-
Training	+	+	-	-	-	+	+
Health and fitness	-	+	-	-	-	+	-

Conclusion. Studies have shown that the range of evergreens grown in the interiors of school educational institutions of Minsk is not in diverse, compositional techniques used are usually of the same type, and landscaping elements created on the basis of this techniques often have no expressed ideas and concepts.

Based on the analysis of modern national and foreign practice in the field of planting of greenery in interiors principles of perspective range of evergreen plants that are characterized by stable and decorative expressed phytosanitary properties were proposed; modern approaches to the creation of

landscaping elements in the interiors of school educational institutions were developed; zoning of the internal spaces of school buildings, as well as the compositional techniques that can be used to design the interiors of school for various applications were suggested.

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