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Career Guidance Potential of Botanical Gardens Educational Programs (in the Context of the Sustainable Development Concept Implementation)

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ABSTRACT
The educational activity of botanical gardens is one of the most promising areas of their development – it is in demand among representatives of various age and social groups; however, its motivational target, content and organisational aspects require qualitative modernisation. This work aims to determine the potential of educational programs of Russian botanical gardens for career guidance and labour training at all levels of continuing education in the context of the sustainable development concept implementation. Within the framework of this work, the analysis of educational programs implemented in Russian botanical gardens in the target, content and organisational aspects is carried out.
Based on the results of the work done, it was determined that the reviewed programs of Russian botanical gardens in one way or another cover all age and social categories of potential visitors. At the same time, the content is aimed at attracting attention to biodiversity conservation, popularising the ideas of sustainable development, and career guidance, the primary development of labour functions. Nevertheless, the content of these programs and the activities of the participants included in them are more of an introductory nature, and the potential opportunities identified during the study for specialised training of schoolchildren at the stage of general education and professional orientation of students are not being implemented enough.

Keywords: *Botanical Garden, Career guidance, Educational programs, Educational environment, Sustainable development.*

1. INTRODUCTION

To date, there are more than 2,000 botanical gardens in the world, and the issue of unlocking their educational potential in the context of the sustainable development concept implementation does not lose its relevance [1]. In recent years, there has been a need to update the existing forms of educational activities of kindergartens in the direction of labour training and career guidance of the younger generation. Interested visitors demand the development of new programs that allow them to receive information about the contents of botanical collections and activity experience aimed at forming competencies in the field of sustainable development and conservation of biodiversity [2].

The majority of natural science teachers working based on general education schools point to the need to transform the time and content boundaries of educational classes and also expresses readiness to integrate the activities of educational and scientific institutions to solve the problems of a competence-based approach in education [3]. Even though pedagogical projects implemented by botanical gardens around the world confirm the above trend, educational tourism, particularly school excursion tourism, is currently a little-researched area [4]. Information about the work carried out in this direction based on botanical gardens infrequently appears in scientific publications; however, several examples of such projects have been found during the literature analysis over the past ten years.

Since 2010, the international project "Inquire" has been operating in European countries. One of the sites of Inquire is the Botanical Garden of the University of Coimbra (Portugal), whose staff developed an experimental course "The INQUIRE Project: Training in environmental sustainability and biodiversity". Its main goal is to teach teachers to use extracurricular educational resources to form the design and research competencies of school students, ensure the continuity of general and vocational education, and increase the prestige of the profession of a researcher. To date, this course is a full-fledged program for advanced training of teachers of geography, geology and biology [5]. Botanical Garden of Moscow State University "Apothecary garden" (Moscow) is also a partner of this project [6]

An interdisciplinary educational project is being developed at the Gullel Botanical Garden (Ethiopia), which includes programs that reveal the potential of the botanical garden in aspects of various subjects of the school cycle. The project covers eighteen thematic programs based on the integration of knowledge from several of these areas. The project's primary goal is to form professional knowledge, skills, and abilities necessary for the participants to build conscious relationships with the environment [7].

The Center for the Adaptation of Endangered Plants at the Botanical Garden of the National Autonomous University of Mexico (Mexico) offers its visitors the "Young parents by choice" program, in which students from 13 to 18 years old "curate" this or that rare plant and from time to time post relevant phenological observations on social networks [8].

The Botanical Garden at the University of Malaya (Malaysia) implements an integrative project "Rimba". The project's objectives are to support the environmental education of high school students and students and promote the ideas of sustainable development. In the organisational aspect, Rimba is a platform for organising design and research work in the botanical garden [9].

Nezahat Gokyigit Botanical Garden Botanical Garden (Istanbul, Turkey) offers its visitors a wide range of programs aimed at different age groups. For example, such a project as "Gardener Children Project, Useful Plants Project and Summer Camp Activities" is being implemented for schoolchildren, in which participants receive theoretical knowledge and practical gardening skills in the form of an educational camp. The course "Plant Drafting and Horticulture Courses" is designed for university students studying natural sciences. Its content involves an internship at the botanical garden and participation in the research work of its employees [10].

In Russian botanical gardens, the educational direction, although it does not have a pronounced systemic character, is developing no less actively. For example, based on the Botanical Garden, named after V.L. Komarov, several educational projects are being successfully implemented in St. Petersburg, one of which is the International Red Book. Its purpose is to familiarise participants with the activities of the International Union for Conservation of Nature (IUCN) and the key provisions of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) [6].

Employees of the Central Siberian Botanical Garden actively develop interaction problems between higher education and academic science students and take part as experts and jury members in environmental education events for schoolchildren [11].

Polar-Alpine Botanical Garden-Institute named after N.A. Avrorin regularly organises classes for students of general education and correctional educational institutions on several author's programs; since 2017, the Polar Yunnats research club has been operating on its basis for students of grades 6-8 [12].

2. RESEARCH METHODOLOGY

To study the target, content, and organisational components of educational programs based on Russia's botanical gardens, a survey was conducted among specialists of six botanical gardens actively developing this direction based on their institutions. In 2019-2020, employees of the Botanical garden of the Botanic Institute named after V.L. Komarov RAS (BIN RAS), Botanical Garden-Institute of the Far Eastern Branch of the Russian Academy of Sciences (FEB RAS botanical garden), Botanical Garden of Irkutsk State University (IGU botanical garden), Botanical Garden of Perm State University (PSU botanical garden), Central Siberian Botanical Garden of the Siberian Branch of the Russian Academy of Sciences (CSBS SB RAS), the Polar-Alpine Botanical Garden-Institute named after N.A. Avrorin of the Kola Scientific Center RAS) took part in the study. Thus, 57 educational programs were considered in the course of this study.

The questionnaires offered to respondents included the following thematic blocks:

– general information (the years of the beginning of the implementation of programs, their number and volume)

– study of the target aspect of educational programs (goals and objectives of programs)

– study of the organisational aspect of educational programs (the target audience of programs);

– the study of their content aspect (the main activities of program participants).

The survey was conducted in writing. Most of the questions were formulated considering one or more answer options; there were also questions in free form. The content of the questionnaire blocks aimed at studying the organisational and content aspects of the programs was developed based on the requirements of the current Federal State Educational Standards of primary and general education. The results were processed based on Microsoft Office Excel and Phyton applications.

3. RESEARCH RESULTS

To date, many botanical gardens implement programs of various thematic orientations on their basis.

According to respondents, in addition to the dissemination and popularisation of natural science knowledge, among the targets of such programs are also noted:

– drawing attention to the problem of biodiversity conservation;
– popularisation of sustainable development ideas;
– professional and labour orientation of the younger generation;
– increasing the prestige of the profession of researchers.

The results of a survey of employees of botanical gardens of Russia on the organisational aspect of implementing such programs are presented in Figure 1.

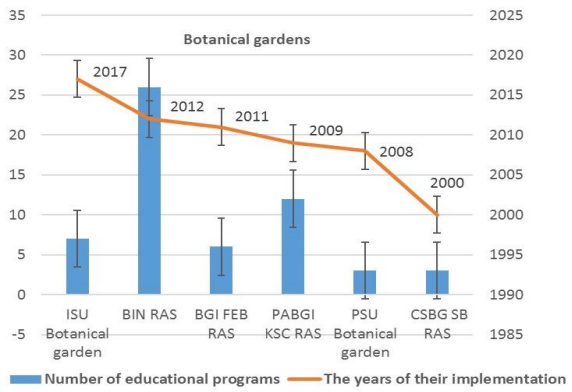

Figure 1 The number and years of the beginning of the implementation of educational programs in botanical gardens and their number.

As follows from Figure 1, the years of the beginning of the implementation of educational programs in botanical gardens vary from 2000 to 2017. In the total array of programs we consider, the most significant percentage falls on the share of the Botanical garden of the BIN RAS - 46%. The share of PABSI of the KSC RAS accounted for 21% of educational programs. Further, 12% - programs of the botanical garden of the ISU, 11% - BSI FEB RAS. The botanical gardens of PSU and CSBS RAS accounted for 5% in equal value.

The data analysis on the target audience of educational programs yielded the following results: the main array of participants are persons of primary and secondary school age. Work in programs for these categories was noted by 100% of respondents. Preschoolers are covered to a lesser extent – only 33% identified them. 67% of the survey participants indicated that they work in family programs. Programs for university students - 33%. 50% of respondents indicated working in programs with people with disabilities. Only 17% of respondents indicated programs for high school students and adults.

In the course of studying the content of the educational programs of botanical gardens by the types of activities of their participants, the following information was obtained (see Fig. 2)

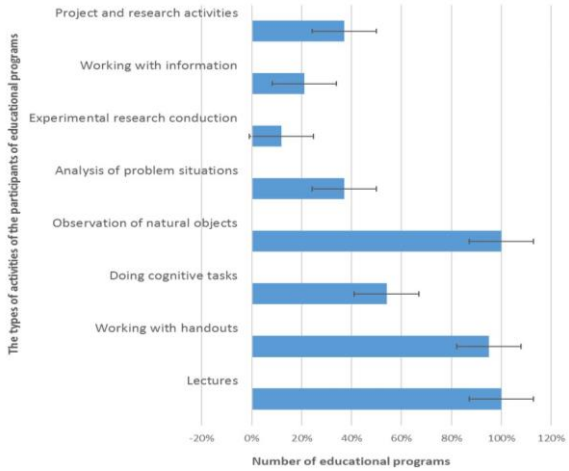

Figure 2 Types of activities of educational programs participants.

The participants' main activities are listening to program material (lectures), observing and determining the characteristic features and properties of natural objects in natural and/or laboratory conditions (involved in 100% of the cases considered). In second place in terms of frequency of use was working with handouts – this type of activity was included in 95% of programs. The share of solving cognitive situational tasks accounts for only 54% of programs. 37% includes the analysis of problem situations and design and research activities. 21% - work with specialised information sources. At the same time, only 12% of the programs involve the organisation and conduct of an experiment.

4. RESULTS DISCUSSION

According to the data obtained during the survey, employees of the Central Siberian Botanical Garden of the Siberian Branch of the Russian Academy of

Sciences (CSBS SB RAS Novosibirsk) have the most extended experience in this area – educational programs have been implemented on their basis since 2000. It is noteworthy that in other botanical gardens, the start of purposeful educational activities was again laid not earlier than the beginning of the 21st century.

Analysing data on the target audience of educational programs makes it possible to judge that these are mainly people of primary and secondary school age. Programs for these ages are implemented based on all participating botanical gardens. Preschoolers are covered to a lesser extent. A possible reason for this is the difficulties associated with organising field classes for this category of persons. An alternative to such programs is the family direction, in which more than two-thirds of our respondents work.

The organisation of work with persons with disabilities requires special psychological and pedagogical training of leading educational programs. The management of not every garden has the opportunity to create conditions for its passage by its employees, which is why this group is attracted by only half of our respondents.

The training of students based on botanical gardens involves close cooperation with their educational institutions to coordinate the content of the studied material. Perhaps it is for this reason that this category of visitors is covered only by botanical gardens at universities.

The share of programs for high school students turned out to be relatively small. In this case, the reason may be related to the peculiarities of existing school programs – students continue to study biology at the primary and profile levels in grades 10-11; therefore, this category has a more significant heterogeneity in the level of basic training. Also, the adult population turned out to be a less popular category among the survey participants. To develop the career guidance potential of botanical gardens, it is necessary to pay special attention to this problem since both of these categories of citizens are its target audience.

Based on the results of studying the content of educational programs of botanical gardens, it turned out that the most frequent types of activities for inclusion in programs specific to botanical gardens are absolutely not specific to their educational environment: lectures, observation and determination of characteristic features and properties of natural objects, work with handouts. As a rule, their organisation and implementation do not require the full involvement of the material, technical and human resources that the botanical garden has, and with a bit of adaptation, the process of implementing these programs can be transferred entirely to the educational institution. According to respondents, this is done in some cases, initiated, for example, by transport problems or restrictions associated with a new coronavirus infection. The frequency of the activities used, for the implementation of which, on the contrary, the botanical garden resource base is needed, can be assessed as low for the programs we have considered.

5. CONCLUSIONS

The study results will allow us to draw the following conclusions on the problem of the development of career guidance opportunities of educational programs of botanical gardens of Russia in the context of implementing the concept of sustainable development.

The current stage of the development of the educational potential of Russian botanical gardens is associated with the development of new specialised programs. Their content is aimed not only at spreading and popularising natural science knowledge but also at drawing attention to the problem of biodiversity conservation, popularising the ideas of sustainable development, career guidance, the primary development of labour functions and increasing the prestige of professions related to the study of flora, the maintenance of artificial ecosystems, landscape architecture and green construction. This opens up great opportunities for the integration of activities, excellent opportunities for the integration of the activities of various institutions based on botanical gardens, according to the basic provisions of the concept of sustainable development.

Educational programs implemented based on modern Russian botanical gardens are more of an introductory nature. Nevertheless, when updating their content from the standpoint of environmental, competence and problem approach, and the inclusion of design and research and experimental activities, the vector of their further development may be more directed towards labour training and professional orientation.

AUTHOR'S CONTRIBUTION

Ischenko Anastasia Vladimirovna - preparation of a literary review, data collection and analysis, preparation of text and graphic data of the article.

Mitina Elena Garisonovna - scientific guidance, formulation of the research problem, research concept, critical analysis and revision of the text.

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