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THE ROLE OF BOTANICAL GARDENS IN ARMENIA IN THE TRAINING OF TOURISM PROFESSIONALS

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Botanical gardens are recognized not only as centers for biodiversity conservation and recreation but also as significant educational and scientific platforms with considerable potential for the training of tourism professionals. The aim of this study is to examine the role of botanical gardens in tourism education by analyzing the prerequisites and opportunities for their effective integration into educational programs. The study explores the diversity of flora and fauna in the botanical gardens of the Republic of Armenia and highlights the importance of their study and observation in the professional training of future tourism specialists. It further substantiates the essential role of botanical gardens in enhancing students' ecological and environmental knowledge, as well as in developing their professional competencies, thereby contributing to the development of sustainable tourism. The integration of botanical gardens into educational curricula enhances the effectiveness of the learning process while fostering the preparation of competitive professionals, who demonstrate environmental responsibility and possess a solid foundation of knowledge about the natural environment.

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Introduction. In the context of tourism development, the training of highly qualified professionals in higher education institutions necessitates the integration of innovative and experiential learning approaches. Traditional classroom-based learning is increasingly insufficient to address the evolving demands of the tourism sector, particularly in areas related to sustainability, environmental awareness and experience economy. Consequently, the importance of introducing alternative educational environments into the tourism education system is becoming increasingly significant.

Botanical gardens constitute an important educational environment that supports the development of professional competencies among students in tourism

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sector. As multifunctional institutions integrating scientific research, environmental protection, education and public recreation, botanical gardens serve as valuable platforms for the practical application of tourism professionals' theoretical knowledge. They provide students with the opportunity to directly interact with nature, thereby improving both their environmental knowledge and practical skills.

The integration of botanical gardens into tourism education can be regarded as a strategic approach to enhancing the quality of professional training. By linking theoretical knowledge with experiential learning, these institutions contribute to the preparation of responsible and environmentally conscious tourism professionals capable of responding to the contemporary challenges in the sector.

Materials and Methods. The study employed methods of professional literature review, analysis, synthesis, comparison and case study.

Observations of the fauna of the Yerevan Botanical Garden were carried out during zoological excursions conducted throughout 2025–2026 in accordance with accepted methodologies [1]. The species composition of the flora was studied through the analysis of relevant literature and direct observations conducted in the garden [2–6]. The taxonomic classification of animals and plants was determined using appropriate identification guides [7–12].

Results and Discussion. Botanical gardens have evolved and developed over the centuries, gradually transforming from simple collections of medicinal plants into multifunctional scientific, educational and research centers. Their historical evolution indicates the increasing depth of human–nature relationships and the growing interest in botanical gardens.

The first attempts to create gardens and grow plants date back to Ancient Egypt and Mesopotamia, around 3000 BC. The Romans also tried to engage in gardening, in particular, to grow plants for medicinal purposes. Monks used plants both in religious ceremonies and for medicinal purposes. The first monastic garden was created in the 8th century, which was a model for gardens that appeared in the 16th century. However, those gardens had no scientific basis meaning that they were not botanical gardens in the true sense of the word [13]. The first scientific botanical gardens were created in Italy in the 16th and 17th centuries. The first garden was created at the University of Pisa by Luca Gini in 1543, then in Padua, Florence and elsewhere. These gardens were created for the scientific study of medicinal plants [14]. Over the past 50 years, botanical gardens have gained greater recognition and today, according to the Botanical Gardens Conservation International, there are about 1775 botanical gardens and arboreta in 148 countries around the world [15].

A number of botanical gardens around the world, in cooperation with higher education institutions or tourism organizations, offer educational programs specifically for future tourism professionals. Among them are the Singapore Botanical Garden, the Ljubljana Botanical Garden, the New York Botanical Garden, etc.

In particular, the Singapore Botanic Gardens is running “Social and Cultural Landscape” vocational education program in partnership with the Singapore Tour Guides Association. The aim of this educational program is to understand how the Singapore Botanic Gardens were inscribed on the UNESCO World Heritage List [16], becoming the first and only tropical botanical garden on the list, as well as to identify and utilize relevant information during tours in order to enhance the visitor experience.

For students specializing in tourism, this acts as a platform for ‘tourism resource valorization’, teaching them how to use the biological history of an area to build a national brand and manage high visitor flows without harming ecosystems [17].

In collaboration with the University of Ljubljana and the Botanical Garden, students of the Master’s Program in Sustainable Tourism Management are engaged in field projects, in which botanical gardens are conceptualized as cultural and scientific products. They analyze the “experience economy” of gardens, assessing how sensory elements (soundscape, tranquility, visual aesthetics) influence visitor loyalty and satisfaction. This practical experience allows students to design “green” [14].

The “Explainer” and “Guide” educational programs implemented at the New York Botanical Garden are based on museum education approaches. Students are trained in audience engagement techniques, learn to adapt storytelling to diverse visitor segments, ranging from international tourists to corporate groups, and acquire the soft skills necessary for leadership within the hospitality industry [18].

In the Law of the Republic of Armenia on Flora, a botanical garden is defined as a scientific, research, educational, and cultural institution where living collections representing the diversity of global flora are created and studied [19]. In this regard, botanical gardens have four main functions: research, environmental, recreational and educational [20]. At present, the implementation of environmental education and the enhancement of environmental awareness are regarded as among the most important functions of botanical gardens [21].

Botanical gardens in the RA can also serve as important educational centers, and the targeted utilization of their potential can contribute to the implementation of educational programs, developing the visitors’ ecological awareness and enabling students to gain practical experience in the fields of environmental protection and tourism. In this context, three botanical gardens of Armenia are considered: the Yerevan, Sevan and Vanadzor Botanical Gardens of the Institute of Botany of the Republic of Armenia.

The Yerevan Botanical Garden was founded in 1935 on an area of more than 100 *ha* in the semi-desert zone of the Northeastern highlands of Yerevan. The garden is located at an average altitude of 1200–1250 *m* above sea level. The climate is strongly continental and arid, with an absolute maximum of 41°C and an absolute minimum of 30°C. The average annual air temperature is 11°C. Winters are characterized by severe conditions, lasting up to four months, with unstable snow cover that is sometimes absent. Summers are hot, with very low relative humidity. Annual precipitation amounts to 350–400 *mm*, most of which falls in spring, autumn and winter. The soils are alkaline, belonging to brown and semi-desert types [22].

The Yerevan Botanical Garden is an institution of scientific, environmental, educational and recreational significance, the main objective of which is the introduction of highly ornamental and economically valuable plant species from different phytogeographical regions of the planet, the establishment of living collections, the study of their adaptation to new ecological conditions and the introduction of the most adapted species into the landscaping of cities and settlements. One of the primary tasks of the Yerevan Botanical Garden is the promotion of environmental education and the enhancement of public awareness of Armenia’s rich biodiversity.

The Ecoepicenter and the Paleobotanical Museum of the A. Takhtajyan Institute of Botany of the Republic of Armenia, situated within the botanical garden, constitute important scientific and educational resources. The Ecoepicenter functions as both a public and a research center. It presents plant species representing different phytogeographical zones of Armenia. In addition, as part of the Department of Conservation of Genetic Resources of the Flora of Armenia, the Ecoepicenter serves as an experimental site for cultivating plants obtained from seeds as well as through tissue culture techniques developed in the Department's laboratories. The Paleobotanical Museum houses approximately 30 000 specimens of fossil plants and animals from Armenia, the most significant of which are displayed or intended for inclusion in future exhibitions. In addition to fossilized plant imprints and remains, the museum also exhibits numerous paleozoological specimens from Armenia and abroad, among which the bones of ancient elephants, bison horns, and fossilized dinosaur eggs are of particular scientific interest. The first floor of the museum presents photographic displays of plant species representing all major groups of the modern flora of Armenia.

The assortment of plant species introduced and studied under both indoor and outdoor conditions during the existence of the Yerevan Botanical Garden comprises more than 7 000 species, forms and varieties. The Botanical Garden is also notable for its faunal diversity; in particular, 54 bird species have been recorded within its territory, 16 of which are nesting species, 13 are nesting-migratory, 9 are wintering and 9 are migratory. An additional seven species are occasionally observed in the area during migration periods. Among the birds found in the Botanical Garden, the Levant sparrowhawk (*Tachyspiza brevipes*), European roller (*Coracias garrulus*) and the semi-collared flycatcher (*Ficedula semitorquata*) are included in the Red Book of Animals of the Republic of Armenia, and the woodchat shrike (*Lanius senator*) is also registered in the Red List of the International Union for Conservation of Nature (IUCN) [23].

Among other vertebrate animals, approximately 15 mammal species are recorded in the botanical garden, including the red fox (*Vulpes vulpes*), the Caucasian squirrel (*Sciurus anomalus*), the forest dormouse (*Dryomys nitedula*), several species belonging to the family Muridae, the Southern white-breasted hedgehog (*Erinaceus concolor*), and two to three species belonging to the family Soricidae. Among the reptiles, the coin-marked snake (*Hemorrhois nummifer*), the Lebetine viper (*Macrovipera lebetinus*), the Caucasus emerald lizard (*Lacerta strigata*), the European legless lizard (*Pseudopus apodus*) are found in the area. The Ecoepicenter of the garden is home to Greek tortoises (*Testudo graeca*), which are registered in the Red Book of Animals of the Republic of Armenia [24]. The artificial ponds of the Ecoepicenter are home to Prussian carp (*Carassius gibelio*), goldfish (*Carassius auratus*) and Koi (the colored variants of common carp) (*Cyprinus carpio*).

The current territory of the Botanical Garden is characterized by a high diversity of arthropod fauna (Arthropoda). In particular, representatives of the orders Coleoptera, Lepidoptera, Hymenoptera, Odonata, Orthoptera, Hemiptera, Diptera, Mantodea, Neuroptera, Blattodea and Homoptera, as well as Chilopoda, Opiliones, Scorpiones and Aranei are recorded in the area, with the total number of species

estimated at approximately 1000. In addition, the Garden hosts numerous species belonging to other invertebrate phyla, including Mollusca, Annelida, and Nematoda, as well as numerous species representing other taxa of invertebrate animals. Overall, the composition of animal species within the botanical garden is not yet fully clarified and requires further research efforts.

The Yerevan Botanical Garden offers a range of eco-educational programs, including herbarium, composting, Young Naturalist, paleobotanical, and horticultural workshops; however, these are primarily designed for schoolchildren. Only the composting and paleobotanical workshops are specifically intended for university students.

The Yerevan Botanical Garden has significant eco-educational potential for undergraduate students majoring in tourism at various higher education institutions. Due to its accessible location, it can serve as a non-traditional educational environment for the delivery of professional tourism courses, such as “Tourism and Environment”, “Ecotourism Planning and Management”, “Application of GIS in Tourism”, “Tourism Resources of RA” and others. Moreover, the garden may function as a platform for scientific research activities, contributing to the enhancement of students’ theoretical knowledge and practical skills [25].

The Botanical Garden can serve as an important platform for experiential learning. It provides students with opportunities to integrate theoretical knowledge with practical experience through the design and implementation of excursion programs and the development of new tourism products. This experience contributes to the enhancement of students’ professional competencies and the formation of the skills required for sectoral practice.

In general, research activities at the Yerevan Botanical Garden are focused on three main areas: dendrology, floriculture and the flora of Armenia. These fields support the conservation, study, and sustainable management of botanical collections. Among them, the sections dedicated to Caucasian and Crimean dendroflora, as well as Armenian flora, are of particular importance in the context of ecological education for future tourism professionals.

The Armenian flora exposition occupies an area of approximately 1.8 *ha*. It contains numerous valuable species of trees, shrubs, and herbaceous plants from different regions of Armenia. These include Common hop (*Humulus lupulus*), Litwinow birch (*Betula litwinowii*), Tamamshyan pear (*Pyrus tamamschianae*), Willow-leaf pear (*Pyrus salicifolia*), Euphrates poplar (*Populus euphratica*), Elegant Iris (*Iris elegantissima*), white bryony (*Bryonia alba*), St John’s wort (*Hypericum perforatum*), Adam’s silvery crocus (*Crocus adamii*) and many other species.

The Caucasian and Crimean arboretum area occupies approximately 7 *ha*. Among the species cultivated in this area, particular attention is given to the Persian ironwood (*Parrotia persica*), whose natural distribution is confined to the Lankaran Region and the forests of Northern Iran. This area also includes species such as Chestnut-leaved oak (*Quercus castaneifolia*), Caucasian hackberry (*Celtis caucasica*), Caucasian pear (*Pyrus caucasica*) and others. The garden also includes plant plots established with species introduced from different phytogeographical regions of the Earth.

The North American geographic area (approximately 4 ha) includes species such as Eastern Black walnut (*Juglans nigra*), Large-thorn hawthorn (*Crataegus macracantha*), Oregon grape (*Mahonia aquifolium*), Northern white cedar (*Thuja occidentalis*), Common snowberry (*Symphoricarpos albus*), Eastern red cedar (*Juniperus virginiana*) and others.

The European and Siberian arboretum area (approximately 3 ha) is notable for its tall and economically valuable species, including English oak (*Quercus robur*), European horse chestnut (*Aesculus hippocastanum*), Judas tree (*Cercis siliquastrum*), Manna ash (*Fraxinus ornus*), Siberian larch (*Larix sibirica*), Scots pine (*Pinus sylvestris*) and others.

The East Asian arboretum area (approximately 3.5 ha) is represented by species such as Manchurian walnut (*Juglans mandshurica*), Amur grape (*Vitis amurensis*), Oriental arborvitae (*Platycladus orientalis*), Japanese honeysuckle (*Lonicera japonica*), Japanese pagoda tree (*Styphnolobium japonicum*), Paper mulberry (*Broussonetia papyrifera*), Maidenhair tree (*Ginkgo biloba*), Dawn redwood (*Metasequoia glyptostroboides*) and others [26].

Visits to the above-mentioned areas can significantly contribute to the acquisition of professional knowledge by tour guides regarding the flora of Armenia and the neighboring regions.

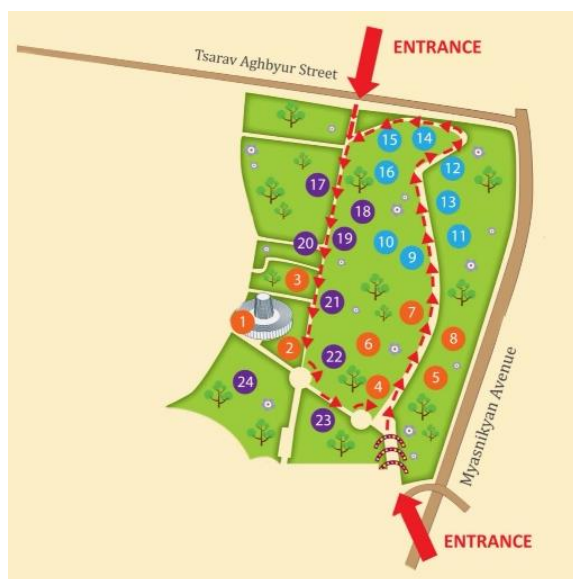


Fig. 1. Botanical Trail of the Yerevan Botanical Garden.

Source: <http://botany.am>

- 1 – Ecoepicenter; Botanical Museum;
- 2 – Subtropical Plants Greenhouse;
- 3 – Linden Alley;
- 4 – Caucasian Zelkova;
- 5 – Honey Locust Alley;
- 6 – Chestnut-Leaved Oak Alley;
- 7 – Caucasian and Crimean Dendroflora Exposition;
- 8 – Osage Orange Alley;
- 9 – North American Dendroflora Exposition;
- 10 – Common Oak Alley;
- 11 – Horse Chestnut Alley;
- 12 – Euro-Siberian Dendroflora Exposition;
- 13 – Dawn Redwood;
- 14 – White Poplar Alley;
- 15 – East Asian Dendroflora Exposition;
- 16 – Common Oak Alley;
- 17 – Eastern Cottonwood;
- 19 – Virginian Juniper Grove;
- 20 – Nursery;

21 – Maidenhair Tree; 22 – Rosarium; 23 – Lilac Collection; 24 – Armenian Flora Exposition.

The Vanadzor branch of the Botanical Garden of the Institute of Botany of the National Academy of Sciences of the Republic of Armenia is located on the Southern outskirts of the city, within the canyon of the Vanadzor River, and occupies an area of approximately 14 ha. The garden was established in 1936.

The favorable soil and climatic conditions of Vanadzor have facilitated the relatively intensive introduction of plant species. The climate is temperate, forest type, with a mean annual air temperature of 7.3°C. The absolute minimum temperature is

–31°C, while the absolute maximum is +36°C. Snow cover persists for approximately 3.5–4 months, and the vegetation period lasts 190–205 days. The average annual precipitation is 618 mm, and relative humidity during the vegetation period ranges from 60% to 70%. The altitude ranges from 1,400 to 1,500 m a.s.l. [22].

The forest zone adjacent to the scientific section of the garden is dominated by species such as Scots pine (*Pinus sylvestris*), Caucasian oak (*Quercus macranthera*), common hornbeam (*Carpinus betulus*), Oriental beech (*Fagus orientalis*), small-leaved linden (*Tilia cordata*), European ash (*Fraxinus excelsior*), field maple (*Acer campestre*), Norway maple (*Acer platanoides*), Trautvetter's maple (*Acer trautvetteri*), Caucasus apple (*Malus orientalis*), Caucasian pear (*Pyrus caucasica*), Persian walnut (*Juglans regia*), cherry plum (*Prunus divaricata*), Bieberstein's currant (*Ribes biebersteinii*), sticky sage (*Salvia glutinosa*) etc.

The Sevan branch of the Botanical Garden of the Institute of Botany of the RA NAS was founded in 1944 on an area of 4 ha. Its primary objective was to expand the diversity of cultivated plant species adapted to high-altitude conditions. The garden is situated on the outskirts of Sevan, within the Sevan Basin, at an elevation of 1920–1950 m a.s.l. with soil and climatic conditions that are quite characteristic of the corresponding high-altitude ecological zone of the Sevan Basin. The climate of the Sevan Basin is highly continental. Winters last approximately five months and are severe, characterized by stable and dense snow cover, strong winds, and an absence of thaw periods. Spring is prolonged, with a gradual increase in temperature, typically accompanied by frequent rainfall and occasional hail. Summers are moderately warm; while generally sunny, the latter half of the season tends to be dry. Autumn is relatively long and warm, with predominantly dry weather conditions. The average annual air temperature is 4.9°C. The absolute minimum temperature recorded is –37°C, while the absolute maximum reaches +31–32°C. The mean annual precipitation is approximately 574 mm, with maximum levels observed during the spring and winter seasons.

The plant collections of the Botanical Garden are organized into four alleys (comprising poplars, pines, oaks, ash trees, and birches), as well as thematic exposition plots. The dendrological collection of the Sevan Botanical Garden comprises approximately 443 species belonging to 155 genera and 38 families. Of these, 50 species are conifers, 339 are deciduous and 5 are evergreen. The collection includes 235 tree species, 208 shrub species and 14 species of lianas [22]. The fauna of the garden has not been thoroughly studied.

Despite their significant eco-educational potential, the Vanadzor and Sevan botanical gardens currently do not offer structured eco-educational programs. Given their rich biodiversity, they have substantial potential to become important eco-educational platforms for students of higher education institutions in the region.

Thus, it can be noted that the integration of practical and laboratory classes in botanical gardens into tourism education programs would facilitate the acquisition of knowledge related to Armenia's biodiversity, plant species from different phytogeographical regions of the world, invasive and expansive species, ex-situ conservation of biodiversity, and the organization of sustainable and ecological

tourism. Furthermore, such activities would help develop key competencies, including eco-route design, orientation and navigation skills, marketing skills, and the development of ecological awareness necessary for effective professional practice.

The botanical gardens of RA serve as significant and effective platforms for organizing and implementing practical training for students majoring in tourism. Internships conducted here enable the integration of theoretical knowledge with hands-on experience, thereby fostering the development of professional competencies and practical skills. The content of the internship may encompass the following main areas:

1. Analysis of the structure, functions and principal operational directions of botanical gardens.
2. Study of plant collections, arboretums, greenhouse complexes and thematic exhibitions.
3. Study of native and introduced plant species, including rare, endemic, and conservation-priority taxa.
4. Evaluation of ecological trails and visitor infrastructure.
5. Assessment of guided excursion planning and operational delivery.
6. Participation in the preparation and implementation of eco-educational programs for schoolchildren, students and other target groups.
7. Engagement in public awareness and environmental education activities.
8. Assessment of the eco-educational and tourism potential of botanical gardens.
9. Systematization of internship outcomes, report preparation and presentation.

Such internships provide students with direct exposure to the interconnection between environmental conservation and tourism. They facilitate the acquisition of practical skills in visitor communication, tourism resource assessment, organization of excursion services and implementation of environmental education programs. At the same time, they contribute to the formation of professional thinking aligned with the principles of sustainable tourism, environmental responsibility and sector-specific competencies.

Based on the conducted research, it can be concluded that the botanical gardens of the Republic of Armenia can serve as open educational and research platforms, bridging the gap between theoretical knowledge and practical training students specializing in tourism. Educational activities conducted in these gardens contribute not only to enhancement of the professional knowledge of future tourism specialists, but also to the development of skills essential for effective professional practice.

Conclusion. The conducted study indicates that the botanical gardens of Armenia can play an important role in the training of tourism professionals, serving as multifunctional educational and research-oriented platforms. They provide an opportunity to integrate theoretical knowledge with practical experience, thereby fostering students' professional skills and competencies in a real-world environment.

The results of the study demonstrate that activities related to the identification of flora and fauna species in botanical gardens contribute to the practical application

of students' theoretical knowledge, while simultaneously developing their professional competencies. In this context, students not only develop an understanding of biodiversity and environmental issues, but also acquire practical experience in organizing excursions, developing tourism products, communicating effectively with visitors and implementing environmental initiatives.

At the same time, it should be emphasized that the eco-educational potential of Armenia's botanical gardens is still not fully utilized, as eco-educational programs are currently implemented only in the Yerevan Botanical Garden and are not primarily designed for students specializing in tourism.

Thus, the targeted use of the potential of botanical gardens and their integration into tourism education programs can significantly enhance the effectiveness of the educational process, while also laying the foundation for training professionals with strong environmental awareness, who meet the modern requirements of the sector.

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ՊԱՏՐԱՍՏՄԱՆ ԳՈՐԾՈՒՄ**

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Բուսաբանական այգիները դիտարկվում են ոչ միայն որպես կենսաբազմազանության պահպանման և հանգստի (ռեկրեացիայի) կենտրոններ, այլև որպես նշանակալի կրթական ու գիտական հարթակներ, որոնք զգալի ներուժ ունեն գրոսաշրջության ոլորտի մասնագետների պատրաստման գործում: Սույն հետազոտության նպատակն է բացահայտել բուսաբանական այգիների դերը գրոսաշրջային կրթության մեջ՝ դրանց արդյունավետ ինտեգրման նախադրյալների և հնարավորությունների վերլուծության միջոցով: Հետազոտության շրջանակներում դիտարկվում է Հայաստանի Հանրապետության բուսաբանական այգիների բուսական և կենդանական աշխարհի բազմազանությունը, ինչպես նաև ընդգծվում է դրանց ուսումնասիրման ու դիտարկման նշանակությունը գրոսաշրջության ոլորտի ապագա մասնագետների պատրաստման գործընթացում: Հետազոտության մեջ հիմնավորվում է բուսաբանական այգիների կարևոր դերը ուսանողների էկոլոգիական և

բնապահպանական գիտելիքների խորացման, ինչպես նաև նրանց մասնագիտական կարողությունների զարգացման գործում, ինչը նպաստում է կայուն զբոսաշրջության զարգացմանը: Բուսաբանական այգիների ինտեգրումը կրթական ծրագրերում բարձրացնում է ուսուցման արդյունավետությունը և միաժամանակ ապահովում է կոլոգիական պատասխանատվությամբ օժտված ու բնության մասին գիտելիքների ամուր հիմք ունեցող մրցունակ մասնագետների պատրաստումը:

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РОЛЬ БОТАНИЧЕСКИХ САДОВ АРМЕНИИ В ПОДГОТОВКЕ СПЕЦИАЛИСТОВ В СФЕРЕ ТУРИЗМА

Резюме

Ботанические сады рассматриваются не только как центры сохранения биоразнообразия и рекреации, но и как значимые образовательные и научные платформы, обладающие значительным потенциалом в подготовке специалистов в сфере туризма. Цель данного заключается в выявлении роли ботанических садов в туристском образовании посредством анализа предпосылок и возможностей их эффективной интеграции в образовательный процесс. В рамках исследования рассматривается разнообразие флоры и фауны ботанических садов Республики Армения, а также подчеркивается значение их изучения и наблюдения в процессе подготовки будущих специалистов в сфере туризма. В исследовании обосновывается важная роль ботанических садов в углублении экологических и природоохранных знаний студентов, а также в развитии их профессиональной компетенции, что способствует развитию устойчивого туризма. Интеграция ботанических садов в образовательные программы повышает эффективность обучения и одновременно обеспечивает подготовку конкурентоспособных специалистов, обладающих экологической ответственностью и прочной базой знаний о природе.