MINISTRY OF NATURE PROTECTION
OF THE REPUBLIC OF ARMENIA

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SPECIALLY PROTECTED NATURE AREAS OF ARMENIA

YEREVAN
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This publication is the English translation of the second amended edition of “Specially protected areas of Armenia” (2004, in Armenian). It summarizes many years of research and fieldwork by the author as well as numerous scientific publications on the subject. The publication is devoted to the fulfillment of the commitments of the Republic of Armenia under the UN Convention on Biodiversity and the 45th anniversary of establishment of specially protected areas in Armenia.
The publication is intended for teachers, students, nature protection and nature use professionals and readers at large.

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INTRODUCTION

The Republic of Armenia is located in the north-eastern part of the Armenian Plateau and occupies 29,740 km^2 at altitudes ranging from 375 to 4095 meters above sea level. Armenia is a mountainous country with a characteristic ragged relief and a wide variety of climatic conditions and soils. In addition, Armenia is located on the intersection of two different physical-geographic areas, particularly, various botanical-geographic regions, such as the Caucasian mesophilous and Armenian-Iranian xerophilous ones, where natural speciation is active. The nature of Armenia shaped by the above factors stands out because of its rich flora and fauna as well as a variety of landscapes and types of vegetation.

In this respect in Armenia there are about 3500 species of wild-growing vascular plants and the diversity of ecosystems and landscapes includes various elements ranging from sand deserts and wormwood semi-deserts to subalpine and alpine meadows with numerous transitional associations. To imagine the wealth of this flora it is worthwhile to mention that more that the half of the flora of the Caucasus (about 6000 species) occurs in Armenia, which occupies only 6.7% of the whole territory of the Caucasus. In particular, plant density in Armenia is rather high - about 100 species per 1 km^2. The number of vertebrates in the fauna is over 500 species where birds prevail with about 350 species, while the number of invertebrate species is about 17,000.

Along with diversity, the nature of Armenia has also its unique features. Thus, there are over 120 endemic species of flora (plants growing only in Armenia), a rich agro-biodiversity of wild-growing relatives of cultivated plants, including a singular gene stock of wild-growing cereals (wheat, barley, rye etc.), tertiary relicts (juniper, yew, rhododendron etc.), as well as fauna species, especially fish occurring only in Armenia (Sevan trout, Sevan beghlou etc.). It is noteworthy that Armenia serves as habitat for medicinal, decorative, technical, edible, fodder and other plants as well as probably those with yet unknown properties. There are also numerous wild animal species useful for man.

All over the world specially protected areas are established to conserve biological diversity and the gene stock of living organisms. In Armenia there are also 28 specially protected nature areas - 3 reserves, 2 national parks and 23 reservations. The first specially protected nature areas of Armenia were established in 1958.

In 1992 at the Earth Summit in Rio de Janeiro the Republic of Armenia signed the UN Convention on Biological Diversity. The protection of biodiversity in specially designated areas is an evidence of the fulfillment of international commitments by Armenia.

The 45th anniversary of the establishment of protected areas in Armenia was marked in 2003. This scientific-popular publication devoted to this anniversary aims to present the protected areas designed to protect biodiversity of Armenia for present and future generations by joint efforts of representatives of state, general public and each individual. Biodiversity conservation and its reproduction, careful and sustainable use of bioresources are among major prerequisites of independence and sustainable development of Armenia.

FROM THE HISTORY OF PROTECTED AREAS

The formation of protected areas began back in the ancient times, when man started the cultivation and breeding of useful plants and animals. At first, this was determined by religious cults and served ruling classes. Unique territories, certain tree and animal species or individuals were protected as sacred.

Yew (Taxus baccata L.), oriental plane (Platanus orientalis L.) and other plants were regarded as sacred. They were grown near shrines and were not utilized for economic purposes. In exceptional cases they were used in households as symbols. Beautiful red wood of yew was associated with victory and was used as a symbol of victory; only sword hilts were decorated with this wood. For this reason, probably, these beautiful trees have survived to date: yew in Mediterranean countries and the Caucasus; oriental plane in the Asia Minor, Central Asia, Iran, Afghanistan and the Himalayas. Both species occur in Armenia as rare tertiary relicts.

In the middle ages the establishment of protected areas was mainly determined by the intention to protect game resources. In the mid-19th century nature protection activities expanded dramatically and covered a broader variety of protected objects. The mankind realized that apart from useful plants and animals it is necessary to protect the cultural heritage of the past ages, particularly architecture, historical monuments and other territories, including scenic landscapes and virgin lands.

In the 19th century the first protected areas of the world were established. The first national park was established in 1872 in the USA. It comprises the upper stream of the Yellow Stone River. Two years later, in 1874, the second protected area of the world - Askania Nova Reserve was established in Ukraine for the protection of the feather-grass steppes. However, there were few protected areas in the 19th century.

In the 20th century the scale of nature protection activities increased abruptly. Developed countries created nature protection services: committees, unions, companies and others. International consolidation in the sphere of nature protection became global.

At present, an enormous network of protected areas has been established in numerous countries, which despite a great variety of terms (reserve, biosphere reserve, national park, reservation etc.), uses and purposes serves one basic goal - nature protection.

PROTECTED AREAS IN ANCIENT ARMENIA

According to written sources the prototypes of protected areas in Armenia can be traced back to the late 3rd - early 2nd century BC. At least, the earliest reference to that dates back to the mentioned period of the Armenian history.

An Armenian chronicler Movses Khorenatsi mentioned about that in the early 5th century AD (circa 410). Along with the description of Armenian history he provided numerous facts about nature protection. His detailed description of the nature, certain areas, mansions, settlements, fields, orchards, forests and hunting grounds is the evidence of a developed, environmentally minded culture in the ancient Armenia, as well as practical use of nature.

The last king of the Yervanduni dynasty - King Yervand (birth date unknown, circa 200 BC, according to Movses Khorenatsi reigned for 20 years) founded a number of towns and a new capital Yervandashat as well as ordered to plant a forest named "Tsnndots Forest" on the River Akhurian somewhat north of the capital.

Another historical fact is that during the reign of King Khosrov II Kotack (330-338 AD) the "Khosrov Forest" was established in the place of the present reserve with the same name.

These forests were planted for the reproduction of big game for royal hunting. However, these were expressions of careful attitude towards nature and high appreciation of nature. At the same time, these forests were the prototypes of protected areas and solid evidence of their existence in the historic Armenia.

PROTECTED AREAS IN EURASIA

There are numerous protected areas in Eurasia. They are maintained both by state and private people. According to data of “Protected Areas of the World” published in 1991 Germany having 440 protected areas of different status is leading in Europe by the number of protected areas. Poland with 204 protected areas is the second. Sweden (195), Austria (178), Spain (163), Italy (144), Great Britain (140) and Switzerland (109) have over a hundred of protected areas. Dozens of protected areas exist in Norway (80), France (70) and other countries. Such small countries as Greece (25), Albania (13) and Iceland (24) also have over a dozen of protected areas, while Denmark has as many as 65. Moreover, the small Mediterranean Isle of Corsica has 10 protected areas.

Japan with 737 protected areas is the leader by the number of protected areas in Asia; China (396) is the second. Iran and Turkey neighboring with Armenia have 59 and 32 protected areas respectively.

As of April 1, 1999 in the Russian Federation 99 state reserves are operational, of which 21 involved in the international network of biosphere reserves and 7 categorized as international monuments of nature heritage. There are 34 national parks in the Russian Federation.

In the Caucasus region - in the Northern Caucasus and Transcaucasus, the system of protected areas includes 68 state reserves and national parks. Particularly, there are 5 reserves and 2 national parks in the Northern Caucasus, 16 reserves and 2 national parks in Georgia, 14 reserves in Azerbaijan and 3 reserves and 2 national parks in Armenia. In the Caucasus, in addition to reserves and national parks established later by following the example of foreign countries, there are also reservations and other areas of local significance.

The protected areas of Eurasia have various statuses due to the protection regime of a given area (for instance, only for scientific purposes, only for tourism or education etc.) Protected areas with various statuses differ in terms of purpose, structure, management etc.

National park is the most common type of protected areas. In addition, there are reserves, reservations, natural parks and other types of protected areas. For example, out of 178 protected areas in Austria there are 3 national parks, 53 reserves, 107 landscape and 3 lake protected areas as well as 11 natural parks.

Reserves stand out for their diversity among different types of protected areas. They are usually named after their purpose and nature protection activity envisaged for a given territory. Reserves can be scientific (Portugal, Denmark), biological (Spain), botanical (Bulgaria), marine (Italy, Great Britain, France), ornithological (Denmark), ichthyological (Corsica) and others.

In addition to this diversity there is another singular protected area in Greece - the home of Olympic Games. An interesting protected area called Game Refuge and occupying 7200 ha was founded in 1986 on Mount Olympus. The birthplace of Olympic Games, including the ancient stadium with columns and arches, marble statues of Olympic heroes and rare museum remnants, is located in the beautiful Mediterranean subtropical forest and protected by the state. On March 8, 1998 the International Olympic Academy decided to install here the marble bust of an Olympic champion, Armenian King Varazdat Arshakuni (385 BC), by sculptor Levon Tokmajyan.

Olympic complex in Olympia

Bust of Olympic champion Varazdat in Olympia

SPECIALLY PROTECTED NATURE AREAS OF ARMENIA

According to the Law of the Republic of Armenia on Specially Protected Nature Areas (December 17, 1991) "Specially protected areas are those territories of surface and ground waters, underground resources, flora and fauna, which are designated by the order determined by law and have special ecological, scientific, medicinal, cultural, esthetic value and entirely or partially, temporarily or permanently are not subject to commercial exploitation".

According to the law, the specially protected nature areas in Armenia can have four statuses: state reserve, national park, reservation and nature monument.

State reserves are established in allocated areas to protect the natural course of dynamic processes and rare species of flora and fauna. These are scientific-research entities where human activity is restricted. Here a strict protection regime is applied, human intervention is entirely prohibited (logging of trees, hay-making, hunting and introduction of animals, plant gathering etc.) in favor of natural development. By the IUCN international classification (1994) state reserves are protected areas of Ia category.

National parks are areas of ecological, historical-cultural, aesthetic significance and in contrast with state reserves they have protection regimes determined by functional zoning. Usually special zones are designated in national parks: protection zone with strict regime of protection, as well as recreational and economic zones. By the IUCN classification national parks of Armenia are category II protected areas. International experience with national parks proves that protected areas of this status are highly viable.

Reservations can be protected areas of national or local significance with protection regime established in accordance with their purpose. By the IUCN classification reservations of Armenia are close to category IV protected areas.

Nature monuments are exceptional natural objects having special scientific or historical-cultural significance; they correspond to category III of the IUCN classification.

In Armenia there are 28 protected areas established by the state: 3 reserves, 2 national parks and 23 reservations. Their total area covers about 10% of the country territory. By law nature monuments (live and dead) are also considered protected areas, though they have not yet been singled out and approved by the Government.

First specially protected nature areas of Armenia - Dilijan, Khosrov Forest and Shikahogh Reserves were established almost at the same time in 1958. The same year 6 reservations were established. All of them are of forest protection significance.

In 1981 Erebuni Reserve was established in the vicinity of Yerevan to protect wild-growing cereals. Being the smallest reserve (89 ha) of Armenia, it is exceptionally significant for the mankind. Sev Lich ("Black Lake" in Armenian) was the fifth reserve established in 1987 to protect the natural complex of the relict volcanic lake.

In 1978 Sevan National Park was established based on the extremely important task to conserve fresh-water resources of Lake Sevan for the whole Transcaucasus, as well as on the national significance of fish resources.

At present, the number of protected areas in Armenia (28) is the same, although the status of two reserves changed in 2001. Sev Lich now is a reservation and Dilijan is a national park.

Until 2002 state reserves and national parks were under the jurisdiction of the Ministry of Nature Protection of the Republic of Armenia as separate subdivisions - legal entities. In 2002 in accordance with the Law on State Non-Commercial Organizations (SNCO) of the Republic of Armenia they were given the status of SNCOs with charters approved by the Government. Erebuni Reserve is the only exception which has no own management system and stays under the Reserve-Park Complex SNCO of the Ministry of Nature Protection of the Republic of Armenia.

The activities of specially protected nature areas in Armenia are regulated by the above mentioned Law on Protected Areas of the Republic of Armenia, Legislative Bases for Nature Protection in the Republic of Armenia (July 9, 1991), Law on Flora (November 23, 1999), Law on Fauna (April 3, 2000), Law on Lake Sevan (May 15, 2001), Law on Rehabilitation of Lake Sevan Ecosystem, its Maintenance, Reproduction and Utilization (December 14, 2001) as well as other laws of the Republic of Armenia and statutes of protected areas. At present, the drafting of a new law on protected areas is underway.

In this book the establishment dates the protected areas of Armenia and their territories are quoted from the Annex 1 of the Governmental Decree of the Republic of Armenia No. 472 as of July 6, 1995.

SPECIALLY PROTECTED NATURE AREAS OF ARMENIA

National Park

State Reserve

Reservation

I **Dilijan National Park** 2002, 24000 ha

II **Sevan National Park** 1978, 150100 ha

I **Erebuni State Reserve** 1981, 89 ha

II **Khosrov Forest State Reserve** 1958, 29000 ha

III **Shikahogh State Reserve** 1958, 10000 ha

1 **Hazel-nut** 1958, 40 ha

2 **Akhnabat Yew Grove** 1958, 25 ha

3 **Gandzakar** 1971, 6800 ha

4 **Ijevan** 1971, 7800 ha

5 **Getik** 1971, 6000 ha

6 **Gyulagarak** 1958, 2586 ha

7 **Margahovit** 1971, 5000 ha

8 **Rosebay** 1959, 10000 ha

9 **Aragats (alpine)** 1959, 300 ha

10 **Hankavan hydrological** 1981, 9350 ha

11 **Arzakan-Meghradzor** 1971, 14500 ha

12 **Pine of Banx** 1959, 4 ha

13 **Juniper Forest** 1958, 3312 ha

14 **Vordan Karmir** 1987, 200 ha

15 **Sands of Goravan** 1959, 200 ha

16 **Yeghegnadzor** 1972, 4200 ha

17 **Herher** 1958, 6139 ha

18 **Jermuk hydrological** 1981, 18000 ha

19 **Jermuk forest** 1958, 3865 ha

20 **Goris** 1972, 1900 ha

21 **Plane Grove** 1959, 60 ha

22 **Boghakar** 1989, 2728 ha

23 **Sev Lich** 2001, 240 ha

RESERVES OF ARMENIA

I

Erebuni Reserve

1981 89 ha

II

Khosrov Forest Reserve

1958 29000 ha

III

Shikahogh Reserve

1958 10000 ha

EREBUNI RESERVE

Established: 1981
Area: 89 ha
Location: Kotayk Marz
Purpose: protection of the wild-growing relatives of cereals

Erebuni Reserve is located at a distance of 8-10 km from Yerevan between Mushaghbyur and Geghadir villages at the altitude of 1300-1400 m above sea level on the transition between semi-desert and mountain-steppe zones. The purpose of the reserve is to protect the unique gene stock of cereals (family Poaceae), including wild wheat (Triticum L.) and its relatives in Armenia. This reserve along with Vordan Karmir Reservation is in the Reserve-Park Complex SNCO (see also Vordan Karmir Reservation).

Wild-growing wheat was first discovered on the outskirts of Yerevan back in 1926 by botanist M. Tumanyan. This discovery inspired Academician N. Vavilov to emphasize the global significance of the wild-growing wheat in the national press in 1934 during his visit to Armenia. Being knowledgeable about numerous cultivated plants of the world N. Vavilov still in 1934 suggested establishing here a reserve, which was done only in 1981.

Taking into consideration the scientific and practical need for the conservation of wild-growing wheat and its relatives and their global importance Erebuni Reserve was established by the efforts of Armenian scientists (ArmSSR Council of Ministers Decree No. 324, May 27, 1981) for the protection of the wild-growing relatives of cereals.

Erebuni Reserve

According to the 1983 publication by V. Voskanyan, I. Arevshatyan and A. Harutunyan 278 vascular plant species belonging to 176 genera and 42 families were registered on the relatively small territory of the reserve. Especially, family Asteraceae (54 species), Poaceae (27) and Fabaceae (27) are represented by numerous species. 7 plant species are registered in the Red Data Book of Armenia and as many in the Red Data Book of the USSR.

Wild-growing wheat is the gem of the reserve. Three out of four species of wild-growing wheat known in the world occur in the reserve: T. boeoticum Boiss., T. urartu Tum. ex Gandiljan and T. araraticum Jakubz. Species T. urartu and T. araraticum first were discovered and described in Armenia. High intraspecies diversity is typical for wild wheat; they have dozens of varieties. Wild wheat species were studied by botanist P. Ghandilyan.

Among wild cereals rye (Secale vavilovii Grossh.), several species of aegilops (Aegilops L.) and barley (Hordeum L.) occur in the reserve, as well as extremely rare in Armenia Amplyopyrum muticum (Boiss.) Eig and Rhizocephalus orientalis Boiss. In addition to wild cereals numerous other rare species grow in the reserve such as Gundelia tournefortii L. (Asteraceae), Actinolema macrolema Boiss. (Apiaceae) and Hohenackeria excapa (Stev.) Kos.-Pol. (Apiaceae).

The fauna of the reserve has not been well studied yet. However, various authors mention that numerous species of beetles, including endemic ones, reptiles (viper - Vipera lebetina, Levant skink - Mabuja aurata, various species of whip snake - Coluber, tortoise -Testudo graeca etc.), amphibians (toad - Bufo viridis, lake frog - Rana ridibunda, tree frog - Hyla savignyi etc.), birds (partridge - Perdix perdix, quail - Coturnix coturnix, turtle-dove - Streptopelia turtur, falcon - Falco tinnunculus etc.) and mammals (fox - Vulpes vulpes, weasel - Mustela nivalis, marten - Martes foina, wolf - Canis lupus, badger - Meles meles, numerous rodents etc.) occur in the reserve.

Erebuni Reserve being the smallest among all three reserves of Armenia is probably of the greatest value in terms of its international significance as the “gene stock” of the mankind’s daily bread. Indeed, it is a national symbol after the Biblical Mount Ararat and Lake Sevan.

Gundelia tournefortii L.

Flowering Gundelia

Iris elegantissima Sosn.

Capparis spinosa L.

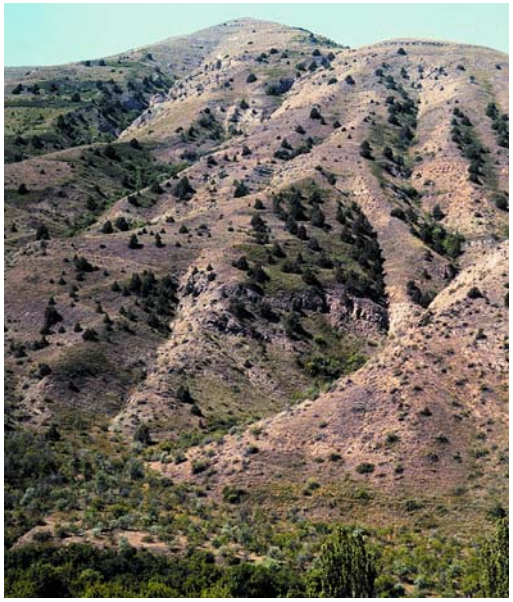
EREBUNI RESERVE

Geranium tuberosum L.

KHOSROV FOREST RESERVE

Established: 1958
Area: 29,000 ha
Location: Ararat Marz
Purpose: protection of the Azat River water resources, juniper and oak, arid mountain vegetation, rare animals and plants
Historical-architectural monuments: Havuts-Tar Monastery (11-13th centuries), stone arch-bridge across the Azat River (12th century), cross-stones

According to historical sources the expression "Khosrov Forest" is associated with King Khosrov II Kotack (4th century). The chronicler Movses Khorenatsi says that during his reign afforestation was undertaken on the territory of the present-day reserve. The King established special hunting grounds for birds and animals. The age-old Khosrov Forest has come down to us and became a reserve (ArmSSR Council of Ministers Decree No. P-341, September 13, 1958).



The Azat River gorge

Juniperus polycarpos C.Koch

The reserve is located on the scenic slopes of Mounts Yeranos, Dahnak, Irits and Khosrovasar, as well as the Yerakh and Urts mountain ranges, at the altitude of 900-2400 m above sea level spreading from semi-deserts to the upper limit of forest zone. Moist meadows and rocky slopes located above this limit and serving as habitat for wild goat (Capra aegagrus) and moufflon (Ovis ammon gmelinii), unfortunately, are not included in the territory of the reserve.

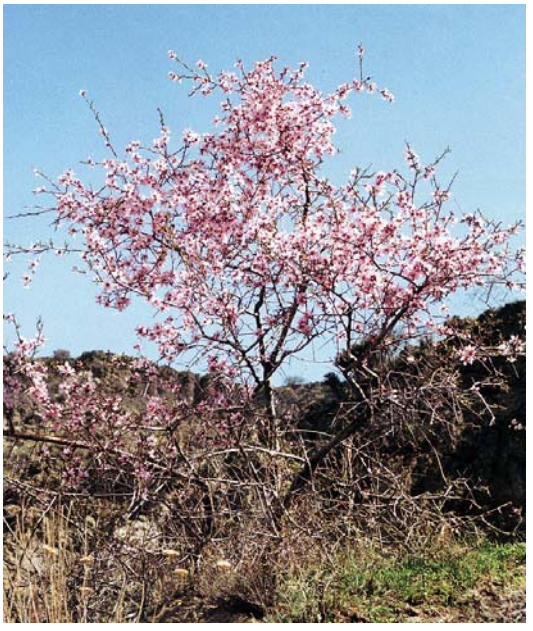
According to M. Grigoryan's unpublished data, the flora of the reserve consists of about 1800 vascular plants, i.e. over the half of all plant species in Armenia (about 3500). The flora diversity of the reserve includes a number of species useful for mankind, such as fruit-bearing, volatile-oil-bearing, medicinal, dye plants and others.

High diversity is typical for the reserve flora. The gems of the reserve are the sparse forests of tertiary relict juniper (Juniperus L.) and oak (Quercus L.). Juniper (Juniperus polycarpos C.Koch) is common on dry and steep southern slopes and form sparse juniper forests with characteristic grass cover. The oak forests consist of Q. macranthera Fisch. et C.A.Mey. ex Hohen. occurring in sparse or sometimes large dense homogenous oak forests. Mentioned dominant species are accompanied by ash (Fraxinus excelsior L. and F. rotundifolia Mill.), mountain ash or rowan (Sorbus aucuparia L.), maple (Acer L.), various species of pear (Pyrus L.) and others. There are many juniper-hackberry, juniper-rowan, juniper-pear and other mixed forests. Pear in the reserve is represented by huge diversity of species and rich gene stock. There are also many bushes such as wayfaring tree (Viburnum lantana L.), honeysuckle (Lonicera L.), various species of rose (Rosa L.) and hawthorn (Crataegus L.), while cereals occur abundantly in the grass cover.

Semi-deserts with prevailing wormwood (Artemisia fragrans Willd.) occupy sizable areas in the reserve spreading over the foothills and lower mountain zone. The monotonous yellowish panorama changes during spring and autumn rainfalls. In spring the landscape is entirely covered with meadow-grass (Poa bulbosa L.) and sedge (Carex stenophylloides V.I.Krecz.) as well as the abundance of ephemeral annuals. White daisy - Tripleurospermum parviflorum (Willd.) Pobed., yellow Ceratocephalus falcatus (L.) Pers., bright yellow flowers of various species of gagea (Gagea Salisb.), as well as bulbous plants such as snowdrop - Merendera trigyna (Stev. ex Adam) Stapf, tulip - Tulipa biflora Pall., bluish bellevalia - Bellevalia Lapeyr and other species of different genera, violet and brownish iris - Iris reticulata Bieb. and I. elegantissima Sosn., bright red poppy (Papaver L.) and clusters of many other species cover some places in the landscape. In summer, numerous perennial plants blossom: white-flowered creeping caper (Capparis spinosa L.), various hard-leaved and thorny species of sage (Salvia L.), knapweed (Centaurea L.), cousinia (Cousinia

Ajuga chia Schreb.

Yeranos view from the Azat River valley



Amygdalus fenzliana (Fritsch) Lipsky

Astragalus paradoxus Bunge

Mylabris cincta

Quercus macranthera
Fisch. et C.A.Mey.

Mesoacidalia aglaja

Astragalus microcephalus Willd.

Ephedra procera Fisch. et C.A.Mey.

Stachys lavandulifolia Vahl

The Azat River gorge

KHOSROV FOREST RESERVE

Scutellaria orientalis L.

Scutellaria orientalis L.

Cyanosylvia svecica

Cass.), mullein (Verbascum L.) and others. In autumn, wormwood blossoms everywhere with small yellowish and reddish flowers.

Most of the brown soils in the wavy landscape of the semi-desert zone, sometimes as high as high-laying rocks and screes have been cultivated and turned into vineyards, orchards and fields of cereals. Wormwood semi-desert serves as winter pasture.

Rocky slopes consisting of sedimentary limestone-clay and marl expand over the upper part of the semi-desert zone. These eroded bare slopes called “skeletal rocks” are the habitat for xerophilous Mediterranean flora - another gem of the reserve.

Frigana (“dried out” in Greek) with its different varieties occurs on the southern dry and cracked rocky slopes. This Mediterranean typical Balkan type of vegetation is described as the association of xerophilous short densely branched and often thorny shrubs, represented in the reserve by almond - Amygdalus fenzliana (Fritsch) Lipsky, cherry - Cerasus mahaleb (L.) Mill. and C. incana (Pall.) Spach, buckthorn - Rhamnus pallasii Fisch. et C.A.Mey., spirea (Spirea L.), pear (Pyrus L. especially P. salicifolia L.), sometimes with hackberry (Celtis glabrata Stev. ex Planch.), pistachio (Pistacia mutica Fisch. et C.A.Mey.), sumach (Rhus coriaria L.) , ephedra (Ephedra procera Fisch. et C.A.Mey.) as well as species Zygophyllum atriplicoides Fisch. et C.A.Mey., Atraphaxis spinosa L. and others. Shrubs grow in patches of tree groups or individual trees and never form a full cover. They cover the rocky slopes of gorges and canyons growing around rocks, sticking out of rock cracks, overhanging from cliffs and spreading life everywhere on barren rocks and slopes.

Rocky slopes are also rich in xerophilous species: smelly thyme (Thymus L.) and ziziphora (Ziziphora L.), beautiful sage (Salvia L.), yellow-flowered species of Helianthemum Mill., thorny species of genera Cousinia Cass. and Eryngium L., green-yellowish Haplophyllum villosum (Bieb.) G. Don, silver-leaved and yellow-flowered species of tansy - Tanacetum argyrophyllum (C.Koch) Tzvel., T. chiliophyllum (Fisch et C.A.Mey. ex DC.) Sch. Bip. and others.

Some gorges in the Yerakh Mountains are entirely covered by so called tomillares (“tomillo” is Spanish for thyme). The name itself indicates that these slopes should be covered by volatile-oil-bearing representatives of the family Lamiaceae. Hedge nettle (Stachys lavandulifolia Vahl.), thyme (Thymus kotschyanus Boiss. et Hohen.) ziziphora (Ziziphora clinopodioides Lam.), germander (Teucrium polium L.) and various species of sage grow with other

plants from different families. The representatives of the family Lamiaceae spread a pleasant frangrance over the gorges covered by tomillares.

There are many cushion-shaped plants in the reserve represented by different species of astragalus (Astragalus L.), prickly-thrift (Acantholimon Boiss.) and sainfoin - Onobrychis cornuta (L.) Desv. A number of resiniferous species of the thorny astragalus comprise yet another xerophyilous type of so called “tragacanth” vegetation. The Urts Mountains is the only place in Armenia, where the Iranian-Turanian gypsophilous species Gypsophila aretioides Boiss. occurs as densely branched cushion-shaped shrubs looking like dead rocks.

The fauna of the reserve is also rich. Among invertebrates beetles numbering over 1000 species are well studied. Numerous species of mollusks and fish (trout - Salmo fario, roach - Rutilus rutilus) have been registered in the water basins. Reptiles are represented by about 30 species (Pseudopodus apodus, Erix jauculus, Coluber ravergieri, Vipera lebetina, Eumeces schneideri, Mauremys caspica etc.). There are about 130 species of birds (European short-toed eagle - Circaetus gallicus, partridge - Alectoris chukar, bearded eagle - Gyps fulvus, Gypeatus barbatus, pigeon - Columba livia ect.). Mammals are represented by approximately 50 species (weasel - Mustela nivalis, marten - Martes foina, wild cat - Felis silvestris, wild boar - Sus scrofa, fox - Vulpes vulpes, hare - Lepus europaeus, lynx - Lynx, wolf - Canis lupus, panther - Pantera pardus tullianus etc.). Amongst mammals there are well-known predecessors of domesticated goat and sheep, namely wild goat (bezoar goat) – Caucasian endemic species known also as Caucasian bearded goat due to its long beard, and Armenian moufflon or Transcaucasian wild sheep. Transcaucasian brown bear (Ursus arctos) also occurs here. Hunting for this bear was prohibited in Armenia in 1967. Most of the aforementioned species are registered in the Red Date Book of Armenia.

Khosrov Forest Reserve with such a rich diversity of semi-desert, forest, xerophilous and especially Mediterranean types of vegetation such as frigana, tomillares, tragacanth and others is the only one both in Armenia and in the whole Caucasus region.

SHIKAHOGH RESERVE

Established: 1958
Area: 10,000 ha
Location: Syunik Marz
Purpose: protection of oak, hornbeam and oak-hornbeam forests, oriental beech, yew, oriental plane and animals
Natural monuments: Mtnadzor, scenic rocks and caves

The reserve was established in 1958 (ArmSSR Council of Ministers Decree No. P-341, September 13) on the basis of Kapan Forest Enterprise. However, during 1961-1975 this area became Bartaz Reservation named after Mount Bartaz (2286 m) of the Meghri mountain range. Only 17 years later the status of the state reserve was re-established (ArmSSR Council of Ministers Decree No. 728, October 27, 1975).

The reserve spreads over the southern slopes of Mountain Khustup and the northern slopes of the Meghri range, at the altitude of 700-2400 m. The Rivers Tsav and Shikahogh run through its territory with their mountain tributaries.

The reserve stands out for its unique mesothermophilous (moisture and heat loving) flora and vegetation formed under the influence of numerous ecological factors, especially geographic location of the terrain and peculiarities of the climate. The warm and moist climate of the reserve is determined by its location. The reserve is surrounded by high mountains on three sides which prevent the northern cold and southern warm winds from entering the basins of the Rivers Tsav and Shikahogh. The fourth side, however, is open to the warm and moist air from the Caspian Sea. That is why this reserve is rich in Caucasian mesophilous plants and at the same time is famous for its mesothermophilous trees, bushes and herbs which determines the uniqueness of its flora.

Although the flora of the reserve has not been specially studied, according to approximate data it comprises 1100 species of vascular plants. About 70 species growing in the reserve are registered in the Red Data Book of Armenia, 18 - in the Red Data Book of the USSR. The reserve is also known for its numerous endemic species, most of which have the place-name “Zangezur”, for example, Zangezur pear - Pyrus zangezura Maleev, Zangezur blue-bell - Campanula zangezura (Lipsky) Kolak. et Serdjukova, Zangezur pennycress - Thlaspi zangezurum Tzvel. etc.

Ficus carica L.

Punica granatum L.

Muscari szovitsianum Beker

Pyrus salicifolia Pall.

Malus orientalis Uglitzk.

Polypodium vulgare L.

SHIKAHOGH RESERVE

Cotinus coggygria Scop.

Paliurus spina-christi Mill.

The flora of the reserve is mostly mesophilous, however, it is also rich in mesothermophilous species. In the lower mountain zone up to 1000 m low-height stands of Arax oak - Q. araxina (Trautv.) Grossh. are common. An interesting type of Mediterranean vegetation shibliak occurs here as well. It was well-described by A. Takhtajan in 1999. It appears that "shibliak" is a Serb word standing for deciduous shrubs, which was introduced to scientific botanical literature by the famous Yugoslav botanist L. Adamovich in 1911. In the reserve shibliak occurs on rather steep, dry and rocky slopes. Christ's thorn or Jerusalem thorn (Paliurus spina-christi Mill.) prevails, which is typical for shibliak. This densely branched and thorny shrub with yellow-greenish leaves and roundish fruits is of Mediterranean origin and often used as a live fence. It is accompanied by smoketree (Cotinus coggygnea Scop.), hackberry (Celtis glabrata), barberry (Berberis vulgaris L.) and other xerophilous shrubs and plants with the dominance of beard-grass - Botriochloa ischaemum (L.) Keng.

The main type of vegetation of the reserve is forest which spreads at the altitude of 1000-2200 m. It consists of oak (Q. iberica Bieb. and Q. macranthera) and hornbeam (Carpinus orientalis Mill. and C. betulus L.). Oak species Q. iberica occurs at the altitude of 1300-1400 m, while Q. macranthera grows higher. Ash (Fraxinus L.), lime (Tilia L.), maple (Acer L.) and elm (Ulmus L.) occur as accompanying species. Hornbeam stands occur on the northern slopes. The only small forest of oriental beech (Fagus orientalis Lipsky) in the Southern Armenia grows in this reserve. The reserve is also the only place in Armenia where hornbeam stands remained at the upper limit of the forest.

There are also many fruit trees in the forests such as walnut (Juglans regia L.), pear (Pyrus L.), apple (Malus orientalis Uglitzk.), plum (Prunus Mill.) as well as some mesothermophilous tree-bush species such as pistachio (Pistacea mutica), chestnut (Castanea sativa L.), persimmon (Diospyros lotus L.), water-elm - Zelkova carpinifolia (Pall.) C.Koch, pomegranate (Punica granatum L.), medlar (Mespilus germanica L.), fig (Ficus carica L.) and others.

Yew and oriental plane also occur in the reserve in patches of groups of trees or individual trees (see as well Plane Grove Reservation). There is a group of 25-30 year-old yew trees in a dark and dense beech forest near the village Shikahogh.

Above the forest zone subalpine meadow vegetation spreads over altitudes above 2200 m. In the transition zone there are numerous resiniferous species of astragalus (Astragalus), as well as prickly thrift (Acantholimon) and sainfoin (Onobrichis cornuta). When blossoming their thorny cushions are entirely covered with yellow, violet and pink flowers.

The fauna of the reserve has not been well studied. It is known that the reserve is a habitat for reptiles (Vipera lebetina, Natrix natrix, N. tesselata, Pseudopodus apodus, Viper raddei etc.), birds (Caspian snowcock - Tetraogallus caspius, bearded eagle - Gypaetus barbatus, various species of vultures - Gyps fulvus and others) and numerous species of mammals (wolf - Canis lupus, fox - Vulpes vulpes, wild cat - Felis silvestris, roe - Capreolus capreolus, hare - Lepus europaeus, badger - Meles meles, hedgehog - Erinaceus auritus etc.). Wild goat (bezoar goat) and moufflon (wild sheep) also occur in the reserve. According to the local population panther (Pantera pardus tullianus) also occurred here in the past. Indian porcupine (Hystrix leucura) feeding on plants is a rare rodent species of the reserve. Most of the mentioned animals are registered in the Red Data Book of Armenia.

Mtnadzor (“dark gorge” in Armenian) covering almost the half of the reserve territory makes it unique. Thanks to well-reserved Mtnadzor forest the reserve can be considered among the monuments of world heritage.

NATIONAL PARKS OF ARMENIA

I

SEVAN NATIONAL PARK

1978 150100 ha

II

DILIJAN NATIONAL PARK

2002 24000 ha

SEVAN NATIONAL PARK

Established: 1978
Area: 150,100 ha
Location: Gegharkunik Marz
Purpose: protection of fresh water reserves of the lake, fish stocks, natural and historical-architectural complexes; recreation and tourism activities
Historical-architectural monuments: monasteries, churches, cross-stones, ethnographic and other monuments

Sevan National Park encompasses Lake Sevan and the adjacent grounds (which used to be covered by water) up to the highway around the lake. The national park is surrounded by a buffer zone, incorporating the slopes of nearby mountain ranges (Areguni, Sevan, Gegham, Vardenis and Pambak) up to their watersheds. Consequently, the national park along with the buffer zone incorporates Gegharkunik Marz (4900 km^2) with its numerous settlements and 270,000 population.

The main area of the national park is occupied by one of the wonders of Armenia - Lake Sevan. This one of the highest and biggest freshwater lakes in the world is a unique reservoir of fresh water for Armenia and the Transcaucasus. The ancient “Geghama Sea” or “Gegharkunik Sea” names of the lake are associated with the name of the country, which according to the chronicler Movses Khorenatsi was named after Gegham – one of the forefather Hayk’s offsprings. The territory of that country corresponds to the territory of nowadays Gegharkunik Marz.

According to one of the hypotheses on the origin of Lake Sevan, it originated in the Quaternary Period in the result of volcanic activity due to accumulation of melting and glacial waters in a tectonic depression. At present, the lake is situated at the altitude of about 1900 m. The lake surface is 1250 km^2, though before the 1930s it was 1416 km^2. After artificial water withdrawal the level of the lake dropped by more than 19.5 m.

The Shorzha barrier is an underwater dam dividing the lake into two parts - Big Sevan and Small Sevan. Big Sevan is located on the south-east from the imaginary line connecting the Capes Artanish and Noraduz, its average depth is 37.7 m. Small Sevan is on the north-west of this imaginary line, its average depth is 50.9 m.

Twenty-eight large and small rivers including the Argichi, Masrik, Gavaraget, Karchaghpyur (Makenis), Vardenis, Dzknaget and others flow into the lake. Only the Hrazdan (Zangu) River flows out of the lake.

A brief history of the lake will be presented below to imagine the mission and vital importance of Sevan National Park. After the establishment of Soviet rules in Armenia Lake Sevan became crucial for the development of economy and energy sector. It was decided to use the age-old water resources of the lake and to drain Big Sevan in 50 years. The disastrous project was launched in 1933. The Sevan-Hrazdan cascade including six hydro-power plants was built to generate power and irrigate agricultural lands.

Before that Lake Sevan was a young oligotrophic lake with pure, transparent and ecologically "clean drinking water". Like all the other freshwater lakes in the world it was expected to age very slowly (natural process called eutrophication). However, the lake originated during the period of glacier melting, endured for centuries and came down to us as a young water reservoir. Consequently, in case of natural development it would exist for many centuries.

Nevertheless, in the result of devastating plan, which certainly boosted temporarily the economic development of Armenia and Gegharkunik Marz, the lake shore-line receded leaving bare areas and white ground previously covered by water. The former Island Sevan turned into a peninsula, Lake Gilli in the Masrik plain dried up leaving only a small peat area. Fast aging of Lake Sevan started. The increase of organic matter in the lake, namely fixed nitrogen and phosphorus compounds as results of economic activity contributed to the aging of the lake. In 1963 the eutrophication or swamping of the lake began. Water "blooming" appeared due to drastic increase of blue-green algae and bacteria leading to the change of water color and transparence. In 1975-1978 the lake was under intensive eutrophication. The risk of swamping became alarming. The Lake Sevan problem emerged as the antropogenic disturbance of the natural balance of the lake ecosystem.

Trying to address the problem in 1978 Sevan National Park was established (ArmSSR Council of Ministers Decree No. 125, March 14, 1978). Its ultimate goal was to protect the lake. National park includes the lake and surrounding areas (24,800 ha) which were under water several decades ago. As it is usually done, special zones have been designated in the national park: protection zone with a strict regime of protection, recreational zone and economic zone for economic activity. These areas in Sevan National Park do not make continuous or uninterrupted zones (though called zones) and spread all over the park territory.

The reserve zone of 3700 ha consists of five reserve areas - Artanish, Vardenis, Lichk, Noraduz and Norashen as well as ten other protected areas stretching along the beds of large rivers on the length of 500 m starting from the river mouth.

The recreational zone occupies 4200 ha of coastal area. It is envisaged for recreational and health purposes. There are various facilities functioning here such as guest houses, hotels, private recreational facilities and others located around the whole shoreline concentrated more in the western part of the lake. Convenient beaches, historical-architectural and ancient ethnographic monuments as well as scenic landscapes provide good opportunities for excursions and tourism.

The economic zone incorporates areas for fishery and forestry activities. At present, licensed fishing of Sevan white fish (Coreganus laveratus) and goldfish (Carassius auratus) is allowed. River crayfish (Astacus leptodactylus) farming is being developed. Crayfish has become a commercial species in Lake Sevan.

When referring to the economic zone it is necessary to mention economic activities being carried out in the buffer zone of the national park, which directly affect its water and terrestrial areas. The division of Gegharkunik Marz into two parts, namely up to the highway and beyond the highway is very artificial from geographic, economic and other perspectives. Hence, it should be noted that in the past before the economic crisis more than fifty large agricultural and industrial facilities (construction material production, chemical, food-processing and light industry etc.) and numerous small enterprises functioned in the big settlements. However, the treatment of their waste and wastewater was not done properly. A wastewater collector planned to be constructed around the lake has not been completed. Only large-diameter pipe sections remained around the lake.

According to P. Ghambaryan’s unpublished data the flora of the national park and its buffer zone includes about 1600 vascular plants represented by both aquatic and terrestrial species. Most of the latter occur in the buffer zone.

Lake Sevan like many freshwater lakes is not very rich in plants and animals, although its fish stocks have big economic significance for the country. The homogeneity of water environment limits the diversity of living organisms.

The lake flora includes algae (Chara, Spirogyra, Zygnemia, Euglena, Volvox, Oscillaria, Diatomeae etc.) as well as other aquatic flowering plants which occupy their own niche - the littoral zone of the lake down to several meters in depth. 9 out of 14 genera and 19 out of 36 species of aquatic flowering plants

Gridzor

Artanish Peninsula

Pine

Hippophae rhamnoides L.

Sevan Peninsula

Armenian gull nesting place

Pelecanus crispus

Salmo ischchan

SEVAN NATIONAL PARK

Salvia verbascifolia Bieb.

Iris pumila L.

Tomanthea aucheri DC.

common for Armenia occur in the lake. The genus Potamogeton L. (pondweed) is especially well represented with seven species occurring in the lake (narrow-leaved Potamogeton pectinatus L., broad-leaved P. natans L., semi-transparent P. perfoliatus L. and others). They all grow either in water or on its surface. They bloom in small greenish flowers emerging from the water and then settle green or gray fruits.

In addition, hornwort (Ceratophyllum demersum L.), water milfoil (Myriophyllum verticillatum L.), crowfoot (Ranunculus kochii Ledeb.), horned pondweed (Zanichellia palustris L.) and different species of duck-weed (Lemna L.) occur in Lake Sevan. Heaps of aquatic plants brought by waves can be seen often on the littoral sands; they consist of the fragments of hornwort and horned pondweed in the mixture with algae, as well as beautiful reddish water milfoil looking like a small floating new-year tree.

The basin of the Argichi River originating in the Vardenis mountains is the only habitat in Armenia for another aquatic plant - opposite-leaved pondweed - Groenlandia densa (L.) Fourr. One more rare aquatic plant trifoliate buckbean - Menyanthes trifoliata L. used to occur in Lake Gilli.

The terrestrial area of the national park surrounds the lake in a narrow band up to the highway. The littoral flora is of secondary origin and mainly consists of artificial stands of pine (Pinus), poplar (Populus), oleaster (Elaeagnus L.), sea-buckthorn (Hyppophae rhamnoides L.) and other species. The grass cover consists of plants adapted to sand as well as weed species. These are blue lettuce (Lactuca tatarica (L.) C.A.Mey.), wormwood (Artemisia austriaca Jacq.), bird spinderflower (Cleome ornithopodioides L.) and different species of genera Potentilla L., Carex L., Veronica L. Duck-weed occurs in small littoral ponds. In summer duck-weed (especially species Lemna minor L.) multiplies intensively and fully covers the surface of ponds. In littoral swamp areas bladderwort (Utricularia vulgaris L.) with whitish flowers and flowering rush (Butomus umbellatus L.) with pink flowers sometimes occur. Crowfoot with yellowish nice flowers often occurs at river mouths and flowing waters.

The fauna of the lake is represented by invertebrates (water fleas - Daphnia, cyclops - Cyclopidae etc.) and vertebrates including mainly fish species. Poor species composition, prevalence of endemics and presence of species adapted to the lake environment again prove that the lake is unique.

Endemic species Sevan trout (ishkhan) - Salmo ischchan is the gem of the lake fauna. It has silvery scale and delicious reddish meat. In the lake it is represented by four ecological races - winter ishkhan, gegharkuni, summer ishkhan and bojak. The races differ from each other externally, by the shape of

the head and body, color of scale and reproduction peculiarities - spawning seasons and grounds. Bojak and winter ishkhan multiply in the littoral area of the lake, summer ishkhan - in the lake and in cold rivers flowing into the lake, while gegharkuni rises upstream to lay spawns. Unfortunately, artificial decrease in water level and pollution of river mouths affected ishkhan. Ishkhan having economic significance due to its nutritional value and great demand appeared in danger of extinction and was registered in the Red Data Book of Armenia.

Sevan beghlou (Barbus lacerta goktschiaicus) is also registered in the Red Data Book of Armenia. Among fish species it is worth mentioning as well Sevan koghak (Varicorhinus capoeta sevangi), Sevan white fish (the hybrid introduced to Lake Sevan from Lakes Ladoga and Chud in the 1920s) and goldfish (silver tsatsan) which was brought to the lake accidentally in 1983. Thanks to its adaptability the latter reproduces itself very well in the lake. The same is true for crayfish. The commercial significance of Sevan white fish became particularly evident during the economic crisis of Armenia. During economic hardship white fish was an essential food product due to its affordable price.

The birds make another important and rich group of the lake fauna. According to data published in 2000 by M. Adamyan there are more than 260 species of birds (Armenian gull - Larus armeniacus, red shelduck - Tadorna ferruginea, common shelduck - Tadorna tadorna, mallard -Anas platyrhynchos, coot - Fulica atra, white-tail eagle - Haliaetus albicilla, lapwing - Vanellus vanellus etc.). There was an abundance of nesting birds (scoter - Melanitta fusca, white-headed duck - Oxyura leucocephala, grey goose - Anser anser, large saw-beak duck - Mergus merganser, grey crane - Grus grus lilfordi etc.) most of which disappeared after the drainage of Lake Gilli in the 1960s. Bird habitats including Lake Sevan, river mouths and littoral swamps suffered badly from the artificial decrease of the lake level.

Pelicans (Pelecanus onocrotalus, P. crispus), common flamingo (Phoenicopterus ruber), scoter (Melanita fusca), mute and whooping swans (Cygnus olor, C.cygnus) and various species of ducks occurring at the national park territory are registered in the Red Data Book of Armenia and the Red Data Book of the USSR.

Among other groups of fauna numerous species of reptiles (lizards - Darevskia unisexualis, D. nairensis, grass-snakes - Natrix natrix, N. tesselata, various species of snakes etc.), amphibians (green toad - Bufo viridis, frogs - Rana ridibunda, R. macrocnemus ect.) occur in the national park.

Sevan Peninsula is one of the largest terrestrial areas of the national park, which was impacted by anthropogenic pressure during years and lost its original natural vegetation. It is edged with small artificial forests; patches of mountain-steppe vegetation have survived only on the hill top of the former island.

Artanish Peninsula is the biggest terrestrial and one of the best conserved areas of the national park. It is regarded as an exceptional monument of nature and was designated as a reserve area. Slopes of different expositions at the altitudes of 2100-2200 meters with the area of about 2500 ha are covered by unique vegetation. The southern rocky slope with caves is of particular interest. The grounds previously covered by water are now covered by artificial forests (pine, poplar, sea-buckthorn etc.). Above there are juniper stands with the dominance of juniper (Juniper polycarpos) as well as the mixture of rose (Rosa L.), barberry (Berberis L.), spirea (Spireae L.), astragalus (Astragalus L.) and prickly thrift (Acantholimon). The meadow vegetation of the higher zone is rich in endemic species. The shores of the Gulf of Artanish are the only habitat of sedge species Carex secale Willd. ex Wahlenb. in Armenia.

Lake Sevan has significant spiritual and material value for Armenian nation. Lake Sevan is a national symbol and its water resources are of vital importance for the Armenian people. The ultimate goal of Sevan National Park is to protect this national wealth which is possible only by joint efforts through the reduction of water withdrawal via the River Hrazdan, raise of the lake water level and protection from wastewaters.

DILIJAN NATIONAL PARK

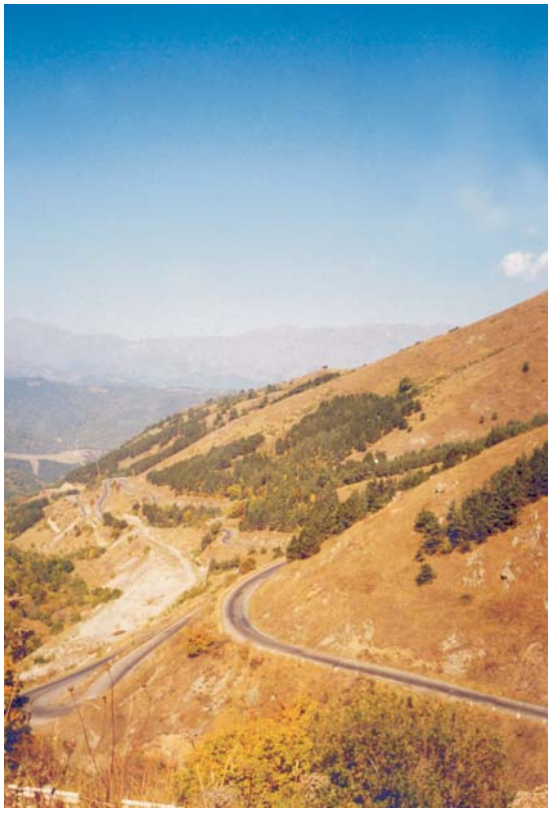
Established: 2002
Area: 24,000 ha
Location: Tavush Marz
Purpose: protection of oak and beech forests
Historical-architectural monuments: Haghartsin Monastery (10-13th centuries), Goshavank Monastery (12-13th centuries), Jukhtak Monastery (11-13th centuries), Matosavank Monastery (10-13th centuries), Akhnabut church (11th century)

Dilijan National Park was established in 2002 (Republic of Armenia Governmental Decree No. 165, February 21, 2002) on the basis of the state reserve with the same name, which in its turn was established in 1958 on the basis of the former Dilijan and Kuybishev Forest Enterprises (ArmSSR Council of Ministers Decree No. P-341, September 13, 1958). The territory of the newly established national park is the same as the territory of the former reserve. It is well known for its forest landscapes, medicinal mineral water springs, nature monuments and historical-architectural monuments.

The change of the status of Dilijan Reserve to Dilijan National Park was conditioned by several objective reasons. Among reasons it is worth mentioning the inevitability of commercial activity in the area, the presence of numerous settlements, including Dilijan with its mineral water resorts, Yerevan-Ijevan railway line passing through its whole territory and others, which had already created zoning typical for national parks.

At present, the general plan of the national park should be designed, including the clarification of the borders and mapping of reserve, economic, recreational and buffer zones of the national park.

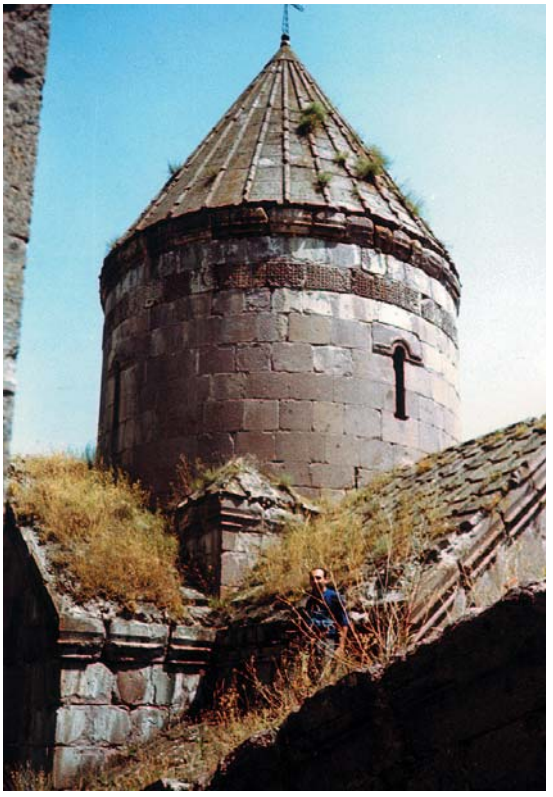
The national park stretches over the slopes of the Pambak, Areguni, Miapor, Ijevan (Kaeni) and Halab mountain ranges at the altitude of 1070-2300 m above sea level. The mountain meadows above this altitude do not belong to the national park. The River Aghstev and its main tributaries – the Rivers Hovajur, Shtoghanajur, Bldan, Haghartsin and Getik run through the national park. In the national park there are Lakes Parzlich, Tzrkalich as well as other scenic lakes.



Dilijan serpentine road

Daphne glomerata Lam.

Forest in the Pambak mountain range



Church in Goshavank

Church in Haghartsin

Papaver L.

Mesoacidalia aglaja

Daphne transcaucasica Pobed.

Ammobiota heba

Fagus orientalis Lipsky

DILIJAN NATIONAL PARK

Eringium gigantheum Bieb.

Swida australis (C.A.Mey.) Pojark. ex Grossh.

Ranunculus kochii Ledeb.

According to data published by N. Khanjyan in 1999 the flora of Dilijan National Park includes 902 species of vascular plants, namely Lycopodium (1 species), Horse-tails (1), Ferns (12), Gymnosperms (7) and Angiosperms (881). About 40 rare species of plants occur here. 29 species of the flora are registered in the Red Data Book of Armenia and 4 in the Red Data Book of the USSR.

The vegetation of the national park is of mesophilous Caucasian type mainly represented by forest associations. It mainly consists of deciduous species such as oak (Quercus iberica, Q. macranthera), oriental beech (Fagus orientalis), common and oriental hornbeam (Carpinus betulus, C. orientalis), which form homogeneous oak, beech and hornbeam forests as well as mixed forests with different combinations of the species mentioned.

Georgian oak (Q. iberica) forests occur on the southern slopes of the middle forest zone and oriental beech forests on the northern slopes. In the upper forest zone forest consists of Q. macranthera. Hornbeam occurs mainly in mixed forests. Oriental hornbeam reaches up to 1500 m above sea level, while common hornbeam up to 2000 m spreading all over the forest zone. Different species of lime (Tilia), maple (Acer) and ash (Fraxinus) grow in the middle forest zone and especially the upper limit of higher forest zone.

Coniferous forests (pine - Pinus, juniper - Juniperus and yew - Taxus) occupy a limited territory in the national park and occur in patches. Pine often makes dense forests in the basin of the River Hovajur on the slopes of the Areguni and Pambak ranges in the vicinity of serpentine Dilijan highway. There are lots of pine trees in Dilijan and on nearby slopes.

Juniper sparse forests spread in the valley of the River Getik especially near the river mouth as well as on the dry slopes of the Ijevan Mountains. Juniperus foetidissima Willd. is the most predominant species among four juniper species occurring in the national park. There are well conserved juniper stands on the rocky slopes of Mount Abeghakhar in the basin of the River Aghstev.

The forests in the national park are rich in fruit trees and bushes such as oriental apple - Malus orientalis, walnut - Juglans regia, cornel - Cornus mas L., plum - Prunus, blackthorn - Prunus spinosa L., pear - Pyrus caucasica Fed., gooseberry - Grossularia reclinata (L.) Mill., different species of black currant - Ribes L. and hawthorn - Crataegus L., medlar - Mespilus germanica, common hazelnut - Corylus avellana (see also Hazelnut Reservation). Many species occurring in the national park are well known as medicinal (Saint John’s wort - Hypericum L., mint - Mentha L., thyme - Thymus L., ziziphora - Ziziphora L. etc.), edible (sorrel - Rumex L., falcaria - Falcaria Fabr., cow parsnip - Heracleum L. etc.),

forage (clover - Trifolium L., sainfoin - Onobrichis L. sea-holly - Eryngium L. etc.) and decorative (iris - Iris L., orchid - Orchis L. etc.) plants.

The western rocky slopes of the Ijevan mountain range and Mount Abeghasar are rich in petrophytes and rare plants. Rocks and cliffs serves as a favorable habitat for numerous rare species such as Armenian Saint John's wort (Hypericum armenum Jaub.et Spach., saxifrage (Saxifraga juniperifolia Adam, S. tridactylites L.), scorzonera (Scorzonera rigida Auch. ex DC.), cephalaria (Cephalaria media Litv.), small scabious (Scabiosa columbaria L.), jasmine (Jasminum fruticans L.) and others. Mount Abeghasar is especially rich in rare species.

Tertiary relicts yew and Caucasian rhododendron (Rhododendron caucasicum Pall.) are the gems of the national park. The small well conserved yew forest located in the basin of the River Polad was designated as a reservation in 1958 (see Akhnabat Yew Grove Reservation).

The second smaller yew forest has been located on the upper stream of the River Aghstev in the gorge Frolova Balka of the Pambak Mountains. Botanists N. Troitski in 1939 and A. Takhtajan in 1954 reported that this younger forest consisting of 100-180 sometimes 220 year-old trees stretched for 4-5 km from the 7^{th} kilometer of Dilijan highway towards Fioletovo village. N. Troitski mentioned also that in the past yew was more abundant. At present, only the remnants of previous dense forest have survived in the form of individual trees in an inaccessible terrain. Groups of yew trees and individual trees occur also over the whole territory of the national park.

Relict species Caucasian rhododendron is also noteworthy. On the territory of the national park it grows on the northern slopes of the Pambak mountains. Rhododendron occurs in the moist well grown meadow vegetation of subalpine zone and stretches westward to Mount Ampasar (the Pambak mountain range) where the largest rhododendron area of Armenia is situated (see Rhododendron Reservation).

The fauna of the national park is also rich. There are about 800 species of beetles as well as numerous species of reptiles (Viper - Vipera lebetina, Armenian and Dali lizards - Darevskia armeniaca, D. dahli etc.), amphibians (lake frog - Rana ridibunda, green toad - Bufo viridis etc.), fish (trout - Salmo fario, barbel or Kura beghlou- Barbus lacertacyri etc.). Birds are also abundant represented by 150 species including black grouse (Tetrao mlokosievicsi), golden eagle (Aquila chrysaetos), bearded eagle (Gypaetus barbatus aureus), Caspian snowcock (Tetraogallus caspius) and others. Over 40 species of mammals are registered in the national park such as red deer (Cervus elaphus),

brown bear (Ursus arctos), fox (Vulpes vulpes), lynx (Lynx), wolf (Canis lupus), wild boar (Sus scrofa), wild cat (Felis silvestris), roe (Capreolus capreolus), badger (Meles meles), squirrel (Sciurus anomalus) and others.

Dilijan National Park is important for the conservation of forest landscapes, recreation and health protection purposes, as well as economic activities due to the presence of favorable conditions.

RESERVATIONS OF ARMENIA

1 **Hazel-nut** 1958, 40 ha
2 **Akhnabat Yew Grove** 1958, 25 ha
3 **Gandzakar** 1971, 6800 ha
4 **Ijevan** 1971, 7800 ha
5 **Getik** 1971, 6000 ha
6 **Gyulagarak** 1958, 2586 ha
7 **Margahovit** 1971, 5000 ha
8 **Rosebay** 1959, 10000 ha
9 **Aragats (alpine)** 1959, 300 ha
10 **Hankavan hydrological** 1981, 9350 ha
11 **Arzakan-Meghradzor** 1971, 14500 ha
12 **Pine of Banx** 1959, 4 ha
13 **Juniper Forest** 1958, 3312 ha
14 **Vordan Karmir** 1987, 200 ha
15 **Sands of Goravan** 1959, 200 ha
16 **Yeghegnadzor** 1972, 4200 ha
17 **Herher** 1958, 6139 ha
18 **Jermuk hydrological** 1981, 18000 ha
19 **Jermuk forest** 1958, 3865 ha
20 **Goris** 1972, 1900 ha
21 **Plane Grove** 1959, 60 ha
22 **Boghakar** 1989, 2728 ha
23 **Sev Lich** 2001, 240 ha

The system of protected areas of Armenia includes twenty-three state reservations. Six of them were established in 1958, five more in 1959. Later on reservations were founded in 1971, 1972, 1981, 1987 and 1989. In 2001 Sev Lich Reserve got the status of a reservation.

By significance and main protected objects there are 8 forest reservations. The rest are of different significance such as for the protection of forest fauna and flora (3), fauna (6), mineral water springs (2), lakes (1), shrubs (1), sands (1) and alpine vegetation (1).

Below several most interesting reservations are briefly described; thereafter, the table provides data about all reservations.

PLANE GROVE RESERVATION

Plane Grove Reservation is located in the vicinity of Shikahogh Reserve at the altitude of 700-800 m in the picturesque valley of the River Tsav which is a left tributary to the River Arax starting from the Khustup Mountains. The grove (8 km long and 50-150 m wide) stretches along the bed of the River Tsav. It continues as much downstream of the River Tsav on the territory of Azerbaijan where it is protected in Bastuchay Reservation (in Azerbaijan the River Tsav is called Bastuchay).

Oriental plane (Platanus orientalis L.) is a long-lived tree (up to 2000 years). Plane tree looks fresh and robust thanks to its gigantic crown and exposed whitish smooth trunk. Plane is also used for greening purposes in urban areas.

In the past, before the 1970-80s the only road to Nerkin Hund village of the distant Syunik Marz used to pass only through a part of the plane grove. According to references five thousand 200-250 year-old trees with the height of 30-45 m and trunk diameter of 2 m were growing in the grove. Century-old trees with hollows also occurred. Natural regeneration by seeds was intensive.

In the 1980s the part of the plane grove became a settlement with standard housing where Nerkin Hund village was resettled. Since then the artificial clearings in the grove have been used for agricultural purposes while nowadays permanent presence of residents endangers the ecological integrity of the grove.

AKHNABAT YEW GROVE RESERVATION

Akhnabat Yew Grove Reservation is located on Mount Tsaghkot of the Miapor mountain range near Aghavnavank village in the basin of the River Polad in the vicinity of Akhnabat church at the altitude of 1500-1800 m. The main species

of the reservation is yew (Taxus baccata L.). Yew is an evergreen, high and beautiful tree with a slender trunk, dark green conical crown and red fleshy berries.

The second name of yew – "karmratsar" ("red-tree" in Armenian) is associated with the color of its wood. Reddish wood of this tree being resistant to fungi, insects and water has been known to the mankind since 3000 BC, when sarcophagi were manufactured out of it. Later on military and household items as well as furniture were made of it. It was also used in the constructions for water supply.

On the territory of the reservation yew grows deep in the mixed forest (beech, oak, maple etc.). 300-400 year-old trees with the height of 25 m and trunk diameter of 70-90 cm occur in the grove. Yew prefers shadow and occupies the second storey of the forest. Yew grows very well in the reservation and reproduces naturally by seeds. However, decorative use of yew branches for flower bunches, as well as cutting of other trees surrounding yew and thus the reduction of dense shadow in the forests can endanger the existence of yew in Armenia.

HAZELNUT RESERVATION

Hazelnut Reservation is situated a few kilometers above Getahovit village on the right bank slope of the River Sarnajur at the altitude of 1400-1600 m. Numerous big higher than 20 m 120-150 year-old hazelnut (Corylus colurna L.) trees with the trunk diameter of about 1 m grow in warm and moist micro-climate of the reservation protected from the cold air coming from the deep gorge. Hazelnut reproduces itself naturally by seeds.

In addition to numerous individual hazelnut trees there is also quite a big homogenous hazel forest in the mixed forest of the reservation, which occurs rarely in the Balkans, Caucasus, Asia Minor, Iran and Armenia. Individual hazelnut trees occur also in the nearby forests.

Corylus colurna is a high tree sometimes up to 50 m with dense pyramidal crown and dark gray cracked trunk. It quite differs from its well known relative bush - common hazelnut (Corylus avellana L.) which occurs abundantly in the forests of Armenia.

Pink hard wood of hazelnut is used as construction material. That is why it is being cut for household purposes, although according to the residents of Getahovit village it had never been cut before and was well protected as a pride of the village. Sometimes it is grown even in the village.

RHODODENDRON RESERVATION

Northern Armenia is the southern limit where Caucasian rhododendron (Rhododendron caucasicum Pall.) occurs. Having survived since the Tertiary Period rhododendron grows in Armenia on the moist foggy slopes of the Javakhk, Bazum and Pambak mountain ranges at the altitude of 1900-2200 m. According to 1973 data its total area in Armenia is about 2000 ha.

Rhododendron Reservation is the largest area in Armenia covered by rhododendron. It is located opposite to Margahovit village on the slope of Mount Ampasar (3053 m) of the Pambak mountain range. Rhododendron is a rare species of Armenian flora. Its evergreen beautiful 20-25 cm high shrubs are covered with hard glossy leather-like leaves and big white or cream colored flowers.

According to botanists, in the not so remote past, in the 1950-60s dense homogenous shrubs of rhododendron used to bloom abundantly reminding flourishing shrubs of the Big Caucasus. However, at present rhododendron area is covered by small shrubs with scarce flowers.

The main reason of the reduction of rhododendron in Armenia is the change of ecological conditions, especially the change of climate, particularly decrease in humidity.

VORDAN KARMIR RESERVATION

Vordan Karmir Reservation is situated between Argavand, Arazap and Sovetakan villages. It is an area where endemic cochineal (Porphyrophora hamelii) occurs in saline soils of the Ararat plain along with halophyte vegetation. Aeluropus littoralis (Gouan) Parl. and Phragmites australis (Cav.) Trin. ex Steud. growing in this area are the main fodder species for the mentioned insect.

Written sources about Ararat cochineal or vordan karmir ("vordan karmir" is "red worm" in Armenian) have been known since the 5th century AD (Movses Khorenatsi, Ghazar Parpetsi etc.). Ancient authors mentioned that cochineal in Armenia was so common on both banks of the River Arax that the soil was red like a carpet and legs of the animals grazing there got colored red.

The natural dye carmine extracted from Ararat cochineal known in the Orient as Armenian "krmizi" ("wine-colored" in Armenian) was superior in its beauty and stability to carmine produced later from Mexican and Polish cochineal. The dye was extracted from the female insects which in certain months - from early

September to mid October and on certain hours - from 6 am to 10-11 am, the most at 9 am emerge on the surface of soil to copulate.

In the past, threads dyed with cochineal carmine were used to weave clothes of Armenian kings. Royal letters and messages from the Catholicos (Patriarch of All Armenians) were written in ink extracted from cochineal. Cochineal dye was also used in medieval manuscripts, miniature paintings and church decorations, as in the Saint Echmiadzin Cathedral. Cochineal dyes reached Europe from Armenia and became a desirable and rare dye for both religious (Armenian Mkhitarian Congregation Church in Venice) and secular (Rembrandt, Aivazovski, Bashinjaghian and others) fine art. Unfortunately, cheap synthetic dyes displaced cochineal and nowadays even the technology of its production has been lost.

In the not so remote past cochineal was more common in the Ararat valley (Armavir, Echmiadzin, Masis and Ararat) and covered the total of 3000 ha. However, as a result of desalination of saline soils this insect became extinct in Ararat Marz and drastically decreased in Armavir Marz. The population of cochineal is also dramatically decreasing in its last habitat - the state reservation.

GORAVAN RESERVATION

Goravan Reservation is located in the vicinity of Goravan village on the left bank of the mid-stream of the River Vedi on the slopes of the Urts Mountains at the altitude of 900-950 m above sea level. It is the largest area of rare sand deserts in Armenia known for unique flora and fauna adapted to sand.

According to scientists the alluvial or proluvial sands of this unique area originated in the geological past from the deposits brought by permanent and temporary water streams (sand, silt, pebbles, gypsum etc.). Very specific psammophyte associations (in Greek “psammos” means sand and “phyton” – plant) as well as unique animals, especially numerous species of insects and reptiles including endemics are typical for sand deserts.

The gems of the sand ecosystem are phog (Calligonum polygonoides L.), milfoil (Achillea tenuifolia Lam.), spurge (Euphorbia marschalliana Boiss.), Oligochaeta divaricata (Fisch. et C.A.Mey.) C.Koch and numerous other psammophyte species such as Astragalus paradoxux Bunge, Kochia prostrata (L.) Schrad., Ceratocarpus arenarius L. etc. as well as species growing on sand such as Rhinopetalum gibbosum (Boiss.) G. Don, Haplophyllum villosum (Bieb.) G. Don, Lepidium vesicarium L., Cousinia macroptera C.A.Mey. ex

DC., Alhagi pseudoalhagi (Bieb.) Desv., Acantholimon vedicum Mirz., A. araxanum Bunge, Ziziphora tenuior L., Z. persica Bunge, Bromus L. etc.

Goravan is the only place in Armenia where relict species phog (Calligonum polygonoides) occurs. It is a leaf-less perennial shrub with dense whitish and green branches sometimes growing as high as 1 meter. Its roots stabilize moving sands. Seeds of phog are disseminated by wind. According to scientists phog is ecologically tied to one of 13 endemic insect species of Armenia occurring in Goravan sands - butterfly Pharaonus caucasicus. This ecological link is important for both species.

Another species is milfoil (Achillea tenuifolia) which usually grows up to 80 cm high. This species is very common for xerophilous associations of the Ararat valley, particularly in wormwood semi-desert. Though milfoil seems to be suppressed in sands and grows not as high, but still it is a predominant species having important ecological role. It is noteworthy that milfoil is surrounded by numerous ant-hills. Ants are vitally tied with it as well as other sand species. Links between ants and numerous plants especially myrmecochorous ("mirminkia" means ant in Greek) species (Euphorbia marschalliana, Oligochaeta divaricata, Ziziphora tenuior, Z. persica etc.) are still studied by scientists. Sand desert plants and animals are not only adapted to life on sands but also are in close contact with each other forming a unique interlinked complex. The presence of sands is one of the vital preconditions for their existence.

Goravan sand desert is gradually shrinking due to human activities, namely animal grazing and use of sand as construction material. The use of the sand desert for economic purposes can disturb the balance of this unique ecosystem and lead to elimination of numerous endemic and relict species.

STATE RESERVATIONS OF ARMENIA AND THEIR MAIN PROTECTED OBJECTS

No	*Name*	*Date of establishment and No. of decree*	*Area (ha)*	*Location (marz)*	*Protected object*
1	Akhnabat Yew Grove	13.09.1958, ArmSSR Council of Ministers Decree No. 341	25	Tavush	Relict yew
2	Aragats Alpine	29.01.1959, ArmSSR Council of Ministers Decree No. 20	300	Aragatsotn	Glacial Lake Kari, alpine meadow
3	Arzakan-Meghradzor	16.11.1971, ArmSSR Council of Ministers Decree No. 375	14500	Kotayk	Forest animals
4	Hazelnut	13.09.1958, ArmSSR Council of Ministers Decree No. 341	40	Tavush	Relict hazelnut, yew
5	Pine of Banx	29.01.1959, ArmSSR Council of Ministers Decree No. 20	4	Kotayk	American pine of Banx
6	Boghakar	10.08.1989, ArmSSR Council of Ministers Decree No. 400	2728	Syunik	Endemic and rare flora and fauna species
7	Gangzakar	16.11.1971, ArmSSR Council of Ministers Decree No. 375	6800	Tavush	Forest animals
8	Getik	16.11.1971, ArmSSR Council of Ministers Decree No. 375	6000	Gegharkunik	Forest animals
9	Juniper Forest	13.09.1958, ArmSSR Council of Ministers Decree No. 341	3312	Gegharkunik	Relict juniper, various species
10	Goris	1972	1900	Syunik	Forest animals
11	Goravan Sands	29.01.1959, ArmSSR Council of Ministers Decree No. 20	200	Ararat	Sand desert ecosystem with unique species
12	Gyulagarak	13.09.1958, ArmSSR Council of Ministers Decree No. 341	2586	Lori	Relict pine forests
13	Yeghegnadzor	1972	4200	Vayots-Dzor	Forest animals
14	Ijevan	16.11.1971, ArmSSR Council of Ministers Decree No. 375	7800	Tavush	Forest animals
15	Hankavan (hydrological)	1981	9350	Kotayk	Hankavan mineral water
16	Herher Forests	13.09.1958, ArmSSR Council of Ministers Decree No. 341	6139	Vayots-Dzor	Relict juniper forest
17	Margahovit	16.11.1971, ArmSSR Council of Ministers Decree No. 375	5000	Lori	Forest animals
18	Rhododendron	29.01.1959, ArmSSR Council of Ministers Decree No. 20	10000	Lori	Relict Caucasian rhododendron
19	Cochineal	03.02.1987, ArmSSR Council of Ministers Order No. 61	200	Armavir	Endemic insect cochineal
20	Jermuk (forest)	13.09.1958, ArmSSR Council of Ministers Decree No. 341	3865	Vayots-Dzor	Oak forests, rare animals
21	Jermuk (hydrological)	1981	18000	Vayots-Dzor	Jermuk mineral water
22	Plane Grove	29.01.1959, ArmSSR Council of Ministers Decree No. 20	60	Syunik	Singular natural grove of oriental plane in the Caucasus
23	Sev Lich	Reserve - 15.10.1987, ArmSSR Council of Ministers Decree No. 683 Reservation - 12.10.2001, Government of Armenia Decree No. 976	240	Syunik	Water resources of volcanic lake

Platanus orientalis L.

Fruits of Platanus orientalis L.

Field research

Porphyrophora hamelii

Argiope sp.

Euphorbia marschalliana Boiss.

Calligonum polygonoides L.

Fruits of Corylus colurna L.

Corylus colurna L.

Flowering Calligonum

Achillea tenuifolia Lam.

DEVELOPMENT PERSPECTIVES OF SPECIALLY PROTECTED NATURE AREAS IN ARMENIA

Specially protected areas of Armenia being mainly of forest protection significance and embracing about the half of the biodiversity of Armenia can not protect the whole diversity of flora and fauna in the country. At the same time, taking into account the trends towards economic development in the country it is essential to designate new protected areas. In addition, taking into consideration the inexpediency of having big protected areas in small countries like Armenia as well as the background of protected areas in Armenia and international experience it is necessary to follow the principle of establishment of small protected areas.

The Ministry of Nature Protection of the Republic of Armenia developed the "National Strategy and Action Plan on the Development of Specially Protected Areas in the Republic of Armenia" approved by the Government of the Republic of Armenia on December 26, 2002 by Protocol Decree No. 54.

It is aimed at creating a system of protected areas designed to ensure international standards in the protection, reproduction and sustainable development of unique landscapes and biodiversity of Armenia. This document outlines the state strategy in the field of specially protected areas of nature, as well as priorities and national action plan.

The national action plan envisages activities needed for the improvement of the legislative framework, management system and financial-economic mechanisms, human resource development and establishment of new protected areas. It proposes also to establish internationally accepted categories of protected areas such as biosphere reserve and natural park, which are new for Armenia and have not been yet set forth in the legislation of Armenia. The national action plan is drafted for 2003-2010.

By the prospective plan it is envisaged to establish Arevik State Reserve in Syunik Marz on the basis of Boghakar Reservation in the Zangezur Mountains, Jermuk and Arpi National Parks in Vayk, as well as two Natural Parks Vorotan and Kirants to protect forest ecosystems in the River Vorotan basin and near Kirants village respectively. The proposed state reservations are aimed at the protection of Khorvirap saline soils, the watershed of the River Mantash, Lake Arpi and the River Akhurian valley, patches of relict aspen forests in Ashotsk, tertiary relict lake of the Lori plateau and ecosystems of alpine Akna and Kaputan Lakes.

The choice of some proposed new protected areas is justified by their geographic location, unique ecosystems, biodiversity and other specific

features. The choice of some others, however, needs to be scientifically justified with the aim to create an integral system of specially protected areas in Armenia and an ecological network ensuring migration routs. Hence, it is necessary to justify scientifically each proposed area applying international experience and up-to-date criteria with the active participation of different specialists and public awareness.

The idea of having a protected area in one of the beautiful places in Armenia - Vayots-Dzor Marz is scientifically justified. Vayk botanical-geographic region, which almost corresponds to the territory of Vayots-Dzor Marz is a territory where Northern Caucasian mesophilous flora meets Southern xerophilous Armenian-Iranian flora resulting in active speciation and creating unique flora with rich genetic diversity. This flora typical only for Vayk and adjacent territories should have already been under protection for the purpose to conserve its rich gene stock.

Designation of a protected area, such as Kirants protected area in the North, should be set in the South of Armenia also. It is urged not only by the need to protect rich xerophilous flora in the South of Syunic Marz or natural forests in Tavush Marz and to establish a regional ecological network, but also by the strategic significance of border neighbouring specially protected areas.

The establishment of new specially protected areas is envisaged to be covered by the state. The state will also finance the establishment of a cadastre for specially protected areas of nature, clarification of boundaries of existing protected areas especially state reserves and mapping, approval of a list of nature monuments, inventory and other activities.

In addition, in the framework of international cooperation it is envisaged to establish a new transboundary protected area on the border of Armenia and Georgia, which will include wetlands of both countries. The idea of including Lake Arpi and adjacent territories in the new protected area is determined by the significance of the lake for bird fauna. Being located on a major migration route Lake Arpi plays an indispensable role as a temporary resting place for migrating birds. However, Lake Arpi being registered as a wetland site for the protection under the Ramsar International Convention on Wetlands still was not designated as specially protected area in Armenia.

Within the framework of a WB-supported project it is planned to develop management plans for Sevan and Dilijan National Parks, introduce monitoring system, conduct applied research, disseminate information, as well as improve the legislation regulating the management of specially protected areas.

There are plenty of unique nature areas in Armenia. In this regard, it is urgent to protect the only saline swamp located in Ararat Marz near the warm mineral springs. Numerous rare flora species occur here, including endemics of Armenia. It would be an incorrigible mistake to lose these relict species which are the last Mohicans of this swamp area.

The state of steppes in Armenia also raises serious concerns. Steppes do not occupy large areas in Armenia and differ from the Russian endless steppes. They are influenced by the terrain and local flora and have their own courses of natural development. Thus, it is necessary to designate an area for their protection in well conserved steppes in Shirak Marz.

The conservation of flora and fauna occurring in tertiary gypsum and red clay areas near Yerevan (Vardashen) is also important. Most of red clays have been processed and a part of them has been lost due to the construction of Sovetashen cemetery. It is urgent to save non-used areas from the irreversible loss.

Another singular plant association is located in the River Azat valley. It spreads along the right river bank opposite to Mount Yeranos. Beautiful gypsum hills are covered by unique plants and animals adapted to gypsum. This is the only such place in Armenia and it is needed to be conserved as it is.

It can be concluded that it is necessary to continue activities on the improvement of the system of specially protected nature areas, establishment of ecological network, as well as the improvement of practical mechanisms of protection in Armenia.

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CONTENTS

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