Final Report of the Project

صندوق محمد بن زايد
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"Conservation of threatened reptiles of Ararat Valley"

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Introduction

The endemic value of the arid ecosystem of Ararat Valley and its importance for conservation is essential. The unique stony semidesert landscape with poorly known endangered plants and animals species is located in the Arax River Valley in southern west region of Armenia. However, unfortunately the biodiversity of the area remained largely unexplored. The biodiversity here is rich by rare, endangered and endemic species, due to their geographic isolation. Among vertebrates animals 17 species are listed in the Red Book of Armenia (2009) and 14 are currently entered in the IUCN Red List (3 of them are listed as CR - critical endangered) species when the invertebrate fauna from this site is almost unknown (IUCN Red List, 2010). The data about plant and fungi diversity here are almost absent.

The following target species of reptiles from IUCN Red List are noted in this territory:

Critically Endangered by the IUCN Red List: persian toad agama (*Phrynocephalus horvathi),* Transcaucasian Racerunner *Eremias pleskei*

Vulnerable by the IUCN Red List of Threatened Species: spur-thighed tortoise (*Testudo graeca armeniaca;* our last study, unpublished data, revealed significant morphological differences between populations of *Testudo graeca armeniaca* from Armavir region and other populations in Armenia, Nagorno-Karabakh Republic and Turkey along Arax River in area of this subspecies).

The following species of amphibian and reptilian are known from Ararat valley (Table 1).

Table 1. Conservation status of amphibian and reptilian species from Ararat Valley

N	Species	Armenian Red Book	IUCN
	Amphibia		
1	*Pelobates syriacus*	+	+
2	*Bufo variabilis*	-	+
3	*Hyla savignyi*	-	+
4	*Pelophylax ridibundus*	-	+
5	*Rana macrocnemis*	-	+
	Reptilia		
	Turtles		
1	*Mauremys caspica*	-	-
2	*Testudo graeca*	+	+
	Lizards		
3	*Cyrtopodion caspium*	-	-
4	*Laudakia caucasia*	-	-
5	*Phrynocephalus horvathi*	+	+
6	*Pseudopus apodus*	-	-
7	*Trachylepis septemtaeniata*	+	-
8	*Eumeces schneideri*	+	-
9	*Ablepharus bivittatus*	-	+
10	*Eremias strauchi*	-	+
11	*Eremias pleskei*	-	+
12	*Lacerta strigata*	-	-
13	*Lacerta media*	-	+
14	*Darevskia raddei*	-	+
15	*Ophisops elegans*	-	-
	Snakes		
16	*Typhlops vermicularis*	-	-
17	*Natrix natrix*	-	+
18	*Natrix tessellate*	-	-
19	*Platyceps najadum*	-	+
20	*Hemorrhois nummifer*	-	-
21	*Hemorrhois ravergieri*	-	-
22	*Dolichophis schmidti*	-	+
23	*Zamenis hohenackeri*	+	+
24	*Eirenis collaris*	-	+
25	*Eirenis punctatolineatus*	-	+
26	*Eirenis modestus*	-	+
27	*Rhynchocalamus melanocephalus*	+	+
28	*Telescopus fallax*	+	+
29	*Malpolon monspessulanus*	-	+
30	*Montivipera raddei*	+	+
31	*Macrovipera lebetina*	-	-

The Ararat Valley forms the lowest part of the Ararat depression, which is still an area of active tectonics. This area is covered with alluvial and proalluvial sediments. The average elevation of the Ararat Valley is 900 m; it is partially semi-desert, with green orchards and gardens along the Araks River. Most of the Ararat Plain is now irrigated and cultivated and is the major agricultural basin for Armenia.

The semideserts are fast disappearing, being converted to agricultural use. Desert and semidesert soils were managed for cultivation for centuries, but in recent years extensive irrigation projects have been introduced. These areas are now devoted to fruit and vegetable crops, flowers, and wineyards. Natural habitats in this zone are thus greatly reduced, and those that remain are threatened because of human activities. In summary, cultivated lands now cover from 80% to 90% of the area, and natural ecosystems have been extensively damaged as the result of agricultural exploitation, including intensive, uncontrolled irrigation, which has led to increasing soil erosion, soil salinity, and pollution.

Conservation of biodiversity is a top national priority in Armenia according to the needs for fulfillment of commitments of Armenia under the United Nations Conventions on Biodiversity, Climate Change and To Combat Desertification. With the high concentration of plant, fungi and animal species, Armenia occupies one of the first places in the world (biodiversity hotspots), with an index of more than 100 species on one square kilometer (Convention on Biological Diversity, 2009). During the last decades the area of semidesert has undergone major anthropogenic transformation, resulting in the degradation of the natural environment. Almost all the land is in private hands, and much of these holdings are ploughed. The biodiversity of the area remain largely unexplored. Thus, under habitat transformation the exceptional biodiversity of semidesert is attackable and endangered. As result many species have almost vanished from the Ararat Valley. The biodiversity hotspots occur on small habitat patches and needs urgent protection. This virtual island of habitat is

situated among agricultural lands and in close proximity to the villages. Due to the rocky terrain of this site, this “island” maintains a natural composition. Plants and animals take refuge here, in what is still relatively pristine habitat. The main treats here are:

- ✓ Destruction, fragmentation and deterioration of the habitats
- ✓ The intensive agriculture. A considerable part of lands are cultivated, on some areas overgrazing of cattle is observed.

The immediate conservation activities on this territory are urgent because our opportunity to save the unique and seriously declining populations of plants and animals in Armavir region of Armenia is rapidly decreasing.

A

B

Fig. 1. The semi-desert landscape of Armavir (A) and Ararat (B) provinces

Project goal and objectives

This project is aimed at getting the first-hand knowledge on ecology, distribution and abundance of target critical endangered (*Phrynocephalus horvathi, Eremias pleskei*) and vulnerable species (*Testudo graeca*) of reptiles and using it as a background for further conservation-oriented projects. The proposed project starts to collect the data to compile multifaceted databases of assessing current diversity, distribution and conservation status of animals, and prepare the recommendations of protection of a unique semidesert ecosystem.

Thus this pilot project has following parallel, interactive goals: 1) Assessment of biodiversity and conservation status of target species reptiles of Ararat Valley; 2) Development the recommendations of protection of endangered species of semidesert ecosystems; 3) Development of research potential for Armenian scientists providing to enthusiastic students a unique opportunity to be involved in conservation activity 4) Educational program among local people.

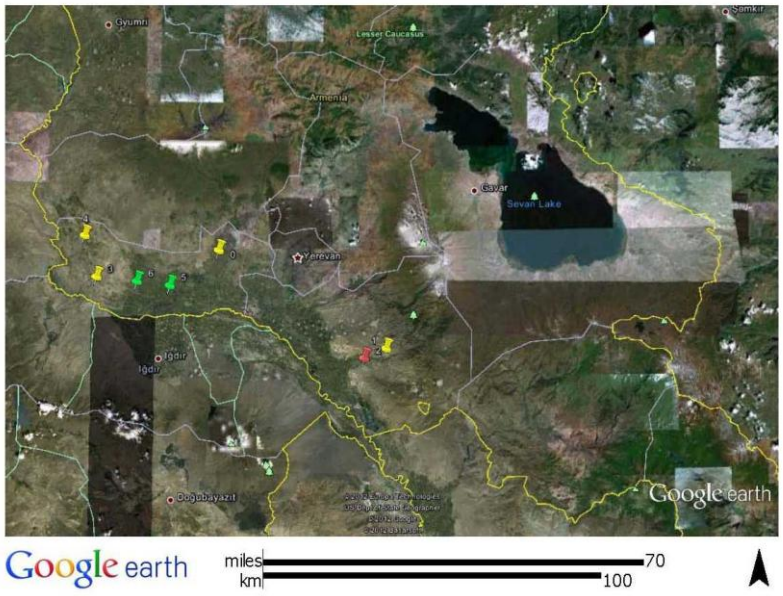
The project will encompass the following activities:

- Inventory and monitoring of reptiles;
- Develop of recommendation for conservation of rare and endemic species and establishment necessary pre-conditions for creation of wildlife sanctuary in Armavir region;
- Raising public awareness and implementation of environmental educational program among local people.

Progress in objectives achieving

Field investigation

Throughout the months of September - October 2011 and May- July 2012, a team of volunteers from Young Biologist Association were attempted to survey the biodiversity of Ararat and Armavir provinces of Armenia. The primer aim was to estimate the current status of the populations of rare species of reptiles and prepare a scientific sound ground for recommendation to proper protection measures according to the legislative, administrative, cultural and economic frameworks. The researched populations are presented on map and table 2.



Yellow points - the sites of *Testudo graeca*
Green points- the sites *Phrynocephalus horvathi*
Red point - the site of syntopy of *T.graeca, Ph.horvathi, E. pleskei*

Table 2. Number of found populations of endangered reptiles during 2011-2012 surveys.

Species	Number of sites where was found species	
	Ararat Province	Armavir Province
Testudo graeca	2	3
Eremias pleskei	1	0
Phrynocephalus horvathi	1	2

Phrynocephalus horvathi

This species is listed as Critically Endangered because it has experienced a loss of over 80 percent of its habitat over the past 3 generations (12 years) due to land conversion for agriculture and urbanization. In addition, its range is highly fragmented and the population is small and declining (IUCN, 2012). There are about 20 localities of *Ph. horvathi* was known in Armenia according to literature (Chernov, 1939; Dal, 1949; Darevsky, 1957; Aghasyan, 1985; Aslanyan, 2004, Ananeva et al, 2006, Melnikov et al, 2006, Arakelyan et al 2011). The most part of the natural habitats of this species were destroyed during last 50 years. Our study has shown that this species are on the edge of extinction and face serious threats to their continued survival. The level of alarm here is the highest. This species have survived on few small islets isolated from each other with extremely low size of populations.

This species was found in Armavir and Ararat provinces of Armenia.

Armavir Province, Armenia

Among surveyed populations, the habitats of lizards from Armavir region is the most endangered. The main threat of them is active opening up new lands for vineyards. We have found this species at two sites in 2011-2012 instead expected three sites. In the third site we have met animals in 2010, but during 4 expeditions in 2011 and 2012 no lizards were found here. Probably this population became extinct. The abundance of lizards in Armavir province in vicinity of Armavir city in July 2011 was 3 lizards on 5 hectares (4 hours searching), in September, 2011 - 6 lizards on 5 hectares (4 hours searching). The census of May- June 2012 no lizards were found on the same territory (10 hours of searching). Similar on next population in Armavir region our accurate searching was not found lizards (8 hours of searching).

Ararat Province, Armenia

In Ararat region occurs the most known population. However our studies of 2011-2012 have shown that the size of population is very low. The abundance in July, 2011 were 2 lizards on 3 hectares (4 hours of searching), when in May, 2012 were found 1 lizard (12 hours of searching) and in June 2012 no lizards were found (4 hours of searching). The comparison with census of different years on same territory have shown deep decline of population size of *Ph. horvathi*

1955 – 10-12 individuals/ha (Dahl, 1954; Darevsky, 1957)

1981 – 2-3 individuals /ha (Aghasyan, 1985)

2005 – 11 individuals /ha (Tadevosyan, 2006)

2011, 2012 – 1 individuals /ha (our result)

Fig. 2. Phrynocephalus horvathi from Ararat province

Eremias pleskei

This species listed as Critically Endangered because of a drastic population decline (IUCN, 2012). According to our preliminary surveys this species is most endangered due to limited habitats. This species is generally associated with sandy semi-desert enclaves.

We have found *E. pleskei* only in Ararat province. All our trips to Armavir province have not got any results. The sites have known from literature and from our previous surveys were empty and fully destroyed.

The abundance in Ararat province in July, 2011 was 16 lizards on 3 hectares during 4 hours of searching. In the same place the census in May of 2012 has shown high density on very restricted territories - near 250 individuals on hectare. This species was met on 6 hectares. The visible lizards on surface in middle of June became less – 23 lizards on hectare.

Fig. 3. Eremias pleskei from Ararat province

Testudo graeca armeniaca

Among threatened animals of Ararat Valley is a spur-thighed tortoise (*Testudo graeca* Linnaeus 1758) *T. graeca* which is listed as Vulnerable in IUCN Red List of Threatened Animals, Convention on International trade in endangered species of wild fauna and flora (CITES, App. II), Bern Convention (App. II), Red Data Book of Armenia. Surveying the habitat of populations of most distinct form of rare subspecies of tortoises *Testudo greaca armeniaca*, an alarming situation has been detected. During the last decades this land has undergone major anthropogenic transformation, resulting in the degradation of the natural environment. Our recent surveys have detected following situation in two provinces of Armenia where living tortoises.

Armavir Province, Armenia

The one of known population of Armavir region located in west southern side of Armenia near to border of Turkey was found during 2008 surveys. Three *T. graeca* were found there in 2011 (9 hours of searching) and two tortoises was found during 2012 survey (14 hours of searching). The landscape here is typical rocky semidesert. The soil is of the gray mosaic semi-desert type. The volcanic hilly land among flat terrain is presented by the pumice fields scattered by individual small thorny shrubs. The soft, friable soil is very suitable for rich semidesert vegetation. Agriculture is the main threat for the ecosystems here. The horizontal range of area is 1000-1500m above sea level. The climate is continental and arid. The wild area proposed for conservation is located on territory approximately 120 hectares.

The population from vicinity of Armavir city is in very poor conditions. It is almost destroyed. However in 2012 we have found one male of *T.graeca* in wild. The local people communicated that very rare meet with tortoises in this area.

The third known population we visit only once and have not seen any tortoises, however the local people communicated that tortoises here are common and often met in gardens and vineyards.

Ararat Province, Armenia

In framework of this project we also survey the other populations of *T. graeca* at Ararat Valley. With help of bachelor student of Biological Faculty of Yerevan State University Mnacakanyan Metaksya, who resident of Ararat region, we start to study the population of *T. graeca*. From May till July, 2011 we have recorded 9 tortoises: 3 males and 6 females. During period of May – June 2012 was recorded 6 individuals (2 males, 4 females). The population occurs in mountain region in surrounding by Dahnak, Yeranos and Urci mountain chains of northern west part of Urtc range along Vedi River. The tortoises were met on open sites. The climate here is arid.

The soil is clayey semidesert with mean carbonate contests. The soil is very soft and suitable for burrowing. The vegetation is xerophilous. *T. graeca* occur in biotopes on the slopes of low-trunk sparse bushes and on the semi-desert areas of intermountain region.

We have no met with *T. graeca* at the second known population (12 hours of searching). However the local people have met with them.

Thus, surveying the habitat of populations of tortoises of Ararat Valley has shown very low density of populations of tortoises.

Fig. 4.Testudo graeca armeniaca from Armavir province

Environmental Educational Program

Seminars

Two seminars were organized in school of Shenik village, Armavir Province and in school of Armavir city where was been presented the lecture about biodiversity of Armavir region and about rare species of lizards and tortoises where were presented the following subjects:

- Biodiversity – informations about biodiversity of Ararat Valley;
- Reptiles importance to humans and role in ecosystems.
- Importance of conservation of *reptiles*

25-minutes class seminars were conducted in two classes using the slide-show. To check effectiveness of the seminar questionnaires were filled out by the participants. The test revealed that the seminars were very effective. More than 80% of seminar participants learned the presented information. Near 70 pupils were participated in the seminars. Calendars and booklets were distributed.

During May 2012, we made one scientific presentations that were organized by Young Biologists NGO meetings.

Fig. 5. Presentation made at the seminar "Day of Biodiversity"

Distribution of booklets and calendars

The booklets which are referring to the actual state of endangered species and common information about this species, as well as calendars entitled “I am on the edge of extinction” were prepared and printed (fig 6 and 7) and then distributed.

Fig. 6. Calendars for distribution

We distributed booklets to schoolchildren and local people of the surrounding villages in order to increase local knowledge and achieve positive attitude concerning environment and wildlife.

Also some calendars and booklets were distributed among zoologists at the International Conference “Biodiversity and conservation problems of fauna in Caucasus” Yerevan, Armenia 26-29 September, 2011 and to herpetologists at SEH European Congress of Herpetology and DGHT Deutscher Herpetologentag, Luxembourg and Trier, 25-29 September, 2011. The electronic version of the booklet will be available at the YBA website (www.yba.am).

Fig. 7. Booklet for distribution

Capacity building program

In the framework of this project we have organized field practice stages for students of the Faculty Biology and members of the Young Biologists Association who worked with us. We have hired one Bachelor student who will prepare her thesis on the topic conservation of *Testudo graeca armeniaca.* In this project we have trained some biology students from the members of Young Biologists Association NGO Conservation and Biodiversity Research Group and biology students from Yerevan State University. Two Bachelor students were prepared and successfully defended their Bachelor thesis on topic of conservation of *Phrynocephalus horvathi* and *Testudo graeca.*

Fig. 8. Field work with students

Potential threats

The principal threats to endangered species are habitat destruction because of agricultural, mining activities, fragmentation and modification, as well as poaching.

1. HABITAT TRANSFORMATION. Destruction, fragmentation and deterioration of the habitats
2. COLLECTION OF REPTILES BY LOCALS AND POACHERS
3. OVERGRAZING.
4. ROAD MORTALITY. The habitat is intersected by many dirt roads. In spite of infrequent traffic, agricultural machinery causes substantial deterioration of habitats and kills animals themselves. Roads also cause habitat fragmentation and increased isolation of patches.
5. SYNANTHROPIC ANIMALS, primarily dogs, damage nests and kill reptiles themselves and their clutches. For example among adult tortoises, there were specimens with characteristic posttraumatic shift of corneous scutes.

Recommended actions for conservation of endangered reptiles

Conservation actions need to encompass different levels of conservation measures.

Habitat Protection

As the habitat loss and destruction are the main cause of the population decline in most of reptiles, habitat management is widely recognized as a stem in conservation action plans.

Establishing the new specially protected natural territories for the conservation of natural populations of the reptiles will protect the habitat from agricultural influence. It would also prevent the overstocking of grazing animals. Environmental management programs are urgently needed for the some hotspots on Ararat Valley.

1. Wherever possible, habitat corridors should be established and maintained to ensure connectivity between isolated patches of the range.
2. Livestock grazing should be stringently controlled.

Species Management

The implementation of a captive breeding program based on genetically screened animals is important to save small populations from inevitable extinction. The reintroduction program will release captive bred animals into sufficiently areas. Captive breeding is an important approach to save the tortoises and endangered lizards population from imminent extinction.

Scientific Research

- Additional more extensive field studies are required to map current distribution of these apparently rare reptiles and learn more about its biology and life history.
- It is essential to monitor the known populations. Large-scale presence-absence surveys should be undertaken
- It is important to continue systematic (morphometric and genetic) and ecological field research activities that we began in this project. Detailed well-designed surveys and genetic studies are most desperately needed.

Education

Raising public awareness and implementation of environmental educational program among local people are important tools of long-term conservation strategy. To reduce anthropogenic threats, a local community has to be involved in conservation development program in future projects which will train highly motivated local community youths.

Thus, the first step of our studies has shown on critical situation of populations of lizards and tortoises in Ararat Valley. The most urgent conservation measurements have to be conservation education program among locals in places of critical habitat of animals, breeding program, establishment of protected sites, improvement the legislation against to animals' dealers. We are planning to continue the field researchers in Ararat Valley, educational program among locals, and preparing the draft Action Plan which will be submitted to Ministry of Natural Protection.

Literature

AGHASYAN, A.L. 1985. Sovremennoe sostoyanie redkikh vidov reptilii Armenii i puti ikh sokhraneniya. [Recent state of rare species of reptiles of Armenia and the ways of their conservation]. *Biologicheskii Journal Armenii* 38(8):661-665 (in Russian).

ANANJEVA, N.B., N.F. MYASNIKOVA, AND A.L. AGHASYAN. 2006. Analiz rasprostraneniya persidskoi krugolovki *Phrinacephalus persicus* (Agamidae, Sauria) v doline reki Araks: opit GIS kartirovaniya [Analysis of distribution of Persian sun-watcher lizards *Phrinacephalus persicus* (Agamidae, Sauria) in Valley of Arax River: the experience of GIS maping]. *Sovremennaya Gerpetologiya* 5(6):18-40 (in Russian).

ARAKELYAN M., DANIELYAN F., CORTI C., SINDACO R., LEVITON A. Herpetofauna of Armenia and Nagorno-Karabakh. Salt Lake City SSAR, 2011: 154 pages

ASLANYAN, A. 2004. Ecologo-faunisticheskii analiz yasheric Armenii [Ecologic - faunistic analysis of lizards of Armenia]. PhD dissertation. Yerevan. 141 pp (in Russian).

CHERNOV, S.A. 1939. Gerpetologicheskaya fauna Armenii i Nakhichevanskogo kraya. [Herpetological fauna of Armenian SSR and Nakhichevan ASSR]. *Zoological sbornik armyanskogo filial AN SSSR* 1:79–194 (in Russian).

DAL, S.K. 1954. *Zhivotnii mir Armyanskoi SSR Pozvonochnie [Animal Kingdom of Armenian SSR Vertebrates]*. Yerevan. 415 pp (in Russian).

Darevsky, I. S. 1957. Fauna amphiby i presmykajushchikhsya Armenii i ego zoogeograficheskу analiz.

IUCN. 2009. IUCN Red List of Threatened Species (ver. 2009.1). Available at: www.iucnredlist.org. (Accessed: 22 June 2009).

MELNIKOV, D.A., N.B. ANANJEVA, A.L. AGHASYAN, AND M. RAJABIZADEH. 2008. [Historical background and taxonomic status of the Persian Toad-Headed Agama *Phrynocephalus persicus* De Filippi, 1863 and Horwath's Sun-watcher toad-head agama *Phrynocephalus helioscopus horvathi* Mehely, 1894]. *In:* Ananjeva et al. (eds.). *The problems of herpetology. Proceedings of the 3th Meeting of the Nikolsky Herpetological Society 9—13 October 2006, Putschino*, St. Petersburg:286-297 (In Russian)

TADEVOSYAN, T.L. 2006. New data on abundance and distribution of the persian toad-headed lizard in the Goravan sands sanctuary, Armenia. Electronic Journal of Natural Sciences. National Academy of Sciences of the Republic of Armenia. 2 (7): 45-50