

Detailed Final Report

Exploration and identification of the new habitats for Papilionaceae endangered species in Armenia

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Project Goals:

The research Project referees to monitor 4 types of endangered and critically endangered plant populations of Papilionaceae and to study limited distribution of these species. The scopes of the interest are *Medicago astroites*, *Astragalus commixtus*, *Astragalus holophyllus*, *Sphaerophysa salsula*, which are included in the Red Book of Armenia and IUCN List, ABC.

During the project it was expected to

1. Monitor the population state, to collect seeds and plant samples
2. Explore distribution of the plants in Yerevan floristic region with the aim of identifying new locations
3. Raise awareness of the population

Medicago astroites Fisch et C.A.Mey.

Literary data

M. astroites Fisch. Et C.A.Mey - included in the Red Book of Armenia (Trigonella astroides) as endangered species EN 1 ab(i,ii,iii) + 2 ab(i,ii,iii), EOO is 1139 km², AOO is 12 km², the number of locations is 3. The extent of occurrence is less than 5000 km², the area of occupancy is less than 500 km² (http://www.mnp.am/red_book_fauna/eng/p308.html).

The conservation actions are not implemented. It is included in the IUCN Red List as a Least Concern (www.iucnredlist.org/details/19379282/0).

Description. Annual plants. Stems 5–15 cm, thin, branched from the base. Inflorescence 3–8-flowered, umbel-shaped, peduncle about 1 cm long. Corolla yellow, 4–5 mm long. Legumes horizontally stellate divaricate, straight or slightly curvate, 10–20 x 1 mm. *M.astroites* is an annual herb, which grows in lower mountain belt, at the altitudes of 600–1300 meters above sea level, on dry stony places, desert, dry rocky slopes, steppes, maquis, pine forest and cultivate land. Flowering in May, fruiting in June.

Fieldwork results:

7 new locations of *M. astroites* were found, 2 of which are located near Yerevan, 5 in Ararat region, near the villages of Kaghtsrashen, Narek and Dvin (Table 1):

Table : *Medicago astroites Fisch. et C. A. Mey.*

Habitats	Coordinate	Distribution and the number of plants	Additional Information
^{NEW} City Yerevan, 6 th Masiv, Armbiotechnology Scientific and Production center (map 2)	N 40° 11' 18" E 44° 33' 16" Alt. 1266m	Area - 1 ha Target > 500 plants	Currently, the area is uncultivated, but it could be put under construction
^{NEW} v. Nubarashen, road bends - not far from Yerevan (map 3, 4)	N 40° 4' 34.4555", E44°32'42.72756" Alt. 1060m	Area – 0.5 ha Target > 100 plants	The point is located along the road. Any road-building work will eliminate the populations
^{NEW} Ararat region, village Qaxcrashen, on the way to the village Narek (map 5)	N 39° 59' 10" E 44° 38' 17" Alt. 989m	Area – 0.5 ha Target > 500 plants	On the road verge, road construction will eliminate the population
^{NEW} Ararat region,	N 39° 59' 39"	Area – 0.5 ha	On the roadside, road

Qaxcrashen-Narek road (map 5)	E 44° 39' 02" Alt. 1022m	Target > 500 plants	construction will eliminate the population
^{NEW} Ararat region, before village Narek, the foot of the mountain (map 5)	N 40° 01' 25" E 44° 41' 06" Alt. 1106m	Area – 0.5 ha Target > 500 plants	In safety
^{NEW} Ararat region, Qaxcrashen-Dvin road (map 5)	N 39° 59' 26" E 44° 37' 20" Alt. 971m	Area – 0.5 ha Target > 500 plants	On the roadside, road construction will eliminate the population
^{NEW} Ararat region, village Dvin, Dvin ancient city (map 5)	N 40° 01' 13" E 44° 34' 37" Alt. 911m	Area – 1 ha Target > 500 plants	In safety

As the table shows, *M. astroites* is a widespread species. Out of the program, in Meghri, surrounding of the village Nrnadzor (Nyuvad) and the 3rd known point of *M. astroites* were visited. The surveyed populations are relatively in a good condition and are still in safe.

As a result of the research, it has been found that

1. This plant is a pioneer plant. It grows in a crude and sandy soils, where there are no other plants. It is one of the first plants that grows in desert lands, creating the primary humus and enriching the soil with nitrogen (due to symbiosis with nitrogen fixing bacteria). *M. astroites* were grown even on the construction sand that had been brought about a year ago.
2. *M. astroites* does not like to grow with other plants. It gradually disappears, when the space occupied by *M. astroites* invades by other plants.
3. Gives a lot of leafy seeds and actively proliferates. *M. astroites* does not have severe specification to symbiotic bacteria, it can symbiosis with any specific strain of the plant from *Trigonella* genus

Anthropogenic factor on *M. astroites* is minimal, it can be considered even favorable - road-building and other similar works contribute to the spread of the plant, as the plant prefers nitrogen-free and non-vegetated lands.

Populations are quite unstable - after growing for 3 years in the same area, it begins to yield its territory to competitor plants. And 7 years later it will not be possible to detect *M. astroites* in the same place anymore.

At the same time, a new population of *M. astroites* can be found in other arched and non-vegetated area.

***Astragalus commixtus* Bunge**

Literary data

***Astragalus commixtus* Bunge** - Is listed in the Red Book Armenia as a Critically endangered species: CR B 1 ab(i,ii,iii) +2 ab(i,ii,iii). AOO is 4 km², the number of locations is 1, the extent of occurrence and area of occupancy are less than 10 km² (http://www.mnp.am/red_book_fauna/eng/p258.html). The conservation actions are not implemented. It is included in the IUCN Red List as a Least Concern (www.iucnredlist.org/details/19379282/0).

Description: Annual plant 10 cm, densely covered with strict hairs. Leaves 2–7 cm long, pinnate; leaflets in 3–7 pairs, at apex obtuse or slightly emarginated. Inflorescence 1–5-flowered. Corolla light violet. Legumes shortly densely pubescent, 10–30 x 3 mm, linear, falcate, with revolute rostellum. *A.commixtus* is an annual herb which grows in lower mountain belt, at the altitude of 900 meters above sea level, in semi-deserts, steppes, in saline soils, on clay, stony slopes. Flowering from March to April, fruiting from April to June.

Fieldwork results:

One new location of *A.commixtus* was found. New habitat is located near the village of Nubarashen - not far from Yerevan (Table 2).

Table 2: *Astragalus commixtus* Bunge

Habitats	Coordinates	Distribution area and number of plants	Additional Information
Khor Virap , Ancient Artashat fortress, The nearby slopes of the church complex (map 6)	N 39°52'47.67'' E 44°34'21.52'' Alt. 838m	Are - 1 ha Target > 200 plants	In safety
^{NEW} v. Nubarashen, road bends - not far from Yerevan (map 3, 4)	N 40° 4' 34.4555", E44° 32' 42.72756", Alt. 1060m	Area - 0.5 ha Target 300 plants	The point is located along the road. Any road-building work will eliminate the populations

The territory of Khor Virap and Ancient Artashat fortress is under protection and is in safety. Our new point is located near Nubarashen village, along the road, thus any construction activity may endanger plant populations.

This year we had some problems with the expeditions related to *A.commixtus* survey

First of all, the appearance of the plant was unknown, there were no photos to identify the plant, the size of the plant varied from 1 to 3 cm and reached only 5-7 cm at the time of the fertilization.

In addition, according to the data, the flowering of *Astragalus commixtus* occurs from March to April, but this year, spring in Armenia came with a delay of one. As a result, three expeditions during March-April months were unsuccessful. Only in the middle of May, it was possible to find a plant and to collect samples, herbaria and to take photos.

A.commixtus is an annual plant, thus, its growth is strongly depend on weather conditions, the vegetation period is 2.5-3 months, besides, only 25% of the observed plants yield fruit.

***Astragalus holophyllus* Boriss.**

Literary data:

***Astragalus holophyllus* Boriss.** - included in the Red Book of Armenia as endangered species EN 1 ab(i,ii) + 2 ab(i,ii) Endemic of Armenia. EOO is 640 km², AOO is 32 km², the number of locations is 4. The extent of occurrence is less than 5000 km², the area of occupancy is less than 500 km² (http://www.mnp.am/red_book_fauna/eng/p265.html).

Part of the population grows in "Sands of Goravan" Reservation included into "Khosrov Forest" State Reserve. It is included in the IUCN Red List as a vulnerable species (<http://www.iucnredlist.org/details/199923/0>).

Description. Stemless plant. Scapes coming from radical leaf rosette. Leaves simple, shortly petiolate, ovate–rounded or almost reniform, densely appressed pubescent on the both sides. Scapes short, up to 5 cm long, 3–7–flowered. Corolla pink. Legumes elliptic–oblong, 4–5 x 1, 5 cm. Taxonomically isolated species, belonging to monotypic section Holophyllum Boriss. *A. holophyllus* is a perennial plant which grows in lower mountain belt, at the altitudes of 800–1000 meters above sea level, on dry stony slopes consisting of marly limestone, in sandy desert. The density of the plants in the habitat is 20–30 individuals per 1 square kilometer. Flowering from April to May, fruiting from May to June.

Fieldwork results:

New locations were not found. Ավելին՝ գրականության մեջ նշված 4 հայտնի կետերից միայն մեկում է բույսը հայտնաբերվել՝ in Red hill - Yeranos mountain range, հնարավոր է, որ մյուս 3 կետերում արդեն անհետացած է (Table 3): Այս բույսն արտաքին տեսքով շատ նման է *Astragalus sukaczevii* Derv. et Jelenevsky -ին, և նրանց հեշտ է շփոթել:

Moreover, *A. holophyllus* was found only in one point (Red hill - Yeranos mountain range) along 4 known points. Possibly the other 3 points already exhausted (Table 3). This plant is very similar to the *Astragalus sukaczevii* Derv. Et Jelenevsky, and they are easy to confuse.

Table 3

***Astragalus holophyllus* Boriss**

Habitats	Coordinates	Distribution area and number of plants	Additional Information
Ararat region, village Aygezard, Yeranos mountain range, Red hill (map 7)	N 39° 57' 49" E 44° 37' 55" Alt. 1032m	Are - 1 ha Target -25-30 plants	Had been repeatedly grazed by sheep and the plant currently is in a deplorable state.

In 2016, only 25-30 plants of *A. holophyllus* were discovered in the Red hill, whose age was about 10-30 years old. There was no young plant in the area. The reason was clear during 2nd visit in 2017.

Although there is almost no grass in the *A. Holophyllus* habitats, it has been repeatedly grazed by sheep. In addition, there was a stream of stones in places where sheep's past, thus, many last year registered plants were densely covered with stones. Plants were grazed in the flowering and fruiting period, and so it was not possible to collect seeds.

The territory is located in the community of Aygezard village, and on this occasion, during organized meeting with shepherds, resident of the village and community leader, it was urged not to graze sheep in that area.

Unfortunately, it was useless. The only shelter for the village lies on the other slope of the Red hill and the shortest path to the village passes through the target area.

For protection of the territory and for status change, suggestion was made to the Minister of Nature Protection.

Sphaerophysa salsula DC.

Literary data

Sphaerophysa salsula DC -Is included in the Red book of Armenia as a vulnerable species: VU* B 1 ab(i,ii,iii) + 2 ab(i,ii,iii). EOO is 190 km², AOO is 16 km², and the number of locations is 2. The extent of occurrence and the area of occupancy are less than 500 km² (http://www.mnp.am/red_book_fauna/eng/p304.html). It is included in the IUCN Red List as a Least Concern (<http://www.iucnredlist.org/details/19891638/0>).

Description. Perennial herbs. Stems erect, 30–100 cm. Leaves imparipinnate; leaflets 6–11–paired, adpressed pilose, grayish, elliptic, obtuse. Inflorescence 7–15–flowered. Corolla purple, 10–12 mm long. Legume on long peduncle, inflated, membranous, glabrous, 2–2, 5 cm long. *S. salsula* is a perennial herb which grows in lower mountain belt, at the altitudes of 800–900 meters above sea level, disturbed sites, along roadsides, in salt marshes, along the banks of streams. Flowering from June to July, fruiting from July to August.

Fieldwork results:

Three new locations of *S. Salsula*, were found. Two of them are located in Ararat region, near Armash and Yeranos villages, the third one-in Armavir region near Metsamor Historical-Archeological Museum (Table 4).

Table 4: *Sphaerophysa salsula DC.*

Habitats	Coordinates	Distribution area and number of plants	Additional Information
Ararat region, city Ararat, Former railway station area, Solt Marshes	N 39° 47' 43" E 44° 43' 20" Alt. 839m	Area- 2 ha, Target> 200 plants	Salt marsh area is located very close to the road, under the direct influence of human activities. Signboards are required
^{NEW} Ararat region, village Armash, before the fishpond (map 8)	N 39° 47' 55" E 44° 45' 50" Alt. 823m	Area- 1 ha, Target> 500 plants	Grassland
Ararat region, village Armash, fishpond area (map 8)	N 39° 47' 8" E 44° 45' 49" Alt. 818m	Area- 3 ha, Target> 300 plants	Is it safe?

NEW Ararat region, village Yeranos, cultivated field	N 39° 47' 5" E 44° 49' 13" Alt. 820m	Area- 0.5 ha, Target > 200 plants	The impact of human activity could lead to the elimination of the population
NEW Armavir region, before Metsamor Historical-Archeological Museum, on the sides of the canal	N 40° 07' 33,1" E 44° 11' 21,1" Alt. 845m	Area- 0.5 ha, Target 50-60 plants	The impact of human activity could lead to the elimination of the population
Armavir region, the territory of Metsamor Historical-Archeological Museum	N 40° 07' 38,9" E 44° 11' 15,9" Alt. 852m	Area- 1 ha, Target 100 plants	Is it safe?

Taking into consideration that *S. Salsula* lives in damp areas, in the boggy soils, near the rivers and lakes, all the lakes and reservoirs in the Ararat and Armavir regions, the entire length of Kasakh River were explored. Unfortunately, the plant has not been found in these areas. It is explained by the fact that these territories are deserted, even on the banks of the river Kasakh, the vegetation was very poor and were represented with salty plants and Alhagi.

To understand what hinders *S. Salsula's* spread, we have made some experiments has been done.

1. Seed germination have been tested

Collected seeds were germinated in the field condition and in the laboratory condition` 100 seeds for each. During one month (September-October) all 200 seeds were germinated in a 100%.

2. The plants frost resistance has been tested.

In the field conditions, during cold winter months, all cultivated plants were frozen and destroyed, whereas, in the laboratory conditions, at room temperature, all cultivated plants are still growing and after becoming a mature plant they will be transported to the natural environment.

Thus, it can be concluded that the main factor limiting the spread of plants is natural conditions, particularly cold winter.

The territory of Metsamor Historical-Archeological Museum and the plants there are growing there are under protection and they are safe.

The area of Solt Marshe gradually descends thanks to natural causes, and the Red Book plants are in danger; The vegetation is gradually replaced by Alhagi. We met Eranos and Armash with the provinces and talked about the protection of *S. Salsula*.

There was a meeting with Yeranos and Armash community councils and during which the way of protection of *S. Salsula* was discussed.

According to the information provided by them, *S. Salsula* habitats has not been used for agricultural purposes, they are used only as grasslands.

The blooming period of *S. Salsula* is from May to late autumn, in July and August and during harvesting period, there are dried fruits, seeds and flowers are in one plant at the same time. Observations have shown that the local population is mowing and transporting *S. Salsula* with a grass which contributes spreading of seeds.

The new locations were found mainly on the roadside, as well as around artificial reservoirs and fishponds.

Other research results

During study of the floristic region of Yerevan, other plant species were discovered which are registered in the Red Book of Armenia. The results are summarized in the table 5 below.

Table 5

Discovered plants			
Habitat	Coordinates	Distribution and the number of plants	Other
Ararat region, city Ararat, Former railway station area, Solt Marshes	N 39° 47' 43" E 44° 43' 20" Alt. 839m	Alhagi pseudalhagi (Bieb.) Desv.	
		Microcnemum coralloides (Loscos et Pardo) Font-Quer	Red book EN
		Linum barsegianii Gabrielian et Dittr.	Red book CR
		Iris musulmanica Fomin	Red book EN
		Falcaria falcarioides (Bornm. et Wolff) H. Wolff	Red book CR
		Juncus effusus L.	
		Trifolium campestre Schreb.	
		Epilobium palustre L.	
		Abutilon theophrasti Medik.	
		Ononis pusilla L.	
		Elytrigia juncea (L.) Nevski	
		Phragmites australis (Cav.) Trin. ex Steud.	
		Glycyrrhiza echinata L.	
Glycyrrhiza glabra L.			
^{NEW} Ararat region, village Armash, before the fishpond	N 39° 47' 55" E 44° 45' 50" Alt. 823m	The area was mowed, plant species could not be determined.	
Ararat region, village Armash, fishpond area	N 39° 47' 8" E 44° 45' 49" Alt. 818m	Alhagi pseudalhagi (Bieb.) Desv.	
		Juncus effusus L.	
		Trifolium campestre Schreb.	
		Epilobium palustre L.	
		Abutilon theophrastii Medik.	
		Elytrigia juncea (L.) Nevski	
		Phragmites australis (Cav.) Trin. ex Steud.	
		Glycyrrhiza echinata L.	
Glycyrrhiza glabra L.			
^{NEW} Ararat region, village Yeros,	N 39° 47' 5" E 44° 49' 13"	Alhagi pseudalhagi (Bieb.) Desv.	
		Juncus effusus L.	

cultivated field	Alt. 820m	Abutilon theophrastii Medik.	
		Phragmites australis (Cav.) Trin. ex Steud.	
		Glycyrrhiza glabra L.	
NEW Armavir region, before Metsamor Historical-Archeological Museum, on the sides of the canal	N 40° 07' 33,1" E 44° 11' 21,1" Alt. 845m	Alhagi pseudalhagi (Bieb.) Desv.	
		Phragmites australis (Cav.) Trin. ex Steud.	
		Glycyrrhiza echinata L.	
		Glycyrrhiza glabra L.	
		Lactuca serriola L.	
		Lactuca tatarica (L.) C. A. Mey.	New point
		Chenopodium album L.	
		Salsola camphorosma Iljin	
		Epilobium hirsutum L.	
Armavir region, the territory of Metsamor Historical-Archeological Museum	N 40° 07' 38,9" E 44° 11' 15,9" Alt. 852m	Alhagi pseudalhagi (Bieb.) Desv.	
		Phragmites australis (Cav.) Trin. ex Steud.	
		Glycyrrhiza echinata L.	
		Glycyrrhiza glabra L.	
		Chenopodium album L.	
		Salsola camphorosma Iljin	
Ararat region, village Qaxcrashen, on the way to the village Narek	N 39° 59' 10" E 44° 38' 17" Alt. 989m	Euphorbia glareosa Pall.	
		Lepidium vesicarium L.	
		Hordeum murinum L.	
		Capparis spinosa L.	
		Artemisia vulgaris L.	
		Sedum hispanicum L.	
		Taeniatherum crinitum (Schreb.) Nevski	
		Երիզաքիստ երկարամազ	
		Glaucium grandiflorum Boiss. et Huet.	
		Zygophyllum fabago L.	
		Stachys lavandulifolia Vahl	
		Iris elegantissima Sosn.	Red book EN, New point

		<i>Gladiolus atrovioleaceus</i> Boiss.	
NEW City Yerevan, 6 th Masiv, Armbiotechnology Scientific and Production center	N 40° 11' 18" E 44° 33' 16" Alt. 1266m	<i>Chardinia orientalis</i> (L.) O. Kuntze	
		<i>Onobrychis hajastana</i> Grossh.	Red book EN, New point
		<i>Medicago minima</i> (L.) Bartalini	
		<i>Alhagi pseudalhagi</i> (Bieb.) Desv.	
		<i>Quercus macranthera</i> F. et M. ex Hohen.	
		<i>Cerasus incana</i> (Pall.) Spach	
NEW Ararat region, Qaxcrashen-Narek road	N 39° 59' 39" E 44° 39' 02" Alt. 1022m	<i>Euphorbia glareosa</i> Pall.	
		<i>Lepidium vesicarium</i> L.	
		<i>Hordeum murinum</i> L.	
		<i>Capparis spinosa</i> L.	
		<i>Artemisia vulgaris</i> L.	
		<i>Sedum hispanicum</i> L.	
		<i>Taeniatherum crinitum</i> (Schreb.) Nevski	
		<i>Glaucium grandiflorum</i> Boiss. et Huet.	
<i>Zygophyllum fabago</i> L.			
NEW Ararat region, before village Narek, the foot of the mountain	N 40° 01' 25" E 44° 41' 06" Alt. 1106m	<i>Euphorbia glareosa</i> Pall.	
		<i>Lepidium vesicarium</i> L.	
		<i>Hordeum murinum</i> L.	
		<i>Capparis spinosa</i> L.	
		<i>Artemisia vulgaris</i> L.	
		<i>Sedum hispanicum</i> L.	
		<i>Taeniatherum crinitum</i> (Schreb.) Nevski	
		<i>Glaucium grandiflorum</i> Boiss. et Huet.	
<i>Zygophyllum fabago</i> L.			
NEW Ararat region, Qaxcrashen-Dvin road	N 39° 59' 26" E 44° 37' 20" Alt. 971m	<i>Euphorbia glareosa</i> Pall.	
		<i>Lepidium vesicarium</i> L.	
		<i>Hordeum murinum</i> L.	
		<i>Capparis spinosa</i> L.	
		<i>Sedum hispanicum</i> L.	

		Taeniatherum crinitum (Schreb.) Nevski	
		Glaucium grandiflorum Boiss. et Huet.	
		Zygophyllum fabago L.	
NEW Ararat region, village Dvin, Dvin ancient city	N 40° 01' 13" E 44° 34' 37" Alt. 911m	Euphorbia glareosa Pall.	
		Lepidium vesicarium L.	
		Hordeum murinum L.	
		Capparis spinosa L.	
		Artemisia vulgaris L.	
		Sedum hispanicum L.	
		Taeniatherum crinitum (Schreb.) Nevski	
		Glaucium grandiflorum Boiss. et Huet.	
		Zygophyllum fabago L.	
		Meghri, surroundings of the village Nrnadzor (Nyuvad)	N 38° 54.865" E 46° 27.691' Alt. 557m
Amygdalus nairica Fed. et Takht.	Red Book EN		
Cercis griffithii Boiss.	Red Book CR		
Cerasus incana (Pall.) Spach			
Ararat region, village Aygezard, Yeranos mountain range, Red hill (Karmir sar)	N 39° 57' 49" E 44° 37' 55" Alt. 1032m	Euphorbia marschalliana Boiss.	
		Euphorbia glareosa Pall.	
		Buffonia takhtajanii Nersesian	Red book CR New point
		Paronychia kurdica Boiss.	
		Astragalus szovitsii Fisch. et C. A. Mey.	Endemic
		Saponaria viscoza C.A. Mey.	New point
		Lepidium vesicarium L.	
		Centaurea arpensis (Czer.) Wagenitz.	Red book EN New point
		Crupina vulgaris Cass.	
		Allochrysa versicolor (F. et M.) Boiss.	
Khor Virap, the nearby slopes of the Monastic complex	N 39° 52' 47.67" E 44° 34' 21.52" Alt. 838m	Astragalus latifolius Lam.	
		Silene ruprechtii Schischk.	
		Astragalus ampopmountainus Kar. et Kir. (=A. persepolitani)-	
		Cistanche armena	Red book EN
		Papaver paucifoliatum (Trautv.) Fedde	

		<i>Silene spergulifolia</i> (Willd.) Bieb.	
		<i>Amberboa turanica</i> Iljin	Red book EN
		<i>Euphorbia marschalliana</i> Boiss.	
		<i>Eremostachys laciniata</i> (L.) Bunge	New point
NEW City Yerevan, route to village Lanjazat, after Nubarashen district, road curves	N40°4' 4.4555" E44°32'42.72756 Alt. 1060m	<i>Amberboa moschata</i> (L.) DC.	Red book EN
		<i>Aegilops cylindrica</i> Host	
		<i>Capparis spinosa</i> L.	
		<i>Aegilops tauschii</i> Coss.	
		<i>Hordeum murinum</i> L.	
		<i>Zygophyllum fabago</i> L.	
Ararat region, nearby v. Tigranashen	N 39°47.154 E 044°56.369 1309m	<i>Iris lycotis</i> Woronow	Red book EN
		<i>Lathyrus cicera</i> L.	
		<i>Scorzonera gorovanica</i> Nazarova	Red book EN
		<i>Gladiolus atrovioleaceus</i> Boiss.	
		<i>Astragalus szovitsii</i> Fisch. et C. A. Mey.	Endemic
		<i>Vicia anatolica</i> Turrill	
		<i>Tomanthea daralaghezica</i> (Fomin) Takht.	Red book EN
		<i>Bungea trifida</i> (Vahl) C. A. Mey.	
		<i>Chardinia macrocarpa</i> K. Koch	Red book VU
		<i>Centaurea arpensis</i> (Czer.) Wagenitz.	Red book EN
		<i>Astragalus latifolius</i> Lam.	
<i>Astragalus sukaczewii</i> Derv. et Jelenevsky	Red book VU		
Ararat region, on the way to Garni, northern shores of the reservoir Azat	N40°4'44.14202 E44°37'25.19357 Alt. 1077m	<i>Eremostachys moluccelloides</i> Bunge	
		<i>Astragalus sukaczewii</i> Derv. et Jelenevsky	Red book VU
		<i>Amberboa moschata</i> (L.) DC.	Red book EN
		<i>Hedysarum formosum</i> Fisch. et C. A. Mey.	
		<i>Hedysarum micropterum</i> Bunge	Red book VU
Ararat region, on the way to Garni	N40°6' 0.0849" E44°39'5.54899 Alt. 1248m	<i>Astragalus mesites</i> Boiss. et Buhse	
City Yerevan, route to Lanjazat village,	N40°7' .09948" E44°41' 6.8264"	<i>Astragalus macrocephalus</i> Willd.	
		<i>Astragalus eriopodus</i> Boiss.	Red book EN

surroundings of the village Lanjazat	Alt. 1368m	Lens ervoides (Brign.)Grande	Red book EN New point
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