

Final Report of the Project

“Identification of conservation status of ground-beetles of Procerus species-complex (Carabidae, Carabus) in Armenia and elaboration of protection measures”

Application ID: 24964-1



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Project background

Subgenus *Procerus* of genus *Carabus* is one of the most beautiful and at the same time most vulnerable group of the family Carabidae. All the *Procerus* are wingless beetles, which leads, in particular, to active speciation processes which are getting as a result of very restricted distribution of each forming taxon. The specific and infra-specific taxa of *Procerus* including those of Armenian fauna are of great national, regional and global conservation interest. But there are no effective conservation measures for *Procerus* in Transcaucasia and, in particular, in Armenian. Till now only sole taxon from Armenian fauna (*Procerus scabrosus fallettianus* Cavazzuti, 1997 – according to modern taxonomy: *Carabus (Procerus) caucasicus fallettianus*) was estimated and included into the Red Book of the Republic of Armenia getting status Vulnerable (VU) according to guidelines of IUCN Red List (Aghasyan, Kalashyan (eds.), 2010). But currently it is clear that estimation was made for complex of taxa and surveys must be remade for assessment of each subordinate taxon of *Procerus* from the area in Southern Armenia previously referred to *P. s. fallettianus*. Besides, special research and assessment need *Procerus* taxa reported from Northern Armenia.

According to recently published data, 6 subspecies of *Carabus (Procerus)* are reported from Armenia; in opposition to previous classification (Cavazzuti, 1989, 1997; Cavazzuti & Myska 2004), all they are referred to *C. (P.) caucasicus* Adams, 1817 (Cavazzuti & Kozlov, 2016). These are as follows:

- *C. (P.) c. fallettianus* Cavazzuti, 1997 – Southern Armenia (described as *P. scabrosus* ssp.);
- *C. (P.) c. nakagomei* Cavazzuti & Kozlov, 2016 – Southern Armenia;
- *C. (P.) c. myskai* Cavazzuti, 2004 – Southern Armenia (described as *P. elbursianus* ssp.);
- *C. (P.) c. colchicus* Motschulsky, 1844 – Transcaucasia, including Armenia (Březina et al., 2017);
- *C. (P.) c. antonkozlovi* Cavazzuti, 2014 – Northern Armenia;
- *C. (P.) c. tatyanaorokhova* Cavazzuti, 2014 – Northern Armenia.

Preliminarily all of subordinate taxa of *Procerus* in Armenia can be assessed as Endangered or Critically Endangered using mainly Criterion B of IUCN Guidelines (IUCN, 2012a, b). Associated habitats of all *Procerus* taxa are forests of different types and some post-forest areas. Majority of these habitats is under more or less pronounced anthropogenic pressure (e.g., due to legal and illegal forest use) excluding few PAs. Giving to the target taxa surveyed in the framework of the Project legal protection status (through inclusion into country's officially approved Red Book) will made them so-called “umbrella species” which will support the protection of containing habitats as well. According to the Red Book of Armenia, *P. scabrosus fallettianus* is protected in “Shikahogh” State Reserve, in “Arevik” National Park and “Zangezur” State Sanctuary (Aghasyan, Kalashyan, *l. c.*). But re-

estimation of taxonomy of *Procerus* taxa and analysis of distribution of *P. s. fallettianus* has shown that the latter does not occur in these PAs. Thus, existing Protected Areas are not covering areas of all the taxa of *Procerus*, and creation of the new PAs is quite desirable.

Survey area covered territories in the Provinces of Tavush, Lori and Syunik of Armenia including the sites previously known as inhabited by *Procerus* taxa. Some of these localities are of great conservation importance being some portions of country's IBA-s and IPA-s and areas important for insect fauna conservation preliminarily allocated in the framework of Dr. G. Karagyan's RSG Projects https://www.rufford.org/files/17140-2%20Detailed%20Final%20Report_0.pdf

Project goal and objectives

Overall goal of the Project was elaboration of complex measures aimed to study and conservation of Armenian *Procerus* taxa and their habitats, and proposal of these measures to the stakeholders for further implementation.

To achieve the goal the following objectives were supposed:

- identification of taxonomic composition of *Procerus* in Armenia, delimitation of taxa;
- elucidation of their distribution and abundance;
- assessment habitat conditions and major threats both current and potential;
- elaboration of Action Plans for all the taxa distinguished including delimitation and planning of PAs necessary for taxa conservation, creation of respective documents and their submission to the Governmental bodies;
- preparation and submission of proposals for inclusion of target taxa into National Red Book and into IUCN Red List;
- rise of awareness of stakeholders including conservationists' community, authorities of different levels, local communities, etc.;
- increasing of capacities of local educational facilities (schools, colleges) and rise of the level of understanding of the importance of insect conservation among teachers and young generation;
- training of young scientists and conservationists for improvement of their skills in researches and implementation of conservation measures and public awareness activity.

Creation of GIS-based database including all the data above mentioned was supposed in my Project proposal.

Progress in objectives achieving

Activities carried out

Field works:

Expeditions were carried out to the several localities of Tavush, Lori, and Syunik Provinces of Armenia during April-October, 2018 (with general duration of 50 days). Besides myself, in all expeditions participated also Dr. Mark Kalashyan (research scientist-entomologist) and PhD student Noushig Zarijian, as well as assistant investigator Dr. Gayane Karagyan, all from our Scientific Center. Besides, Ms. Meri Mazmnyan and Ms. Serine Fahradyan (Master students from Yerevan State University) and Ms. Elya Khachatryan (Master student from Armenian State Pedagogical University) were involved in some expeditions and laboratory researches as well. Dr. George Fayvush (from Institute of Botany, NAS RA) participated in several of our expeditions as an experienced geobotanist for estimation of habitats of *Procerus* beetles.

During expeditions were observed localities previously known as inhabited by *Procerus* taxa and the sites with the habitats potentially suitable for these beetles.

The following expeditions were carried out to the following localities (see Maps in Fig. 1):

- 26-30 April (5 days): Tavush Province (env. Ijevan, Ditavan, Azatamut, Artsvaber, Gosh).
- 1-5 May (5 days): Lori Province (env. Alaverdi, Sanahin, Haghpat, Tsaghkashat, Teghut, Shamlugh, Dsegh).
- 16-25 May (10 days): Syunik Province (env. Goris, Khndzoresk, Halidzor, Tatev, Svarants, Tandzaver, Verin Khotanan, Kajaran, Aygedzor, Shvanidzor, Gyumorants, Shikahogh, Chakaten, Nor Arajadzor).
- 17-24 June (8 days): Syunik Province (env. Tatev, Svarants, Goris, Khndzoresk, Nor Arachadzor, Kajaran vill., Lichk, Shvanidzor, Gyumorants, Shikahogh).
- 6-11 July (6 days): Lori Province (env. Sanahin, Haghpat, Tsaghkashat, Teghut, Shamlugh, Dsegh).
- 3-6 August (4 days): Tavush Province (env. Ijevan, Ditavan, Artsvaber, Gosh).
- 19-23 September (5 days): Syunik Province (Goris, Nor Arachadzor, Kajaran, Lichk, Shvanidzor).
- 12-14 October (3 days): Lori Province (env. Tsaghkashat, Teghut, Shamlugh).
- 19-22 October (4 days): Syunik Province (Khndzoresk, Nor Arachadzor, Kajaran, Shvanidzor).

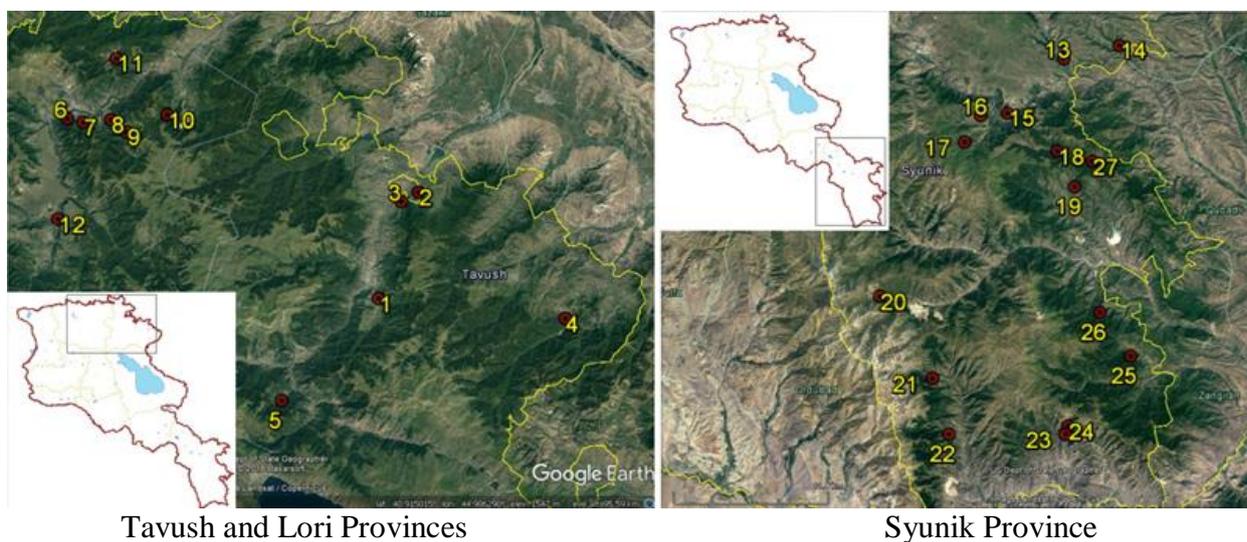


Fig. 1. Maps. Observation localities:

	Tavush prov.	loc. 9	Tsaghkashat	loc. 18	Tandzaver
loc. 1	Ijevan	loc. 10	Teghut	loc. 19	Verin Khotanan
loc. 2	Ditavan	loc. 11	Shamlugh	loc. 20	Kajaran
loc. 3	Azatamut	loc. 12	Dsegh	loc. 21	Lichk
loc. 4	Artsvaberd		Syunik prov.	loc. 22	Aygedzor
loc. 5	Gosh	loc. 13	Goris	loc. 23	Shvanidzor
	Lori prov.	loc. 14	Khndzoresk	loc. 24	Gyumorants
loc. 6	Alaverdi	loc. 15	Halidzor	loc. 25	Shikahogh
loc. 7	Sanahin	loc. 16	Tatev	loc. 26	Chakaten
loc. 8	Haghpat	loc. 17	Svarants	loc. 27	Nor Arajadzor



Fig. 2. Field work' activities.

For estimation of abundance of the target taxa traditional entomological methods appropriate for study of big herpetobian Carabidae species were applied. Series of pitfalls (about 50 on each series) were putted in the survey areas and were checked daily during all the expeditions with releasing of the majority of beetles caught (see Fig. 2). Since *Procerus* species have somewhat daily activity, implementation of the route (transect) method for count of beetles was applied as well. The routes of about 300 m -1 km with width 3-5 m on each side were passed at morning and evening hours. Single specimens from 8 localities were fixed for further morphological, and, besides, karyological and molecular studies.

Some data on the presence of the certain *Procerus* taxa were obtained during conversations with local people.

New data on the target taxa' biology, abundance, estimation of containing ecosystems condition and identification and description of factors threatening were revealed as well.

Coordinates of all beetle registration sites were fixed using GPS tool; GIS-based database was created. Since *Procerus* are the subject of commercial use we are not giving the exact GPS data in this Report which is in open access.

Some observations were made to assess the current threats to the containing ecosystems. It was realized that the majority of threats are due to results of semi-legal tree-cutting, excluding few PA-s.

During our expeditions we could not register two target taxa (*P. caucasicus colchicus* Motsch, *P. c. tatyanaorokhova* Cavazzuti) from six expected in the Project.

Pictures of some Armenian *Carabus (Procerus) caucasicus* and their habitats are presented below (Figs 3-6).



Fig. 3. *C. (P.) c. fallettianus* Cavazzutti and its habitat, env. Goris.
(Photo by G. Karagyan)



Fig. 4. *C. (P.) c. myskai* Cavazzuti and its habitat, env. Kajaran.
(Photo by G. Karagyan)



Fig. 5. *C. (P.) c. nakagomei* Cavazzuti & Kozlov and its habitat, env. Shvanidzor.
(Photos by G. Karagyan & T. Ghrejyan)



Fig. 6. *C. (P.) c. antonkozlovi* Cavazzuti and its prey *Helix buchi*, env. Ditavan.
(Photos by G. Karagyan & T. Ghrejyan)

Laboratory studies and data analysis:

Laboratory studies, other in-door works and data analysis were carried out nearly fully corresponding to the Project proposal, as follows (with notes of the level of implementation):

1. Delimitation of the target taxa from each other, incl. revealing of distinguishing characters (e.g. morphological, geographical, genetic if appropriate), completion of the list of taxa, elaboration of identification key (from July 2018 to March 2019) – ***done, some genetic data are under analysis****;
2. Elucidation of distribution and abundance of each subordinate taxon (from July 2018 to March 2019) – ***done, with supposed further precise definition using genetic data***;
3. Creation and continuous completion of GIS-based database on target taxa (April 2018 to March 2019) – ***done, genetic data supposed to be included***;
4. Assessment of all the taxa distinguished using IUCN Criteria and preparation of fact sheets for each taxon basing on the database created (October 2018 to February 2019) – ***done***;
5. Carrying out public awareness activity in local communities, especially among young generation (April to October 2018; January to March 2019) - ***done***;
6. Training of young conservationists both immediately involved into the Project and young staff of our Center and other educational institutions (during all time of the Project implementation) - ***done***;
7. Reporting, data dissemination and scientific publications:
 - elaboration and submission to the authorities of RA Action Plan for all target taxa with special attention paid to the creation of the new PAs (February to March 2109) – ***in the process of preparation and submission***;
 - publication of booklets and posters/calendars on *Procerus* taxa and their dissemination among stakeholders (September 2018 to March 2019) – ***mainly done, but further activity covering additional communities is supposed***;
 - submission of the fact sheets to the respective authorities for inclusion of the target taxa into Armenian Red Book and IUCN Red List (February to March 2019) – ***in the process of preparation and submission***;
 - preparation of the data obtained for publication in international scientific journals (January to March 2019) – ***in the process of preparation and submission***;
 - submission of reports to the Rufford Small Grants Foundation, including mid-term (September 2018) and final (April 2019) – ***done***.

* Due to the kindness of Dr. V. Gusarov (Oslo University, Norway) we have had the opportunity to make DNA sequences for 8 populations belonging to 4 subspecies; the results are still under analysis.

The main outcomes achieved.

During Project implementation were surveyed several populations of Armenian *Procerus*, besides, were analyzed all available collection and literature data, some information was got from local peoples and PAs staff. As a result, **GIS-based database** was created and completed with all available data above mentioned. The database is continuously completing with the new data obtained from genetic studies, new information from local communities and PAs staff, etc.

Basing on our surveys and database information the following outcomes were achieved:

Four Armenian *Carabus (Procerus)* subspecies from six previously reported from the country were registered by us during fieldwork. All available collection material was approximately mapped and morphologically studied. Morphological data obtained by us confirmed opinion of P. Cavazzuti and A. Kozlov (2016) that all Armenian *Procerus* belong to the species *Carabus (Procerus) caucasicus* Adams, 2017. These are: *C. (P.) caucasicus antonkozlovi*, *C. (P.) c. fallettianus*, *C. (P.) c. myskai*, *C. (P.) c. nakagomei* and *C. (P.) c. tatyanaorokhova*; the latter till now is known by collection materials only, including type specimen and single specimens from the collections of our Centre. As for *C. (P.) c. colchicus*: no specimens from Armenia which could be reliably referred to this subspecies were found among all the specimens studied. Thus, it was preliminarily stated that all the records on it must be referred to *C. (P.) c. tatyanaorokhova* and/or *C. (P.) c. antonkozlovi*.

All the taxa reliably known from Armenia were mapped and preliminarily assessed as threatened with different status (See Maps on Fig. 7 and Table 1).

Geographical distribution and abundance.

From the territories surveyed (See Maps on Fig. 7) *Procerus* beetles were registered in the following localities (included data revealed during fieldwork and label data from collection materials). Abundance was estimated using methods described above. It must be underlined that abundance was low in all populations surveyed.

C. (P.) caucasicus antonkozlovi – Tavush Province: env. Ijevan, Gandzakar*, Ditavan, Khashtarak, Artsvaberd, Gosh. Abundance was estimated near Ditavan and Khashtarak; by route method for about 1 km route (3 times passed in each locality) 1-2 specimens were registered in May and June; by series of pitfalls in May-July 2018 were found 3 specimens;

C. (P.) c. fallettianus – Syunik Province: env. Goris, Khndzoresk, Halidzor*, Tatev*, Svarants*, Tandzaver*, Verin Khotanan*; rather abundant subspecies, in Khndzoresk by rout counted 2-4 specimens on 1 km along 4 rout passed in May-June and October. Pitfalls were not used;

C. (P.) c. myskai – Syunik Province: env. Nor Arachadzor*, Kajaran vill., Aygedzor, Lichk*. Single specimen was registered by rout method near Kajaran (4 times passed in May, June and September). Four specimens were collected using pitfalls put at the same locality for period May-October, 2018.

C. (P.) c. nakagomei – Syunik Province: env. Shvanidzor *, Nrnadzor. Only one specimen was registered during 4 routs passing near Shvanidzor in May-June and September-October, 2018. By pitfalls put in May-October 2018 at the same locality only two specimens were collected.

C. (P.) c. tatyanaorokhova – Known from Lori Province by type specimen (Shamlugh) and two specimens in the collection of our Centre (Sanain*, Dsegh*).

In the list above the localities where the beetles were registered during our fieldwork are underlined. 11 new localities inhabited by *Procerus* of five subspecies were revealed during fieldwork and revision of collection material (marked “*”).

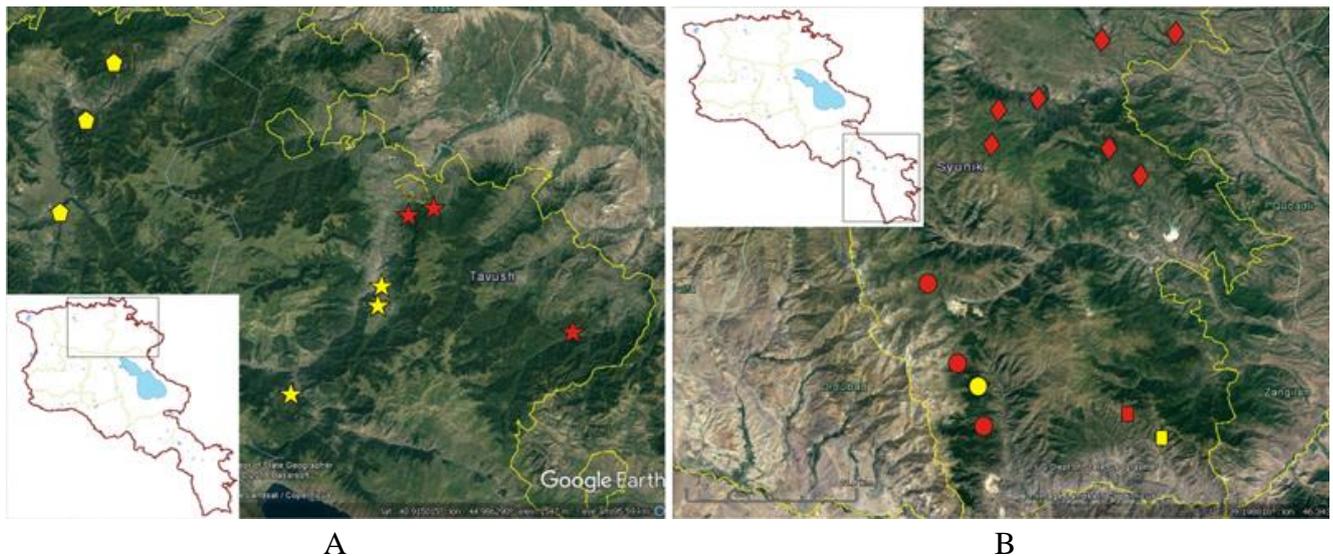


Fig. 7. Distribution maps for subspecies of *Carabus (Procerus) caucasicus* Adams of Armenian fauna.

A – Lori and Tavush Provinces (☆ *C. (P.) caucasicus antonkozlovi*, ⬠ *C. (P.) c. tatyanaorokhova*);

B – Syunik Province (◊ *C. (P.) c. fallettianus*, ○ *C. (P.) c. mysikai*, ◻ *C. (P.) c. nakagomei*).

(Symbols in red color – habitats where *Procerus* beetles were registered during our fieldwork; in yellow – distribution data obtained from collection materials).

Key to identification of Armenian subspecies of *Carabus (Procerus) caucasicus* Adams, 1817 was prepared – see below:

1(2) Elytra elongate, more than 1.6 times as long as wide. Pronotum 1.7-1.85 as wide as long. Subspecies from North-Eastern Armenia..... *C. (P.) c. antonkozlovi* Cavazzuti, 2014.

2(1) Elytra shorter, 1.44-1.55 times as long as wide

3(4) Smaller, body length less than 42 mm. Pronotum 1.8-1.95 as wide as long. Subspecies from Northern Armenia*C. (P.) c. tatyanaorokhova* Cavazzuti, 2014.

4(3) Bigger, body length more than 44 mm except of obviously affected specimens. Subspecies from Southern Armenia.

5(6) Pronotum subquadrate, with anterior margin width sub equal to posterior one. Most South-Eastern Armenia (Meghri region).*C. (P.) c. nakagomei* Cavazzuti & Kozlov, 2016

6(5) Pronotum distinctly narrowed anteriorly.

7(8) Posterior margin of pronotum distinctly curved, with posterior angles more pronounced. Medial longitudinal sulcus of pronotum distinct*C. (P.) c. fallettianus* Cavazzuti, 1997

8(7) Posterior margin of pronotum nearly straight, posterior angles less pronounced. Medial longitudinal sulcus of pronotum somewhat hidden by rather rough surface sculpture.....

.....*C. (P.) c. myskai* Cavazzuti, 2004

The key is translated to Armenian, and it is planned to disseminate it among stakeholders.

Basing on the data obtained assessing and categorization of 5 subspecies of Armenian *Procerus* for inclusion into the next edition of the country's Red Book was carried out (Table 1).

Table 1. *Carabus (Procerus)* taxa, proposed for inclusion into the next edition of the Red Book of the Republic of Armenia*

Taxa of <i>Procerus</i>	Proposed status and criteria used	Comments
<i>C. (P.) caucasicus antonkozlovi</i> Cavazzuti	EN B1ab(iii) 2ab(ii, iii)	Rare subspecies with restricted distribution; as far as it's known the area of occurrence is about 400 km ² , and area of occupancy– less than 50 km ² . Containing ecosystems somewhere are under immediate threat of illegal tree-cutting which leads to the decreasing of the area of occupancy
<i>C. (P.) c. tatyanaorokhova</i> e Cavazzuti	CR B1ab(iii)	Extremely rare subspecies occupying very restricted area and known by single earlier collected specimens; assessment was made basing on collection materials
<i>C. (P.) c. fallettianus</i> Cavazzuti	VU B1ab(iii) 2ab(iii)	Subspecies with rather restricted distribution; as far as it is known the area of occurrence is about 600 km ² , and area of occupancy – less than 100 km ² . Included into Red Book of Armenia
<i>C. (P.) c. myskai</i> Cavazzuti	EN B1ab(iii) 2ab(iii)	Subspecies with rather restricted distribution; as far as it is known the area of occurrence is about 600 km ² , and area of occupancy – less than 100 km ² . Protected in “Zangesur” Sanctuary
<i>C. (P.) c. nakagomei</i> Cavazzuti & Kozlov	EN B1ab(iii) 2ab(iii)	Rare taxon till now known from single habitats by few specimens. The area of occurrence is about 200 km ² , and the area of occupancy – less than 40 km ² . Protected in “Arevik” National Park but until zonation of the park's territory protection can be considered as no more than conventional.

* *C. (P.) c. colchicus* Motschulsky is not assessed because the taxon being referred for Armenian fauna not reliably registered from the country yet – see above.

Fact sheets for each Armenian *Carabus (Procerus)* taxon proposed for inclusion into the next edition of country's Red Book are elaborated according to the scheme used in Book's current edition (one

Biological traits. The beetles are recorded during all warm seasons, from spring to autumn. Daily activities depend on the weather: in cool weather beetles are active in the afternoon and in hot weather at twilight and nights. Beetles and larvae feed on snails (generally *Helix buchi* Dubois de Montpéroux, 1839), probably, on some other mollusks.

Population size and its trends. Rare beetle known by single specimens. Trends were not revealed yet.

Major threats. Degradation of habitats due to tree-cutting (mainly illegal).

Conservation measures. Not applied yet.

Suggested conservation measures. Implementation of **real** measures for prevention of tree-cutting in the species habitats. Inclusion of habitats of type locality into neighboring “Ijevan” State Sanctuary. Creation of PA in the vicinities of Artsvaberd village.

Draft Action Plan dedicated to the conservation of Armenian *Procerus* is elaborated. This includes the following points:

1. Avoiding habitats’ degradation using approaches targeted, in particular, to prevention of illegal and so-called “semi-legal” tree-cutting in the target areas;
2. Planning and creation of PAs dedicated to protection of *Procerus* populations and habitats; preliminary map is given in Fig. 8.
3. Public awareness rising issues, including:
 - carrying out activities aimed to increase of the level of understanding of the members of local communities on the role of *Procerus* subspecies in ecosystems’ functioning and their importance for agriculture as the agents controlling harmful snails; this includes, first of all, educational activity among young generation. Use of traditional approaches is supposed, including publication and dissemination of didactic and information materials, meetings, lectures, etc.;
 - training of PAs and forestry staff on identification and protection of *Procerus* inhabiting the territories being under their responsibility;
 - training of specialists on insect researches and conservation both in high education institutions and in among scientific departments of PAs.

This Plan with concretization for each *Carabus (Procerus) caucasicus* subspecies is submitted to the stakeholders and is in the process of co-ordination and harmonization. In particular, special efforts have to be made for co-ordination of PAs planned taking into consideration peculiarities of land-use, property’s issues and so on.

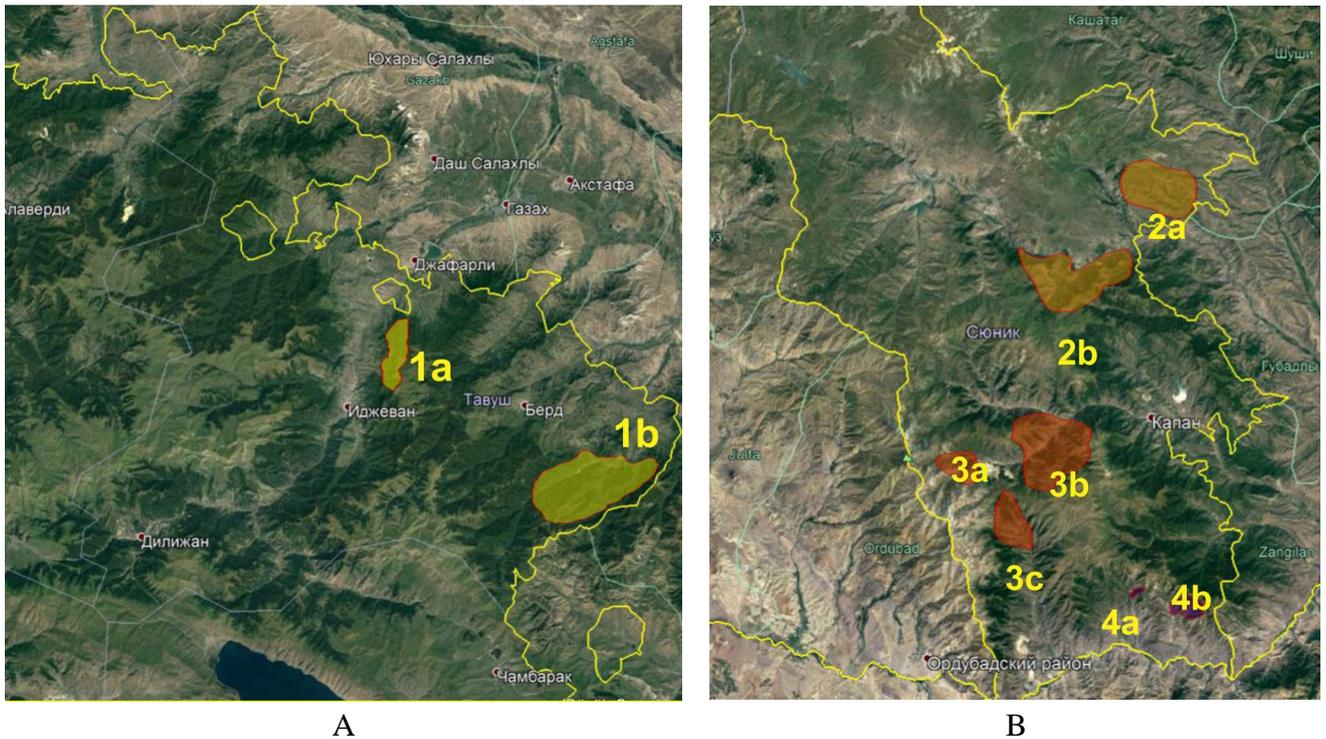


Fig. 8. Proposed Protected Areas and Reserve Zones of PAs already existed and planned in Tavush (A) and Syunik (B) Provinces. 1 – *Carabus (Procerus) caucasicus antonkozlovi*: 1a – env. Khashtarak*; 1b – env. Artsvaberd; 2 – *C. (P.) c. fallettianus*: 2a – env. Khndzoresk; 2b – env. Tatev**; 3 – *C. (P.) c. myskai*: 3a – env. Kajaran vill.***; 3b – env. Geghi; 3c – Meghri pass and env. Lichk; 4 – *C. (P.) c. nakagomei*: 4a – env. Shvanidzor****; 4b – env. Nrnadzor****. [*– it is proposed to add the territory to “Ijevan” State Sanctuary; ** the territory is proposed (taking into account our data) for inclusion into planned “Tatev” State Sanctuary; *** – partly covered by the territory of “Zangezur” State Sanctuary, enlarging of the sanctuary is proposed; **** – in “Arevik” National Park, inclusion of *Procerus* habitats into reserve zone is proposed] (Maps’ background – ©Google Earth)

Public awareness rising issues

Public awareness rising activities included preparation and publishing of illustrated Poster (providing a brief information on all Armenian *Procerus* surveyed) and Calendar for 2019 (each in 100 copies) (Figs 9 and 10). The booklets with the brief information regarding each taxon (their importance, distribution, ecology, conservation status and possible protection measures; as an example see Fig. 11) were prepared, published and disseminated as well.

The logo of Rufford Foundation was used in all the materials published in the framework of the Project.



Fig. 11. Example of booklet dedicated to *Carabus (Procerus) caucasicus nakagomei* conservation importance (concretely focused on *C. (P.) caucasicus nakagomei*)

All these materials were disseminated among schoolchildren of the schools in all communities visited, local communities' authorities, staff and authorities of Protected Areas (“Shikahogh” State Reserve, “Ijevan” and “Kajaran” State Sanctuaries, “Arevik” National Park, etc.), as well as among some other stakeholders including Ministry of Nature Protection of RA, Armenian offices of international conservationists' organizations (WWF), "Zikatar Environmental Center" SNCO, Ministry of Nature Protection of Armenia, some institutions of higher education in Yerevan (Yerevan State University, Armenian State Pedagogical University, etc.) and some NGOs (“Young Foresters Union”, “Towards Sustainable Ecosystems”, “Society of Biologists”, “Nature Rights Protection”). During all our meetings and discussions the role of Rufford Small Grant Foundation in the implementation of current Project was stressed.

Thereby, during these activities short time lectures, discussions and meetings with local communities' authorities and members including teachers and schoolchildren were conducted in 25 settlements:

Tavush Province: Ijevan, Ditavan, Azatamut, Artsvaberd, Gosh, Koghb.

Lori Province: Alaverdi, Sanahin, Haghat, Tsaghkashat, Teghut, Shamlugh, Dsegh.

Syunik Province: Goris, Verin Khotanan, Khndzoresk, Tatev, Tandzaver, Kajaran town, Kajaran village, Lichk, Shvanidzor, Vank, Shikahogh, Nor Arajadzor.

And I want to add, that public awareness rising activity could not cover all the settlements of target Provinces due to deficiency of time and facilities and, in my opinion, must be continued.

Some pictures of our meetings with local communities' members, schools' pupils and PAs authorities are presented below (Figs 12-23).



Fig. 12. "Zikatar" Environmental Center



Fig. 13. Meeting with Head of "Young Foresters Union" NGO



Fig. 14. Lecture in Department of Biology, Yerevan State University



Fig. 15. Meeting with pupils of Khndzoresk vill., secondary school after Garegin Sevunts



Fig. 16. Meeting with Head of Department of the Programs of Nature Protection, Agriculture and Economical Development, Kajaran Municipality



Fig. 17. Lecture in Kajaran secondary school № 1



Fig. 18. Meeting with pupils of Anania Shirakatsy Armenian National Lyceum (Yerevan)



Fig. 19. Meeting with pupils of Meghri secondary school



Fig. 20. Meeting with Director of “Arevik” National Park



Fig. 21. Meeting with Deputy Director of “Shikahogh” State Reserve SNCO



Fig. 22. Meeting with pupils and teachers of Shikahogh secondary school



Fig. 23. Meeting with local community member involved in Nature Protection activity (Kapan town)

Capacity building issues

In the framework of the project two postgraduate students and one biology master student (stipulated by the project proposal) as well as three master students additionally involved were trained in both field and laboratory methods of insect investigation. Besides, they got experience in presentation of conservation issues in the schools and local communities.

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