Mid-Term Report

“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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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 Dr. Mark Kalashyan (research scientist-entomologist) and PhD student Noushig Zarikian, as well as assistant Dr. Gayane Karagyan, all from our Scientific Center. Besides, Ms. Meri Mazmanyan 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 research 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 the 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, Artsvaberd, 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, Artsvaberd, 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).

Localities of Tavush and Lori Provinces Localities of Syunik Province

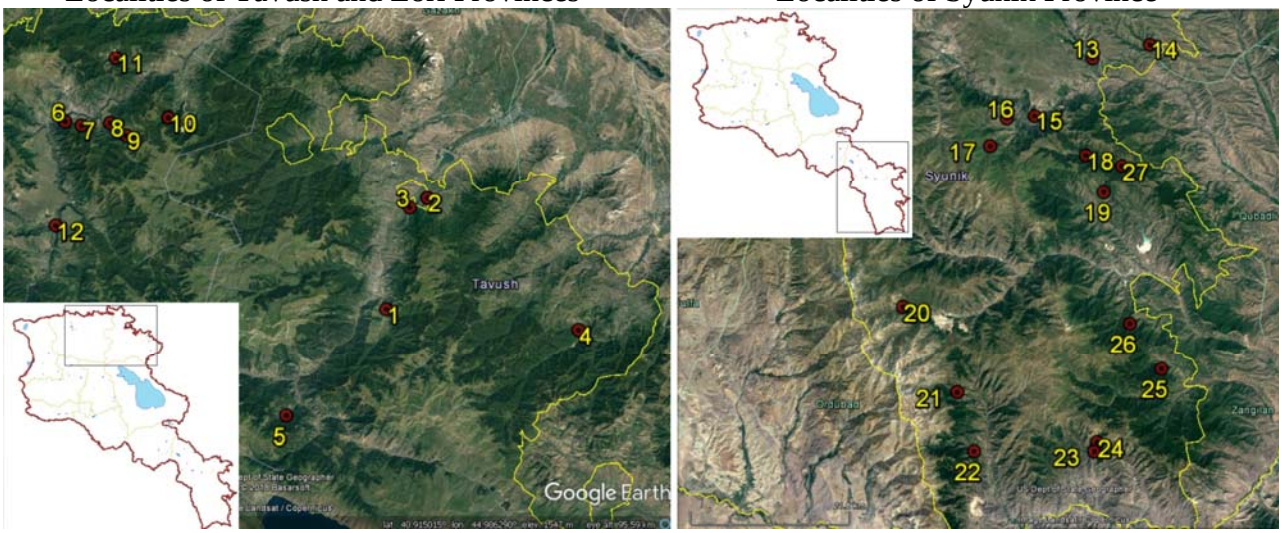

Fig. 1. Maps. Observation localities.

	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.

3 new localities inhabited by *Procerus* were revealed.

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. caucasicus tatyanagorokhovae* Cavazzuti) from 6 expected in the Project. But we have in our disposal several collection specimens of these subspecies for further morphological study and inclusion them into the identification key of Armenian *Procerus.*

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

Fig. 3. *Procerus scabrosus fallettianus* Cavazzutti and its habitat, env. Goris.
(Photo by G. Karagyan)

Fig. 4. *P. caucasicus mishkai* Cavazzuti and its habitat, env. Kajaran.
(Photo by G. Karagyan)

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

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

Laboratory studies.

- Morphological and geographical methods for delimitation of the target taxa from each other were applied;
- Keys for identification of Armenian *Procerus* were prepared for further dissemination among stakeholders that will help to improve distributional data and further conservation measures;

- GIS-based database was created and partly completed. The data concerning to populations' conditions and abundance, current conditions of containing ecosystems, current and potential major threats were included;
- Preliminary assessment of status of Armenian *Procerus* using to IUCN Red List' Criteria was carried out. Preliminarily all of subordinated taxa of *Procerus* in Armenia can be assessed as Endangered or Critically Endangered using mainly Criterion B of IUCN Guidelines.

The implementation of **public awareness rising program** was restricted only by meetings and consultations with some local communities' authorities and, especially, with authorities and staff of Protected Areas (Shikahogh Reserve, Ijevan and Kajaran Sanctuaries, Arevik National Park, etc.) of the survey area to co-ordinate further activity.

The further activities (lectures in the schools, meetings with students and local community's members, etc.) will be conducted during the period from the end of October, 2018 until beginning of April, 2019. For these activities illustrated Poster (with brief information on Armenian *Procerus*) and Calendar for 2019 were prepared and published (each in 100 copies) for further dissemination among stakeholders (Figs. 7 and 8).

Fig. 7. Poster (the title in Armenian is "Recognize and conserve helix-eater ground beetles").

Fig. 8. Calendar for 2019
(the title in Armenian is “Must be conserved”)