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**ASSESSMENT OF CONSERVATION STATUS OF THE LAST
ARMENIAN POPULATION OF RACERUNNER *EREMIAS ARGUTA
TRANSCAUCASICA***

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The unique isolated population of racerunner *Eremias arguta transcaucasica* in Armenia is under strong human pressure and seeks urgent conservation measures. The population has a limited area (approximately 9 hectares) on the shore of Lake Sevan, in vicinity of a settlement. Census of lizards in the habitat has shown that the density of population with juveniles is about 36 individuals per hectare. However, this density of population has been observed on a restricted territory, which faces serious threats to their continued survival.

Eremias arguta transcaucasica - abundance - biotope preference - conservation

Հայաստանում բազմագույն մողեսիկի միակ և մեկուսացված պոպուլյացիան գտնվում է մարդածին գործոնի ուժեղ ազդեցության ներքո, և անհրաժեշտ են անհապաղ միջոցառումներ նրա պահպանության համար: Պոպուլյացիան գտնվում է Սևանա լճի ափին, բնակելի տարածքից ոչ շատ հեռու և գրավում է 9 հա տարածք: Պոպուլյացիայում անհատների քանակական հաշվարկները ցույց են տվել, որ 1 հա տարածքի վրա հանդիպում է մոտավորապես 36 կենդանի, ներառյալ անչափահասները: Այսպիսի խտություն նկատվում է սահմանափակ տարածքում, որը գտնվում է անհետացման եզրին:

Eremias arguta transcaucasica - քանակ - կենսավայր - պահպանություն

Единственно известная изолированная популяция разноцветной ящурки в Армении находится под сильным антропогенным прессом и требует срочных мер по ее охране. Популяция занимает ограниченную площадь (около 9 гектаров) на берегу озера Севан недалеко от населенного пункта. Подсчет численности ящериц показал, что плотность популяции ящериц вместе с сеголетками составляет около 36 особей на гектар. Однако, такая плотность наблюдается на локальной, ограниченной территории, которая находится под угрозой уничтожения.

Eremias arguta transcaucasica - численность - биотопическая
приуроченность - охрана

The racerunner *Eremias arguta transcaucasica* is the rarest and most endangered taxon among rich biodiversity of Armenia [1, 3]. The listing of this species in the Red Data Book of Armenia provides *E. arguta* with nominal protection as a threatened species. The Armenian subspecies are isolated from the main distribution range of *E. arguta*. This widespread species ranges from eastern Romania, through southern Moldova, Ukraine, southwestern Russia, the Caucasus, northern Iran, through much of Central Asia to northwestern China and southwestern Mongolia [9]. The population in Armenia differs from

others by habitat in mountain steppe at elevation of about 2000 m above sea level, while sand dune habitat on low elevations is common for this species.

According to the reviewed literature [2, 3, 4, 5, 6, 7 and 8] about 5 localities of *E. arguta* in Armenia were recorded on southwest part of Sevan Lake basin. Sadly, at present only one population is survived on relatively small isolated territory. The natural habitats of terra typical of endemic subspecies *E. arguta transcaucasica* in vicinity of Martuni town was described by Darevsky, in 1953 [7] and then other few places of relict habitats were fully destroyed and lizards vanished from these sites. Therefore, in 1961, the 27 adult lizards from population of vicinity of Martuni were relocated to 20 km from Gavar town by Darevsky I. and Danielyan F. During the last 37 years the lizards have colonized the shore of the lake and have established new stable population with approximate number of 80-150 specimens [7]. However the known place of their habitat was also fully destroyed during sand mining works and this species was inclined to extinction until recent times. Occasionally in 2006 new locality of this species was found on restricted area of mountain steppe of basin Sevan Lake which occurs on approximately 5 km distance from early known population [8]. The status of this population is also critically endangered. The small patches among agricultural lands will also be likely used in the near future. The immediate conservation activities on this territory are urgent because the chances to save the unique and seriously declining populations of lizards are rapidly decreasing.

Thus, the main aim of this article is getting the first-hand knowledge on ecology, distribution and abundance of the racerunner to use it as a background for further conservation-oriented projects.

Materials and methods. The field researches were made between the months of August –October, 2008 and May - August 2009. During field works the distribution and abundance of *E. arguta* were documented in addition to gathering the requisite data and materials for morphological analyses. Census was made by two methods: 1) Census on random squares. The survey was performed in 55 random sampling quadrates (20 Ч20 m) with total area 90 hectares where were registered all target lizards, as well as syntopic animals, habitat, and weather condition. The center of each square was marked with GPS. The describing of habitat was included documentation of soil type, vegetation, and regional geomorphology as well as 360° photo-documentation of each site; 2) Visual encounter surveys of *E. arguta* on outside the sampling quadrates where also were marked the GPS coordinates and get habitat description.

For each lizard the series of variables were measured, such as: sex (male, female or juvenile), age in years (whenever possible), body length (SVL) and tail length (L.cd), weight (measured with electronic scales up to 0, 01 grams). The lizards were digital vouchering which included the images from all angles to help in researches of their morphology as well as later identification. All lizards after measured on site were immediately released.

The database was created in Excel. The spatial distribution of habitat variables was considered from the topographic map and satellite image. The georeferencing was made in GIS 9 software. The quantitative data was been analyzed in STATISTICA 7.0 (Statsoft, Inc.)

Results and Discussion. The unique population of *E. arguta* in Armenia occupies the restricted area in the Gegharkunik region of the eastern part of Armenia at the foot of the Geghama Mountains. The landscape is mountain steppe. The area of distribution of lizards is situated on elongated hill in surrounding of agricultural fields which spit by numerous field roads and tracks. Our survey of neighboring territories has not detected the target lizards in vicinity hills. Range of altitude where the lizards were recorded was 1907 -1991 m above sea level. The area of racerunner has small range where the core of population occupied the zone of 0.48 km². According to the map with GPS points of occurrence of lizards and sampling squares, only one plot of distribution occurs. The longest ways between two points where lizards were found is 1.47 km in NW – SE direction and 0.47 km in NE-SW direction. The lizards mostly prefer to occupy the west (21%) and northeastern (76 %) slopes of hill. The inclination of slope seems were not influence on density of distribution. The lizards have met

as in bottom and top of slopes as in different range of angles of inclination up to 50°. The more often lizards have been found on slopes with inclination 9° (22%) and 18° (28%).

The soil of hill mainly is chestnut-carbonate with small patches of sands. *E. arguta* prefer inhabit on stony-clayey slopes of hill and rare meet on agriculture fields, sandy or stony patches, and places where the vegetation cover is more than 90%. Lizard does not exist in places where there are no shelters for them, such as rodent burrows, stones of medium size, the base of thorny plants, and, somewhere, scattered household refuse. The vegetation of hill consists of a miscellaneous assemblage of plants. The surveys on random squares have shown that *E. arguta* mostly prefer following assembles of plants: the grass cover usually were Asteraceae (*Achillea biebersteinii*, *Artemisia absinthium*, *Carduus nutans*, *Centaurea depressa*, *Carduus arabicus*), Caryophyllaceae (*Diantus cretaceus*), Convolvulaceae (*Convolvulus arvensis*), Fabaceae (*Trifolium dubium*), Euphorbiaceae (*Euphorbia orientalis*); Lamiaceae (*Thymus kotschyanus*, *Teucrium polium*); Poaceae (*Aegilops tauschii*, *Bromus japonicas*). The following shrubs on hill usually lizards use as shelters: Asteraceae (*Cirsium vulgare*), Apiaceae (*Astrodaucus orientalis*), Fabaceae (*Astragalus maximus*, *Astragalus sevangesis*), Lamiaceae (*Salvia nemorosa*, *Scutellaria orientalis*), Ranunculaceae (*Adonis aestivalis*), Scrophulariaceae (*Linaria curdica*), Solanaceae (*Hyoscyamus niger*). The sites with a relatively high percentage of common for mountain steppe plant - wormwood species *Artemisia fragrans* was not convenient for *Eremias*.

Under severe climate conditions of shore of Lake Sevan, where the average temperature in winter is - 9°C, and in summer - +25°C the season of activity of lizards start in May and last till end of September. The early survey period (March-April) of the study is characterized by cold snow conditions. The first *E. arguta* was met at 21 of April under the stone when the weather was sunny but with cold wind. It is diurnal lizard and appears on surface after 11 o'clock of morning when the ground become warmer. Moreover, no one *E. arguta* was met on surface or under cover when the weather was sunny and temperature high (+28°C), but soil was still wet, while other syntopic reptiles (lizard - *Lacerta strigata* and snake - *Natrix natrix*, *Natrix tessellata*, *Coronella austriaca*) were active and visible.

E. arguta usually start to breed in the middle of May and proceed till the first decade of June. The pregnant females of *E. arguta* were met at end of June (26 June 2009) and beginning of July (6 July 2009). The palpations of females observed in 19 July 2009 have not recorded the eggs inside. An egg number which is possible to counting by palpation were from 3 to 6 (often 4-5). The first juveniles become visible in the first decade of September.

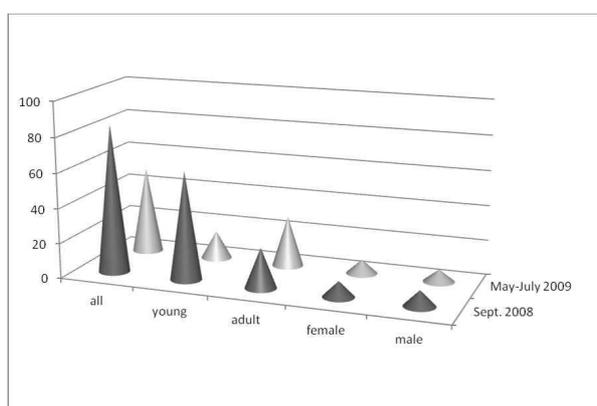


Fig. 1. Range of number of *E. arguta* by season, age and sex.

During 2008-2009 on territory of 9 km² 168 specimens of *E. arguta* were found (Fig. 1). The 72 specimens (42.8 %) of *E. arguta* were registered within sampling squares, while 96 lizards (57.1%) were registered during survey between the squares. During the census carried out in September, 2008 we have recorded 85 specimens of *E. arguta* over the area of

0.25 km². Mean abundance of lizards on one square among 20 random sampling plots (20x20 m) with area 0.008 km² was Mean \pm SE = 2.8 \pm 0.63; R – 0-9. During fieldworks at May–August, 2009 we have counted 50 *E. arguta*. The census on 30 random sampling plots (20x20 m) in 2009 have shown 44 lizards on area 0.012 km² with mean abundance of lizards one square was Mean \pm SE = 0.5 \pm 0.18; R – 0-3.

During our surveys we have noted the number of young lizards in spring was unexpected lower. If before hibernation the percent of young was 67 % of all population, the census of spring has shown only 10 %, and in summer 3%. The many young were found in field at September, where conditions of winter shelter are unsatisfactory for successful hibernation. The plowing of agricultural fields also may damage the population of the young.

The single known population of *E. arguta* is critically endangered where most threats to it is a risk of habitat destruction, fragmentation and deterioration of the habitats, and agricultural cultivation of land. The plowing of lands, overgrazing of cattle, road mortality, using the territory as dump which attract synanthropic animals (dogs, cats, rodents) numerous birds gulls (*Larus*), crows, rooks, daws (*Corvus*), magpies (*Pica*) that prey up on lizards are risk for surviving of population. However the main threat for this species in Armenia is loss of habitat due to transformation habitat to agriculture land. Thus, the conservation actions on different levels that is protection and management of both species and habitat, additional distribution surveys, population and conservation status monitoring, scientific research, the improved coordination of conservation efforts and raising public awareness are urgent for saving last population of *Eremias arguta transcucasica* in Armenia.

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