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DAILY ACTIVITIES OF PARTHENOGENETIC *DAREVKIA* *ROSTOMBEKOWI* SPECIES

R. K. PETROSYAN

Yerevan State University, Chair of Zoology
petrosyan.ruzanna@mail.ru

The daily activities of two isolated populations of endangered species of rock lizards *Darevka rostombekowi* were studied. The main aim of our study was the show the competition among syntopic species of rock lizards. Our results have shown the similarity of patterns of daily activities for lizards belonging to different species and sharing the same territories and differences in peak of their activities, which allow them to avoid the competition.

Rock lizards – syntopic species – competition

Ուսումնասիրվել է հազվագյուտ տեսակի *Darevka rostombekowi* իրարից մեկուսացված պոպուլյացիաների օրական ակտիվությունը: Հետազոտության հիմնական նպատակը՝ ցույց տալ սինտոպիկ ժայռային մողեսների միջև մրցակցային փոխհարաբերությունները: Հետազոտության արդյունքները ցույց տվեցին, որ չնայած սինտոպիկ ժայռային մողեսների օրական ակտիվության նմանությունը՝ օրվա ընթացքում բանական տարածվածության գրաֆիկներում ակտիվության պիկերում կան որոշ տարբերություններ, ինչը թույլ է տալիս փոքրացնել տեսակների միջև մրցակցությունը:

Ժայռային մողեսներ – սինտոպիկ տեսակներ – մրցակցություն

Суточная активность редкого вида скальных ящериц *Darevka rostombekowi* была исследована в изолированных друг от друга популяциях. Основной целью нашего исследования было показать конкурентное взаимодействие между синтопичными видами скальных ящериц. Наши результаты показали, что, несмотря на схожесть схемы суточной активности синтопичных видов ящериц, в графиках распределения их численности в течение дня имеются некоторые различия в пиках активности ящериц, что позволяет уменьшить конкуренцию между особями, принадлежащими к разным видам, но обитающими на одной территории.

Скальные ящерицы – синтопические виды – конкуренция

The Caucasian rock lizards of genus *Darevskia* is one of the most interesting and outstanding group species of reptiles, which made fauna of Armenia especially unique and attractive. Being the recognition of reticulate evolution and hybrid speciation in animals, the Caucasian rock lizards' complex have a strong impact on our understanding of evolutionary mechanisms, where parthenogenesis was first reported in vertebrates by I.S. Darevsky in 1956. Unexpected, the some parthenogenetic species which have twice reproduction rate inhabit restricted territory and have low density of their population [1, 2, 3]. Consequently, one of them – *Darevka rostombekowi* species have been included

in Red Book of Armenia and IUCN Red List and have category “Endangered” B1ab (i,iii) ver. 3.1.

In many sites this species are sharing with the territories with other syntopic species of rock lizards. Thus, two parthenogenetic species (*D. rostombekowi*, *D. unisexualis*) inhabit together in vicinity of Tsovak village (Gegharkunik Marz) and three parthenogenetic (*D. rostombekowi*, *D. dahli*, *D. armeniaca*) species occur near to Dilijan city (Tavush Marz). It is well known that parthenogenetic species often reach relatively high density of populations. According to the theory of ecological niche specification, competition of two close related species living in the same area should lead to competition exclusion [4, 6]. Thus, the main goal of the present study is to compare some aspects of autoecology of parthenogenetic species and to reveal differences in their ecological niches. It is well known that the temperature plays a major role in many aspects of ectotherm physiology, behavior and ecology of lizards [5, 8]. We studied daily activity of *D. rostombekowi* in comparing with syntopic parthenogenetic species *D. unisexualis*, *D. dahli* with aim to clarify the factors of coexisting in mixed populations.

Materials and methods. Fieldwork was conducted in June-July 2015 near to the Tsovak village in the Gegharkunik Marz and Dilijan city in the Tavush Marz of Armenia. Two 1 km transects were surveyed by a pair of observers that systematically searched for lizards by walking through transects between 08:00 to 18:00. All transects were sampled by walking in a regular slow cadence for up to ca. 60 minutes each. Thus, a given transect started within intervals of three hours. This method was used to increase the independence of observations. All lizards sighted along transects were recorded. For each sighted lizard we recorded the time of sighting, condition of the weather (sunny, partially clouded or cloudy), whether the lizard was in the sun or shade, and the type of substrate. We also took hourly air, rock and soil temperatures with a bulb thermometer, prior to the beginning of each transect. No lizards were killed during this study.

Results and Discussion. A total of 352 individuals of *D. rostombekowi* and 345 individuals of *D. unisexualis* were recorded in Tsovak locality, while only 43 individuals of *D. rostombekowi*, 81 individuals of *D. dahli* and 12 *D. armeniaca* were recorded in Dilijan during the study period. In both localities *D. rostombekowi* showed a large overlapping in the spatial and trophic niches with syntopic species.

In vicinity of Tsovak village during summer days both parthenogenetic species exhibited similar patterns of activity, with activity concentrated in the late morning, decreasing to 12.00 h. However, we may see on fig. 1, where pattern of two species in one day is presented, the one peak of activity for *D. rostombekowi* (87 lizards on 1 km) and two peaks of activities for *D. unisexualis* (97 lizards on 1 km). The young lizards of two species have different peaks of activities, where *D. unisexualis* were more active in morning time, while the number of subadults of *D. rostombekowi* lizards has increased in midday time.

In next studied area we also noted the similarity of pattern of daily activity for *D. rostombekowi* and *D. dahli* with two peaks of activity in morning time and midday time (fig. 2). *D. dahli* has morning peak of activities from 9.10 until 9.50, while *D. rostombekowi* reach the peak of activities on one hour later: from 10.00 until 10.50. Later activity decreasing at the same time for both species: from 11.10 until 12.00 with slightly increasing during second peak in period of 14.30-15.00. The young of *D. rostombekowi* have the only one peak of activity in morning time.

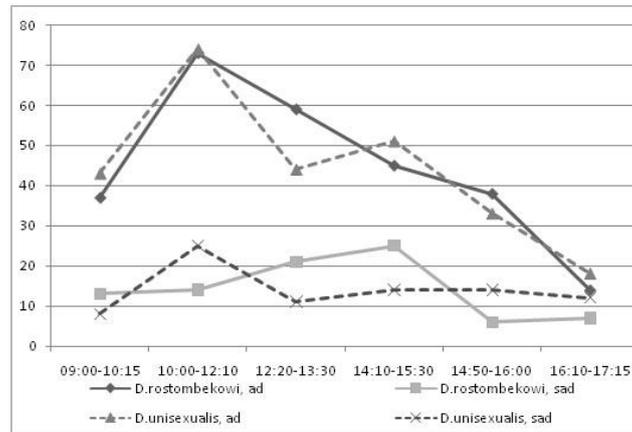


Fig. 1. The pattern of daily activities of adults (ad) and subadults (sad) lizards of two parthenogenetic species during June 18, 2015, in Tsovak population (on Y-axes is the number of lizards).

The difference between peaks of activity of *D. rostombekowi* from two localities is explained by climate difference observed on 1956 m altitude in Tsovak locality, where temperature of air increased from 14°C at 10.00 till 23°C at 12.00 and humidity decreased from 64% till 40%, while in Dilijan locality on 1327 m above sea level, temperature of air changed in diapason 19°C-21°C and humidity 80% -71% in the same period of time.

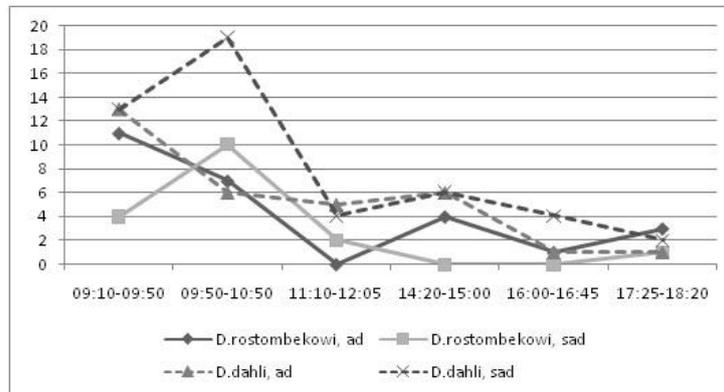


Fig. 2. The pattern of daily activities of adults (ad) and subadults (sad) lizards of two parthenogenetic species during June 20, 2015, in Dilijan population (on Y-axes is the number of lizards).

In two localities the patterns of activities of young of one species are following the patterns of activities of adults of other species. The asynchronous activity cycles of adult and young of syntopic species are probably the result of avoidance of competition for food. As have shown our measurement of body temperature of lizards in Tsovak population, the *D. rostombekowi* had higher temperatures during peak of activities, than *D. unisexualis* when temperature of air in shadow was recorded 24-25°C, the mean temperature of body of *D. rostombekowi* was 30.3°C, while *D. unisexualis* had 27°C, average body temperature. The differences of preference in optimal temperature among two species may reveal the occurrence of one peak in pattern of daily activities of *D. rostombekowi* and pattern with two peaks of activities for *D. unisexualis*.

REFERENCES

1. *Agasyan A., Ananjeva N. Darevskia rostombekovi*. The IUCN Red List of Threatened Species. Version 2014.2. "www.iucnredlist.org". 2009. Downloaded on 20 August, 2014.
2. *Arakelyan M., Danielyan F., Corti C., Sindaco R., Leviton A. E: Herpetofauna of Armenia and Nagorno-Karabakh*. Salt Lake City SSAR, 2011.
3. *Arakelyan M.S. Skeletochronological Study of Rock Lizards from Armenia and Some Questions of Their Ecology*. Ph.D. Dissertation. Russia, St. Petersburg, Zoological Institute, 2001.
4. *Buckland, S.T., Anderson, D.R., Burnham, K.P., Laake, J.L., Borchers, D.L., Thomas, L.* Introduction to distance sampling. Estimating abundance of biological populations. Oxford, Oxford University Press, 2001.
5. *Bogert, C.M.* Thermoregulation in reptiles, a factor in evolution. *Evolution*, 1949.
6. *Blair C.* Daily activity patterns and microhabitat use of a heliothermic lizard, *Ameiva exsul* (Squamata: Teiidae) in Puerto Rico. *Journal of Herpetology*, 4, 2, 179-185, 2009.
7. *Darevsky I.S.* Rock lizards of the Caucasus: systematics, ecology and phylogenesis of the polymorphic groups of Caucasian rock lizards of the subgenus *Archeolacerta*. Leningrad, Nauka. [in Russian], 1967.
8. *Winne C.T. & Keck, M.B.* Daily activity patterns of whiptail lizards (Squamata: Teiidae: *Aspidocelis*): a proximate response to environmental conditions or an endogenous rhythm? *Functional Ecology*. 18, 314-321, 2004.

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