

SEASONAL AND DAILY ACTIVITIES OF TWO SYNTOPIC  
PARTHENOGENETIC LIZARDS OF GENUS *DAREVSKIA*

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The patterns of seasonal and daily activities of two parthenogenetic species of lizards (*Darevskia armeniaca*, *D. unisexualis*) sharing the same territories in the zone of hybridization in central region of Armenia demonstrate ecologically similar potential niches.

**Keywords:** parthenogenetic species, seasonal and daily activities.

**Introduction.** Different species of rock lizards of genus *Darevskia* often coexist in the same habitats. Hybridization zone may arise, if parthenogenetic and bisexual species share the same habitat. Two parthenogenetic species (*D. armeniaca*, *D. unisexualis*) and their parental bisexual ancestor *D. valentini* [1] occur in vicinity of Kuchak Village (Aragatsotn region) on the eastern slopes of Mt. Aragatz in Central Armenia, where the hybridization zone is present. This zone is under a strong interest of zoologists during the last two decades [2–4], however, few notes about ecology of syntopic lizards were published [5].

It is well known that parthenogenetic species often reach relatively high density of populations [6–8]. According to the theory of ecological niche specification, competition of two close related species living in the same area should lead to competition exclusion [9]. Thus, the main goal of the present study is to compare some aspects of autecology of two parthenogenetic species and to reveal differences in their ecological niches in hybridization zone. Such a study may help in discussing the speciation by hybridization and explain the possibility of a new polyploid species of rock lizards origin (*Darevskia*) in Kuchak population.

**Materials and Methods.** This study was conducted during spring–autumn period of 2013. Lizards were calculated within approximately on 5 hectares. Census was conducted on five different transects (each near 1 km long) at warm sunny days, where lizards were active. For studying seasonal activities the number of lizards was calculated during the most active time of days: from 10 am till 1 pm

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on the same transect. Daily activity was studied only on one transect from 7.30 am till 7.30 pm during June and July, 2013. Lizards were registered visually with binocular. The age (adult, subadult and juveniles) and their behavior were noted. The temperature of the air above the surface and the temperature in the sun were registered. The presence in the sun, in the shadow, on the stone or in the grass for each registered lizard was recorded. In total 1292 specimens of *D. unisexualis* and 392 of *D. armeniaca* were recorded. Some animals were captured with a noose and were palpated to assess their reproductive condition.

No lizards were killed during this study. Statistical analysis of data was performed by Statistica 7.0 Software package.

**Results and Discussion.** The pattern of seasonal activity of two parthenogenetic species is presented in Fig 1. In server climatic conditions of mountain steppes of Central Armenia the appearance of lizards after hibernation takes place at the end of April till the beginning of May. Mass emergence of animals of two species in 2013 was noted only at the end of May, when the air temperature reached 20–22°C. Before hibernation at the beginning of October the lizards were concentrated on rocks with deep clefts at the end of September. For both species a low density was noted during the hot period of summer in August. The first clutch for *D. armeniaca* was recorded on June 28, while *D. unisexualis* start to lay eggs later (the first clutch was noted on July 14). Generally, the *D. armeniaca* appear in May and have similar density till August, while the number of *D. unisexualis* was gradually increasing from May to July and disappearing in August. Thus, the peak of activity of *D. armeniaca* took place in May and *D. unisexualis* in June.

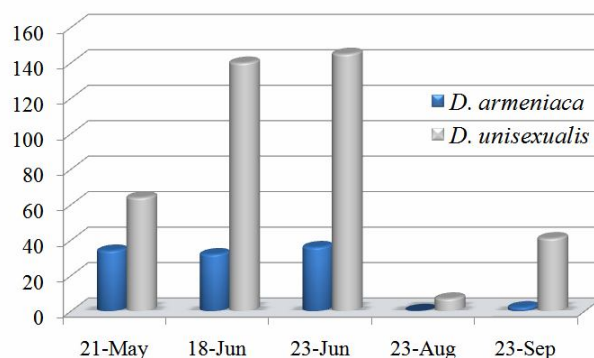


Fig. 1. Pattern of seasonal activity of two parthenogenetic species of lizards (on Y-axis is the number of lizards on 1 km of transect).

Usually in the morning *D. unisexualis* appeared on the surface before *D. armeniaca*, while in the evening *D. armeniaca* stayed active longer than *D. unisexualis*. The pattern of daily activity during one summer day is presented in Fig. 2 and summarized pattern of average number of lizards during different days of June and July is presented in Fig. 3. On both graphics *D. unisexualis* has two peaks of activities: the first is from 9.30 am until 10.50 am in one day of census, where the number of lizards reached 132 individuals on 1 km of transect, and the second is from 4.00 pm until 5.20 pm, where density of lizards was 148 individuals

on 1 km of transect. *D. armeniaca* has shown an other pattern of daily activities. The number of lizards was increasing during daytime and reached their maximum at 5 pm.

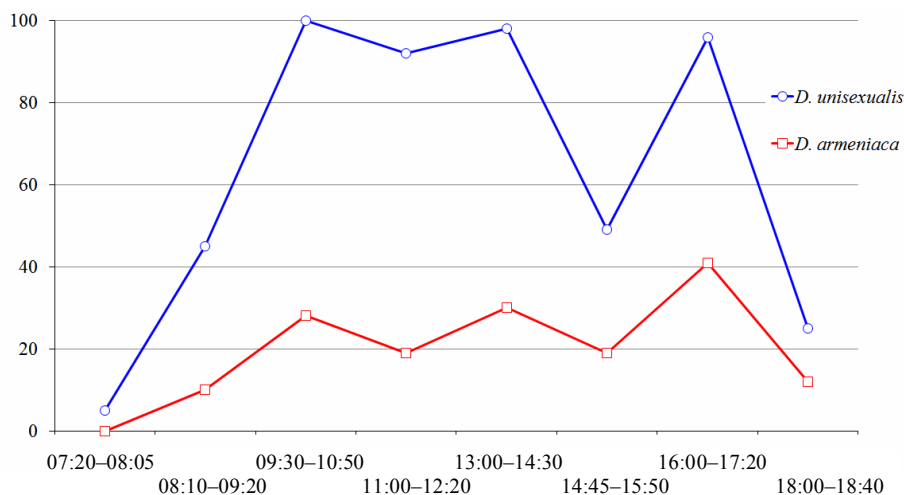


Fig. 2. The pattern of daily activities of two parthenogenetic species during June 23, 2013 (on Y-axis is the number of lizards).

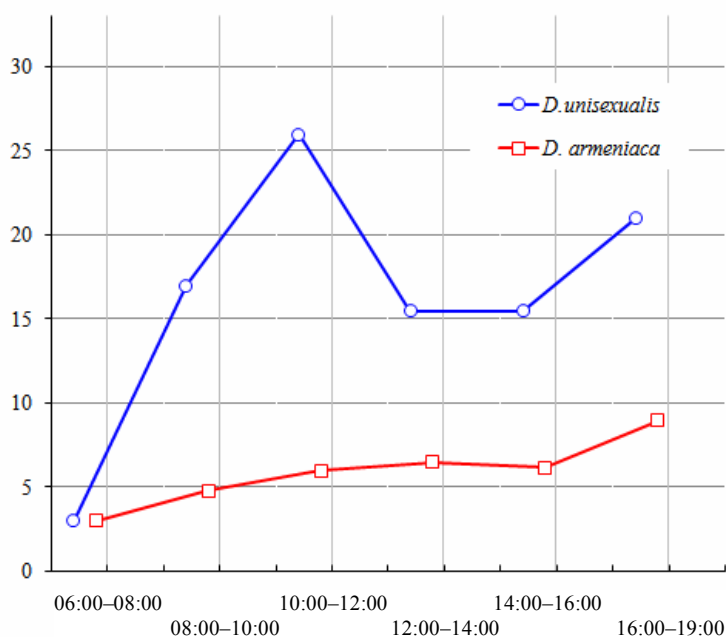


Fig. 3. The pattern of daily activities of two parthenogenetic species, during June 2, 2013 until July 23, 2013 (on Y-axis is the mean number of lizards).

The seasonal and daily activity patterns of two studied parthenogenetic species overlap broadly and demonstrate ecologically similar potential niche partitioning. However, we revealed that *D. unisexualis* and *D. armeniaca* being similar in daily activity, have different thermal preferences. Individuals of

*D. unisexualis* are more dependent on direct solar radiation and have later terms of reproductions than *D. armeniaca*. The synchronous activity cycles did not allow avoiding competition between them, and the differentiation question of ecological niche among two species stay open. Moreover, the sharing of the same habitat with bisexual species, *D. valentini* hybridization with this bisexual species leads to various types of hybrids with different potential for the next step of reticulate evolution. As a result of fertility of some hybrids a tetraploid hybrid lizard was recently revealed in this zone of hybridization [2, 5]. Two studied parthenogenetic species *D. unisexualis* and *D. armeniaca* are similar in their ecological preferences and timing of oocyte development. It means that they should have similar evolutionary potential of hybridization with *D. valentini*, however, hybrids of *D. unisexualis* and *D. valentini* were met more often, than those of *D. armeniaca* and *D. valentini* [2]. Thus, evolutionary future of studied hybrids is not equal and further multidisciplinary studies need to be continued.

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