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Short Note

Is the Spiny-tailed Lizard Darevskia rudis (Bedriaga, 1886) Active All Year?

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Abstract. The current literature and our field observations have shown that spiny-tailed lizard may also be active in the winter season. Activity of *Darevskia rudis* in the February was recorded for the first time in the province of Giresun, Eastern Black Sea Region, Turkey. In conclusion, we assessed that the spiny-tailed lizard could be active throughout the year due to global climate changes.

Key words: hibernation, Giresun, activity pattern, Trabzon, climate change.

Introduction

Global warming and climate change generally effect on the animal species (Corn, 2005; Borenstein *et al*., 2009; Huey *et al*., 2012; Blaustein *et al*., 2010; Li *et al*., 2013) and reptiles, specifically (Hawkes *et al*., 2009; Bickford *et al*., 2010; Le Galliard *et al*., 2012; Escobedo-Galván, 2013; Kurnaz *et al*., 2016). The majority of these impacts has negative consequences for reptile populations (Winter *et al*., 2016). First of all, the climatic changes affect the summer and winter activity of reptiles (Zug *et al*., 2001). Hibernation, one of the behavioral responses to seasonal change in reptiles, is directly influenced by the lack of climate (Gregory, 1982; Adolph & Porter, 1993).

There is a known fact that the members of family Lacertidae are hibernating species in the Northern Hemisphere (Smith, 1946). In general, *D. rudis* hibernates between October and March in the bottom of stones and rockies (Demirsoy, 2003).

Darevskia rudis (Bedriaga, 1886) ranges from sea level to 2400 m a.s.l., inhabiting rocky areas in temperate forests, but also montane-steppes, and walls and other human structures (Akarsu *et al*., 2009 and Kaska *et al*., 2009).

The researchers reported winter activity for different lizard species; *Podarcis erhardi* (Buresh & Tsonkov, 1933; Beshkov, 1977), *Sceloporus jarrovi* (Tinkle & Hadley, 1973), *Podarcis muralis* (Buresh & Tsonkov, 1933; Beshkov, 1977; Beshkov & Nanev, 2002; Westerstrom, 2005; Tzankov *et al*., 2014), *Lacerta viridis* (Vongrej *et al*., 2008), *Zootoca vivipara* (Grenot *et al*., 2000), *Mediodactylus kotschyi* (Mollov *et al*., 2015) and *Darevskia derjugini* (Kurnaz *et al*., 2016).

In the present study, we present data on the extraordinary activity of *Darevskia rudis* in Turkey.

Materials and Methods

The individuals were found during excursions in the province of Trabzon (in

November 2016, 2017; December, 2017) and Giresun (in February, 2017) during the day. No individuals were caught to avoid the disturbing them. The sexes of the individuals were diagnosed by the secondary sex characters (e.g., dark blue spots on the margins of ventral plates and dorsal coloration of males). All individuals were photographed with a digital camera.

Results and Discussion

November

In total, 7 individuals (4 adults and 3 subadults) of *D. rudis* were found during an excursion in Mansion of Timurcular, Trabzon Province of Turkey between 12:33 and 14:40 AM on 27th November 2016. The observation site was located at the 100 m a.s.l. (41°01'21'' N; 39°33'83'' E). The lizards were observed on the walls, which were covered with faded leaves, of Timurcular Mansion. The air temperature in the locality was 15°C in the observation time. In addition, 12 adults and 3 subadult individuals of *D. rudis* were found during an excursion in Akoluk District, Trabzon between 15:15 and 16:00 AM on 12th November 2017. The observation site was located at the 370 m a.s.l. (40°48'77'' N; 39°36'65'' E). The lizards were observed on the rocks on the edge of a stabilize road. The air temperature was 17.5°C in the observation time.

December

Two subadult and 8 adult individuals of *D. rudis* were found during an excursion in Ortahisar, Trabzon at 13:45 AM on 2th December 2017. The observation site was located at the 116 m a.s.l. (40°59'45'' N; 39°45'50'' E). The lizards were observed on the rocks on the edge of the main road. The air temperature was 16.5°C in the observation time. Besides, 4 adult individuals of *D. rudis* were found during an excursion in Hagia Sophia Museum, Trabzon at 12:00 AM on 10th December 2017. The observation site was located at the 23 m a.s.l. (41°00'19'' N; 39°41'76'' E). The lizards were observed among the vines on the retaining walls around the museum. The air temperature was 16°C in the observation time. Furthermore, 5 subadult and 15 adult individuals of *D. rudis* were found during an excursion in İkisu Village, Trabzon at 14:00 AM on 10th December, 2017. The observation site was located at the 323 m a.s.l. (40°55'39'' N; 39°48'28'' E). The lizards were observed on the rocks near the village road. The air temperature was 16°C in the observation time.

February

Two adult individuals were observed in Tirebolu, Giresun, between 13:34 and 15:20 AM on 19th February, 2017. The observation site was located at the 17 m a.s.l. (41°04'56'' N; 38°48'87'' E). The individuals were found among the rocks on the roadside. The air temperature in the locality was 10°C in the observation time. Two individuals were photographed.

Several active subadult and adult individuals of *D. rudis* were photographed in November 2016 (Fig. 1-A), December 2017 (Fig. 1-B) and February 2017 (Fig. 1-C) brings to mind that this species is active during the winter months. In addition to our field observations, an unusual *D. rudis* activity was observed on December 1989 by FRANZEN (2000). He reported that the lizards of the *D. rudis* were regularly observed being active in his short visit at the Turkish Black Sea coast between Trabzon and Hopa. Our findings and reports of FRANZEN (2000) show that the Spiny-tailed lizard may be active during the winter months, except in January.

According to MOLLOV *et al.* (2015), the records of several subadult and adult individuals of *Mediodactylus kothcyi* in a winter season show that if the temperatures are high enough and they can maintain in certain levels especially in their habitats geckos can be active as long as temperatures allow it. So, we can evaluate that *D. rudis* can be active as long as temperatures allow it during winter, similar to *Mediodactylus kotschi* (MOLLOV *et al.*, 2015).

Although active periods during the winter were reported for some lizards (SHTERBACK & GOLUBEV, 1986; OKE, 1982, CAMILLONI & BARROS, 1997; VONGREJ *et al.*, 2008; MOLLOV *et al.*, 2015; KURNAZ *et al.*, 2016), this phenomenon was not previously reported for *D. rudis* except the report of FRANZEN (2000). Our data may contribute to the knowledge of the annual activity of *D. rudis*. In our opinion, the unusual activity may be a result of global warming of the world in the Northern Hemisphere.

Fig. 1. The observed individuals of *D. rudis*. **A)** A female individuals from Mansion of Timurcular, Trabzon. **B)** A female individuals from Hagia Sophia Museum, Trabzon. **C)** Two female individuals from Tirebolu, Giresun.

One of the effective factors on hibernation of the lizards is cold environment. Certain vital activities (e.g. mobility, fertility, food availability and escaping behavior) of these animals mainly depend on air temperature and lower temperatures have negative effects on these activities (ADOLPH & PORTER, 1993).

Accordingly, the air temperature during the observation time of the individuals in the present study was very low to be carried out the vital activities of *D. rudis*. Regular change of air temperature can be thought of as the reason for the early awakening from hibernation of some lizards (KURNAZ *et al.*, 2016). In conclusion, we assessed that the spiny-tailed lizard could be active throughout the year due to global climate changes.

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