Tr. J. of Zoology
23 (1999) 227-230

A Serological Investigation of *Lacerta viridis* (Laurenti, 1768) (Sauria: Lacertidae) Populations in Turkey

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Received: 20.10.1998

Abstract: A total of 58 (24 ♂♂, 34 ♀♀) *Lacerta viridis* specimens, which were collected from Turkish Thrace and the Black Sea region of Anatolia, were evaluated serologically. The analyses support the view that a single race of *L. viridis* (*L. v. meridionalis*) inhabits Turkey.

Key Words: *Lacerta viridis,* blood-serum proteins, polyacrylamide-disc electrophoresis.

Türkiye'deki *Lacerta viridis* (Laurenti) 1768 (Sauria: Lacertidae) Populasyonlarının Serolojik Yönden İncelenmesi

Özet: Bu çalışmada, Trakya ve Karadeniz Bölgesinin değişik lokalitelerinden toplam 58(24 ♂♂, 34 ♀♀) *Lacerta viridis* örneği serolojik yönden incelenmiş ve ülkemizde *meridionalis* alttürünün yaşadığı görüşü desteklenmiştir.

Anahtar Sözcükler: *Lacerta viridis,* Kan-serum proteinleri, Poliakrilamid disk elektroforezi.

Introduction

The range of *Lacerta viridis* (Laurenti, 1768) extends from Europe to the Marmara and Black Sea regions of Turkey. The subspecific status of *L. viridis* has been investigated by various authors. In the check-list of Mertens & Wermuth (1) five subspecies were mentioned (*L. v. viridis, L. v. chloronota, L. v. citrovittata, L. v. fejervaryi* and *L. v. meridionalis*). According to Başoğlu & Baran (2), Turkish populations belong to *L. v. meridionalis,* a view which was shared later by Çevik (3) for the populations inhabiting Turkish Thrace. However, Schimidtler (4) is of the opinion that only the populations from Bursa, Yalova, İzmit and Adapazarı belong to *L. v. meridionalis,* but those from Kastamonu, Sinop and Samsun should be accepted as a new race (*L. v. paphlagonica*) and the population from Espiye (Giresun) as *L. v. infrapunctata*; i.e., according to this author, *L. viridis* is represented by three races in Turkey. The detailed survey of Kumlutaş (5) on the samples collected from eight different localities in the Black Sea region, shows that there are no discernible differences between these populations in terms of pholidosis, morphometry and pattern and coloration characteristics; demonstrating the inadequacy of Schmidtler's (4) subspecific division concerning the populations of the same region and for now, the presence of a single race (*L. v. meridionalis*) in Turkey.

The aim of the present work was to establish the blood-serum protein distribution patterns of *L. viridis* populations from Turkish Thrace and the Black Sea region; and if possible, to back one of the two contrasting views given above concerning the number of *L. viridis* races inhabiting Turkey.

Material and Methods

The material consisted of the samples collected from Turkish Thrace and the Black Sea region between 1986 and 1995 (Fig. 1). The data on this material, which is deposited at the museum of Zoology Department, Ege University (ZDEU) are as follows:

ZDEU 109/1986. 1-25 (9♂♂, 16♀♀) Hendek-Adapazarı 14.06.1986, leg. Çevik-Mermer.

ZDEU 88/1991. 1-7 (4♂♂,3♀♀) Perşembe-Ordu 14.06.1991, leg. Kumlutaş-Tok

ZDEU 89/1991. 1-4 (4♀♀) Espiye-Giresun 17.06.1991, leg. Kumlutaş-Tok

ZDEU 1/1990. 1-2 (1♂,1♀) Mengen-Bolu 27.07.1990, leg. Kumlutaş

ZDEU 2/1990. 1-5 (2♂♂, 3♀♀) Devrek-Zonguldak 27.07.1990, leg. Kumlutaş

ZDEU 3/1990. 1-3 (3♀♀) Cide-Kastamonu 28.07.1990, leg. Kumlutaş

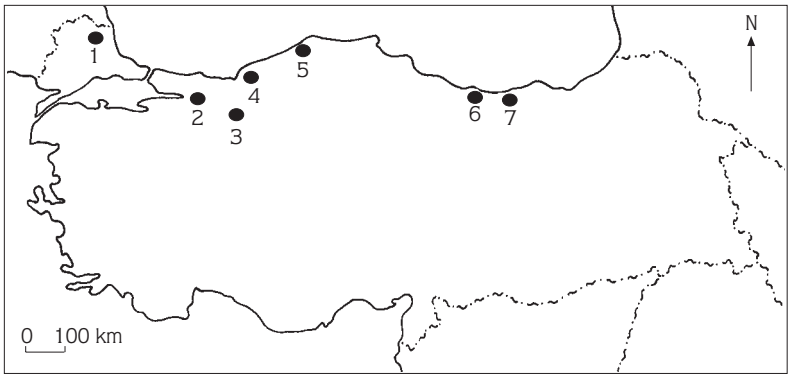

Figure 1. Sample collecting localities. 1. Dereköy-Kırklareli, 2. Hendek-Adapazarı, 3. Mengen-Bolu, 4. Devrek-Zonguldak, 5. Cide-Kastamonu, 6. Perşembe-Ordu and 7. Espiye-Giresun

ZDEU 43/1995. 1-12 (8♂♂, 4♀♀) Dereköy-Kırklareli 19.05.1995, leg. Çevik-Arıkan.

Blood samples were obtained from the postorbital sinuses (6). The separation of blood-serum proteins were carried out following a slightly modified version of the polyacrylamide-disc electrophoresis method of Davis (7, 8). The separations were conducted at room temperature with a "Canalco Model 1200" electrophoresis chamber. 0.5% Amido black (Naphthol Blue-black 10-B) stained separation gels were passively destained in 7% acetic acid baths. A Gelman ACD 15 Model 39430 densitometer was utilized to obtain the densitometric tracings of the separation gels.

Results

Sexually mature specimens were used. Since no discernible qualitative differences were seen between the electropherograms of the males and the females, data from the two sexes were pooled.

Blood-serum protein separation gel photographs showing the protein distribution patterns of four specimens representing the four different populations of Turkey (Dereköy-Kırklareli in the west, Hendek-Adapazarı, Cide-Kastamonu and Espiye-Giresun in the east) are given in Figure 2, and their densitometric tracing curves are shown together in Figure 3. No significant qualitative difference was evident between the

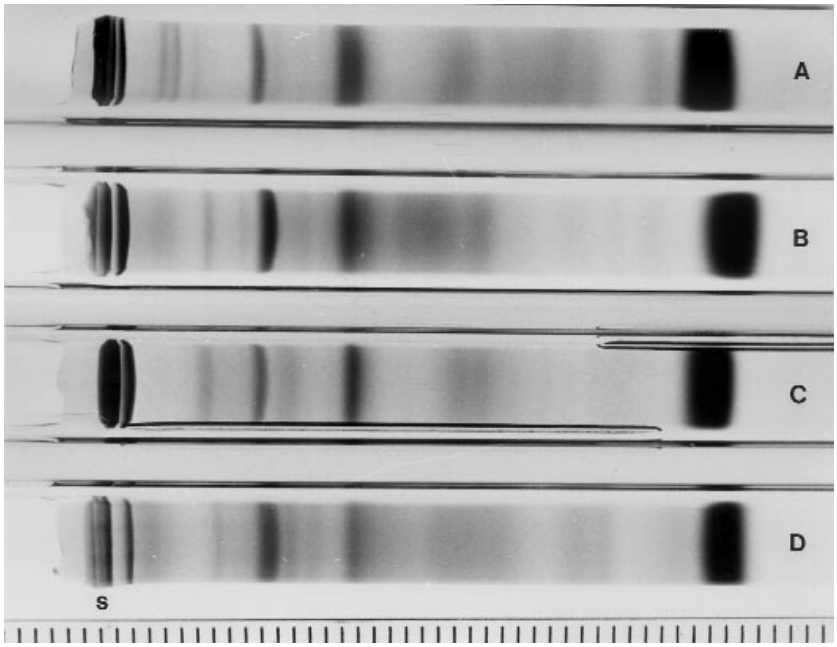

Figure 2. Blood-serum protein electropherograms of representative specimens from four different populations; A. Espiye-Giresun, B. Cide-Kastamonu, C. Hendek-Adapazarı and D. Dereköy-Kırklareli. The scale is in millimeters; s. start of separation.

four populations in terms of their blood-serum proteins. This was also the case for the three other populations in between (Devrek-Zonguldak, Mengen-Bolu and Perşembe-Ordu). However, there were some quantitative diffeneces, especially among the globulins (all of the fractions except the albumin peaks on the far right-Figures 2 and 3) both between the populations and within the populations.

Several authors (9-11) who worked on electrophoretical separation of the blood-serum proteins of various amphibians and reptiles, noted the taxonomical importance of the number, speed and density of protein fractions. Furthermore, Ferguson (11) stressed the fact that the protein constitution is affected by factors such as genetic variations, age, sex, physiological and environmental conditions. Among these, the genetic variations cause qualitative differences observable in an electrophoretical separation, while the other factors (age, sex, etc.) become observable as quantitative differences. Hence, the importance of qualitative differences from a taxonomical viewpoint is obvious.

As the observable differences in the globulins of our samples were quantitative, they probably stemmed from age differences, physiological conditions of the tested specimens or from environmental factors, hence they were not genetical, thus not significant taxonomically.

According to Schmidtler (1986), two new subspecies inhabit the general area; *L. v. paphlagonica* in Kastamonu, Sinop and Samsun, and *L. v. infrapunctata* in Espiye (Giresun). But since there are no qualitative differences in the blood-serum proteins of the investigated populations, we believe that, for the present, it would be more accurate to say only *L. v. meridionalis* is present in Turkey. Our serological results are also supported by the morphological analyses of Kumlutaş (5) and Çevik & Kumlutaş (12, in press).

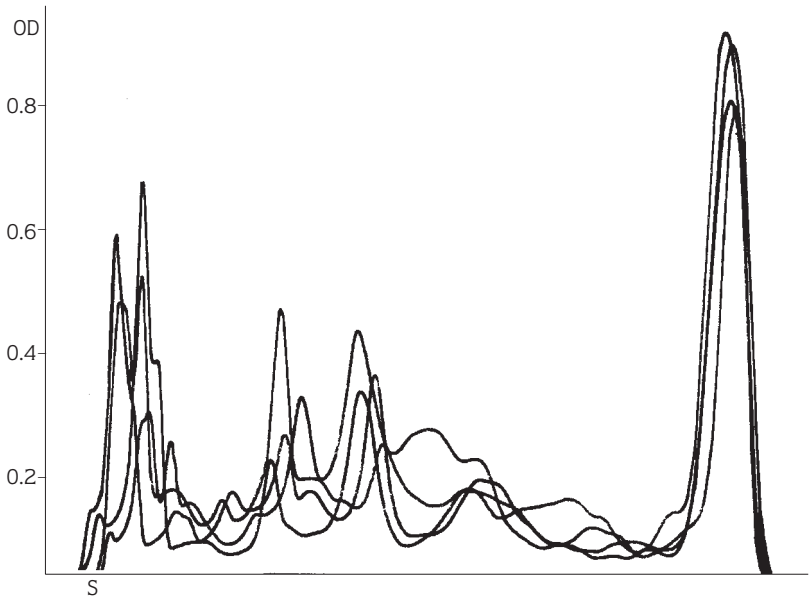

Figure 3. Superimposed densitometric tracing curves of the four separation gels given in figure 2. OD. optical density, s. start.

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