

## An Investigation on the Blood-Serum Proteins of *Chalcides ocellatus* (Sauria: Scincidae) Populations from Southern Anatolia

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Received: 18.01.1996

**Abstract:** In this study, blood-serum proteins of 22 adult (11♂♂, 11♀♀) *Chalcides ocellatus* (ocelated skink) specimens collected from various localities in Southern Anatolia are investigated qualitatively and quantitatively by means of polyacrylamide disc electrophoresis and densitometry. The species' serum protein electropherograms and protein distribution patterns are established for the first time.

**Key Words:** *Chalcides ocellatus*, blood-serum proteins, electrophoresis, densitometry.

### Güney Anadolu'dan *Chalcides ocellatus* (Sauria: Scincidae) Populasyonlarının Kan-Serum Proteinleri Üzerine Bir Çalışma

**Özet:** Bu çalışmada, Güney Anadolu'da çeşitli yörelerden toplanmış 22 ergin (11♂♂, 11♀♀) *Chalcides ocellatus* (benekli kertenkile) örneğinin kan-serum proteinleri poliakrilamid disk elektroforezi ve densitometri yöntemleri ile kalitatif ve kantitatif olarak incelenmiştir. Türe ait serum proteini elektroferogramları ilk kez sağlanarak protein dağılım şekilleri ortaya konmuştur.

**Anahtar Sözcükler:** *Chalcides ocellatus*, kan-serum proteinleri, elektroforez, densitometri.

### Introduction

The Ocellated Skink, *Chalcides ocellatus* Forskal, 1775 (Scincidae) inhabits the coastal strips of Mediterranean countries, Saudi Arabia, Iran, Iraq and Pakistan. Anderson (1) constructed 6 varieties of the species in N. Africa; Mertens (2) later raised these varieties to the subspecies level. Still later, various authors collectively constructed 11 subspecies under *C. ocellatus*, while Pasteur (3) raised the sympatric subspecies to 6 separate species.

A few specimens from Turkey have been studied taxonomically by several authors (4-7). Baran (8) has established that the species is present on several small islands, as well as on the Mediterranean coastal strip of Anatolia. More recently, Mermer (9) studied a rich collection of specimens morphologically, also recording observations on the species' feeding and breeding biology.

The aim of the present study is to investigate serologically *C. ocellatus* specimens from the Mediterranean coastal strip of Anatolia in order to establish the species' blood-serum protein distribution patterns and to correlate the data with morphological findings.

### Material and Methods

The 22 adult *Chalcides ocellatus* specimens (11♂♂ 11♀♀) used in the study were collected from the Mediterranean coastal strip of Anatolia between Antalya and Mersin during 3-7 July, 1992. Blood-serum samples were taken on 14 July, 1992.

Separation of blood-serum proteins was performed according to Özeti & Atatür (10,11), who slightly modified Davis polyacrylamide disc electrophoresis method (12). The separations (of 4 microliter serum samples) were carried out at ambient temperature (approx. 20-25°C), utilizing a Canalco Model 1200 electrophoresis apparatus. Separation gels were stained with 0.5% Amido Black (Naphthol Blue Black 10-B), later destained passively with repeated 7% acetic acid baths. The qualitative evaluations of the separations were made directly while quantitative evaluations were performed by means of a Gelman ACD-15 Model 39430 Computing Densitometer, which gave the relative percentages of the protein fractions or chosen fraction groups in a separation (scanning wavelength 500 nm). Albumin/Globulin ratios of the samples were then computed from the same data.

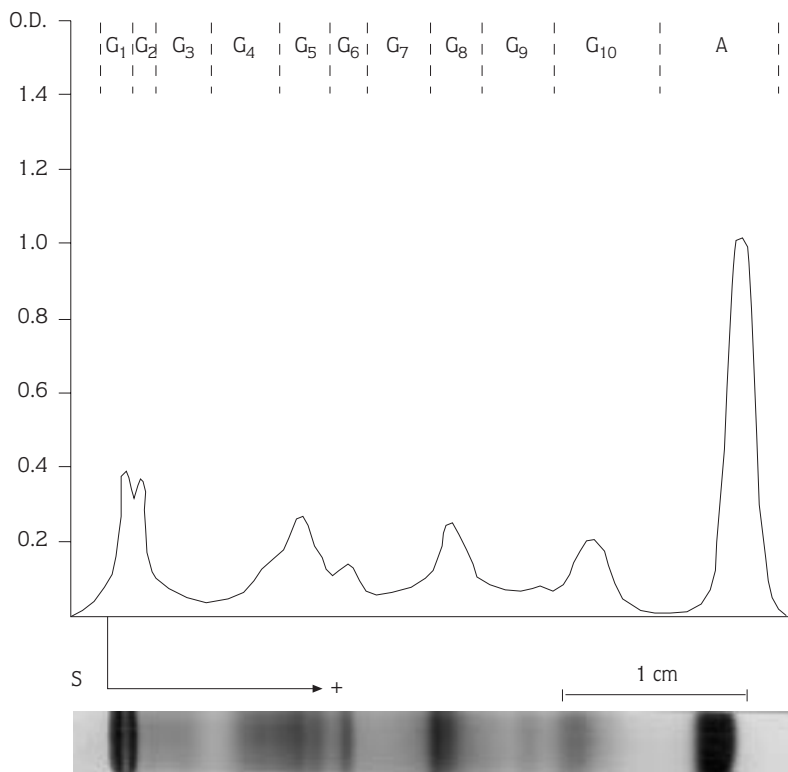


Figure 1. Electropherogram (gel photograph) showing the electrophoretic separation of the blood-serum proteins of an adult female specimen from Kale-Antalya, representing the Anatolian *C. ocellatus* populations, together with its densitometric tracing curve. Designations G<sub>1</sub> to G<sub>10</sub> indicate the globulin zone fractions or fraction groups. "A" designates the albumin-like fraction. O.D.: Optical density, S: Start (junction between the spacer and separation gels).

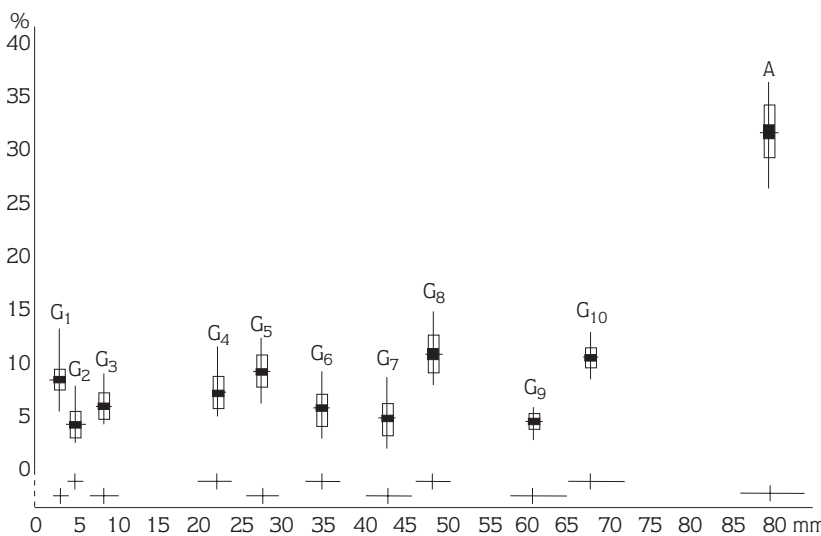


Figure 2. Variation in relative blood-serum protein percentages of the sera obtained from 22 (11♂♂, 11♀♀) adult *C. ocellatus* specimens (upper figures). G1-A: selected protein fractions or fraction groups (see fig. 1). The vertical line of each range-diagram represents the observed variation; the horizontal line, the mean; the white rectangle, two standard deviations; and the black rectangle, two standard errors of the mean. The horizontal lines in the lower figures indicate the variation in fraction mobilities; the vertical lines, the means (running time: approx. 60 mins at 3 mA per gel). Abscissa in millimeters, ordinate in relative protein percentages.

## Results and Conclusion

Mature *C. ocellatus* specimens were used in the present study. Males and females were evaluated together, for no discernible sex-related differences were observed in the electropherograms of the samples.

The protein distribution pattern of a female specimen representing of the *C. ocellatus* populations studied is

given in figure 1, along with its densitometric tracing curve. The serum proteins of our samples can be divided into a total of 11 fractions or fraction groups: one in the albumin zone (an albumin-like fraction) and ten in the globulin zone (ten globulin-like fractions/fraction groups).

The distribution of the relative protein percentages of *C. ocellatus* samples, representing the Mediterranean coastal strip populations of Anatolia, is shown as a range-

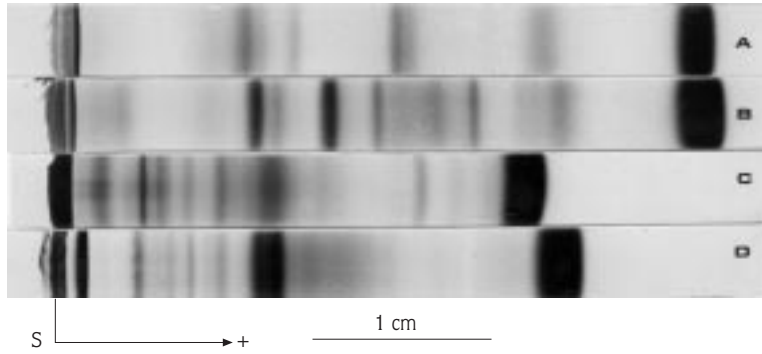


Figure 3. Electropherograms (gel photos) of A: *Chalcides ocellatus* and B: *Mabuya vittata* representing the scindis; C: *Lacerta trilineata* and D: *L. viridis* representing the lacertids. S: start; running time: approx. 60 mins.

diagram in figure 2. There are evident variations in the separated protein fractions/fractions groups, except in the fraction designated as "Gq". For the whole group, the mean albumin value was computed as  $31.31 \pm 0.559\%$  and the mean ratio of albumin/globulin as  $0.458 \pm 0.012$ .

Several authors have stressed the taxonomical importance of the number, mobility and relative abundance of the protein fractions obtained from the electrophoretic separation of blood-serum proteins of amphibians and reptiles (13, 14, 15). According to Ferguson (15), genetic variation leads to qualitative differences in protein fractions while variation in factors like age, sex, physiological condition and environment lead to quantitative differences. Therefore, it is qualitative differences that are important taxonomically.

According to serological analysis results of the present

study, no significant qualitative differences are present among the electropherograms of blood- serum proteins obtained from the *C. ocellatus* populations of Anatolia while quantitative differences are evident in all of the fractions except the one designated as "Gq". However, these non-genetical variations are of no taxonomical importance. Thus, it can be stated that the Anatolian *C. ocellatus* populations do not differ in their blood-serum protein patterns, which supports the morphological data on the same group established by Mermer (9).

Attention should also be given to the relative mobilities/speeds of the albumin-like fraction and globulin-like fractions following it, which are found to be quicker in the scincids than the lacertids. Representative electropherograms of scincids (*C. ocellatus* and *Mabuya vittata*) and lacertids (*Lacerta trilineata* and *L. viridis*) are given in figure 3.

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