

Erythrocyte sizes of some Urodeles from Turkey

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Abstract: This study is on the erythrocyte sizes of some urodeles (*Salamandra salamandra*, *Triturus vulgaris*, *Triturus karelinii*, *Triturus vittatus*, *Mertensiella luschani*, *Mertensiella caucasica*) living in various localities of Turkey. Blood smears stained with Wright's stain were utilized.

Key Words: Urodela, blood smears, erythrocyte size.

Türkiye'de yaşayan bazı Kuyruklu Kurbağalarda eritrosit büyüklükleri

Özet: Bu çalışmada, Wright boyasıyla boyanmış yayma kan preparatlarından yararlanılarak, Türkiye'de yaşayan bazı kuyruklu kurbağalarda (*Salamandra salamandra*, *Triturus vulgaris*, *Triturus karelinii*, *Triturus vittatus*, *Mertensiella luschani*, *Mertensiella caucasica*) eritrosit büyüklükleri tespit edilmiştir.

Anahtar Sözcükler: Urodela, yayma kan preparatı, Eritrosit büyüklüğü.

Introduction

Various authors (1, 2, 3, 4) have investigated the haematology of amphibians. The majority of these were concerned with the blood cell counts of different anurans. There were some works on the blood cell sizes of amphibians (5-15), however only a small percentage of these were on the hematology of urodeles.

A literature scan showed us that there are no haematological studies on the urodeles inhabiting our country. The aim of the present work is to establish the erythrocyte sizes of some urodeles living in Turkey.

Material and Methods

The specimens of the different urodele species used in this study (*Salamandra salamandra*, *Triturus vulgaris*, *T. karelinii*, *T. vittatus*, *Mertensiella luschani*, *M. caucasica*) were collected from various localities of Turkey between the years 1989-1996 (Figure 1). This material (except the specimens of *M. luschani*) is deposited at the herpetological collection in our department under the following ZDEU codes:

S. salamandra ZDEU 6/1991, Harbiye-Hatay, 23.2.1991.

T. vulgaris ZDEU 120/1992, İkizgöller-Bornova-Izmir, 15.12.1992.

T. karelinii ZDEU 46/1991, Kalecik-Ankara, 17.7.1991.

T. vittatus ZDEU 14/1995, Mezitli-Mersin, 21.3.1995.

M. caucasica ZDEU 86/1991, Erikli-Akçaabat-Trabzon, 15.6.1991.

M. luschani (blood samples were obtained from Alanya-Antalya specimens)

In measuring and computing the sizes of the erythrocytes blood smears stained with Wright's stain were utilized, the necessary blood samples were obtained by cardiac puncture. The erythrocyte measurements were taken by means of a BBT Krauss ocular micrometer. In each slide, the lengths (L) and widths (W) of 40 erythrocytes were measured and their sizes (area of an optical section of each cell through the two main-length and width-axes) were computed from the formula $LW \pi/4$.

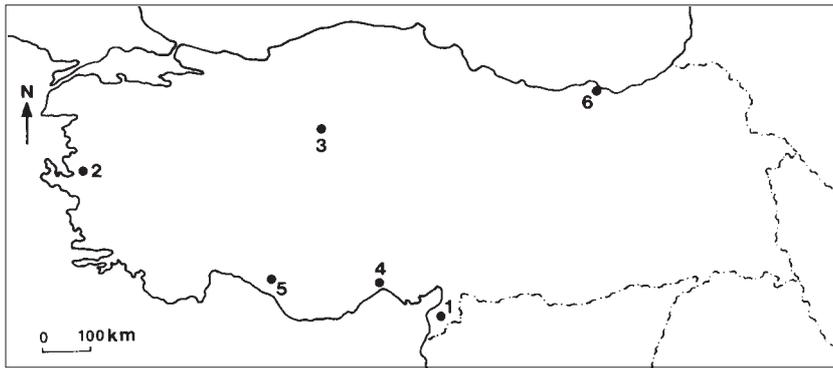


Figure 1. Material collecting localities: 1. *Salamandra salamandra*, Harbiye (Hatay); 2. *Triturus vulgaris*, İkizgöller-Bornova (Izmir); 3. *Triturus karelinii*, Kalecik (Ankara); 4. *Triturus vittatus*, Mezitli (Mersin); 5. *Mertensiella luschani*, Alanya (Antalya); 6. *Mertensiella caucasica*, Erikli-Akçaabat (Trabzon).

Results

In all of the studied urodele species no discernible differences were evident between the sexes from the viewpoint of erythrocyte size, so data from the sexes of the same species were pooled.

The characteristic erythrocyte shape of the urodeles is ellipsoidal (Figure 2). The erythrocyte length, width and size data of the studied six urodeles are given in Table 1, together with their ratios of length/width.

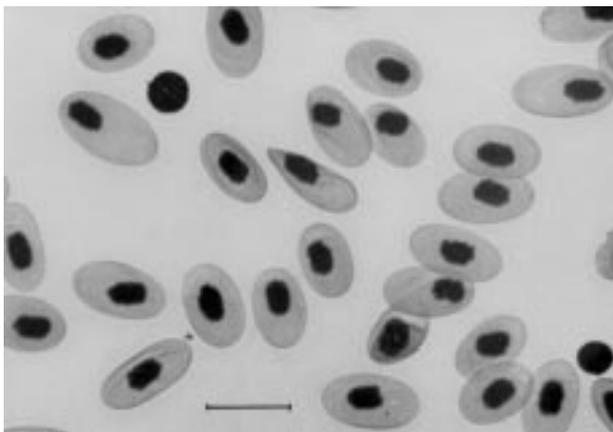


Figure 2. Erythrocytes of *Mertensiella luschani* on blood smear, horizontal bar; 30 micrometers

Of the investigated species, the longest erythrocytes belonged to *M. luschani*, the widest and the largest sized to *S. salamandra*, while the shortest, narrowest and hence the smallest sized erythrocytes were found in *T. vittatus*. Between the species of the genus *Triturus*, erythrocyte sizes were similar in *karelinii* and *vulgaris*, but that of *vittatus* was distinctly smaller than both of them. A difference was likewise evident between the cells sizes of *M. luschani* and *M. caucasica*. From the viewpoint of cell shape, the most ellipsoidal erythrocytes were found in *M. caucasica* while the least ellipsoidal cells belonged to *T. karelinii*.

Discussion

Of the former authors, Vernberg (11) mentioned of a correlation between the erythrocyte sizes and body weights in some urodeles living in the two states of the USA, but also had stressed the point that the two species of the genus *Ambystoma* were an exception to this generalization (in the larger sized *tigrinum* the erythrocyte size was smaller than that of the smaller sized *maculatum*). Evans (16) had reported that in some plethodontids, the more active species have smaller erythrocytes while in others with lower oxygen consumption the cells were larger. Some other authors (17, 18, 19) have stressed that various environmental factors are effective on erythrocyte size.

Species	N	L (µm)	W (µm)	A (µm ²)	LW
<i>Salamandra salamandra</i>	5	33.10±0.202	20.13±0.128	523.44±4.794	1.651±0.015
<i>Triturus vulgaris</i>	4	30.02±0.163	17.81±0.082	419.44±3.113	1.689±0.012
<i>Triturus karelinii</i>	4	29.50±0.156	18.14±0.092	420.37±2.960	1.633±0.012
<i>Triturus vittatus</i>	5	28.06±0.160	16.63±0.117	367.05±3.821	1.695±0.012
<i>Mertensiella luschani</i>	5	33.28±0.170	19.44±0.085	507.54±3.345	1.727±0.015
<i>Mertensiella caucasica</i>	4	31.69±0.285	17.69±0.285	440.44±5.793	1.795±0.019

Table 1. Erythrocyte data in six urodele species inhabiting Turkey. N: sample size, L: erythrocyte length, W: erythrocyte width, A: erythrocyte size (means±standard errors of the means).

We have established that there are some discernible differences between the investigated urodeles from Turkey from the viewpoint of their erythrocyte sizes. However it was not possible to correlate those differences with the body weights of the related species, more probably these differences may stem from the different activity levels of these urodeles and/or from different and variable conditions to which they are exposed in their various environments.

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