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# Erythrocyte Measurements in *Lacerta rudis* (Reptilia, Lacertidae)

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**Abstract:** In this study, which was carried out in July 1998, erythrocyte sizes of *Lacerta rudis* were examined. The *L. rudis* specimens were collected from Zigana Pass (Trabzon) at an altitude of 1820 m. Blood smears were prepared at Zigana Pass.

Mature erythrocytes (entire cell) and their nuclei lengths and widths were measured by means of an ocular micrometer at a total magnification of 1600x.

**Key Words:** *Lacerta rudis,* erythrocyte measurement.

## *Lacerta rudis* (Reptilia, Lacertidae)'te Eritrosit Ölçümleri

**Özet:** Temmuz 1998 yılında yapılan bu çalışmada *L. rudis*'in eritrosit büyüklükleri incelendi. Çalışılan tür örnekleri 1820 m. yükseklikteki Zigana (Trabzon) geçidinden toplandı. Yayma preparatlar Zigana geçidinde yapıldı.

Olgun eritrositlerin ve çekirdeklerinin uzunlukları ve genişlikleri toplam 1600x büyütmede ölçüldü.

**Anahtar Sözcükler**: *Lacerta rudis,* eritrosit ölçümü.

## Introduction

There have been many haematological studies on reptiles' blood. Various authors (1-6) have studied the morphology of circulating blood cells of reptiles. Some authors have studied the number of red blood cells (7-9) and haemoglobin contents of reptiles' blood. (8,10,11). However they are limited to some species in Europe.

Erythrocyte sizes have not been measured for all reptile species. The measurements of erythrocytes were given in some species in Europe (4). In Turkey, there are many papers on reptiles, but they are concerned with their morphology and systematics. There are no haematological studies on reptiles' blood cell size, blood count and haemoglobin content. A literature scan showed us that there are no haematological studies on the reptiles in Turkey. We found two studies, but they are concerned with some amphibians in Turkey (12, 13). However, recent studies concentrate on single species (15, 16).

The purpose of our investigation was to establish the erythrocyte sizes of *L. rudis* in Turkey.

## Materials and Method

In this study, twelve individuals (6 ♀♀, 6 ♂♂) belonging to the same species were examined. The study was carried out in July 1998. The specimens were collected from Zigana Pass (Trabzon) at an altitude of 1820 m. Blood was obtained by cutting off the tail of the lizards (14). As soon as the blood was sucked into heparinized capillary tubes, the blood smears were prepared. They were air-dried and stored until required for study in the laboratory. In the study, Wright's stain was used (1-3).

Staining was carried out in the laboratory. For each individual, three or more blood smears were prepared. Twelve drops of Wright's stain were dropped on the slides and allowed to remain on the slide for one and half minutes before the addition of a phosphate buffer (pH=6.5). The slides were allowed to stand for ten minutes at room temperature, washed with distilled water and allowed to dry.

On each slide fifty mature erythrocytes and their nuclei were measured by means of an ocular micrometer at a magnification of 1600 x (2, 3). In this way fifty erythrocyte sizes were calculated from the measurements. Erythrocyte and nucleus measurements are given in Table 1. Erythrocyte and nucleus sizes are calculated according to the formulas [(EL x EW x $\pi$) / 4], [(NL x NW x $\pi$) / 4], (12).

**Results and Discussion**

The erythrocytes or red blood cells of *L. rudis* are nucleated, oval cells (Fig. 1). Their nuclei are also oval and centrally located. The nuclei of mature erythrocytes are chromophilic. The nucleus is stained dark purple, the cytoplasm is stained light red. There is no significant difference between female and male lizard's erythrocyte sizes so the data from the males and females were pooled. The mean length of mature erythrocytes was 13.45 μm (± 1.20 standard deviations, with a range of 10.37-15.86 μm). The mean width of mature erythrocytes was 8.28 μm (± 0.77 standard deviations, with a range of 6.10 - 10.98 μm). The mean length of nucleus was 5.87 μm (± 0.64 standard deviations, with a range of 4.27 - 7.93 μm). The mean width of the nucleus was 3.61 μm (± 0.45 standard deviations, with a range of 2.44 - 5.49 μm) and also erythrocyte and nucleus sizes and length/width ratios of *L. rudis* are given in Table 1.

In reptiles, erythrocyte sizes vary greatly. The cryptodiran turtles have larger erythrocytes. The erythrocytes of *Sphenodon punctatus* differ from those

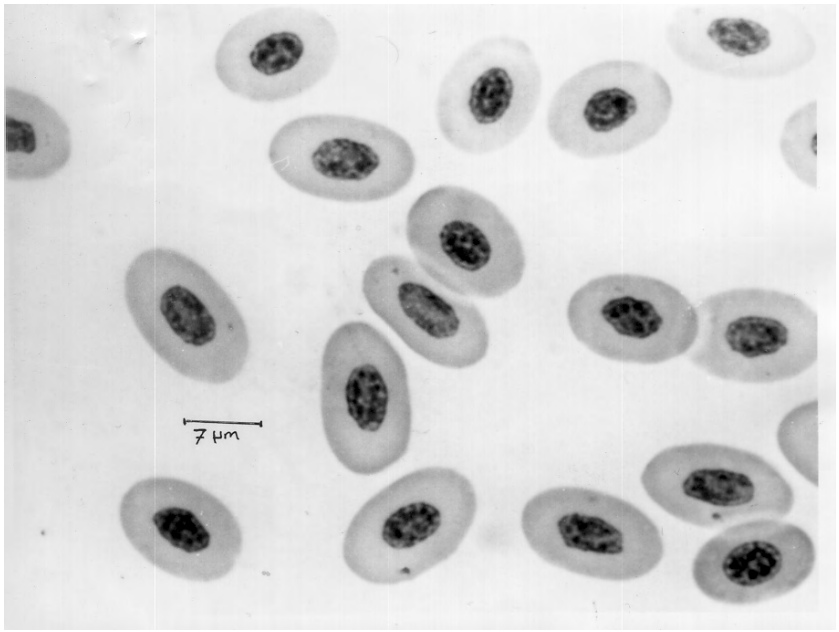


Fig.1. Erythrocyte sizes of L. rudis.

Table 1. The mean erythrocyte dimensions of *Lacerta rudis* together with the standard errors of the means.

| EL: Erythrocyte length, NL: Nucleus length, | | EW: Erythrocyte width, NW: Nucleus width, | | ES: Erythrocyte size NS: Nucleus size | |
|---|---|---|---|---|---|
| *L. rudis* (12) | EL(μm) | EW(μm) | EL/EW | ES($\mu m^2$) | ES/NS |
| Mean | 13.45 ± 1.20 | 8.28 ± 0.77 | 1.63 ± 0.21 | 87.46 ± 11.14 | 5.35 ± 0.95 |
| Maximum | 15.86 ± 1.20 | 10.98 ± 0.77 | 2.18 ± 0.21 | 119.17 ± 11.14 | 7.87 ± 0.95 |
| Minimum | 10.37 ± 1.20 | 6.10 ± 0.77 | 1.21 ± 0.21 | 52.57 ± 11.14 | 2.96 ± 0.95 |
| | NL(μm) | NW(μm) | NL/NW | NS($\mu m^2$) | |
| Mean | 5.87 ± 0.64 | 3.61 ± 0.45 | 1.64 ± 0.29 | 16.66 ± 2.73 | |
| Maximum | 7.93 ± 0.64 | 5.49 ± 0.45 | 2.50 ± 0.29 | 28.91 ± 2.73 | |
| Minimum | 4.27 ± 0.64 | 2.44 ± 0.45 | 1.14 ± 0.29 | 11.68 ± 2.73 | |

of all other reptiles by their large size. The erythrocytes of lizards vary greatly in size depending on the family and sometimes even within one family. The snakes, except for *Typhlops vermicularis*, form a relatively homogenous group. The smallest erythrocytes are found in the Lacertidae family (4). Hartman and Lessler stated that the lizard families have the smallest erythrocytes in reptiles (2). The results given in table 1 are in agreement with those of Saint Girons (4) and Hartman and Lessler (2).

One of the most important function of erythrocytes is to carry oxygen and carbon dioxide and also its surface area to size ratio is a determining factor in the exchange of oxygen and carbon dioxide in the tissues. Thus, a small erythrocyte offers a possibility of greater rate of exchange than a larger one (2). Our results are in agreement with those of Hartman and Lessler (2).

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