



CASE REPORT

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Morphology of Sperm Cells Obtained from *Androctonus Turkiyensis* Yağmur, 2021 (Scorpiones: Buthidae) Scorpions: The First Data Obtained in TurkeyAli Dogan OMUR^{1*}, Kursat FILIKCI², Ersen Aydın YAGMUR³ and Serkan Ali AKARSU¹¹Atatürk University, Veterinary Faculty, Department of Reproduction and Artificial Insemination, Erzurum, Turkey²Harran University, Veterinary Faculty, Department of Pathology, Şanlıurfa, Turkey³Manisa Celal Bayar University, Alaşehir Vocational School, Alaşehir, Manisa, Turkey**ABSTRACT**

Scorpions are venomous arthropods, members of the order Arachnida and the order Scorpiones. Scorpions and their venom have been used in China, India and Africa for years to treat various diseases. In recent years, there are studies showing that scorpion venoms and toxins can reduce cancerous growth, induce apoptosis and prevent metastasis. The popularity of scorpion venom in recent years has brought to mind the morphological features of scorpion sperm. Therefore, in this study, the morphological characteristics of the sperm of the scorpion *Androctonus turkiyensis* Yağmur, 2021, which is widely found in Turkey, were determined. In the study, one *Androctonus Turkiyensis* scorpion obtained from Şanlıurfa region was used. After the death of the scorpion, which was kept in formaldehyde solution for 5 minutes, semen sample was taken from the spermatophore capsule. Sperm cells were examined by staining on the slide from the semen sample taken. Head, middle and tail compartments of spermatozoa were examined. However, due to the thin head of the sperm cell, the staining status could not be determined.

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Introduction

There are very few studies on the structure of scorpion sperm[1]. In Scorpions, mature spermatozoa are filamentous and divided into a sperm head, middle piece, and end piece[2]. Scorpion spermatozoa consist of an acrosomal vacuole and filament, a long filiform nucleus, an elongated mitochondrial segment, and an axoneme with a typical 9+2 or an abnormal 9+0[3].

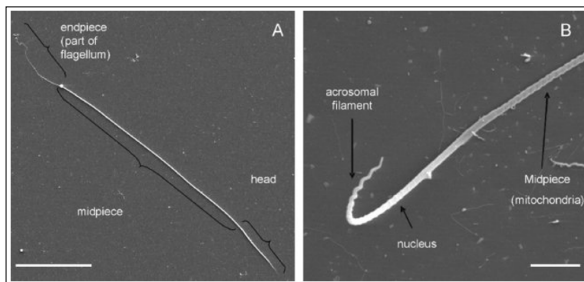


Figure 1: Structure of Scorpion Spermatozoa [4].

The first record of *Androctonus* was given as *Buthus crassicauda* by Werner [5]. Just after, Birula [6] recorded this species from Iğdır (Tuzluca) and Penther, 1912 [7] recorded from Mardin and Şanlıurfa as *Prionurus crassicauda*. Subsequently it was recorded as *Androctonus crassicauda* from Diyarbakır[8], Elazığ (Palu), Malatya, Mardin, Şanlıurfa[9], İçel [10], Adıyaman[11, 12], Kilis[13], Gaziantep[14], Batman[15], Kars, Siirt, Şırnak [16]. Recently Yağmur [17] reviewed *Androctonus* population of Şanlıurfa and compared it with neotype of the *A. crassicauda*. He

described Şanlıurfa population as a new species called *Androctonus turkiyensis*. Yağmur [17] did not give any identifications on other populations of Turkey. But we used specimens from Şanlıurfa population and their morphology coherent with description of Yağmur[17].

In this study, it was aimed to morphologically examine the spermatozoa of *Androctonus turkiyensis*.

Material Method

Permission for the study was provided by the Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and National Parks, Turkish Republic (Protocol No: E-21264211-288.04-3886212). In the study, one scorpion obtained from Şanlıurfa, Turkey was used.



Figure 2: Photograph of the *Androctonus Turkiyensis* Yağmur scorpion

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Semen Collection Method

After the death of the scorpion, which was kept in formaldehyde solution for 5 minutes, an incision was made and the semen sample taken from the spermatophore capsule was placed on the slide.

Detecting Sperm Cells

A thin smear was prepared by placing the sample taken from the scorpion cadaver on the slide. The slides were dried at room temperature for 30 minutes and then stained with the Histoplus brand Diffplus Fast diff-quick dye set (REF: HST-DIF-0100, LOT: 41122102) according to the manufacturer's instructions. For this purpose, the slides immersed in the solution number 1 for 5 times (each for 1 second), solution number 2 for 10 seconds, and solution number 3 for 10 times (each for 1 second). Then, the excess stain in the slides was removed with distilled water. The slides, which were left to dry again at room temperature, were examined with an Olympus BX53 microscope. Necessary areas were photographed with the Olympus DP73 camera and Cellsens Entry (V 1.12) software.

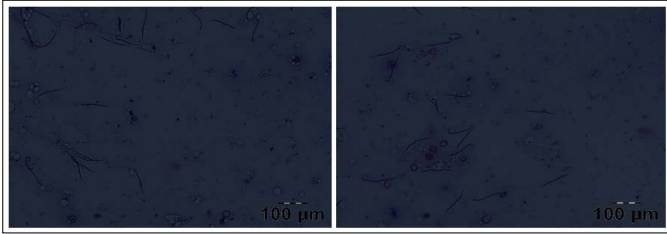


Figure 3: *Androctonus turkiyensis* Yağmur Scorpion Spermatozoa

Discussion

In this study, morphological features of scorpion spermatozoa of *Androctonus turkiyensis* were tried to be determined. Alberti divided scorpion semen into two parts as head and tail. Then, it has been evaluated in 2 sub-sections as the middle part and the end part [2, 3]. In our study, it can be said that it consists of 3 main parts morphologically. When compared with the electron microscope image in Peretti's study[4], the spermatozoa structure matches. In the review by Vignoli et al.[1], they reported that scorpion semen had cytoplasmic droplets in the head and middle part. In our study, it is seen that there are cytoplasmic droplets at the junction of the head and middle part of some sperm. In a study, it is stated that scorpion spermatosae play a role in the formation of mating plugs in females[18]. The plug blocking the female genital tract may be the function of these droplets. As a result, *Androctonus turkiyensis* type scorpion sperm has a morphological structure similar to other scorpion species. However, further studies are needed to understand its role in the female genital tract.

Acknowledgement

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