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New records of *Androctonus* Ehrenberg, 1828 (Scorpiones: Buthidae) from Iran

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Abstract
Limited studies have been conducted on the scorpions of East Azarbaijan Province, resulting in the identification of seven Buthid species. The examination of *Androctonus* specimens collected from East Azarbaijan Province between 2021–2023 resulted in the identification of two new records, *Androctonus kunti* Yağmur, 2023 and *Androctonus turkiyensis* Yağmur, 2021. These two species were collected and described from east and south of Turkey respectively and recorded here for the first time from Iran. With the identification of *A. kunti* and *A. turkiyensis*, which before reported as *Androctonus crassicauda*, the total number of reported scorpion species in East Azarbaijan Province raised to eight, while the number of *Androctonus* species documented in Iran rose to six. Diagnostic characters of the two species and an identification key to Iranian *Androctonus* were provided.

Keywords: Fauna, *Androctonus*, taxonomy, morphology, Azarbaijan, Iran.

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INTRODUCTION

Fat-tailed scorpions of the genus *Androctonus* Ehrenberg, 1828 (Buthidae C. L. Koch, 1837) are easily distinguished by their thick and high metasomal segments. Its species are widely distributed in Middle East and Asia (Iran, Afghanistan and India) (Lourenço, 2008; Rein, 2025). Members of *Androctonus* have an extensive distribution throughout Iran (Barahoei et al., 2020). Although black specimens of this genus have been mostly classified as *Androctonus crassicauda* (Olivier, 1807), with Kashan as type locality, recent studies (Jafari et al., 2020; Ghavami et al., 2022; Barahoei et al., 2022a, 2025) have revealed significant morphological and genetic differences among various populations in Iran.

In recent years, several studies on the populations of this taxon in neighboring countries in the west of Iran have led to the description of three new species, including *A. sumericus* from Iraq, *A. turkiyensis* and *A. kunti* from Turkey (Al-Khazali & Yağmur, 2023; Yağmur, 2021, 2023). Study on populations residing in the highlands of the eastern mountain belt of Iran restulted in the description of *A.*

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rostami (Barahoei et al., 2025). The populations found in southwestern Iran were classified as *A. sumericus* (Barahoei et al., 2025). The yellow-coloured Iranian populations inhabiting the lowlands along the southeastern borders of Iran belong to *A. sistanus* (Barahoei et al., 2022a).

Limited studies have been conducted on the scorpions of East Azarbaijan Province, resulting in the identification of only seven species of the Buthidae (Barahoei et al., 2020, 2022b; Kovařík et al., 2022), one of which is *A. crassicauda* (Mohammadi-Bavani et al., 2017). The present study aims to conduct a faunistic survey on the populations of *Androctonus* in East Azarbaijan Province, Iran using morphological characters, and to determine their distribution range.

MATERIAL AND METHODS

Field work for this study was conducted in the East Azarbaijan Province from 2021 to 2023. Scorpion specimens were collected from the designated locations in both mountainous and plain regions, as well as five stations across various cities of the Province. Sample collection involved daily searches for scorpion shelters, burrow excavation, and night searches using UV light.

The collected samples were transferred to the laboratory of the Infectious Tropical and Disease Research Center at Tabriz University of Medical Sciences in the sampling containers by installing the specification labels. The morphological characteristics of different body parts were examined using reliable identification keys (Barahoei et al., 2025; Yağmur, 2021, 2023).

Photography was done using a Canon EOS 800D digital camera, and images were processed using Adobe Lightroom version 6.0 and Adobe Photoshop CS5.

The collected specimens are housed at the Research Institute of Zabol, Zabol, Iran (RIZ) and Infectious and Tropical Disease Research Center, Tabriz University of Medical Sciences, Tabriz, Iran (TBZMED).

RESULTS

The analysis of 34 specimens of *Androctonus* scorpions gathered from various areas within East Azarbaijan Province resulted in the identification of two species, namely *A. kunti* and *A. turkiyensis*, which represent new records for the fauna of Iran. The results of this study confirmed that the previous records of *A. crassicauda* from East Azarbaijan Province are mis-identifications.

Systematics

Family Buthidae C. L. Koch, 1837

Genus *Androctonus* Ehrenberg, 1828

***Androctonus kunti* Yağmur, 2023** (Figure 1)

Prionurus crassicauda: Birula, 1896: 232 (in part); Birula, 1904: 29 (in part).
Androctonus crassicauda: Yağmur et al., 2008: 14.
Androctonus crassicauda: Mohammadi-Bavani et al., 2017: 373-377.
Androctonus kunti Yağmur, 2023: 1-19, 79 figs.

Examined material (10♀, 15♂): ***East Azerbaijan Province*** - 1♀, **Jolfa** (38°56'28.50"N, 45°37'48.79"E), 18 October 2023, col.: M. Salami; 3♂, **Marand**, Yamchi (38°31'12.14"N, 45°37'50.94"E), 26 June 2023; 1♂, 23 July 2023, col.: M. Keykhali; 1♀ (Figure 1A-B), Yekan-e Kahriz (38°40'23.11"N, 45°24'25.70"E), 18 June 2023; 1♂, 20 July 2023, col.: M. Keykhali; 1♂, 23 June 2023, col.: Amirjani; 1♀, 1♂, Girag-sofla (38°32'34.40"N, 45°34'20.51"E), Jolfa, 18 July 2024, col.: M. Salami; 2♂, Kafiolmolk (38°08'18.58"N, 45°34'44.63"E), 22 July 2023, col.: Sarvari; 1♂, **Shabestar**, Dizaj-e-Khalil (38°09'10.07"N, 45°43'28.39"E), 24 July 2023, col.: H. Amirian; 1♀, Kūh-e Mīshū (38°28'19.95"N, 45°43'08.59"E), 23 June 2023, col.: M. Babaei; 1♂, Sis, 11 August 2024, col.: M. Babaei; 1♀, Ammand (38°01'37.87"N, 46°09'37.50"E), 13 July 2023, col.: M. Farhan; 2♀, **Tabriz**, Asbes (38°00'04.65"N, 46°07'10.32"E), 23 August 2022, col.: S. Asghari; 1♀, 1♂, Sari Zami (38°00'22.57"N, 46°19'27.83"E), 23 July 2023; 1♀, 20 July 2024; col.: Khodaparast; 1♀, 15 July 2023, col.: Arezoomand; 1♂, 20 July 2023,

col.: H. Razmjoo; 1♂ (Figure 1C-D), 10 July 2023, col.: V. Ghaderi; 1♂, 13 August 2024, col.: S. Kolahdooz.

Diagnosis

Medium to large sized, body overall colour brownish-black to black, chela manus wider than patella, fixed and movable fingers with 14–16 oblique rows of denticles, carapace covered with coarse and rounded granules on anterior part, pectines with 31–35 teeth in males, and 25–27 in females, ventrolateral carinae of metasomal segment V with 3–4 non-spaced large triangular denticles, dorsolateral carinae rounded with very swollen and large granules anteriorly, without granules posteriorly, anal arch with two large round lobes on lateral part, first lobe divided.

***Androctonus turkiyensis* Yağmur, 2021** (Figure 2)

Examined material (2♀, 6♂): ***East Azerbaijan Province***, 1♂, **Charoimagh**, Zaker Kandi (36°98'32.40" N, 47°13'00.08" E), 28 June 2023, col.: K. Habibi and M. Azizi; 2♀, 2♂ (Figure 2), **Malekan**, Bayqut (37°15'54.30" N, 46°04'50.92" E), 25 June 2022, col.: M. Zarrinfar; 1♂, Turaghay (37°05'13.96" N, 46°18'43.15" E), 28 August 2024, col.: E. Fathi; 1♂, Abbas Abad (37°09'46.25" N, 46°06'30.67" E), 16 July 2023, col.: Mokhtari; 1♂, **Maragheh** (37°09'11.29"N, 46°10'45.68"E), 20 August 2024, col.: M. Farmani.

Diagnosis

Medium to large sized, body overall colour dark brown, pedipalp slightly elongated, movable and fixed finger with 14–16 rows of oblique teeth, intercarinal area on carapace with large and sparse granules on anterior part, pectines with 30–33 teeth in males, and 26–27 in females, ventrolateral carinae of metasomal segment V with 1 large rectangular (in females) or 3–4 nonspaced large triangular denticles (in males), dorsolateral carina with granules anteriorly and smooth edge posteriorly, anal arch with two lobes in lateral part, first one rounded, large and always with a groove.

Identification key for *Androctonus* species occurring in Iran

1- Overall colouration yellow; metasomal segments IV-V and telsom black ……..… *A. sistanus*
- Overall colouration brown to black; all metasomal segments and telsom with same color …….. **2**
2- Overall coloration black; anterior part of carapace with coarse and dense granules; ventrolateral carinae of metasomal segment V without large denticles or with 3-4 large nonspaced denticles …… **3**
- Overall coloration brown; anterior part of carapace with large granules; ventrolateral carinae of metasomal segment V with 1-2 large triangular denticles or spaced 2-3 large denticles **5**
3- Ventrolateral carinae of metasomal segment V with 3-4 large nonspaced denticles; sternite VI without granule; distributed in northwest highlands of Iran ……..…… *A. kunti*
- Ventrolateral carinae of metasomal segment V without large denticles; middle part of median carina and end part of sub lateral carina in the sternite VI granulated ……..… **4**
4- Lateral surface of sternites III-VI smooth; intercarinal surface of sternite VII smooth or sometimes with some large granules; posterior lateral carina of carapace vestigial; distributed in eastern and southern highlands of Iran ……..……..… *A. rostami*
- Lateral surface of sternites III-VI covered with granules; intercarinal surface of sternite VII with fine and abundant granules; presence of posterior lateral carina of carapace; distributed in the center of Iran ……..…… *A. crassicauda*
5- Carapace on anterior part with coarse, flattened and dense granules; ventrolateral carinae of metasomal segment V with 1-2 moderate triangular denticles ……..…….. *A. sumericus*
- Carapace on anterior part with large, cuneiform and sparse granules; ventrolateral carinae of metasomal segment V with 1 large rectangular denticles in females and 3-4 large triangular denticles in males ……..…….…….... *A. turkiyensis*

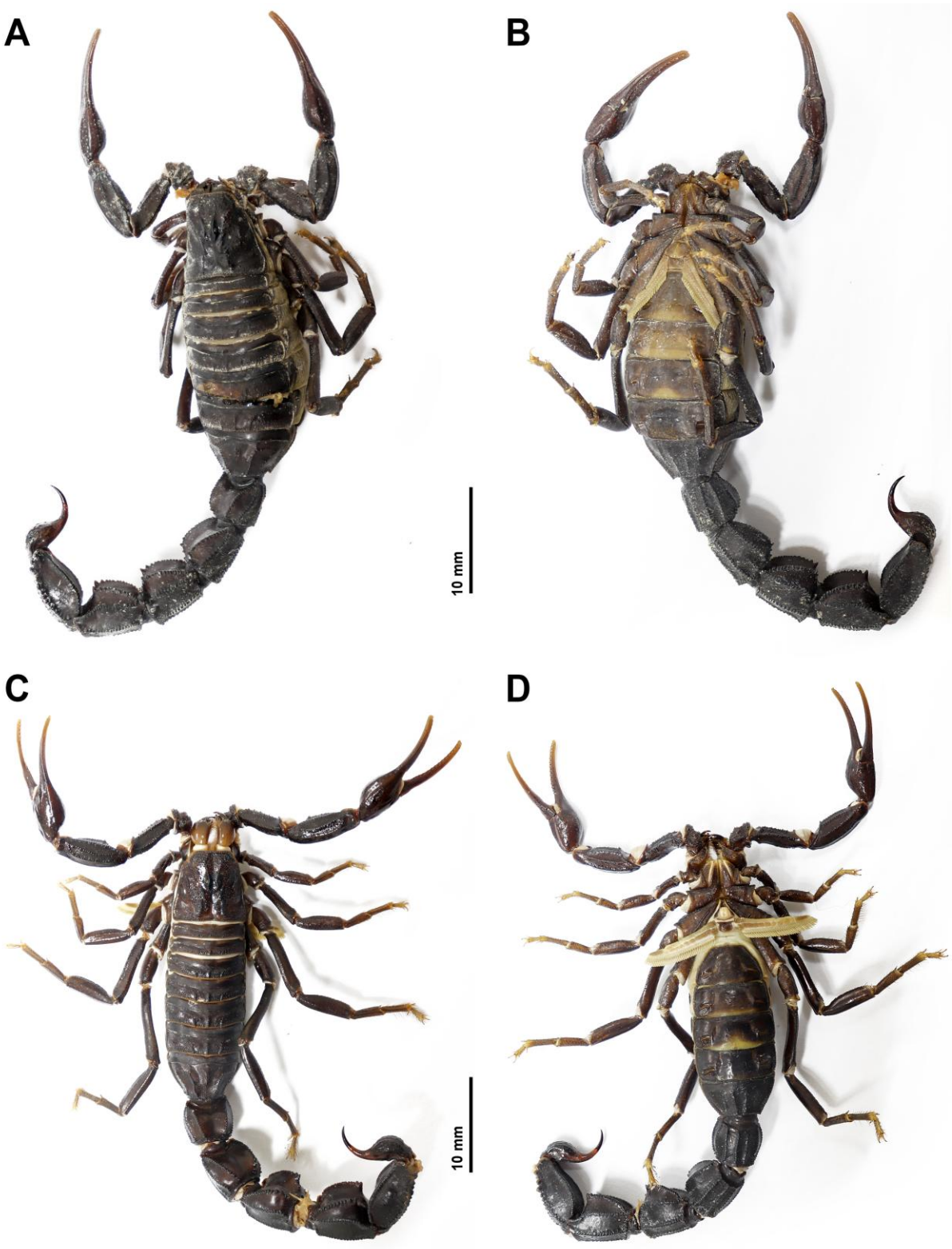

FIGURE 1. Adult specimens of *Androctonus kunti* Yağmur, 2023 collected from northwest Iran, female: A) dorsal view, B) ventral view; male: C) dorsal view, D) ventral view.

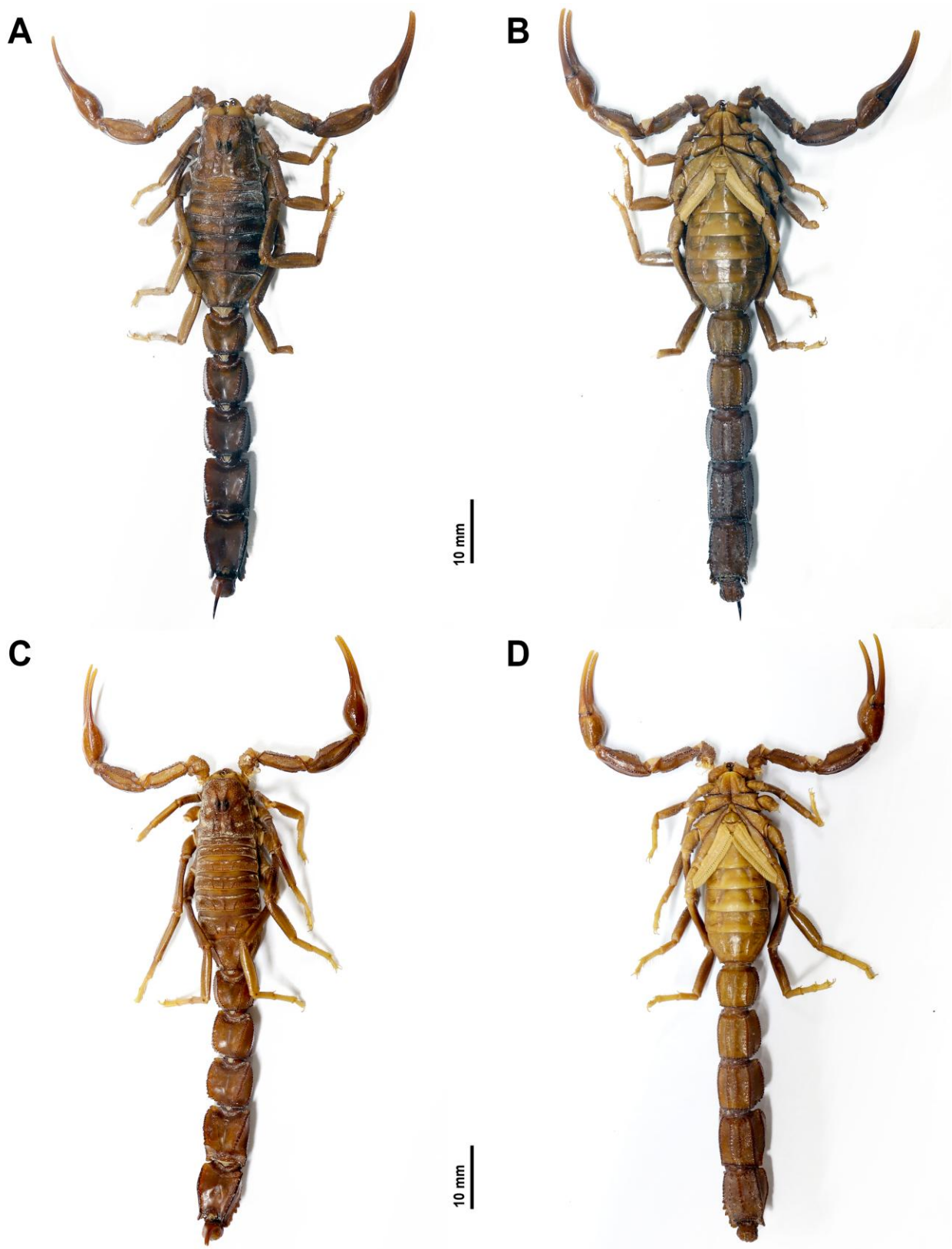

FIGURE 2. Adult specimens of *Androctonus turkiyensis* collected from northwest Iran, female: A) dorsal view, B) ventral view; male: C) dorsal view; D) ventral view.

DISCUSSION

To date, seven species of scorpions have been documented in the East Azerbaijan Province, all of which are classified under the family Buthidae, and all records of the genus *Androctonus* were assigned to *Androctonus crassicauda* (Olivier, 1807). Research on the *Androctonus* populations residing in East Azerbaijan Province (northwest Iran) has indicated that all specimens from this area are linked to *A. kunti* and *A. turkiyensis*. Therefore, it can be inferred that *A. crassicauda* is exclusively found in the central regions of Iran, located between the Alborz and Zagros mountain ranges (Barahoei et al., 2025).

The identification of *A. kunti* and *A. turkiyensis* has led to an increase in the total number of scorpion species reported in this Province to eight. Concurrently, the number of *Androctonus* species recorded in Iran has raised to six. It is essential to comprehend the distribution of different *Androctonus* species to ascertain their habitat conditions, mitigate the risk of scorpion stings, and formulate specific antivenoms designed for each species to ensure effective treatment.

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