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Scorpion Fauna of Zanjan Province, Iran (Arachnida: Scorpiones)

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Abstract
In this study scorpion fauna of Zanjan province(Northwestern of Iran) is searched which has not previously studied in detail. In this work, in 2013 and 2014, a total of 99 scorpion specimens were collected and *Androctonus crassicauda*(Olivier, 1807), *Hottentotta salucyi* (Simon, 1880), *H. zagrosensis* Kovarik, 1997, *Odontobuthus doriae* (Thorell, 1876), *Mesobuthus eupeus eupeus* (C. L. Koch, 1839), and *Scorpio maurus townsendi* (Pocock, 1900) taxa were identified. Among them *H.salucyi*, *H. zagrosensis*, *O. doriae*, *M.e. eupeus*, and *S. m. townsendi* are recorded for the first time from the Zenjan province. Zogeographical and ecological remarks are given.
Keywords: Fauna, Scorpiones, Buthidae, Scorpionidae, Zenjan, Iran

INTRODUCTION

Iran has very reach scorpion fauna including high level endemism relativly adjacent countries. Recently Mirshamsiet al. [14-15] and Navidpour et al. [23] listed53 species (among them 32species are endemic), whereas Al-Asmariet al. [1] listed 28 species from Saudi Arabia and Çaliskan[3], Yağmuret al. [30] and Tropea et al. [25] listed 28species from Turkey. Although this reach fauna, generally samplings were made randomly from Iran [14]. But recently Navipour and his team began to review of Iraninan scorpion fauna province by province [16-24]. But Zenjan Province has not searcheddetailed yet. The known scorpion records were given by Karataş et al. [6] from Zenjan Province. Karataş et al. [6] gave *A. crassicauda* ve *M. eupeus* records that have very wide distribution area in the Plaearctic.

The purpose of this study is to introduce the scorpion species which live in Zenjan Province as a contribution to increasing our knowledge of Iranian scorpion fauna.

MATERIAL AND METHODS

Field work was carried out between March 2013 and September 2014 by first author. 99 specimens have been collected and examined from 24 different localities in Zenjan Province (Fig-1). Scorpions were collected by hand from under stones during the day and with UV light at night. All the material mentioned in athis work is preserved in 70% alcohol and deposited in animal biosystematic laboratory at department of Biology, University of Zanjan and some of the samples were stored at Museum of Alaşehir Vocational School, Celal Bayar University, Manisa, Turkey (AZM). The specimens were identified using an Leica EZ4stereomicroscope.

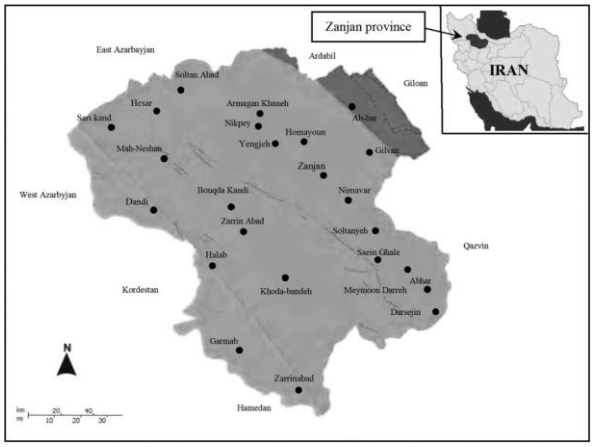

Figure 1. Distribution map of samples locality collected from Zanjan province

RESULTS

5 species and 4 genera belonging tofamily Buthidae and 1 species belonging to family Scorpionidae were identified.

***Androctonus crassicauda*(Olivier, 1807)**

Examined material and stations:

3♂♂, 1♀, Central District, Campus of Zenjan University, 12.08.2014, 36°41'38"N,48°23'02"E, 1579 m. 1♂, 2♀♀, Central District, Tazekent Village, Mianneh road, 25. Km, 18.08.2014. 2♂♂, Khodabandeh District, 1 km west of Katale Khor Cave, 13.08.2014, 36°50'06"N, 48°09'45"E,1710 m.1 juv., Abhar District, Soltanieh environs, 18.06.2014, 36°27'26"N 48°47'46"E, 1769 m.

Comments

A. crassicauda was recorded from Zenjan Province by Karataş et al. [6]. Zenjan Province known northern most locality in Iran for *A. crassicauda*. This species generally preferes low altitude localities. But it was found relatively higher places in Zenjan Province. It is one of the species with wide distribution in Iran.

Distribution

A. crassicauda is known from Armenia, Azerbaijan, Bahrain, Egypt (Sinai), Iran, Iraq, Israel, Jordan, Kuwait, Oman, Saudi Arabia, Syria, Turkey, United Arab Emirates and Yemen [4-5], [31]. *A. crassicauda* was recorded from Bushehr, ChaharMahal & Bakhtiyari, Fars, Hormozgan, Ilam, Kashan, Kerman, Kermanshah, Khoozestan,Khorassan, Kohgilouyeh & Boyer Ahmad, Lorestan, Qazvin, Tehran and Yazd Provicnes in Iran [6, 16-24].

Ecological Notes

A. crassicauda specimens were observed in sandy soil and hard calcarous soil areas. The habitats are steppe and sometimes includes thornbushs. It was observed that some specimens were sitting entrance of some rodent burrows. Their collecting localities have lower altitudes then the other places of Zanjan.

***Hottentotta salucyi* (Simon, 1880)**

Examined material and stations:

1♂, Khodabandeh District, Hirabad Village, 12.06.2013,35°52′50″N, 48°40′24″E, 2025 m. 1♀, Abhar District, Dolatabad Village 23.06.2013,35°58′36″N, 49°07′49″E, 2003 m. 1♂, Abbar, District, AbbarTown, 21.09.2013,36°56'21"N 48°55'51"E, 684 m.

Comments

H. saulcyi is firstly recorded from Zenjan province. Probably Zenjan localities are determine northern distribution border of this species. When these records evoluate with the records of Yağmur et al.[32] from Southeastern Turkey, they determine allnorthern distribution border of this species.

Distribution

H. saulcyi is known from Afghanistan, Iraq, Iran, andTurkey [2,7, 8,26] (Vachon, 1966; Kovařík, 1997, 2007; Crucitti and Vignoli,2002; Yağmur et al.,2008b). It is known from Chahar Mahal & Bakhtiyari,Fars, Hamadan, Hormozgan, Ilam, Kermanshah, Khuzestan, Kohgilouyeh & BoyerAhmad, andLorestan provinces in Iran (Mirshamsi et al.,2011b; Navidpour *et al*., 2012, 2013).

Ecological Notes

H. saulcyi specimens were observedin stepe habitats including calcarous soil. They were collected from the elevations between 684-2025m vertically. Yağmur et al. (2008b) reported this species until 1100 m vertically. Our records show that this species can be distrubuted until 2000 m.

***Hottentotta zagrosensis* Kovarik, 1997**

Examined material and stations

1♀, Khodabandeh District, Dashbloagh Village, 26.06.2013,35°41'01"N, 48°29'14"E, 1822 m. 1 subadult, Mahneshan District, Qavaq Sofla Village, 15.08.2013, 36°26'28"N, 47°36'01"E, 1833 m.

Comments

H. zagrosensis is firstly recorded from Zenjan province. Very little is known about this species. Its exact distirbution area still unclear. Similarly *H. saulcyi*, Zenjan localities are detemine northern distribution border of this species. Zagros mountains range lies until west of Zenjan province. Due tolocation of Zagros mountains, existing of this species in this province is not big suprise, although this species have not been recorded until now from Zenjan.

Distribution

This species is endemic to Iran. It is found in Fars,Khuzestan, Kohgilouyeh & Boyer Ahmad, Qazvin, Lorestan,and West Azerbaijan provinces (Kovařík, 1997, 2007; Navidpour et al., 2008d, 2010;Karataş et al., 2012)

Ecological Notes

H. zagrosensis specimens were collected in steppe habitats including calcarous soil. They were found in the elevations between 1822 -1833 m vertically. Their collecting localities have high altitudes. This species is endemic in Zagros mountains and probably prefers high places in slopes of Zagros mountains.

***Mesobuthus eupeus eupeus* (C. L. Koch, 1839)**

Examined material and stations

2 ♂♂, 2♀♀, Central District, Qavazang Mountains, 11.08.2014°43'43"N, 48°32'39"E, 2091 m. 3 ♂♂, Central District, Saidkandi Village, 16.08.2014, 36°36'39"N, 48°12'16"E, 2040 m. 1 ♂, Central District, Papai Village, 16.08.2014, 36°33'59"N,48°21'53"E, 1886 m. 12♂♂, 5♀♀, 3 juv.,Central District, Taham Dam area, 14.08.2014, 36°46'40"N, 48°30'06"E, 1998 m. 4♂♂, 2♀♀, 3 juv., Central District, Bagdakendi Village, 15.08. 2014, 36°37'01"N, 48°16'22"E, 1954 m. 5♂♂, 8♀♀, 8 juv, Abhar District, Soltanieh environs, 18.06.2014, 36°27'26"N, 48°47'46"E, 1769m. 1♀, Central District, Campus of Zenjan University, 23.05.2014, 36°41'38"N, 48°23'02"E, 1579 m. 1♀, Central District, Nimavar town environs, 26.05.2014, 36°33'16.28"N 48°40'15.02"EE, 1770 m. 2♂♂, 1♀,3 juv.,Central District, Yamch Village, 26.06.2014, 36°46'34"N, 48°12'28"E, 1523 m. 1 ♂, Mahneshan District, Anguran town environs, 05.08.2014, 36°35'03"N, 47°38'30"E, 1566 m. 1♂, Central District, Tazekent Village, Mianneh road, 25. Km, 18.08.2014.

Comments

Kovařík et al. [9] reviewed some *M. eupeus* populations in Turkey, Iraq, Iran and Caucasus and *M.e. philippovitschi* (Birula, 1905) was synonymized with *M.e. eupeus* and *M.e. mesopotamicus* (Penther, 1912) was synonymized with *M.e. phillipsii*. Kovařík et al. [9] and Mirshamsiet al. [13]

classified Northwestern Iran populations as *M.e. eupeus*. Our this record completed records of Kovařík et al. [13] and Mirshamsiet al. [13].Karataş et al. [6] informed existing of *M. eupeus* in Zanjan province, but they did not informed any information about subspecific level of *M. eupeus* populations in Zanjan province. Therefore our *M.e. eupeus* recordis first for Zenjan province.

Distribution

M.e. eupeus is known from Armenia, Azerbaijan, Georgia, Turkey, Iran, Turkmenistan [4, 9]. It is found in Ardabil, Khorāsan, Mazandran, West Azerbaijan[9, 14].

Ecological Notes

M.e. eupeus specimens were collected from high places in Zanjan. The collecting localities composed hard calcerous soil and steppe vegetations.

***Odontobuthus doriae* (Thorell, 1876)**

Examined material and stations

1♀, Abhar District, Abhar Town, 28.07.2013, 36°08'22"N, 49°10'01"E, 1630 m. 4 juv., Abhar District, Soltanieh environs, 18.06.2014,36°27'26"N, 48°47'46"E, 1769m. 1♀, Central District, Campus of Zenjan University, 23.05.2014, 36°41'38"N, 48°23'02"E, 1579 m.

Comments

This species is distributed in Northwestern, Western and Southwestern Iran. Its distribution is restricted by Zagros mountains. Zagros montain is a border between distribution are of *O. bidentatus* and *O. doriae*. Zenjan localities probably part of northern distribution border of *O. doriae*. Similarly *H. zagrosenis*, *O. doriae* is distributed until Zenjan province along to northern foot hills of Zagros mountains.

Distribution

This species is endemic to Iran. It is found in Esfahan, Fars, Hamadan, Kerman, Kermanshah, Mazandaran, Markazi, Teheran, West Azarbaijan, Yazd, Chahar Machal & Bakhtiyari, Hormozgan, Sistan & Baluchistan Provinces. [7, 12, 23, 24]

Ecological Notes

*O. doriae*specimens were observed in calcarous soil and stony area. Their habitats are steppe.

***Scorpio maurus townsendi* (Pocock, 1900)**

Examined material and stations

2 ♂♂, Central District, Campus of Zenjan University, 12.08.2014, 36°41'38"N,48°23'02"E, 1579 m. 1♂, Khodabandeh District, 1 km west of Katale Khor Cave, 13.08.2014, 36°50'06"N, 48°09'45"E,1710 m. 2 juv., Abhar District, Soltanieh environs, 18.06.2014,36°27'26"N, 48°47'46"E, 1769m. 1♂♂, Central District, Nimavar town environs, 26.05.2014, 36°33'16"N, 48°40'15"E,1770 m. 4♂♂, Central District, Tazekent Village, Mianneh road, 25. Km, 18.08.2014.

Comments

S. maurus comprises taxonomically19 subspecies[10]. But recently Lourenço[11] reviewed North African population and elevated 8 of them to species level. But populations of Middle East need reviewing. Among them two subspecies recorded from Iran, *S. m. townsendi* and *S.m. kruglovi* [14].*S. m. townsendi* is recorded from Zenjan Province firstly.

Distribution

S. maurus recorded from Iraq, Israel,Jordan, Kuwait, Lebanon, Quatar, Saudi Arabia, Syria, Turkey and Yemen in the Middle East [10]. This species has wide distributin area in Iran. It was recorded from Azerbaijan, Busher,Chahar Machal & Bakhtiyari, Esphehan, Fars,Gilan, Ilam, Khorasan, Khuzestan, Kohgilouyeh&BoyerAhmad, Kordestan, Lorestan,Qazvin and Semnan provinces [14].

Ecological Notes

S. maurus specimens were collected in sandy soil and hard calcarous soil areas. They were observed in open steppe or includes thornbushs steppe habitats. They were collected from low land areas. They were collected in low altitudes places in Zanjan.

DISCUSSION

Zenjan Province comprises 6 species of 53recorded species in Iran. When consider all Iranian fauna and searched provinces, Zenjan province has poor fauna. Relativiely Zenjan Province has 6 species whereas HormozganProvince has 20, Fars Province has 18, Khoozestan Province has 17, Bushehr and Ilam Provinces have 14, Kerman Province has 13, Kohgilouyeh & Boyer Ahmad Province has 11, Chahar Mahal & Bakhtiyari and Lorestan Provinces have 10 [16-24].

The reason of this poorness in Zenjan Province probably related with high elevation. Elevation of this province generally between 1800-2000 m. This amount high elevation is not suitable for most of scorpion species in Iran. But this high elevation reason to the species that adaptated to high elevation and cold habitats, present in Zenjan. Therefore *M. eupeus* good adaptated such habitats, it is dominat and most widespread species of Zenjan.

Considering distributional affinities of the genera, genus *Mesobuthus* has CentralAsian-Balkan range while the genera*Androctonus*, *Scorpio* have Saharo-Sindian distribution and the genera *Hottentotta*, *Odontobuthus* Iranian distribution. Since Zenjan is situated in the northwestern Iran, the scorpion fauna of this area is a mixture of the species with Caucasus and Iran origin origines.

Hottentotta salucyi, *H. zagrosensis*, *Odontobuthus doriae*,*M.e. eupeus*, *s*and *Scorpio maurus townsendi*arereported in this study as new geographical records for Zenjan Province.

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