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Four New Records of Snake Species in Ar'ar Region, Northern Border of Saudi Arabia

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Abstract : The current study represents the first comprehensive survey of snakes in the Arar region, northern Saudi Arabia. A total of twenty-seven specimens representing seven species that belong to four families (Viperidae, Colubridae, Psammophiidae, and Elapidae) are documented. The present study includes new records of snakes from the Arar region, namely *Psammophis schokari*, *Walterinnesia aegyptia*, *Echis coloratus*, and *Lytorhynchus kennedyi*.

Keywords: Ar'ar, *Lytorhynchus kennedyi*, new records, snakes.

Introduction

The country of Saudi Arabia has different and diverse environments, extending over an area of about 2,250,000 km^2. Despite the harshness of the desert and its climate, it is a shelter for many reptiles (Alshammari and Busais, 2020). In Saudi Arabia, the herpetofauna includes five species of turtles, seven species of amphibians, fifty-five species of snakes, and one hundred species of lizards (Al-Sadoon, 2010).

The reptiles of the Kingdom of Saudi Arabia have been the center of interest in several studies. Over the past thirty years, a number of publications have investigated the distribution, systematics, and ecology of the reptiles of the Kingdom of Saudi Arabia (Farag and Banaja, 1980; Al-Sadoon,1988 and 2010; Arnold, 1986; Alshammari, 2012; Gasperetti, 1988; Aloufi and Amr, 2015; Alsadoon, *et.al*., 2017; Busais 2019; Alshammari and Busais 2020).

All previous studies have provided invaluable information about the herpetofauna of Saudi Arabia in general. However, the northern border province has not been fully studied; in fact, there is a real poor representation of its herpetofauna. Accordingly, this study aims to document the ophiofauna of the Ar'ar region in northern Saudi Arabia.

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Material and Methods

The current study covers the region of Ar'ar located in the north of the Kingdom of Saudi Arabia (N 30° 55' 13", E 40° 0' 3") adjacent to Iraq. It is characterized as a desert area at an altitude of 530 m asl, with intermittent wadi systems in addition to the presence of sand-dune habitats on its southern border with Al-Jouf region. The Ar'ar region has a continental climate; and the average annual temperature ranges from 15.4°C (minimum temperature) to 30°C (maximum temperature), and the average annual precipitation is 57.6 mm (National Center for Meteorology, 2022). Field studies were conducted over the period from March to mid-October from 2019 to 2021. Twenty-six sites were selected to cover all habitats in the region of Ar'ar (Table 1, Figure 1). The surveys, conducted at these sites during the day and at night, resulted in collecting twenty-seven specimens. The specimens were deposited at the Biology Department Museum of Ha'il University (Figure 2).

Results

A total of twenty-seven specimens belonging to four families (Viperidae, Colubridae, Psammophiidae, and Elapidae) representing seven species of snakes were collected and observed during this study. The families Colubridae, Psammophiidae and Viperidae were represented by two genera with one species for each, whereas Elapidae was represented by only one species in the Ar'ar region.

Table 1. The localities of the North Border Province, Kingdom of Saudi Arabia, covered in this study.

No.	Locality	Coordinates (*)		Description (**)
1	Abar Alowaysi	N41° 07' 00"	E 31° 10' 00"	Water supplier
2	Abar Al-lowayzieah	N41° 20 '00"	E 31° 15' 00"	Water supplier
3	Abar Almera'	N40° 14' 00"	E 31° 44' 00"	Water supplier
4	Umm Khenser	N41° 36' 00"	E 30° 42' 00"	Residential area and facilities
5	Umm Aldeyan	N41° 59' 00"	E 30° 57' 00"	Residential area and facilities
6	Ebn Bakor	N40° 39' 00"	E 31° 13' 00"	Residential area and facilities
7	Ebn Sa'ed	N40° 47' 00"	E 31° 04' 00"	Residential area and facilities
8	Hazm Aljalameed	N40° 06' 00"	E 31° 17' 00"	Residential area and facilities
9	Hozoom Alsha'ran	N39° 54' 00"	E 31° 04' 00"	Mountainous area
10	Alhamad (1)	N39° 54' 00"	E 31° 15' 00"	Flat Area
11	Alhamad (2)	N40° 03' 00"	E 31° 09' 00"	Flat Area
12	Ad Dadab	N41° 17' 00"	E 30° 50' 00"	Residential area and facilities
13	As Sulaymaniyah	N41° 09' 00"	E 30° 34' 00"	Residential area and facilities
14	Sehan Albehayrat	N39° 52' 00"	E 31° 38' 00"	Valley
15	She'eeb Alhilali	N41° 06' 00"	E 30° 47' 00"	Valley
16	Veidat Mersel	N41° 56' 00"	E 30° 46' 00"	Annual rain water swamp
17	Garat Alqat'a	N41° 47' 00"	E 30° 24' 00"	Mountainous area
18	Qa' Albardaweel	N41° 35' 00"	E 31° 01' 00"	Annual rain water swamp
19	Almojayles	N40° 01' 00"	E 31° 22' 00"	Mountainous area
20	Wadi Alobayed	N40° 40' 00"	E 31° 34' 00"	Valley
21	Wadi Badanh	N40° 37' 00"	E 31° 07' 00"	Valley
22	Wadi Shadi Hamer	N41° 08' 00"	E 31° 20' 00"	Valley
23	Wadi Ar'ar (1)	N40° 40' 00"	E 31° 34' 00"	Valley
24	Wadi Ar'ar (2)	N40° 02' 00"	E 31° 00' 00"	Valley
25	Wadi Algorabah	N40° 37' 00"	E 30° 55' 00"	Valley
26	Wadi Almera	N40° 22' 00"	E 31° 50' 00"	Valley

(*) and (**) Source: A Guide for Wild Trips' Enthusiasts in the Kingdom of Saudi Arabia, The Saudi Geological Survey, first edition, 2003.

Relative abundance data indicated that viperids are the most abundant (n=11, 40.74%), followed by Colubrids (n=7, 25.93%), Psammophiids (n=6, 22.22%), and Elapids are the least common (n=3, 11.11%) of the total individuals recorded (Figure 2). At the species level, *Cerastes gasperettii* was the most encountered species with ten observations accounting for 37.04% of the total records, followed by *Spalerosophis diadema cliffordi* with six observations 22.22%, while *Lytorhynchus kennedyi* and *Echis coloratus* were the least observed species with one observation for each (3.70% for each species).

Five out of the total observed species were identified as venomous snakes. These include the two viper species of *Cerastes gasperettii* (Leviton and Anderson, 1967), and *Echis coloratus* (Günther, 1878), two species of Psammophiidae, *Psammophis schokari* (Forskål, 1775), *Rhagerhis moilensis* (Reuss, 1834), and one species of the elapid Snake, *Walterinnesia aegyptia* **(**Lataste, 1887**).**

Taxonomic Account

Family Colubridae

Lytorhynchus kennedyi Schmidt, 1939

Common name: Kennedy's Leafnose Snake**,** (Figure 3A)

Material examined: HUM1001, Wadi Almera, 21.6.2021.

Remarks: This species was originally described from the area between Homs and

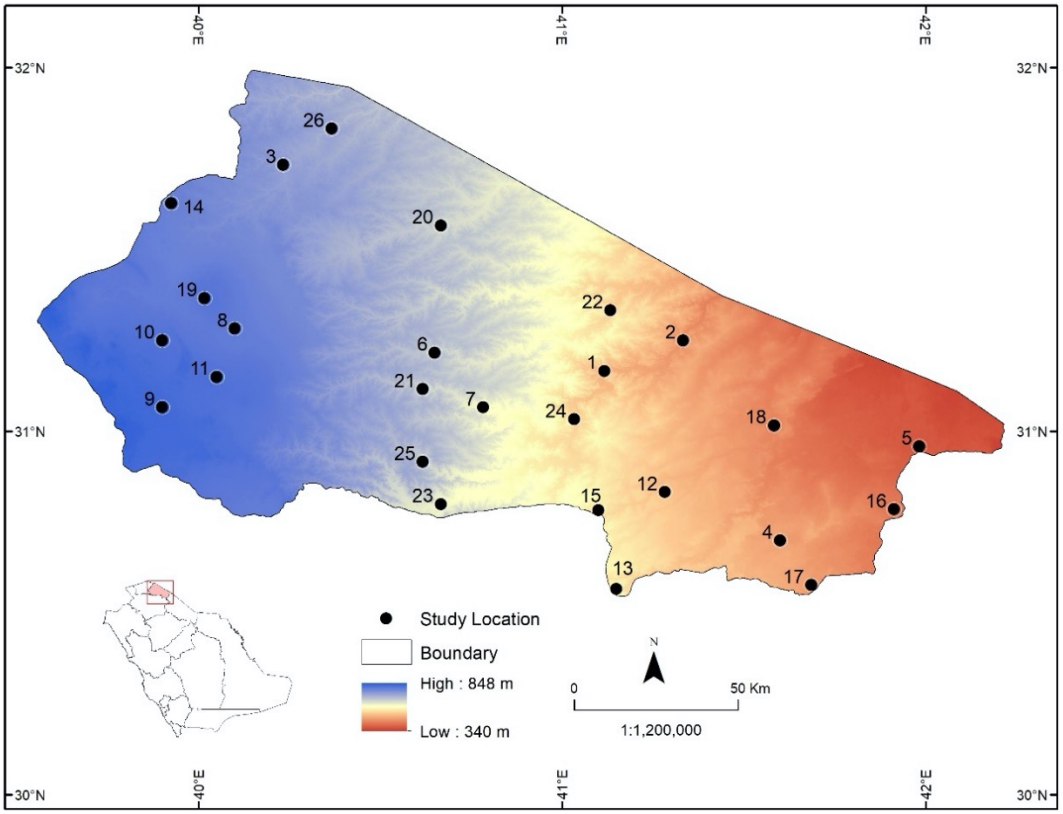

Figure 1. The outline map of the Arabian Peninsula presenting the Kingdom of Saudi Arabia region of Ar'ar and the location covered by this study (dotted map). The numbering of the localities corresponds to the numbering in Table 1.

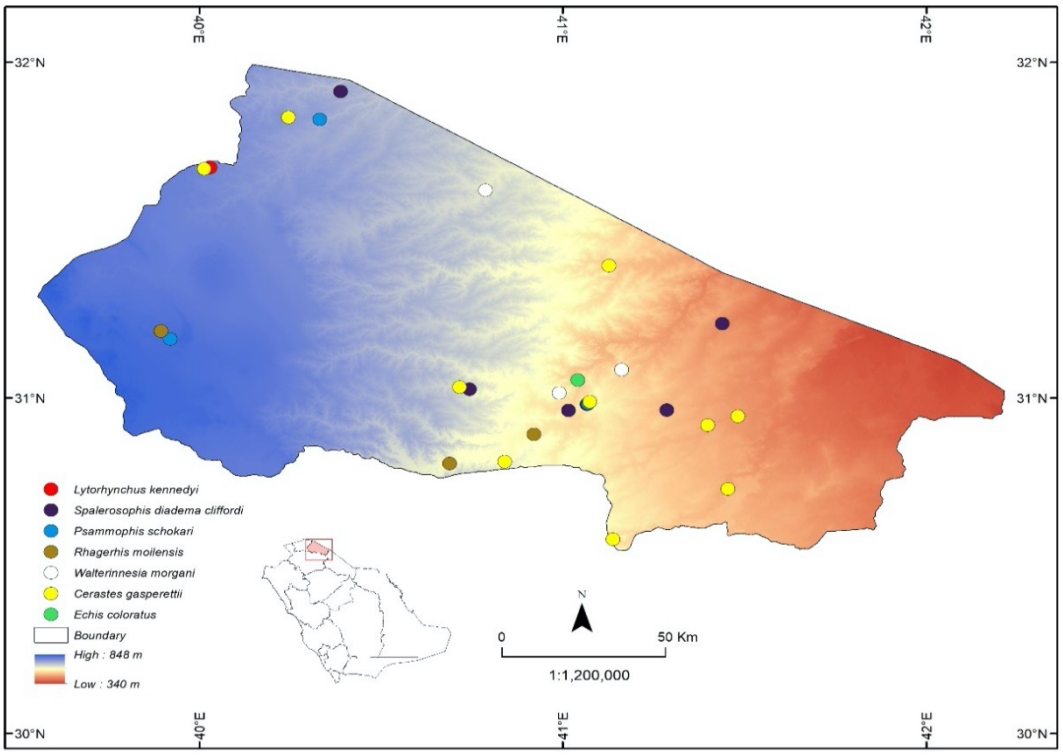

Figure 2. Locations of snakes from the Ar'ar region. The colored circles indicate the different species.

Palmyra, Syria (Schmidt, 1939). Its current distribution is confined to Jordan, Iraq, and Syria. This species is distributed over thr region from Jordan through the center and northeast of Syria extending to the west of Iraq (Sindaco *et al*., 2013). A single specimen of *L. kenneddyi* was collected from Wadi Almera, north of Hazm Aljalameed Center near the Saudi-Iraqi border (Alshammari, 2021).

Spalerosophis diadema cliffordi Schlegel, 1837

Common name: Diadem Snake (Figure 3B)

Material examined: HUM1002, Almansorieah Garden (Ar'ar city), 02.4.2019. HUM1003, East of Jedaidat Ar'ar border center, 15.5.2021.

Observed: Arar Public Park, on 13.6.2019. North of the Aldaidab Village, on 22.8.2019. North of Wadi Almera, on 5.4.2020. South of the Ebn Sa'aied village, on 19.5.2021.

Remarks: The Clifford's Diadem Snake is commonly distributed throughout the Arabian Peninsula and is reported from the central, eastern, western regions (Gasperetti, 1988, Aloufi *et.al*., 2021) and Ha'il Province (Alshammari and Busais, 2020). It was recorded in Ar'ar from Badanah (Gaspertti, 1988). It seems to be a common species in the Ar'ar region. Six specimens of this class of snakes were collected from the studied region which includes open areas with scant vegetation; they were also spotted close to the city's public parks.

Family Psammophiidae

Psammophis schokari Forskål, 1775

Common name: Schokari Sand Racer (Figure 3C)

Materials examined: HUM1004, North of the Hozoom Alsha'ran, 14.5.2020.

Observed: Almansorieah Garden (Ar'ar city), 2.4.2019. Wadi Almera, 15.7.2020.

Remarks: Three specimens of *P. schokari* were collected from three areas with different altitudes. The distribution of this species ranges from northwestern Africa to northern Somalia and spreads across the Arabian Peninsula to the northwest of India. It is common in Saudi Arabia (Corkill and Cochrane, 1965; Farag and Banaja, 1980; Gasperetti, 1988; Schätti and Gasperetti, 1994; Al-Sadoon, 2010; Ashammari *et al.,* 2017).

Rhagerhis moilensis Reuss, 1834

Common name: Moila Snake (Figure 3D)

Materials examined: HUM1005, Ar'ar Cattle market, 6.6.2020.

Observed: Wadi Arar Dam, Sakaka Road, 11.4.2021. Alhamad (1), 22.5.2019.

Remarks: This species was previously recorded from the south of Hijrat Manahi Bin Bakar **(**Gasperetti, 1988). From the study area, three specimens of the Moila snake were recorded. This species lives in sandy desert environments and grassy plains. Throughout Saudi Arabia, the accounts of this class of snake show that they are commonly dotted (Gaspertti, 1988; Schatti and Gaspertti, 1994; Al-Sadoon, 2010; Sendaco *et al.,* 2013; Alshammari and Busais,2020).

Family Elapidae

Walterinnesia aegyptia Lataste, 1887

Common name: Desert Cobra (Figure 3E)

Materials examined: HUM1006, Abar Alowaysi, 7.9.2020.

Observed: Wadi Alobayed, 11.8.2020. Sha'eeb Hilal, 2.8.2019.

Remarks: *Walterinnesia aegyptia* is distributed over the northeastern parts of Saudi Arabia, Syria, southeast of Turkey, Iraq, and southwest of Iran (Sindaco *et al.,* 2013). Al-Sadoon *et al.* (2017) reported this species from the Turaif region. Furthermore, it is re-

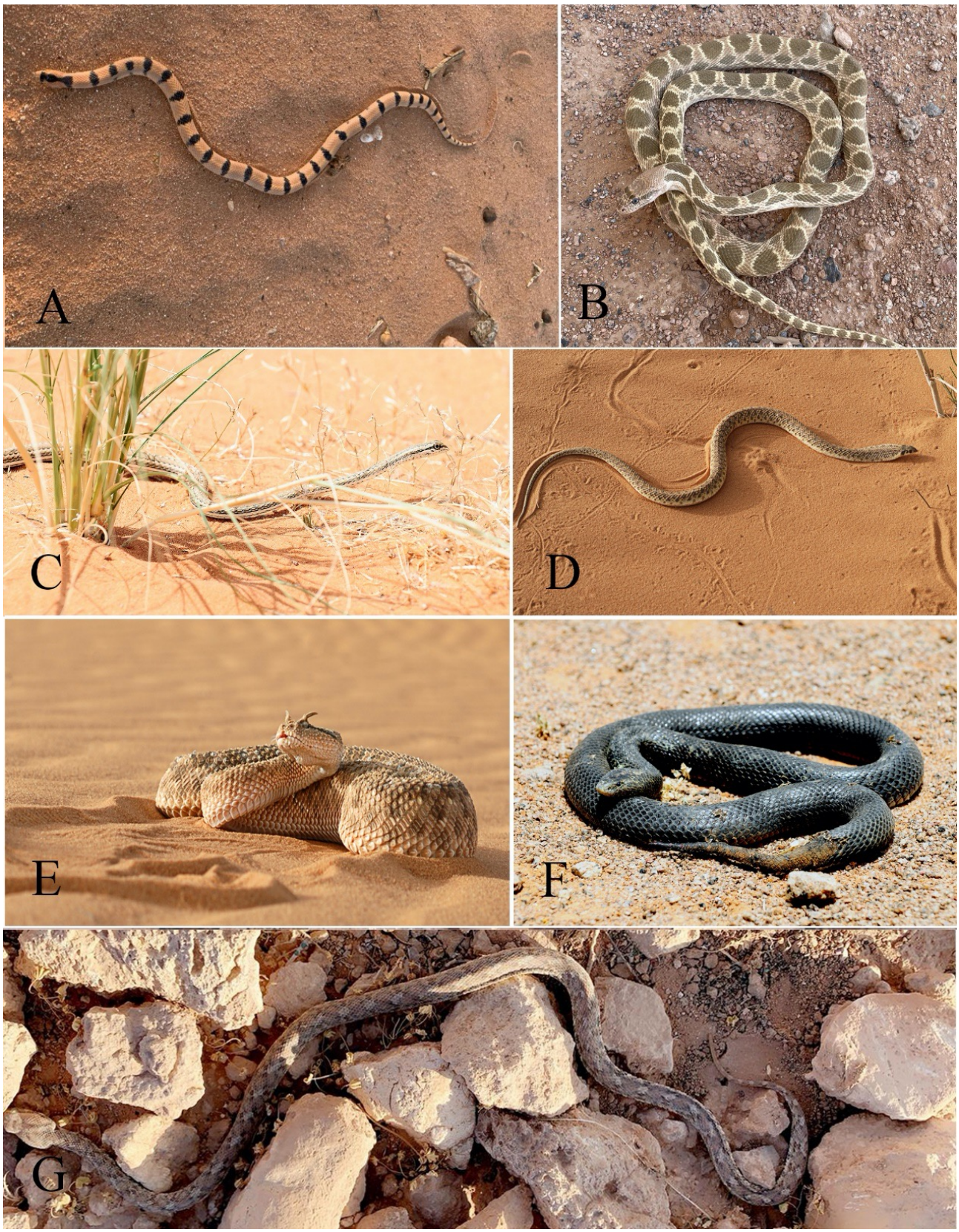

Figure 3. Snakes from the Region of Ar'ar, North Border Province, Saudi Arabia. **A** *Lytorhynchus kennedyi*. **B**. *Spalerosophis diadema cliffordi* **C**. *Psammophis schokari* **D**. *Rhagerhis moilensis* **E**. *Cerastes gasperettii* **F.** *Walterinnesia aegyptia* **G**. *Echis coloratus.*

ported from Ha'il (Alshammari and Busais, 2020). Three specimens were collected from rocky valleys and open areas close to herders of cattle, sheep, and camels. It is considered as one of the most venomous snakes.

Family Viperidae

Cerastes gasperetti (Leviton & Anderson, 1967)

Common name: Arabian Horned Viper (Figure 3F)

Materials examined: HUM1007, North of the Alsuliamainh Village, 22.9.2020. HUM1008, south of Almesa'deah farm, 22.5.2021. HUM1009, 25 km Arar Sakaka Road, 27.6.2019. HUM1010, North of the Aldaidab Village, 15.9.2019.

Observed: Almansorieah Garden (Ar'ar city), 28.6.2019. Wadi Shadi Hamer, 4.4.2021. Wadi Almera, 2.8.2021. South of the Ebn Sa'aied village, 20.5.2021. Northwest of Wadi Sehan Albehairat, 8.8.2020. Southwest Qa' Alberdweel, 26.8.2021.

Remarks: This is the most common viper to be found insand habitats in the Arabian Peninsula. Ten specimens of the Arabian Horned Viper were collected during this study. Some specimens were observed hiding themselves in the sand. *Cerastes gasperettii* can be spotted in the Arabian Peninsula, Iraq, Jordan, and to the west of Iran (Amr and Disi, 2011; Schätti and Gasperetti, 1994; Sindaco *et al*., 2013). This species was previously recorded in Ar'ar from Badanah (Gaspertti, 1988).

Echis coloratus (Gunther, 1878)

Common name: Palestine Saw-scaled Viper (Figure 3G)

Materials examined: HUM1011, Wadi Ar'ar (N Ar'ar city), 22.9.2020.

Remarks: One specimen was collected from rocky and sandy regions. In the Kingdom of Saudi Arabia, this species is very aggressive, and it is considered as one of the most dangerous venomous snakes (Busais, 2019). It has been reported from the Tabuk region (Aloufi and Amr, 2015), Turaif region (Alsadoon *et.al*, 2017), and Ha'il region (Alshammari and Busais 2020).

Discussion

Despite the diversity of the reptiles of the Kingdom of Saudi Arabia, snakes occupy habitats within different ecological regions that are commensurate with their environmental requirements. Many studies have been conducted on the Kingdom's snakes across different regions; however, the snakes of the Ar'ar region of the northern border of the Kingdom have not been studied before. The results of this study are consistent with the results of other studies in northern Saudi Arabia (Al-Sadoon *et.al,* 2017; Aloufi and Amr, 2015), or other regions through the reports of several authors such as Faraj and Banaja (1980), Al-Sadoon (2010), Masoud (2012), Masood and Asiry (2012), Sindaco *et al.* (2013), Alshammari and Ibrahim (2015), Alshammari *et al.* (2017), Aloufi and Amr (2015) and, Alshammari and Busais (2020). This report presents different types of species such as, *E. coloratus*, *W. aegyptia*, *P. schokari*, *Rhagerhis moilensis*, *Cerastes gasperettii*, and *Spalerosophis diadema cliffordi*. It confirms the surveys conducted by Al-Sadoon *et al.* (2017) in Tarif, and Aloufi and Amr (2015) in Tabuk. However, in this study, a new species of snake was recorded in the Arabian Peninsula *Lytorhynchus kennedyi* (Alshammari, 2021), with three species of snakes namely as *P. schokari*, *W. aegyptia* and *E. coloratus* as new records from the Ar'ar region.

The current study is the first to investigate a the wide range of snakes in the Ar'ar region, on the northern borders of the Kingdom of Saudi Arabia. According to the survey conducted during the study period, seven species of snakes that belong to four different families (Viperidae, Colubridae, Psammophiidae and Elapidae) were recorded. The distribution of these species varies in relation to abundance and habitat. The most abundant families

recorded by the current study's survey include Psammophiidae, Colubridae, and Viperidae with two species for each family. On the other hand, the study recorded only one species of the family Elapidae. However, three species of snakes that belong to the family Colubridae and two species that belong to the Colubridae family were recorded. Moreover, the families Viperidae and Psammophiidae were recorded by Al-Sadoon *et al.* (2017). The current survey shows that four species of snakes were recorded for the first time in the Arar region in the Kingdom of Saudi Arabia. The present study also reports the first record of Kennedy's Leafnose Snake from the Arabian Peninsula. In conclusion, as this is the first faunal reptile investigation of the Ar'ar region of Saudi Arabia, further rigorous surveys sampling different seasons are recommended to increase the number of the species records from the northern border regions of Saudi Arabia.

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