

**Ecological studies on the diversity of terrestrial poisonous snakes
"Proteroglyphous" of Jazan region Kingdom of Saudi Arabia
(Reptilia: Ophidia)**

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ABSTRACT:

The present work was carried out in Jazan region. The region of Jazan in being in the South-Western part of Saudi Arabia between longitudes 42⁰ and 43.8⁰ and latitudes 5, 16⁰ and 17⁰, and is bounded on the south and east of the Republic of Yemen, Asir area in the north and the Red Sea in the west.

The results showed that there are four families of poisonous snakes "Proteroglyphous" living in Jazan region. They are: Family Atractaspididae, Elapidae, Viperidae and Hydrophiidae . This work aimed to unveil ecological problems and throw light on diversity of poisonous snakes in Jazan region and the danger of these species to human life. Despite the fact that these snakes may be harmful to human life in some cases, it may also be useful to him in many aspects of life. Since there are no enough studies on the animal species in the region, this study came to identify the diversity of this animal group. There is no doubt that the study of these species and identifying them will provide some solutions that could make this group as an endless source of biodiversity and at the same time, this study provides information on the feasibility of protection of this species in this region. Discussion of ecological and geographical affinities of this taxa and taxonomic keys of different types in order to facilitate the process of identification will be provided.

Key words: Biodiversity, conservation, Reptilian, Serpents, Habitat, Ecology, Survey, Feeding, behavior and Zoogeographical distribution.

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INTRODUCTION

The Kingdom of Saudi Arabia is mostly desert and its geographical location between the temperate and tropical climatic regions, together with the extreme variations in its climatic conditions, make it unique in harboring many species of reptiles. However, very few ecological

studies have been undertaken on Saudi Arabian snakes and lizards.

Reptiles are considered a major part of Jazan fauna and have an important economic value in many ways. Reports on the Jazan reptile, fauna are relatively few

Biodiversity is one of the most basic natural resources of the Kingdom, if not the most important in the current era, and is meant to "contrast and difference at the level of living organisms from all sources of natural ecosystems, including terrestrial, marine and aquatic environment which they are part" (UNEP, 1992).

In 2001 the Kingdom of Saudi Arabia became a signatory to the Convention on Biological Diversity that seeks to ensure the conservation of species and their habitats for all time (Abu Zinada *et al.*, 2004).

The world awoke recently to the importance of biodiversity and the adverse consequences of the loss, falling, or where countries and organizations concerned with this aspect of great importance rushed to the adoption of the International Convention on Biodiversity signed this Convention more than 150 countries at a conference in the city of Rio de Janeiro in Brazil in 1992. Some scientists estimate that the number of species on the known so far (Hammond, 1995).

Very few ecological studies have been undertaken on Saudi Arabian snakes and lizards. Certain authors have described small collections of amphibians and reptiles from different regions in Saudi Arabia, including the Southern Hijaz (Parker, 1933 & 1938); Eastern Arabia and Northeastern Arabia (Mandaville, 1965 & 1967); Central Arabia (Schmidt, 1941 and Al-Wailly & Al-Uthman, 1971) and Riyadh (Hussein, 1966). Farag and

Banaja (1980) identified four anuran species, 28 species of lizards and 15 species of snakes, and mapped their distribution in the western region of Saudi Arabia. Fifty-one species of snakes can be recognized in Arabia. Nine of these are poisonous sea snakes and the remaining 42 species are terrestrial, of which 9 are poisonous (Mandaville, 1965; Gasperetti, 1974; Leviton, 1977 a & b and Al-Sadoon, 1980).

The environmental strategy of Jazan considered biodiversity as one of its priorities conservation, which has become an important issue receiving national and international attention. The interest in conservation of biodiversity increased due to population declines and extinctions throughout the world, which was found to be for many reasons; habitat loss and degradation. Unsustainable use, invasive species, environmental pollution, disease and global climate change (Gibbon and Stangel, 1999). Herpetofauna is among the animal groups, which suffer "world wide" of decline (Gibbon *et al.*, 2000). At the national level, the population of herpetofauna has affected by almost the same reasons (Saleh, 1997).

There are three types of venomous snakes: Opisthoglyph, Proteroglyph and Solenoglyph. The first type is mostly harmless or mildly venomous snakes. Their fangs are enlarged rear teeth with a groove that venom flows down while they are swallowing their prey. Proteroglyphs have small, fixed, non-movable front fangs.

When they bite, they hang on and chew their prey to envenomate it, like Cobras (*Naja*). Which concedes one of the deadliest snakes in the world. Solenoglyphs have movable front fangs that fold back into the mouth until they are needed (**Sharawy and Alshammari, 2009**). These snakes are very dangerous for they can open their mouths almost 180 degrees with their fangs extended straight out. They can strike at any portion of the body and their attack is much unpredictable. Snake venom is modified saliva that is primarily used for hunting (capturing and digesting the prey). Some venom is hemotoxic (affecting the blood). It destroys tissues and causes great pain, swelling and thinning or thickening of the blood (**Egan, 2007**).

Venomous snakes (Proteroglyphous) are the most dangerous inhabitants in the world. They inhabit deserts, fields and valleys. Snakes of the families are highly toxic to man. Snake venom is produced by a pair of modified salivary gland that open to a pair of hollow fangs by narrow venom ducts. The venom is mainly made of proteins mostly enzymes besides non-protein components, which are divided into inorganic and organic constituents. All venoms cause severe changes in one or more body organs of the victim. Viperidae snakes are mainly hemotoxic, while Elapidae and Atractaspididae snakes are mainly neurotoxic.

The venomous borrowing asp, cobras, carpet vipers, and puff adder are all relentlessly persecuted, and are likely to

come under increasing pressure from collection for their venom, which fetches a high price in the pharmaceutical market.

The objective of the present work is to enhance further the biological and ecological studies and will be of most importance to those who engaged in the conservation of the natural biological resources. The work aimed to unveil on ecological problems, in addition to provide up-date information about the composition, ecology, conservation and the diversity of poisonous snakes, which are found in Jazan area, and the danger these species represent, which are widespread in different localities of Jazan. The work aimed dealing with the poisonous snakes in detail as one of the natural resources in Jazan.

MATERIAL AND METHODES:

(1) The Study Area:

The present work was carried out in Jazan region. The region of Jazan in being in the South-Western part of Saudi Arabia between longitudes 42 ° and 43.8⁰ and latitudes 5, 16° and 17°, and is bounded on the South and east of the Republic of Yemen. Asir area in the North and the Red Sea in the West; Jazan region is away from the city of Riyadh with a distance of 1000 km and the holy city of Mecca with a distance of 500 km. The region is distinguished with its long coasts on the Red Sea, which estimated at about 200 km; and its towering green mountains in the Eastern region. The region is followed by several islands in the Red Sea, the most important and largest one is the island of

Farasan, the estimated size of Jazan region of about 40000 km² and this means that it

occupies an area of 6.0% of the Kingdom of Saudi Arabia Fig. (1).

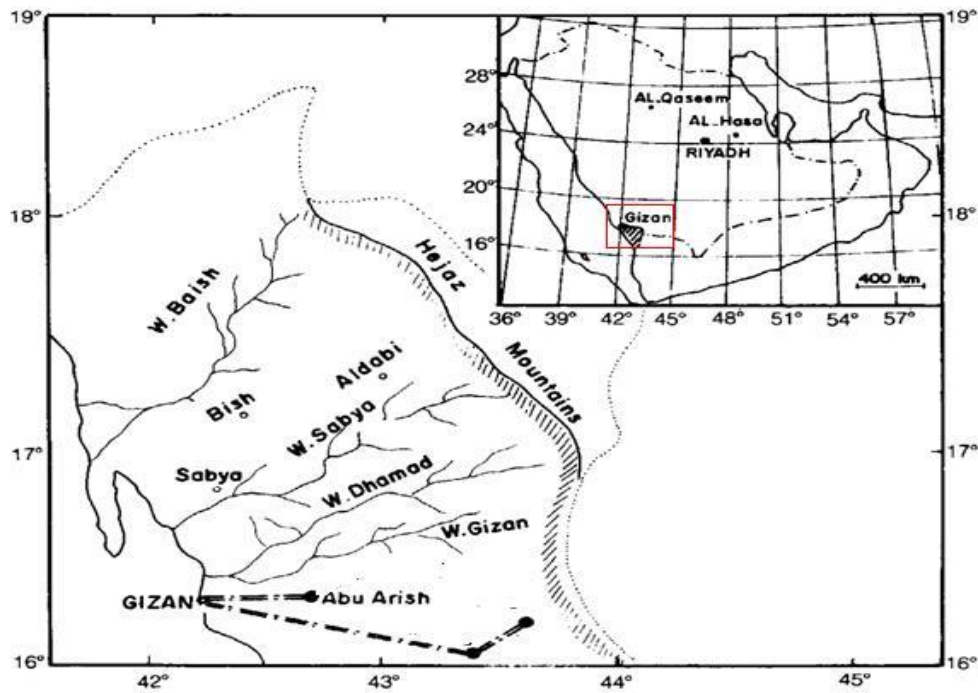


Fig.(1) Map of Saudi Arabia and enlarged part of Jazan region showing the location of the study area

A biotic Elements of the Study Area:

The topography of the study area was investigated directly and examining literature. Notes on the climatic condition were obtained during the visits to the study area, the bulk of information about climatic condition were also obtained from the Meteorological unit Jazan.

Biotic Elements of the Study Area:

Information on the fauna of the study area were obtained by direct observation, residents communication and examining literature. Collections of local fauna were also carried out for further identification.

Surveying Snakes in the Study Area:

The survey of venomous snakes depended on the collected material, and

other record of literature. Snakes were obtained by putting a hard stick on the head and pressing with stick on the snake head in such a manner that the snake could not move its head or its jaws, then, the snake was held with the thumb and forefinger just behind the head pulling of snakes out of holes or crevices by their tails many injure them seriously. Date, locality, Co-ordinates: Latitude, longitude and altitude, have been recorded by a GPS (Table 1), time of day and other ecological information were recorded. Dead animals were preserved in 10% formalin. Relatively lager animals were injected with 10% formalin before being preserved. Specimens in the collection were identified by standard keys (Marx, 1968; Levition *et al.*, 1992;

Schleich *et al.*, 1996 and Saleh, 1997). according to IUCN (2005).

The status of each species was identified

Table (1). Co-ordinates: Latitude, longitude and altitude, of the studies area by a GPS

No	Location	Co-ordinates		
		Altitude (meter)	Latitude	Longitude
Site (1)	Al-Aradha	200 m	17° 02'	43° 05'
Site (2)	Sabya	60 m	17° 10'	43° 43'
Site (3)	Al-Darb	100 m	17° 44'	42° 16'
Site (4)	Al-Haredah	60 m	17° 47'	41° 57'
Site (5)	Zahban	17 m	18° 06'	41° 37'
Site (6)	Al-Khoba	306 m	16° 47'	43° 14'
Site (7)	Ahad Almasarha	55 m	16° 43'	42° 57'
Site (8)	Abu- Arish	65 m	16° 58'	42° 49'
Site (9)	Sad Malaky	180 m	17° 01'	42° 58'
Site (10)	Bish	183 m	17° 26'	42° 32'
Site (11)	Wadi Jory	472 m	17° 18'	43° 04'
Site (12)	Wadi Laijab (Al reth)	390 m	18° 32'	42° 59'
Site (13)	Al -Hakwo	190 m	17° 29'	42° 41'
Site (14)	Wadi kholb	90 m	16° 43'	42° 57'
Site (15)	Samtah	50 m	17° 02'	43° 05'
Site (16)	Al rad	220 m	17° 028'	42° 58'

RESULTS

The Study Area:

Jazan region with its habitat diversity different from the rest of the Kingdom makes it a region rich in biodiversity, where the mountainous areas bordering the east and find the sea beaches bordered on the west. As well as sand dunes and plains and green agricultural hills which characterizing the region and makes

it one of the finest agricultural regions of the Kingdom. The geographical diversity of the region is an appropriate opportunity to study the biodiversity, especially that the region lacked the studies in this regard. Jazan most famous mountains are: mountains of Bani Qays, Abadlah and Sala mountain. This mountains are located in the southeastern part of the region. Belghazi

Mountains to the east of the region. Hurub mountains, ARRith mountain, ArRabu, ah mountain, Alfarashah. Mountains Hashr, valleys of Jazan region. The main seasons in the region is autumn, held the clouds, rains fall and the overflowing flood. In the region there are about 29 valleys "Wadi Bayd, Wadi Baysh, Wadi Dhahban, Wadi Ta'shar. Wadi alkor,, Wadi Khulba, Wadi AlMa'yn, Wadi Jazan, and Wadi Nakhlan, Wadi Damad, Wadi AlRayah, Wadi Sabya, Wadi Amleh, Wadi Atud, Wadi Samarah, Wadi Wasa, and Wadi Aramram Wadi Hurub, Wadi Hamdah Wadi Al khoms, Wadi Ramlan, Wadi Plage, Wadi Rym, Wadi, Ghuan , Wadi Fayfa and Wadi Moka.

Climate of the Study Area:

Average temperature in January about 23 C° in August to about 33 degress Celsius, and the average relative humidity in January 74%; In August, 66% and the average of 68% over the year and rain fall in winter, spring and autumn and rate of fall is to more than 600 mm³/y and more in the mountain areas. The rainfall in coasts of

Jazan a rate of more than 300 mm³/y. As for the mountain regions in Jazan the temperature, degree is moderate in summer and so cold in winter and cool air almost throughout the year in mountainous areas and rainfall all over the year.

Species Composition

The present results showed the poisonous snakes in Jazan table (2-3) it represented by four families Atractaspididae represents 2.1% from total of snakes of Jazan and 5 % from the poisonous snakes. It includes one species. Elapidae represents 6.3% from total of snakes of Jazan and 15 % from the poisonous snakes. It includes three species. Viperidae represents 12.5 % from total of snakes and Jazan and 30 % from the poisonous snakes. It includes five species. Hydrophiidae represents 20.8 % from total of snakes of Jazan and 50 % from the poisonous snakes. It includes 10 species. Nevertheless, this search concentrated on terrestrial snakes.

Table (2): Species Composition of Snake Fauna of Jazan:

Family	Genera	Species	%
Typholopidae	2	2	4.1
Letotypholopidae	1	2	4.1
Boidae	1	2	4.1
Colubridae	12	22	46
Atractaspididae	1	1	2.1
Elapidae	2	3	6.3
Hydrophiidae	5	10	20.8
Viperidae	3	6	12.5
Total	24	48	100

Table (3): Species Composition of Poisonous Snake of Jazan:

Family	Genera	Species	%
Atractaspididae	1	1	5
Elapidae	2	3	15
Hydrophiidae	5	10	50
Viperidae	3	6	30
Total	6	20	100 %

Systematic list:

- **Class: Reptilia**
- **Order: Squomata**
- **Sub-order: Ophidia**
- **Family 1: Atractaspididae**
- **Genus:** *Atractaspis* Smith, 1849
- ***Attactaspis engaddensis* Hass, 1950:**
- **Common name:** Oasis Mole Viper or Burrowing adder
- **Arabic name:** Haffar Sinai, Hanash Aswad, El Abtar and Abo shenf, black snake.
- **Distribution:** Sinai, Palestine, Jordan and southwestern and central Saudi Arabia
- **Distribution in Jazan:** sites (1, 3, 10, 13)
- **Habitat:** Rocky desert
- **Activity Pattern:** It is a nocturnal snake
- **Feeding:** If feeds on rodents, amphisbaenas, lizards and other Snakes.
- **Mode of feeding:** active searcher
- **Zoogeographical distribution:** Saharan and Ethiopian species
- **Behavior:** It is Fossorial, burrowing snake but occasionally comes above ground. This snake spends most of it

are very dangerous snake, which are known to have resulted in human mortalities throughout its range.

- **Status:** rare and very localized, classified as Least Concern by IUCN (2005)

Family 2: Elapidae

- **Genus:** *Naja* Laurenti, 1978
- ***Naja haje Arabica* (Linnaeus, 1758).**
- **Common name:** Cobra; Arabian
- **Arabic name:** Al-Cobra; Al-Nashir
- **Distribution:** Africa and Arabia.
- **Distribution in Jazan:** sites (1, 5, 6, 7, 10, 11)
- **Habitat:** It habits areas with at least some vegetation and water, never in deserts, steppes, dry savannahs, semi desert, margin of deserts, in oases, Wadis, on farmland near old wall or ruins, in ditches along roads and on hills with sparse.
- **Behavior:** It occasionally enters human habitations. Frequently near water. It was met on margins of the backwaters left by the retiring Nile (Anderson, 1898). Herbert (1981) saw this species swimming in the Mediterranean Sea. Its characteristic cobra threat stance with the elevated

attacking viscously when cornered, its characteristic cobra threat stance with the elevated anterior part of the body and dilated hood is very characteristic (Saleh, 1997). Very quick by lateral undulation swims voluntarily across broad watercourses and it were occasionally observed climbing on trees. Schleich *et al.* (1996) reported that mating is in early summer is loose soil. Abandoned rodent burrows, old termite mounds or under rocks. Oviparous: oviposition in July – August – incubation period 48-52 day.

- **Activity Pattern:** Diurnal, but Schliech *et al.* (1996) said that is the most crepuscular and nocturnal species, but it can often be seen active by day even during the hottest hours.
- **Feeding:** Feeds on frogs, toads, fishes, birds and small mammalian.
- **Mode of Feeding:** Active searchers.
- **Zoogeographical Distribution:** Saharan and Ethiopian species
- **Status:** Widespread and common, threatened by intensive commercial collection. This species is near threatened. It is classified as Least Concern by IUCN (2005)

• *Naja nigricollis nigricollis* Reinhardt, 1843) .

- **Common name:** Spitted cobra; Black-necked cobra
- **Arabic name:** Al-Cobra ; Al-Bakhakh.
- **Distribution:** Africa

- **Distribution in Jazan:** sites (1, 3, 5, 6, 7)
- **Habitat:** Vegetation areas.
- **Activity Pattern:** Diurnal
- **Feeding: Feeds** on frogs, toads, fishes, birds and small Mammalian.
- **Mode of feeding:** Active searchers.
- **Zoogeographical distribution:** Saharan and Ethiopian species
- **Behavior:** The spitting cobra is a relatively aggressive snake. When irritated it assumes the typical cobra threat attitude with the raised anterior part of the body and dilated hood. If approached closely, the snake will lower its anterior part to form about a 45-degree angle, open its month and forcefully ejects a stream of poison toward the intruder. The poison is usually direct to the eyes of the intruder with amazing accuracy. Resulting in severe pain and inflammation. If not immediately washed off, it might lead to irreversible damage to the eyes and even blindness (Saleh, 1997). In one case, the snake even spitted through a cloth collection bag on to the face of a person who was handling it (Personal experiences).
- **Status:** Uncommon and localized in Saudi Arabia. This species is near threatened. It is classified as Least Concern by IUCN (2005).

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- **Genus:** *Walterinnsia* Latasta, 1887
 - *Walterinnsia aegyptia* Latasta, 1887.

- **Common name:**Innes Cobra; Black desert cobra Inne's cobra.
- **Arabic name:**Al- Bargeel, Yaim , Al-Sul; meaning the Black one.
- **Distribution:** Northeastern Egypt and southwestern Asia.
- **Distribution in Jazan:** sites (1, 3, 5, 6,7,10,15)
- **Habitat:** Rocky areas. .
- **Feeding:** It seems that they prey mainly on *Uromastyx sp.*
- **Mode of feeding:** Active searchers.
- **Zoogeographical Distribution:** Ethiopian species.
- **Behavior:**
 - This snake is much feared by the people. It is not as aggressive as the cobra of genus *Naja*, when disturbed it rarely attacks, and simply tries to hide (Saleh, 1997). The venom of this species is reported to be much less potent than that of other members of this family (Gasperetti, 1988). He also added, it is strictly nocturnal and fossorial, rarely coming to the surface of the ground.
- **Status:** threatened. It is classified as Least Concern by **IUCN (2005)**.

Family (3): Viperidae

- **Genus: Cerastes Laurenti, 1768.**
- *Cerastes cerastes gasperetti* (**Leviton & Anderson 1967**)
- **Common name:** Greater *cerastes* Viper; Horned Viper.

- **Arabic name:** Haiya Al - Moqrana. . Hayya umm jnaeb, Umm Krun or horned snake.
- **Distribution:** This species is widely distributed throughout Africa to southwestern Asia (**Marx, 1968**). In Saudi Arabia, it has been reported from Alula, Duba, Ummlij, Dirs (**Farag and Banaja, 1980**) and from Bishah, Jabrin, Abqaiq, Dharan, Al-Jubayl, Badanah and Mahd Al-Dhahab (**Gasperetti, 1974**). It is the commonest snake in the Central Region (**Al-Sadoon, 1989**).
- **Distribution in Jazan:** sites (1, 2, 4, 7, 6.9, 10, 13, 15,)
- **Habitat:** Horned vipers are true desert snake, preferring sandy soil with some vegetation rocky outcrops as shelters. .
- **Activity Pattern:** Nocturnal activity.
- **Feeding:** It ranges long distances in search prey, which is mainly small birds (song-birds) or small mammals (*Gerbillus, Mus* and *Rattus*), Lizards and occasionally young or small snakes,.
- **Mode of feeding:** Depending upon the availability of food, it has two ways in feeding strategies (Sit & wait and active searcher feeding).
- **Zoogeographical Distribution:** Palaearctic species.
- **Behavior:** It is a true side winder, never have been seen to employ any other type of locomotion. Preferred hiding places are burrows of small rodents and *Uromasyx*, also under grass

tussocks, small shrubs or flat rocks. They were even found in concrete water conducts. Mating in April-June depending on the climate. Ovipositor in July – August - incubation period 6-8 weeks, hatching mostly in October. **Saleh (1997)** reported that some individuals have two horns located above the eyes and are made of single spine each. Hornless individual are also common. Horned and hornless individuals are found in males and females of all age groups from the same locality or even the same brood. The percentage of horned to hornless individuals in a population differs from one area to another.

- **Status:** Widespread and common, threatened by intensive commercial collection. This species is near threatened in Saudi Arabia; it is classified as Least Concern by **IUCN (2005)**

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- ***Cerastes vipera* (Linnaeus 1758) .**
 - **Common name:** Lesser Cerastes viper
 - **Arabic name:** Haiya El – Qaraa
 - **Distributions:** North Africa to Arabia
 - **Distribution in Jazan:** sites (1, 3, 5, 6, 7, 9, 10, 11, 13, 16)
 - **Habitat:** Sandy desert particularly sand dune areas.
 - **Activity Patterns:** Nocturnal activity
 - **Feeding:** Feeding on lizards, rodents and small birds.

- **Mode of feeding:** Depending upon the availability of food, it has two ways in feeding strategies (Sit & wait and active search feeding).
- **Zoogeographical distribution:** Palaearctic species.
- **Behavior:** It buries itself in the sand tail first with shoveling motions of the flattened body without changing the location of the body loops. Only the eyes and nostrils remain above the surface. The hidden snakes can be discovered by following their traces. Oviparous. Mating in April – June. Hatching mostly in August. Juveniles hatch a few hours after Ovipositor.
- **Status:** Uncommon, and much localized .because it often found in high densities it is susceptible to intensive collection by commercial animal collectors. This species is near threatened in Saudi Arabia; it is classified as Least Concern by **IUCN (2005)**.
- **Genus *Echis* Merrem, 1920**
- ***Echis coloratus* Gunther 1878.**
- **Common name:** Burton's Carpet Viper.
- **Arabic name:** Haiya Ghariba –Al-ragtag or spotted snakes .
- **Distribution:** Sinai, Israel and Arabian Peninsula
- **Distribution in Jazan :** sites (1, 2,3,4,.5,6,7,8,9,10,11, ,13)
- **Habitat:** Strictly associated with vegetated rocky Wadis.

- **Feeding:** Small frogs, toads small reptiles and small rodent and it was found in his stomach Scorpion, spider, termites and small beetles (**Schliech et al., 1996**).
 - **Mode of feeding:** Chiefly nocturnal, but it is also found basking in the early morning (in spring and autumn)
 - **Behavior:** This species observed wandering at night in search of rodents that form their main food. In daytime, they conceal themselves below sand or below vegetation. They also make use of burrows of rodents. Occasionally, they climb in bushes up to a height of two meters. A very dangerous snake, venom is strongly coagulant and contains neurotoxin element. Oviparous, mating in August and September. Incubation 50-64 day at temperature 32 C° (night).
 - **Zoogeographical Distribution:** Saharan (E).
 - **Status:** fairly common and widespread. Classified as Least Concern by **IUCN (2005)**
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- *Echis carinatus* (E. & I . Geoffroy ST. Hiliarie. 1827).
 - **Common name:** Saw-scaled viper.
 - **Arabic name:** Haiya Ghariba Samra
 - **Distribution:** Throughout Africa north of the Equator, throughout southern Asia to India and Ceylon.
 - **Distribution in Jazan :** sites (1, 2,3,4,5,6,7,8,9,10,11, ,13,14,15)
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- **Habitat:** Desert, semi deserts and sandy plains, sometimes in grassy terrain on cultivated land and gardens at the border of oases. .
 - **Activity Patterns:** mainly Nocturnal
 - **Feeding:** It feeds on lizard, rodents, small birds, Scorpion, small beetles, small frogs, toads, Small Mice and small rats. .
 - **Mode of feeding:** Depending upon the availability of food, it has two ways in feeding strategies (Sit & wait and active search feeding)
 - **Behavior:** It buries itself in the sand tail first with shoveling motions of the flattened body without changing the location of the body loops. Only the eyes and nostrils remain above the surface. The hidden snakes can be discovered by following their traces oviparous. Mating in August and September, incubation, 50 – 64 days. **Saleh (1997)** reported that this is probably the most dangerous snake in Jazan. Its venom is extremely potent.
 - **Zoogeographical Distribution:** Saharan (E) .
 - **Status:** Uncommon, and much localized, because it often found in high densities, it is susceptible to intensive collection by commercial animal collectors. This species is near threatened in Saudi Arabia; it is classified as Least Concern by **IUCN (2005)**
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- *Bitis arietans arietans* Merrem, 1820

- **Common name:** Puff adder.
- **Arabic name:** Haiya Al Nafasa.
- **Distribution:** This species is the most common and widespread venomous snake in Africa. Its geographic range includes: South Africa, Namibia, Swaziland, Morocco, Saudi Arabia, Oman, and Yemen.
- **Distribution in Jazan:** sites (1, 3, 5, 6, 7, 13, 14, 15)
- **Habitat:** is found in all habitats except for true deserts and rain forests and mountain tops. The preferred habitat for the species includes open grassland, savanna, open woodlands and rocky outcrops
- **Feeding:** Small frogs, toads, small reptiles and small rodent but **Schliech et al. (1996)** found in its stomach Scorpion, spider, termites and small beetles.
- **Mode of feeding:** Chiefly nocturnal, but it is also found basking in the early morning (in spring and autumn)
- **Behavior:** It is a usually nocturnal animal, hunting in ambush, relying in the immobility, but it is often met during the day, basking in the sun. After a cold night, an astonishing number of these reptilians may be met, all lying on the slopes or on the roads, and, even if terrestrial, they do not hesitate in climbing low shrubs especially when the soil is humid. It is one of the most dangerous African serpents, but this assertion needs a clarification. The danger represented by a serpent to the man is not only in function of the strength of its venom, even if I have remarked that this is what strikes more many people.
- **Zoogeographical Distribution:** Saharan (E).
- **Genus *Pseudocerates* Boulnger, 1896**
- ***Pseudocerates persicus fieldi* Schmidt, 1930.**
- **Common name:** Fields Horned - Viper.
- **Arabic name:** Haiya Moqarana Kaziba
- **Distribution:** Sinai, Israel, Jordan northern Saudi Arabia and southwestern Iraq.
- **Distribution in Jazan:** sites (1, 5, 6, 8, 10, 12, 15, 16)
- **Habitat:** Rocky areas of north and central Sinai..
- **Activity Patterns:** Nocturnal activity
- **Feeding:** Feeds on lizard, rodents and small birds. .
- **Mode of feeding:** Depending upon the availability of food, it has two ways in feeding strategies (Sit & wait and active search feeding)
- **Zoogeographical Distribution:** Saharan (E).
- **Status:** Rare but fairly widespread. Classified as Least Concern by IUCN (2005)

Identification Key to Poisonous Snakes of

Jazan:

Family: Atractaspididae:

- 1- Loreal absent
- 2- Dorsal scales smooth in at least anterior half of body
- 3- Anal plate single
- 4- Subcaudals single

- than 130..... *Cerastes vipera*
- Scales between eyes 15 or more; ventrals more than 130.....*Cerastes cerastes gasperetti*.....
- Scales between eyes 14 or more; ventrals 130..... *Bitis arietans arietans*

DISCUSSION..... 4

The conservation of biodiversity is particularly important as it provides the option to use biological resources in the future. Therefore, with Saudi Arabian

- Family: Elapidae**
- 5- Anal plate divided.....
 - 6- Subcaudals paired
 - 7- Suboculars exclude eye from upper labials; 1 anterior temporal..... *Naja haje arabica*
 - 8- Eye in contact with at least one upper labile; 2 anterior temporals..... *Naja n. nigricolis*
 - 9- Scales keeled posteriorly; uniformly blackish, large snake.....

National Report on Biodiversity that provides both information on the status of biodiversity and presents the overall plan for implementing the Convention on Biological Diversity, the Kingdom has taken an important step in ensuring its natural heritage.

Walterinnesia aegyptia

For Family: Viperidae

- 10- Subcaudals single
 - Subcaudals paired 12
- 11- Scales on snout smooth or slightly keeled; 3-4 series of scales between eye and upper Labials
 -*Echis coloratus*
 - Scales on snout strongly keeled; usually 2 series of scales between eye and upper Labials*Echis carinatus*
- 12- Gulags, ventral, and Subcaudals keeled; keels of lateral scales serrated13
 - Gulags, ventral, and Subcaudals smooth; keels of lateral scales smooth,.....*Pseudocerastes persica fieldi*
- 13- Scales between eyes 9-13; ventrals less

Venomous snakes (Proteroglyphous) are the most dangerous inhabitants in the world. They inhabit deserts, fields and valleys. Snakes of these families are highly toxic to man. Snake venom is produced by a pair of modified salivary gland that open to a pair of hollow fangs by narrow venom ducts. The venom is mainly made of proteins mostly enzymes besides non-protein components, which are divided into inorganic and organic constituents. All venoms cause severe changes in one or more body organs of the victim. Viperidae snakes are mainly hemotoxic, while Elapidae and Atractaspididae snakes are mainly neurotoxic. Hydrophiidae snakes are mainly Myotoxins (Sea Snakes): There are no symptoms really. Just severe upper body

pain and urine changes to brown black color.

The cobra generally tries to escape. According to **Schliech (1987)** their flight distance is very low, namely less than 2-5 m. If threatened, it assumes the typical upright posture with expanded hood. Bites are common in some area. Venom yields of 175-300 mg have been reported.

Bites by Mole viper *Atractaspis engaddensis* usually show a single fang puncture because the snake is peculiar manner of biting. Pain and swelling develops rapidly usually accompanied by nausea, vomiting, and diarrhea, respiratory distress and cyanosis (**Saleh, 1997**). Local necrosis may be serving enough to require amputation of digits (**Leviton et al., 1992**). Fatalities because of bite by this snake have been reported (**Weister et al., 1984**).

A terrestrial species is that often remain in the same area for a long time. They are normally not aggressive even if the poison is neurotoxin and extremely dangerous. Despite the wide distribution of this species, the number of fatal bites is very low. The Jazan cobra feeds mainly on amphibians and other snakes. The Arabian cobra is not able of spiting venom but the close species *Naja nigricollis* is. If annoyed, they are able of standing up and displaying a large hood. As defensive behavior, *Naja haje* often shams death.

Effects of venom to man: Heavy to very heavy local pain and swellings, cranial nerve palsies and respiratory paralysis; heavy local necrosis. Neurotoxin symptoms

within about 30 min: drooping of eyelids, biurred vision, difficulties in speaking and swallowing, dilated pupils; these are often followed by flaccid muscle paralysis, drowsiness and mental confusion, shallow and difficult respiration. Death occur after convulsions and coma.

Viper venom (*Cerastes, Echis*) acts more on the vascular system, brining about coagulation of the blood and clotting of the pulmonary arteries. Its action on the nervous system is not great, no individual group of nerve cells appears to be picked out and the effect upon respiration is not so direct; the influence upon the circulation explains the great depression, which is a symptom of viperine envenomation. The pain of the wound is sever and is speedily followed by swelling and discoloration.

In spite of the danger of these snakes, the existence of snake's especially poisonous species is a type of the environmental balance. The environmental balance based on the exchangeable relationships between animals; that the big eats the smaller and snakes eats rodents. Therefore, snakes help to save the crops and prevent the transference of diseases, which transfer to man by these rodents. Snakes also, are feeding on some other reptiles and decrease their reproduction. They also, have a great economical and medical value. Economically, their skin is exploited in many industries such as making shoes, boots, belts, buttons, wallets, lampshades and other accessories. Medically, they are used in making antivenom serum, which

neutralizes the effect of snake's bits. In addition, they have a scientific importance for research purposes. What can be done to reverse population of these reptiles? Many options are available. Generally, conservation programs must be multifaceted involving field and laboratory research to understand the animals, education to inform the public, legislation to protect the endangered species and their habitat, and if appropriate, captive breeding and management programs.

From the above we conclude that the necessity of conserving biodiversity lies in the conservation of the important environments, which is an important source of biodiversity, therefore the conservation of biodiversity in Jazan, in general, is reflected in several recommendations of the utmost necessity in this study, which is:

1 – Enabling the citizens to use the natural resources in the region in a way that ensuring the continuation of these resources and achieving a balance between benefit and optimal utilization.

2 – The need for appropriate administrative procedures, which ensure preservation of the environments that represent the biodiversity of the region.

3- Enhanced protection more than it is now in the southern areas and patrolling on a regular basis to follow up on these areas.

4 - Establishment of some protected areas in a number of important valleys in the region to ensure the preservation of species.

5 - As the study recommends further study of the biological diversity of all the animals

in the region to complete image of all elements of biodiversity in the region.

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المخلص العربي

دراسات بيئية علي تنوع الثعابين السامة الأرضية "أمامية الأنياب" في منطقة جازان -

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لقد أظهرت النتائج إلى وجود أربع فصائل من الثعابين "أمامية الأنياب" السامة إلى تقطن منطقته جازان وهذا من اجمالي عدد أنواع الثعابين الموجودة في المنطقة وهم: فصيلة الايلابيدي أو الكوبريات Elapidae. وفصيلة الفيبريدي "الحيات" Viperidae. وفصيلة الأبتير Atractaspididae. وأيضا فصيلة الهيدروفيدي "Hydrophiidae" الثعابين البحرية .

وتم اقتراح هذه الدراسة لإماتة اللثام عن بعض المشاكل البيئية وإلقاء الضوء على التنوع الحيوي للأنواع السامة الموجودة في منطقة جازان و الخطورة التي تمثلها هذه الأنواع بحياة الإنسان والمنشرة في أماكن متعددة في منطقة جازان. وعلى الرغم من أن هذه الثعابين قد تكون ضارة بحياة الإنسان في بعض الأحيان فهي أيضا قد تكون نافعة له في كثير من النواحي الحياتية.

وحيث أنه لا توجد دراسات كافية على الأنواع الحيوانية الموجودة في المنطقة. أتت هذه الدراسة للتعرف على التنوع الإحيائي لهذه المجموعة الحيوانية . ولاشك فإن دراسة هذه الأنواع والتعرف عليها سوف يقدم بعض الحلول التي يمكن أن تجعل من هذه الأنواع مصدراً لا ينضب للتنوع الإحيائي وفي نفس الوقت توفر هذه الدراسة معلومات عن إمكانية جدوى الحماية في هذه المنطقة لهذه الأنواع . وتأتي هذه الدراسة لتحقيق الأهداف التالية:

1. وصف المنطقة بيئياً وجغرافياً.
2. مسح شامل لكل أنواع الثعابين الموجودة في المنطقة وخاصة الأنواع السامة.
3. تقسيم الثعابين التي تم حصرها بيئياً من حيث: التنوع الحيوي والتوزيع الجغرافي والتوزيع الزمني
4. دراسة طريقة الاغذاء و نوع الغذاء والسلوك .
5. عمل مفاتيح تصنيفية للأنواع المختلفة لكي يسهل من عملية التعرف عليها.
6. دراسة علاقة هذه الثعابين بالإنسان مع إلقاء الضوء على الأهمية الاقتصادية والطبية والعلمية لهذه الثعابين وكذا أهميتها بالنسبة لعملية التوازن البيئي.
7. إلقاء الضوء على طرق صون هذه الكائنات كأحد المصادر الطبيعية التي لا بد من الحفاظ عليها حتى لا تتعرض للانقراض .
8. إعطاء مقترحات للجهات المعنية للمحافظة على الأنواع الموجودة في المنطقة من خلال النتائج المتحصل عليها وتبرز أهمية هذه المقترحات لغرض صون واستمرارية هذا التنوع.