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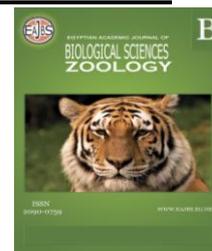


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Biodiversity and Distribution of Lizards in Jazan area, Kingdom of Saudi Arabia

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ABSTRACT

Background: Jazan region is one of the most important areas of the Kingdom that is located in the southwest of the country. It is considered one of the richest areas in biodiversity and it encompasses a large group of lizards belonging to different families. The aim of the current research is to survey different types of lizards in Jazan. **Materials and Methods:** Lizards were collected from Al-Aradha, AL-tuwal and Damad by hand capturing between dawn and midmorning, or shortly before sunset. **Results:** In this work, eight species belonging to four families (Camaeleonidae, Scincidae, Gekkonidae, and Agamidae) were collected and identified. Most of the gathered species belong to the family Gekkonidae. **Conclusions:** The widespread of species belonging to the family Gekkonidae may be attributed to the ability of these species to withstand various climatic conditions and to live in different habitats using the available facilities to survive and broadly distribute.

INTRODUCTION

Reptiles are a standout amongst the most essential taxa, particularly in hot nations which are considered biomarkers of changes in condition and atmosphere. Reptiles generally have a low capacity to weather changes in natural surroundings and dispersal being especially subject to ecological conditions for survival; they are subsequently pointer types of living space and atmosphere. Few have really advanced adjustment idiosyncrasies to life in the Sahara abandon (Abuzinada *et al.*, 2004; Masood, 2012b). In addition, reptiles are richer in the tropics and subtropics than in the mild zones. The reptile's dry, thickened cornfield skin is appropriate for these atmospheric circumstances as well as natural surroundings and shields the creatures from stuns and dangers of hydration (Capula, 1989; Abd Rabou *et al.*, 2007).

The kingdom of Saudi Arabia is a generous country with various geography and characteristic environment. Moreover, its geological territory among tropical and warm temperature zone makes the country an intriguing one in supporting rich and separated fauna (Al-Sadoon, 2010; Al-Sadoon *et al.*, 2016). One of the most important features that recognize Saudi Arabia is the biodiversity of its animal fauna (Masood, 2012a). The kingdom is well known for its biological diversity to an extent that it has been signified by its preservation of various species all over Saudi (Abuzinada *et al.*, 2004; Masood,

2012a). Hardly any investigations have been done on the different assortment of lizards of Saudi Arabia. Past explores have depicted little aggregations of lizards from different areas in Saudi Arabia, including the Southern Hejaz (Frag and Banaja, 1980), Eastern Arabia and Northeastern Arabia (Mandaville, 1967), Central Arabia (Al-Sadoon, 1989), Riyadh region (Al-Sadoon, 1988) and Al-Hassa region (Al-Sadoon *et al.*, 1991; Al-Sadoon, 2010; Al-Sadoon *et al.*, 2016).

Notwithstanding, the way that Jazan region has, in particular, the examinations of lizards fauna in Jazan territory remains ineffectually mulled over and information about them are insufficient (Frag and Banaja, 1980). Jazan is one of the wealthiest zones of the Kingdom of Saudi Arabia with creature biodiversity, where the region is portrayed by the proximity of significant get-together wild animals that have a place with different families (Masood, 2012b). It was recorded that lizards are descendants of ancient reptiles with variable shapes due to dry conditions that had occurred million years ago (Masood, 2012b). Since lizard families have a tendency to be environmentally particular, it is in this manner not shocking that the structure of lizard groups on various landmasses shifts so significantly (Vitt and Pianka, 2005; Melville *et al.*, 2006).

Lizards usually have little heads, long bodies and long tails. With such a large number of types of lizards, it's reasonable that they arrive in a wide assortment of sizes. Lizards are discovered everywhere throughout the world in relatively every kind of landscape. Some live in trees; others want to live in vegetation on the ground, while others live in deserts among rocks. Most reptiles including lizards are dynamic throughout the day. They are merciless creatures, which implies their dependence on their condition to warm their bodies. They utilize the warmth of the sun to raise their body temperatures and are dynamic when their bodies are warm. The sun additionally enables them to deliver vitamin D. Their days are spent sun-showering on rocks, chasing for nourishment, or sitting tight for sustenance and determining the direction. A few lizards are regional, while others can, without much of a stretch, live with many different reptiles of a wide range of animal types. Other than mating times, most lizards are not social with few exceptions (Greenie, 2003). The present article centers on the lizards of Jazan area and is seen as one of the earliest studies that outline different types of lizards in Jazan. This examination intends to give basic information, examination, riches, characteristic depiction, and status of lizards of Jazan region, Saudi Arabia.

MATERIALS AND METHODS

Jazan area is with coordinates (16.5°-17.0°N 42.0°- 43.8° E). Jazan region lies in the Southwestern piece of Saudi Arabia. It is bounded by Asir from the north and east, the Red Sea from the west while from the south and south-east was bordered by the Republic of Yemen, with a total area of 13.500 km² (Al-Farraj, 2008) (Fig. 1).

Jazan is an area that is characterized by habitat variation, including Sandy habitat, Mountain habitat, Sabkha (Qa'a) habitat and Wetland habitat. The climate in the Jazan region is dry weather in winter, while rain ordinarily falls during the autumn and summer seasons, May-July and September-November (Sallam *et al.*, 2013). The annual rate of rain is up to 300 mm. yearly and the mean temperature is 28 °C with Average year-round humidity is 62% (Al-Farraj, 2008). In our study, most areas were visited during winter and spring (January–April 2018) to collect animals under various climatic conditions. The most favorable time for the collection was when the environmental conditions were most suitable for the presence of animals. Two field visits were made to different locations in Jazan region of Saudi Arabia. The animals were mostly observed and collected between dawn and midmorning, or shortly before sunset. Animals were

collected by hand capturing method during this survey. Lizards were identified by the author based on previous experience and using the keys of Arnold (1986). Live animals were narcotized and then frozen at 4C at Biology Department, Faculty of Science, Jazan University, Jazan.



Fig. 1: A map showing Jazan

RESULTS

In the current study, all species were gathered from Al-Aradha, AL tuwal and Damad.

Family: Camaleonidae

Genus: *Chamaeleo Laurenti, 1768*

Chamaeleo Calyptratus

Common Name: Veiled or Yemen Chameleon.

Chameleons are a unique type of lizard. It has several exceptional characteristics such as a long projectable tongue, independently movable eyes, prehensile feet, and the ability to change its skin coloration. *Chamaeleo calyptratus* is large-sized lizard (Fig. 2). Males are with a total length of 62 cm (TL) and 20–30 cm snout-vent length (SVL), while females' length is about 45 cm TL besides their SVL is 10–20 cm (Schmidt, 2001). It is also commonly known as Yemen Chameleon or veiled Chameleons which is commonly distributed in the Arabian Peninsula along the south and southwestern Yemen as well as in southwestern Saudi Arabia (Tilbury, 2010).

Family: Scincidae

This family is widely spread in Australia, Africa and Asia. It lives in most environments. They have cylindrical bodies with conical heads and non-distinct necks from the trunk. They possess short limbs and the body is covered by smooth and shiny solid scales. Two species of this family were collected in Jazan region. The first of them is named *Chalcides ocellatus* (Fig. 3).

Genus: Chalcides, Laurenti, 1763

Chalcides ocellatus

Common name: Eyed Skink, Garden, or Ocellated Skink.

This lizard is common in cultivated fields and around urban areas. The second species that was found in Jazan is *Scincus hemprichii* (Fig. 4).

Genus: Scincus Laurenti, 1768

Scincus hemprichii

Common Name: Sand Skink

Sandy betrays, ideal were aggregations of free-floating sand with rich vegetation, frequently around roots.

Family: Gekkonidae

Members of this family are characterized by a flattened body at the poles, granulated scales, large head and prominent eyes. Some geckos have suckers at the end of their fingers helping them to stick to smooth surfaces such as walls and rocks. This family is widely spread in tropical, warm and temperate regions of the world. Three species of this family were collected in our survey of Jazan region (Figs. 5, 6 & 7).

Genus: Ptyodactylus Goldfuss, 1820

Ptyodactylus hasselquistii

Common Name: Fan-footed Gecko

This species lives in different habitats such as mountains, walls and soft sand. The body length is medium sized which is about 8-9 cm in total length. It has a triangle-shaped head with comparatively large eyes. It also has yellowish-brown transparent skin which can be easily seen. It has five fingers with suckers for constancy on the flat surfaces during movement on the walls or ceilings.

Genus: Pristurus Rüppell, 1835

Pristurus flavipunctatus

Common Name: Middle Eastern Rock Gecko

Pristurus flavipunctatus is small in size with a narrow body and a long tail. It is characterized by smaller SVL than TL with SVL of about 35-40mm. It appears greyish brown in color with inconspicuous dorsal and lateral patterns.

Genus: Stenodactylus Fitzinger, 1826

Stenodactylus selvini

Common Name: Slevin's Gecko

It has the ability to adapt to living on relatively hard ground, coarse sandy planes, large wadis and sandy substrates.

Family: Agamidae

Agamidae members are characterized by their triangular-shaped head, wide body covered by small scales and fleshy broad tongue. Two species were recorded in Jazan region (Figs. 8 & 9).

Genus: Acanthocercus Fitzinger, 1843.

Acanthocercus adramitanus

Common Name: Anderson's Rock Agama

It possesses extremely dry rough zones in sloping and bumpy areas.

Genus: Laudakia Gray, 1845

Laudakia stellio stellio

Common Name: starred Agama

Starred agama inhabits rocky surfaces and walls of old buildings. It is often arboreal when large trees are available. It squeezes into cracks or climbs high on walls or trees.



Fig. 2: *Chamaeleo Calyptratus*



Fig. 3: *Chalcides ocellatus*



Fig. 4: *Scincus hemprichii*

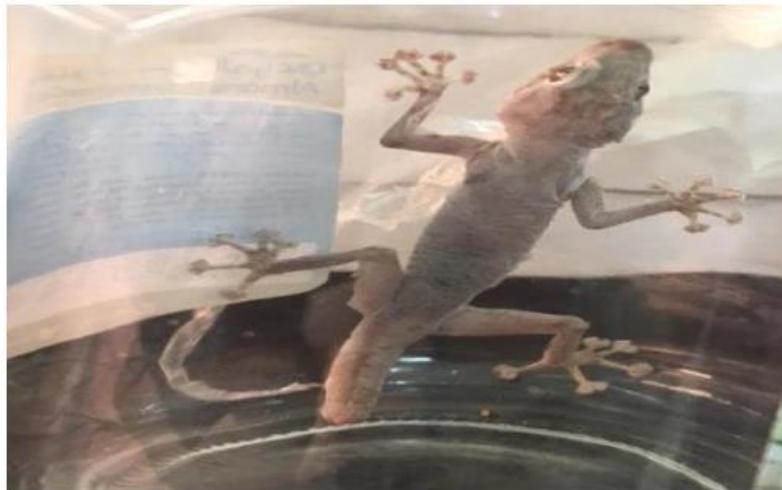


Fig. 5: *Ptyodactylus hasselquistii*



Fig. 6: *Pristurus flavipunctatus*



Fig. 7: *Stenodactylus selvini*

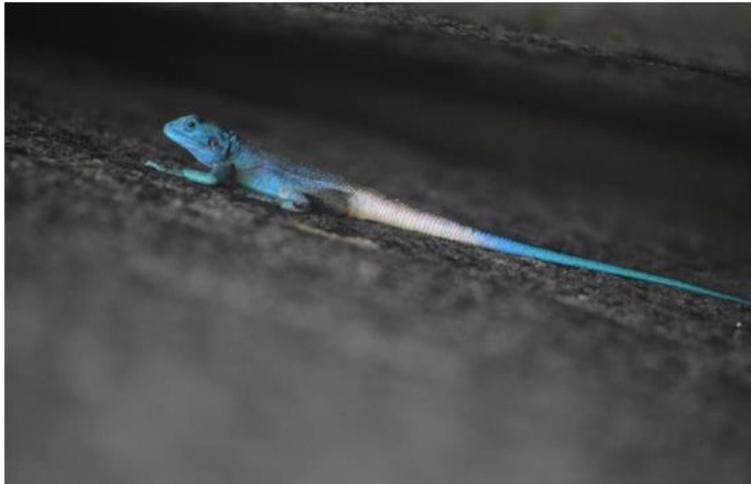


Fig. 8: *Agama (Laudakia) adramitana*



Fig. 9: *Laudakia stellio stellio*

Table 1: Co-ordinates: Latitude, longitude and altitude, of the collected specimens by a GPS

Scientific name	Status in the study area	Coordinates	
<i>Chamaeleo Calyptratus</i>	Abundant	N 43.1291	E 16.9223
<i>Chalcides ocellatus</i>	Abundant	N 42.9418	E 16.5237
<i>Scincus hemprichii</i>	Abundant	N 42.9418	E 16.5237
<i>Ptyodactylus hasselquistii</i>	Highly Abundant	N 42.7725	E 17.1172
<i>Pristurus flavipunctatus</i>	Highly Abundant	N 43.1291	E 16.9223
<i>Stenodactylus selvini</i>	Abundant	N 43.1291	E 16.9223
<i>Acanthocercus adramitanus</i>	Abundant	N 43.1291	E 16.9223
<i>Laudakia stellio stellio</i>	Abundant	N 43.1291	E 16.9223

DISCUSSION

In spite of the variation of habitats existing in Saudi Arabia, Jazan is one of the richest regions in animal diversity, especially in lizard fauna (Masood and Asiry, 2012). The biodiversity of lizards found in the zone was surveyed in the current investigation. Although several previous studies on various species of lizards in different regions of Saudi Arabia were carried out, Jazan is still an area that doesn't receive prominent attention to its wealthy fauna generally and lizards in specific. There are very few studies on Lizards in territory compared with other regions. Up to our knowledge, this work represents one of the first studies which transact with lizards' biodiversity in Jazan.

Lizards' diversity has been studied in Southwestern Saudi Arabia (Masood and Asiry, 2012), yet not enough examinations had been made to provide essential data about the species abundance and diversity of this kind of reptile, principally the geographical propagation and dispersions in Jazan region. This investigation recorded eight-species from various zones in Jazan which belong to four families, family Camaeleonidae, family Scincidae, family Gekkonidae, and family Agamidae. These families were collected from different zones of the study region.

The first species that was noticed in the present survey is *Chamaeleo calyptratus*. It has been recorded that the previous species was found in the southwestern Arabian Peninsula in western Yemen and southwestern Saudi Arabia. *Chalcides ocellatus*, which belongs to the family Scincidae, was demonstrated in this work. It was reported that *Chalcides ocellatus* was found enormously in different regions throughout the kingdom such as Bisha, Asir, and Ha'll (Masood and Asiry, 2012; Alshammari and Ibrahim, 2015).

Another species also belongs to the family Scincidae is *Scincus hemprichii* which was reported previously by other authors (Abdel-Baki *et al.*, 2013). In addition, the family Gekkonidae demonstrated three species, the *Ptyodactylus hasselquistii*, *Stenodactylus selvini*, and *Pristurus flavipunctatus*. *Ptyodactylus hasselquistii* which was recorded in our work, was found in Bisha, Asir, Ha'll, and Tabuk (Masood and Asiry, 2012; Aloufi and Amr, 2015). Regarding *Stenodactylus selvini*, it was recorded in Turaif and Ha'll (Alshammari and Ibrahim, 2015; Al-Sadoon *et al.*, 2016). In Arabian Peninsula, *Pristurus flavipunctatus* was found around Makkah, along Asir's mountains, and Farasan's island to Yemen (Masseti, 2014). Regarding Family Agamidae, two species were registered in this study; *Acanthocercus adramitana* and *Laudakia stellio stellio*. It has been reported that the first type also exists in the Western region of Saudi Arabia (Frag and Banaja, 1980), while the other one was found in Asir and Tabuk (Masood and Asiry, 2012; Aloufi and Amr, 2015). It is noteworthy to know that the lizards of Jazan are similar to those present in other neighboring areas which extend from southwest Asia,

northwest Ethiopian district, Palestine, Jordan to Arabian Peninsula (Masood and Asiry, 2012).

Climatic conditions and other factors such as the topography, the height, shape of the land, and vegetation, play an important role in the distribution of lizards in the Jazan zone (Al-Sadoon *et al.*, 2016). All these factors are reflected in particular in the ecosystem, behavior, distribution of the fauna in Jazan region and distribution of the lizards in the study area (Farang and Banaja, 1980).

Conclusions

In conclusion, this study recorded eight species of lizards from different areas in Jazan, most of them ranged from highly abundant to abundant or common. The widespread of species belonging to the family Gekkonidae in the study zone may basically be related to the ability of these species to live in assortments of habitats; including sand, gravel, and rocks, which may be utilized as a shelter from any interruption to their diversities.

Acknowledgment

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ARABIC SUMMARY

التنوع الحيوي وانتشار السحالي في منطقة جازان بالمملكة العربية السعودية

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الخلفية: تعتبر منطقة جازان واحدة من أهم المناطق التي تقع في جنوب غرب المملكة. كما تعتبر واحدة من أغنى المناطق في التنوع البيولوجي. تضم منطقة جازان مجموعة كبيرة من السحالي والتي تنتمي إلى عائلات مختلفة. الهدف من البحث الحالي هو مسح لأنواع السحالي المختلفة في جازان. **المواد والأساليب:** تم جمع السحالي من مناطق العارضة، الطوال، ضمد في الأوقات بين الفجر ومنتصف الصباح أو قبل غروب الشمس بفترة قصيرة. **النتائج:** تم جمع وتعريف ثمانية أنواع من السحالي والتي تنتمي إلى أربع عائلات (الحرابي، الأبراص، السقنقوريات، العضايا). تنتمي معظم الأنواع التي تم جمعها إلى عائلة الأبراص. **الاستنتاجات:** يمكن أن يعزى انتشار الأنواع التي تنتمي إلى عائلة الأبراص إلى قدرة هذه الأنواع على تحمل الظروف المناخية المختلفة والعيش في البيئات الطبيعية المتنوعة مستخدمة كل الإمكانيات المتاحة للانتشار والبقاء على قيد الحياة.

الكلمات المفتاحية: التنوع الحيوي، السحالي، جازان، المملكة العربية السعودية.