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Khaled Ahmad Al Malki , Abdul Rahman Al Ghamdi , Faisal Shuraim , Farah Neyaz , Ahmad Al Boug , Sharif Al Jbour , Francesco Maria Angelici , Zuhair Sami Amr *

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Keywords: Rodentia; Saudi Arabia; distribution; conservation; zoogeography

*Article*

# Diversity and Conservation of Rodents in Saudi Arabia

**Khaled Al Malki, Abdul Rahman Al Ghamdi, Faisal Shuraim, Farah Neyaz, Ahmad Al Boug, Sharif Al Jbour, Francesco M. Angelici and Zuhair S. Amr ***

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**Abstract:** The rodents of Saudi Arabia consist of 20 species and 12 genera within four families (Gliridae, Dipodidae, Muridae, and Hystricidae). Details on the past and present distribution of the rodents were included along with available data on their habitat preference and biology. The eastern central part of Saudi Arabia covering Tuwiq mountains plateau, including the vicinity of Riyadh, hosts the highest number of rodent species. Analysis of the rodent fauna of Saudi Arabia revealed that they have four major zoogeographical affinities; Palaearctic-Oriental (one species), Afrotropical- Palaearctic (six species), Palaearctic (four species), endemic to Saudi Arabia and Yemen (three species), Afrotropical-Palaearctic-Oriental (three species) and three cosmopolitan species. According to the National Red List, the Euphrates Jerboa, *S. euphratica*, is listed as Endangered, Near Threatened for the Indian Crested Porcupine, *H. indica*, three species as Data Deficient, while the rest are considered as Least Concern.

**Keywords:** Rodentia; Saudi Arabia; distribution; conservation; zoogeography

## 1. Introduction

Rodents are considered as the largest order of mammals worldwide, comprising about 50% of living mammals. They are distributed all over the world in almost all types of habitats including forests, temperate, tropical, deserts, riparian habitats as well as human inhabited areas [1,2].

Species of this order play an important role in arid regions. Some keystone species are considered as ecosystem engineering, where they propagate seeds, increase plant productivity around their burrows, provide shelter for arthropods and reptiles in their deserted burrows, as well as food source for small and medium carnivores, snakes and raptors [3,4].

Studies on the systematics and distribution of the rodents of Saudi Arabia were published over the past century [5–13], with a total of 20 extant species. The most comprehensive study was published by Büttiker & Harrison [14]. Other studies addressed the ecology and biology for some species; the Southwest Asian Garden Dormouse, *Eliomys melanurus* [15], the Yemen White-footed Rat, *Myomyscus yemeni* [16] and the reproductive biology of the Baluchistan gerbil, *Gerbillus nanus* [17].

Studies on the locomotory activity rhythm for *Eliomys melanurus, Acomys dimidiatus, Meriones rex, Meriones lybicus* and *Gerbillus dasyurus* were investigated [18–21]. Rodents remains in owl pellets were studied by several authors, providing additional locality records [22–25].

The present study updates the taxonomy and distributional data for 20 rodent species based on previous records and the recent results of field work, addressed their zoogeographical affinities, and identified threats facing some rodent species in Saudi Arabia.

## 2. Materials and Methods

Previous records for the rodents of Saudi Arabia were extracted from published papers, reports, and the mammal's collection of the late Prof. Iyad Nader deposited at the National Centre for Wildlife (NCW). Additionally, personal observations, rodents recovered from owl pellets and from trapping

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in different sites in Saudi Arabia by the NCW field biologists over the past three years (2022-2024) are included. Data on rodents' distribution covers 176 localities (Figure 1, Appendix A). Records for each species reported previously are indicated with the reference number in parentheses. Scientific and common names were checked according to Wilson and Reeder [26].

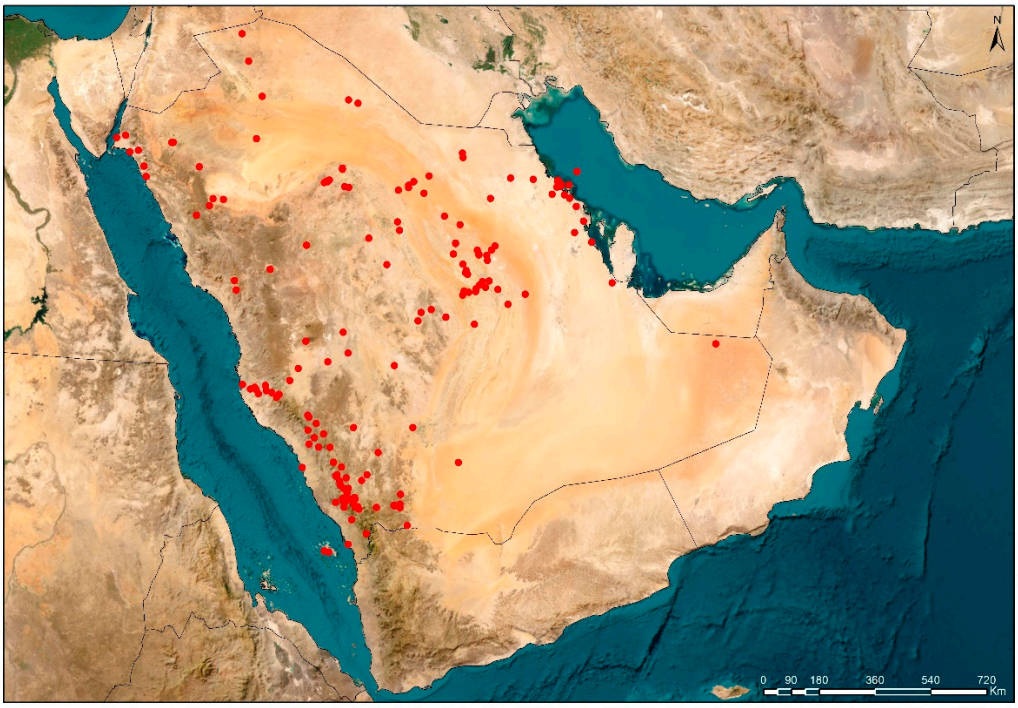


**Figure 1.** Map of Saudi Arabia showing localities of reported rodents.

## 3. Results

### *3.1. Diversity of the rodent Fauna of Saudi Arabia*

The rodents of Saudi Arabia consist of 20 species in four families (Gliridae, Dipodidae, Muridae, and Hystricidae) and 12 genera. The family Muridae includes 16 species, while the families Gliridae and Hystricidae include one species for each, and family Dipodidae includes two species.

**Family Gliridae**

Dormice occurs mostly in Europe, with some species in Asia and Africa. Members of this family are characterized by a hairy and bushy tail and with presence four ckeekteeth in the maxilla. Members of this family are known to have an arboreal lifestyle. In Saudi Arabia, this family includes a single species.

***Eliomys melanurus* (Wagner, 1839)**

**Common name**: Southwest Asian Garden Dormouse

**Previous records**: Dar el Harma [6], Jabal Shar, Medain Salih, Wadi Dalaghan [15,27], Raydah Protected Area [18].

**Recent records**: 35 Km SE Abha, Alagan, Al Souda, Neom, Tabuk.

**Habitat and ecology**: It occurs in very arid and densely vegetated habitats. As the distribution map shows, it was collected in sandstone deserts and rocky areas. It feeds on insects, snails and centipedes. They come out at night and feed on wild fig trees. The Southwest Asian Garden Dormouse became adapted to a non-arboreal lifestyle 1.2 million years ago [28]. This species has a remarkable distribution pattern, despite being originally an arboreal species. Populations of this species may represent relicts in the deserts of Saudi Arabia [29].

**Biology**: Females give birth to 2-9 young, and become fully mature by one year [30]. The Southwest Asian Garden Dormouse lives along with other desert rodents, such as *G. dasyurus* and

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*Acomys russatus* [31]. Alagaili et al. [18] studied the locomotor activity of this species under controlled environment in Saudi Arabia. Al Khalili [32] recovered *Myoxopsylla laverania* parasitizing this species.

**Family Dipodidae**

The elongated hind limbs and short forearms characterize members of this family. This is an adaptation for saltatorial movement. Two genera are recognized in Saudi Arabia, *Scarturus* and *Jaculus*. Both contain one species that are found in dry arid parts of the country.

***Scarturus euphratica* (Thomas, 1881)**

**Common name**: Euphrates Jerboa

**Distribution in Saudi Arabia:**

**Previous records**: Qaisumah [7], Summan Plateau [9], Turaif [12], Ara'r [24].

**Recent records**: Luga.

**Habitat and ecology**: This is a true desert species and restricted to the arid habitats of Saudi Arabia. It is mostly associated with wadis in dry parts of the country and avoids sand habitats. In Saudi Arabia, burrows may reach up to 45 cm. deep and about one meter long with one single entrance [7].

**Biology**: The Euphrates Jerboa becomes active after sunset and looks for food close to its burrow site. Females may give birth up to nine young. Kadhim and Wahid [33] examined the reproduction of *S. euphratica* males and stated that the period of February to May includes higher level of breeding activity of males with a second activity period during October. In Saudi Arabia, many remains were found in pellets of the Pharaoh Eagle Owl, *Bubo ascalaphus* and possibly the Omani owl, *Strix butleri* and the Barn Owl, *Tyto alba* [9].

***Jaculus loftusi* (Blanford, 1875)**

**Common name**: Arabian Jerboa

**Global distribution**: Arabian Peninsula, Syria, Jordan, Iraq (W of Euphrates).

**Distribution in Saudi Arabia**

**Previous report:** Artawiya [6], Summan Plateau [9], Harrart Al Harrah [10,34], Saja/Umm Ar-Rimth [11,36], Turaif [12], Wadi As Sulai [13,22], Al Khubra, Mekka by pass, Makkah-Lith, Wadi Sirhan [14], Ara'r [24], Al Daba'ah, Bsitah [25], Hazm an-Nuquria, Ras al-Abkhara [35], Uruq Bani Ma'arid [37].

**Recent records**: Al Thumamah, Buridah, Luga, Qbah, NW Riyadh, Sha'ib Al Shoki, Shaybah, Tabuk.

**Habitat and ecology**: The ecology of the Arabian Jerboa is well studied in Saudi Arabia [7]. It is a nocturnal species and remains active for the first 3 to 4 hours after dark. Burrows are situated in levelled arid areas and may reach up to 120 cm deep with several food chambers, a nest and several blind alleys. The entrance is plugged by sand during the daytime. *Jaculus loftusi* is a successful desert colonial species. In Turaif, it was a very common species in high densities [12]. It is mostly associated with open gravel plains. It inhabits a wide variety of habitats including sabkhas, sand and alluvial deserts covered by chenopods [14].

**Biology**: It is a nocturnal species and remains active for the first 3 to 4 hours after dark. Females produce 2-7 new born after a gestation period that lasts for about 25 days [7,38]. The Arabian Jerboa is a one of the prey items for desert owls in Saudi Arabia [6,34]. Two flea species, *Xenopsylla cheopis* and *Ctenocephalides felis* were also found to parasitize this species in the vicinity of Riyadh [39].

**Family Muridae**

Recent revision of Order Rodentia made radical changes in the systematics of this order [1,2]. By now three main subfamilies are known to occur in Saudi Arabia (Gerbillinae, Murinae and Deomyinae). This family includes rats, jirds and gerbils that assumes different lifestyles. It includes species that are considered serious pests of economic and health importance.

***Acomys dimidiatus* (Cretzschmar, 1826)**

**Common name**: Eastern Spiny Mouse

**Global distribution**: Jordan, Palestine, Lebanon, Yemen, Oman, Saudi Arabia, S Iraq, Iran, and Pakistan.

**Distribution in Saudi Arabia**:

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**Previous records**: Abha, Birka, Rumah, Shaib Hajlil, Wadi Liya [6], Wadi As Sulai [13,22], Adama, Adnan, Al Haniq, Al Na'amah, SW Al Ula, Al Wajh, Artawiyah, Ash Sharayi, 38 km S Athnen, Bani Musayqirah, Hamid, Hesua, Fayfa, Jabal Ammariyah, Jabal Al Alam, Jabal Farrash, Kushm Buwaybiyat, Kushm Dibi, Shaib al Tawqi, Tala'a, Thamniya, Wadi Karrar, Wadi Khumra, Wadi Qatan, Wadi Rasid, Wadi Sanakhah, Wadi Shaib Luha, Wadi Thalham, Wadi Turabah, Wadi Wajj [14], Riydaha Protected Area [19], Al Daba'ah [25], Riyadh [39], Wadi Sharayi [40], Wadi Hanifah [41], Farasan Al-Kebir [42], Aga, Alzobara, Barazan, Eljameayein, Elkhomashiya [43], Alogl, Alous, Wosanib [44], Riyadh Province [45].

**Recent records**: Dirab, Duba, Harrat Kishb, Ibex Reserve, Jeddah, Neom, NW Riyadh, Tabuk, Wadi Dalagan.

**Habitat and ecology**: The Eastern Spiny Mouse is a rock dwelling species including mesic and xeric biotopes. It is found across the entire mountain ranges extending along Hijaz reaching south wards to Abha mountains [14]. It can be found in rocky areas with trees and shrubs. It also invaded forest habitats in south-western Saudi Arabia. In Hisma around Tabuk, it is associated with dry sandstone mountains with minimal vegetation.

**Biology**: It is strictly nocturnal in contrast to the Golden Spiny Mouse, *Acomys russatus*. In arid regions, the Eastern Spiny Mouse feeds on land snails and seeds of various plants. The entrance of its burrow is usually piled with crushed land snails of several genera [29]. Also, the entrance may be plugged by thorny plants, perhaps to prevent intruders (e.g. snakes) from entering. Gestation lasts for 36-40 days, and the young (2 or 3, at most 5) are born mainly in the spring and summer months [2]. The circadian rhythm of locomotory activity of this species was studied under controlled conditions [19]. Al Khalili [32] recovered parasites from this species including *Parapulex chephrenis, X. cheopis, Stenoponia tripectinata, Rhipcephalus sanguineus*, and *Haemaphysalis sulcata*. Al-Ahmed and Al-Dawood [41] collected *Xenopsyllus* sp., and *Rhipicephalus turanicus* parasitizing this species in the vicinity of Riyadh. Two flea species, *X. cheopis* and *C. felis* were also found to parasitize this species [39]. Stekolnikov et al. [44] collected several species of chigger mites parasitizing on this species.

***Acomys russatus* (Wagner, 1840)**

**Common name**: Golden Spiny Mouse

**Global distribution**: E Egypt, Sinai, Jordan, Palestine, and Saudi Arabia.

**Distribution in Saudi Arabia**:

**Previous records:** Wadi Liya [6], Tuwaiq Escarpment, Wadi Khumra [14], Wadi As Sulai [22], Riyadh Province [45].

**Recent records**: Jabal Al Aswad, Harrat Kishb, Harrat Khaybar, NW Riyadh. Ibex Reserve

**Habitat and ecology**: This species is common among rocky areas around the Arabian Sheild and the western mountains. Atallah [31] stated that the Golden Spiny Mouse lives along with *A. dimidiatus*; both species prefer rocky terrain. It feeds on several halophytic plants such as *Anabasis articulata, Atriplex halimus* and *Hammada scorpia* [46].

**Biology**: The Golden Spiny Mouse is nocturnal in areas where *A. dimidiatus* is absent, while it is active in the morning hours and late afternoon in habitats shared with *A. dimidiatus* [47].

**Remarks**: It is highly possible to find the melanistic form *Acomys russatus lewisi* in the black lava deserts of Harrat Al Harrah [29].

**Subfamily Gerbillinae**

This subfamily includes gerbils and jirds. This subfamily constitutes the largest group of rodents occurring Saudi Arabia, with four genera, *Gerbillus, Meriones, Psammomys* and *Sekeetamys*, with a total of 10 species.

***Gerbillus dasyurus* (Wagner, 1842)**

**Common name**: Wagner's Gerbil

**Global distribution**: Arabian Peninsula, Iraq, Syria, Lebanon, Palestine, Sinai.

**Distribution in Saudi Arabia:**

**Previous records**: Artawiya, Balum wells, Thamami wells [6], Summan Plateau [9], Harrat Al Harrah [10], Wadi As Sulai [13], Al Haniq, Al Wajh, An Namas, An Na'amah, Jabal Banban, Jabal

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Thamamah, Nuayriyah, Risayah, Thamniyah, Tumeir, Wadi Rasid [14], Ara'r [24], Al Daba'ah [25], Ras al Abkhara [35].

**Recent records**: Luga, Neom, Qbah, Sharma, Tabuk, Tanomah.

**Habitat and ecology**: Wagner's Gerbil has a wide range of habitats including basalt deserts, silt dunes, run-off wadis and cultivated areas. This gerbil is very common in the Saudi Arabian deserts. It was also collected from several localities along the western mountains, the Arabian shield area as well as open deserts. It was found to share burrows with *P. obesus* [48].

**Biology**: The burrows are simple but deep, with 1-2 unplugged emergency exists. Stored plant found includes *Anabasis articulata, Atriplex halimus* and *Artemisia herpa-alba* [49]. Reproduction occurs almost all year-round and pauses in December. Gestation lasts for 18-22 days with a litter size of 3-7 new borne [50]. In Saudi Arabia, many remains were found in pellets of the Pharaoh Eagle Owl, *Bubo ascalaphus* and possibly the Omani owl, *Strix butleri* and the Barn Owl, *Tyto alba* [9,22]. Al Khalili [31] recovered ectoparasites from this species including *P. chephrenis, X. cheopis, Xenopsylla dipodilli, Xenopsylla brasiliensis, S. tripectinata, Rhipicephalus sanguineus* and *H. sulcata*.

***Gerbillus cheesmani* Thomas, 1919**

**Common name**: Cheesman's Gerbil

**Global distribution**: SW Iran, C and S Iraq, Saudi Arabia, Oman, North Yemen, South Yemen, and Kuwait.

**Distribution in Saudi Arabia**:

**Previous records**: Al Saiyarat, Hafr Al Batin [6], Harrat Al Harrah [10], Saja Umm Ar-Rimth [11,36], Turaif [12], Wadi As Sulai [13,22], Ash Sharayi, Al Wajh, Al Uquar, Jeddah, Makkah by pass, Salim [14], Abu Ali Island, Abu Hadriya, Dauhat ad Dafi, Hazm al Faidah, Jubail, Ras az Zaur [35], Mahazat as-Sayd [51].

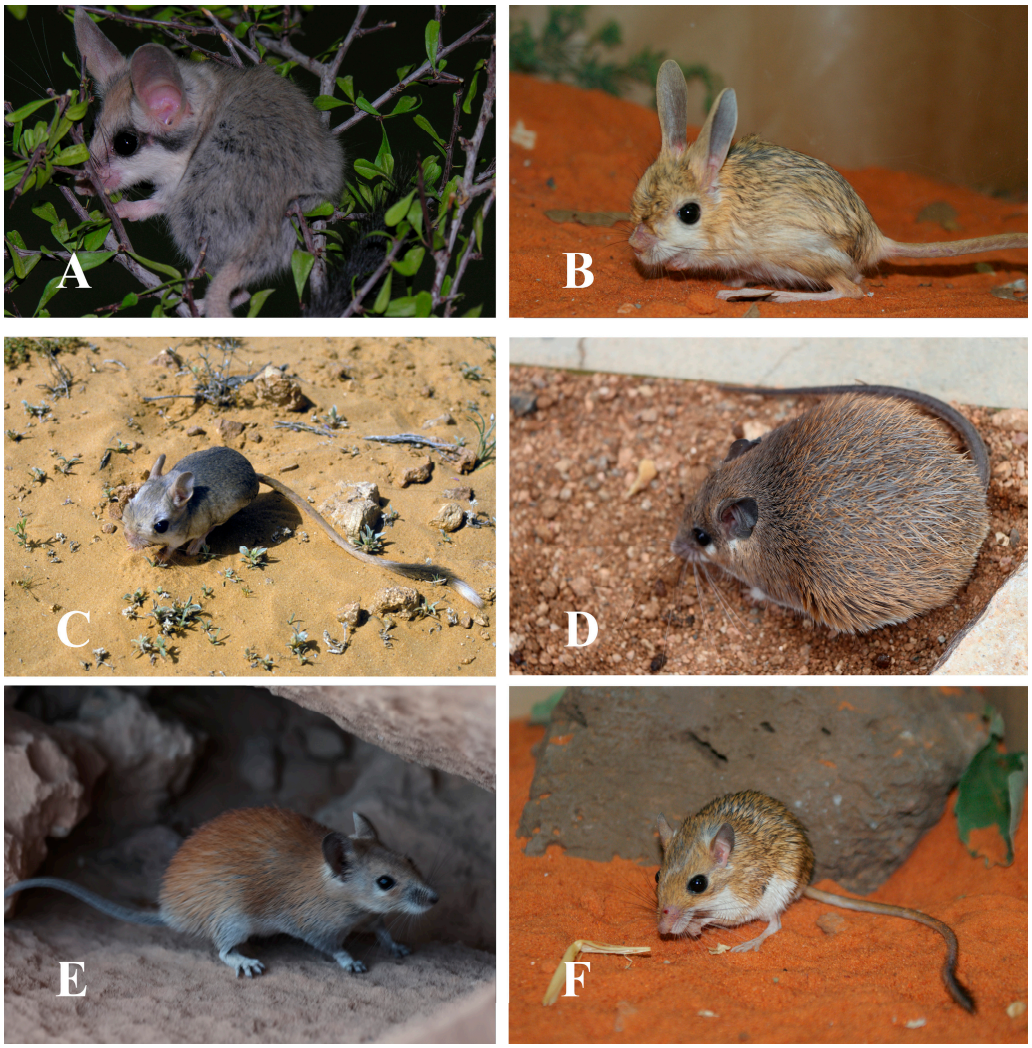

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**Figure 2.** A. Eliomys melanurus. B. Scarturus euphratica (Photo by A. Shehab). C. Jaculus loftusi. D. Acomys dimidiatus. E. Acomys russatus (Photo by B. Rubinic). F. Gerbillus dasyurus (Photo by A. Shehab).

**Recent records**: Hafir Kishb, Ibex Reserve, Immam Turki Ben Abdullah Reserve, Luga, Qubat Al Zbair, Shaybah, Urouq Bani Moa'red.

**Habitat and ecology**: This is a sand dwelling species and most abundant among red sandy areas around *Ephedra alata* and *Calligonum* shrubs. It does not form extensive burrow system, and the burrow has one hole located under shrubs [6].

**Biology**: The reproduction pattern of this species was studied in Saudi Arabia by Henry and Dubost [36]. They stated that males and females reproduced synchronously and the reproduction season coincided with rainfall. In Saudi Arabia, many remains were found in pellets of the Pharaoh Eagle Owl, *B. ascalaphus* and possibly the Omani owl, *S. butleri* and the Barn Owl, *T. alba* [9,22].

***Gerbillus henleyi* (De Winton, 1903)**

**Common name**: Pygmy Gerbil

**Global distribution**: Algeria through N Africa to Palestine and Jordan, Western Saudi Arabia, N Yemen, and Oman.

**Distribution in Saudi Arabia**:

**Previous records**: Summan Plateau [9], Al Arf [14].

**Habitat and ecology**: The Pygmy Gerbil was collected from extreme desert habitats. It prefers gravelly as well as sandy deserts with very scarce vegetation of perennial bushes and shrubs [14]. Its burrow is characterized by its small diameter (1-2 cm).

**Biology**: The Pygmy Gerbil is the smallest rodent known to inhabit the Saudi Arabia deserts. A female was found to have six embryos [52]. In the Negev, two distinct breeding periods were observed, one in the spring and the second in late summer. In comparison with other species of the genus *Gerbillus*, *G. henleyi* is more a seed eater, more mobile with a less stable home range than *D. dasyurus*. This suggests that *G. henleyi* is more adapted to xeric habitats than other gerbils [53]. It was collected from areas with scarce vegetation cover. In Saudi Arabia, many remains were found in pellets of the Pharaoh Eagle Owl, *B. ascalaphus* and possibly the Omani owl, *S. butleri* and the Barn Owl, *T. alba* [9].

***Gerbillus nanus* Blanford, 1875**

**Common name**: Dwarf Gerbil

**Global distribution**: An extensive range from the Baluchistan region of NW India, Pakistan, S Afghanistan, and Iran through the Arabian Peninsula, Iraq, Jordan, Palestine, and North Africa to Morocco.

**Distribution in Saudi Arabia**:

**Previous records**: Artawiya, Balum wells, Median Salih, Raudha Tinhat, Rumaihiya, Thamami wells [6], Harrat Al Harrah [10], Saja Umm Ar-Rimth [11,36], Turaif [12], Wadi As Sulai [13], Ashayrah, Ath-thamamah, Al Uquar, Ar Rayn, Bahara, Dirab, Hofuf, Jabal Alam, Jabal Banban, Jabal Maniq, Jizan, Kushm Dibi, Makkah by pass, Quwaywiyah, Sanam, Todiah, Umm Ad Dabah, Wadi Awsat, Wadi Hureimala, Wadi Karj, Wadi Khumra, Wadi Nissah, Wadi Shija, Wadi Shuqub, 10 km W Al Qasab [14], Farasan Island [23], Ara'r [24], Al Aba Oasis, Dauhat al Musallamiya, Jubail, Ras al Abkhara [35], Riyadh Province [43].

**Recent records**: Al Qidiyah, Hail, Harrat Kishb, Harrat Khaybar, Ibex Reserve, Immam Turki Ben Abdullah Reserve, Qbah, Tabuk.

**Habitat and ecology**: The Dwarf Gerbil was collected from low sandy wadis with considerable salty nature in eastern Saudi Arabia. It was found coexisting with either one of the large-sized jirds, *M. crassus* or *M. libycus* [54]. It was one of the most common species in Saja/Umm Ar-Rimth Protected Area, and was trapped along with *M. crassus, M. libycus, G. cheesmani,* and *J. loftusi* [11]. Activity is at its maximum two hours after dusk [7].

**Biology**: This is a herbivorous species feeding also on seeds and buds of species of grasses. temperature. First pregnancies were observed in late spring [17]. Litter size ranges from 2-5.

***Gerbillus poecilops* Yerbury and Thomas, 1895.**

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**Common name**: Large Aden Gerbil
**Global distribution**: Yemen and southwestern Saudi Arabia.
**Distribution in Saudi Arabia**:
**Previous records**: Mecca bypass, Wadi Uranah [31], Al Hadda [55].

**Habitat and ecology**: Very little is known about the ecology of this species in Saudi Arabia. It was trapped from cultivated fields and was found along coastal mountains in the Red Sea as well as sandy deserts within the vicinity of inhabited areas. It was found in farms cultivated with cotton and sorghum as well as buildings within farms in Yemen [27].

**Biology**: The Large Aden Gerbil feeds on various vegetable matter [2]. Very little is known on the breeding biology of this species, it may breed in spring and summer.

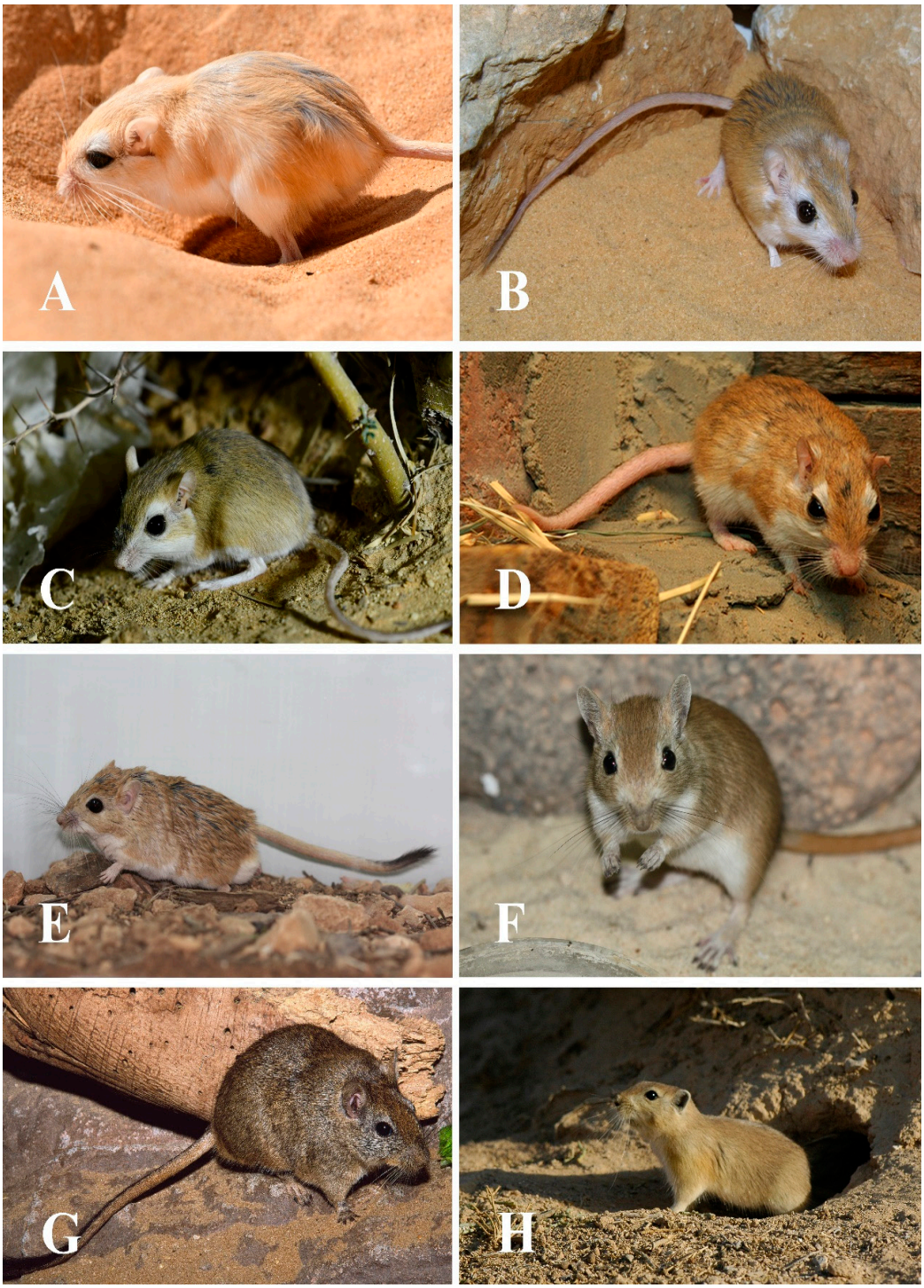

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**Figure 2.** A. Gerbillus cheesmani. B. Gerbillus henleyi (Photo by M. Abu Baker). C. Gerbillus nanus. D. Gerbillus poecilops (Photo by M. Jordan). E. Meriones crassus. F. Meriones libycus. G. Meriones rex (Photo by R. Wirth). H. Psammomys obesus (Photo by S. Al Jbour).

***Meriones crassus* Sundevall, 1842**

**Common name**: Sundevall's Jird

**Global distribution**: Across North Africa from Morocco through Niger, Sudan, and Egypt to Palestine, Jordan, Syria, Saudi Arabia, Iraq, Iran, and Afghanistan.

**Distribution in Saudi Arabia**:

**Previous records**: Ajibba, Balum wells, Gariya, Hafar Al Batin, Qunfidah, Rumaihiya [6], Summan Plateau [9], Harrat Al Harrah [10], Saja Umm Ar-Rimth [11,36], Turaif [12], Wadi As Sulai [13,22], Al Qasab, Dammam-Dhahran Rd., Hofuf, Jeddah, Nabhaniyah, Tumeir, Wadi Khumra, Wadi Shija [14], Ara'r [24], Al Daba'ah, Bsitah [25], Dauhat ad Dafi, Dauhat al Musallamiya, Hazim an Naquriya, Jubail, Ras al Abkhara [35].

**Recent records**: al Beda'a, Immam Turki Ben Abdullah Reserve, Luga, Maqna, Neom, Sharma, Tabuk.

**Habitat and ecology**: This is one of the most common jirds inhabiting the dry and arid habitats of Saudi Arabia. Büttiker & Harrison [14] indicated that sabkhas and alluvial wadi beds with relatively rich vegetation as favourite habitats for this species This is a colonial species with extensive burrow system. Abu Dieyeh [56] described the burrow system of the Sundevall's Jird in Jordan. The burrow has elaborate tunnels that may reach several meters with several food and nesting chambers. Burrows are located among silty flat areas with ample vegetation around such as *Rhanterium epapposum* [6].

**Biology**: It feeds on a variety of food items including desert plants, seeds (Medicago sp.), animal dung and insects such as locusts [57]. This is a diurnal species, but may also forage at night. In Saudi Arabia, many remains were found in pellets of the Pharaoh Eagle Owl, *B. ascalaphus* and possibly the Omani owl, *S. butleri* and the Barn Owl, *T. alba* [9,22]. Breeding occurs during the cooler months, but may breed all year round, producing up to three litters a year. Litter size is around 3 to 7 young [58].

***Meriones libycus* Lichtenstein, 1823**

**Common name**: Libyan Jird

**Global distribution**: North Africa to Egypt, through Saudi Arabia, Jordan, Iraq, Syria, Iran, Afghanistan, and into S Turkestan to W China.

**Distribution in Saudi Arabia**:

**Previous records**: Adwa, Anaiza, Artawiya, Hafr Al Batin, Rumaihiya [6], Summan Plateau [9], Harrat Al Harrah [10], Saja Umm Ar-Rimth [11], Turaif [12], Wadi As Sulai [13,22], Al Khardj, Hofuf, Thamamah, Wadi Khumra [14], Ara'r [24], Abu Hadriya, Dauhat al Musallamiya, Jubail, Ras al Abkhara [35], Riyadh Province [45].

**Recent records**: Hail, Immam Turki Ben Abdullah Reserve, Luga, Taif.

**Habitat and ecology**: The Libyan Jird is a common colonial species in north-central and north eastern Saudi Arabia. Burrows are constructed in sand-silty hillsides near bushes around wadi beds. It forms extensive burrow systems that consist of many openings, a nest and food chambers [26]. Atallah [59] reported that it feeds on *Citrullus coloycnthis*, while Vesey-Fitzgerald [6] stated that it excavates and feeds on Iris bulbs. This is a nocturnal species; however, it may appear during daytime.

**Biology**: In Saudi Arabia, remains of this species were found in pellets of the Pharaoh Eagle Owl, *B. ascalaphus* and possibly the Omani owl, *S. butleri* and the Barn Owl, *T. alba* [9,22,24]. Females give birth to 2-4 young [60]. Newborns were observed in March.

**Remarks**: listed as *Meriones erthrourus* Gray by Vesey-Fitzgerald [6].

***Meriones rex* Yerbury and Thomas, 1895**

**Common name**: King Jird

**Global distribution**: Yemen and southwestern Saudi Arabia.

**Distribution in Saudi Arabia**:

**Previous records**: Hijla [6], Al Dalhan, Wadi Turabah [14], Raydah Protected Area [20], Al Baha, Taif, Wadi Dalaghan [24], Alogl, Wosanib [62], Ash Sharayi, Dailami, Shaib Hanjur [61], Abha, Kamis

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Mushayat, Sarhan, Wadi Bin Hashbal [63], Najran [64], Wadi Bin Hashbal, Wadi Dalaghan [65], Taif [66].

**Recent records**: Abha, Al Azizah, Wadi Eia.

**Habitat and ecology**: This is an endemic species confined to Yemen and south-western Saudi Arabia. It was found in large burrows under trees in areas on the border between desert and agricultural land [24]. It shares burrows with *A. dimidiatus* and *Gerbillus* spp. It seems to be very common in cultivated and uncultivated areas and forms large colonies [6]. Specimens were taken from altitudes ranging from 1350-2200 m a.s.l. [14].

**Biology**: The King Jird is active during evening and early morning hours, where it was observed feeding on shoots. It feeds on *Salvadora persica*. The locomotory activity patterns of the King Jird was studied under controlled condition [20]. Several studies investigated the ectoparasites associated with this species; Al Khalili [32] recovered *Xenopsylla brasiliensis, S. tripectinata, R. sangeinius* and *Haemaphysalis* sp., while Al Mohammed [65] found *Xenopsylla astia, Ctenocephalides arabicus, and Ornithonyssus bacoti and Androlaelaps tateronis, P. chephrensis, Synosternus cleopatrae, Xenopsylla conformis mycerini, Xenopsylla nubica, Hyalomma impeltatum,* and *Rhipicephalus camicasi* were collected by Harrison et al. [66].

***Psammomys obesus* Cretzschmar, 1828**

**Common name**: Fat Sand Rat

**Global distribution**: In North Africa from Algeria through Tunisia and coastal region of Egypt into Syria, Jordan, Palestine, and parts of Arabia, also on the coast of Sudan.

**Distribution in Saudi Arabia**:

**Previous records**: Hail, Median Saleh [6], Wadi As Sulai [22], Abqaiq, Nabek [24], Riyadh Province [45], Dailami [55], Safaha Desert, near Hail [61], Tabuk [67].

**Habitat and ecology**: The Sand Fat Jird is a colonial species forming large colonies constructed close to *Anabasis* sp. shrubs. The ecology of this species was studied by Amr and Saliba [48], where they reported on its diurnal activity, feeding habits, burrow system and association with other animals. In Saudi Arabia, it was found in gravelly deserts and avoids rocky areas.

**Biology**: This is a strictly diurnal species that can be observed near the burrow opening. Gestation period may last for 23-25 days, and females give birth to 2-8 young [60].

**Remarks**: the Saudi subspecies *Psammomys obesus dianae* was described from Dailami [55].

***Sekeetamys calurus* (Thomas, 1892)**

**Common name**: Bushy-tailed Jird

**Global distribution**: From E Egypt through Sinai, S Palestine and Jordan into Central Saudi Arabia.

**Distribution in Saudi Arabia**:

**Previous records**: Jabal Banban, Wadi Khumra [14], Wadi As Sulai [22], Tuwaiq Mountains 36km SW Riyadh [68].

**Recent records**: Hail, Neom, Majama' Al Hadab.

**Habitat and ecology**: This species prefers to live around mountain slopes in arid regions. It is a good climber and perhaps lives under boulders. Specimens were collected from a rocky ledge on the eastern side of the Tuwaiq mountains and were found associated with *A. dimidiatus* and *G. nanus* [68].

**Biology**: The Bushy-tailed Jird is a nocturnal species with very little knowledge on its biology. Specimens from Saudi Arabia in February were pregnant with three embryos [68]. In Palestine, it was found to be in breeding condition in February and March [57]. In captivity, a female gave birth to four offspring [68]. Vegetation observed near its burrows includes the Wild Fig, *Ficus pseudo-sycomorus*. Osborn and Helmy [60] included many desert plants as part of its diet (*Zilla spinosa, Citrullus colocynthis* etc.). It subsists on dry vegetation, seeds, and arthropods [69]. Remains of this jird were found in *Vulpes cana* faecal remains [70]. In Saudi Arabia, remains were found in pellets of the Pharaoh Eagle Owl [22].

**Subfamily Murinae**

Species of this subfamily are characterized by having relatively long tails that is covered by scales with annuli. Tail does not terminate with a hair tuft. Four species have been confirmed to occur in

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Saudi Arabia, including three genera; *Rattus*, *Mus* and *Myomyscus* while *Nesokia indica* was not listed until further investigation.

***Rattus rattus* (Linnaeus, 1758)**

**Common name**: Black Rat

**Global distribution**: All over the world.

**Distribution in Saudi Arabia**:

**Previous records**: Wadi As Sulai [13,22], Dammam Port, Hofuf, Jeddah, Riyadh [14], Al Aba Oasis [35], Wadi Hanifah [41], Aga, Alzobara, Barazan, Eljameayein, Elkhomashiya [43], Alous [62].

**Recent records**: Bani Malik, Farasan Island, Jabal Al Lith Island.

**Habitat and ecology**: This is a common species occurring in cities, villages and farming areas. Its populations are increasing rapidly in association with urban and agricultural expansion. The Black Rat successfully invaded remote areas in the country. This was facilitated by vehicles transporting animal feed and other agricultural crops.

**Biology**: Breeding takes place between March and November; three to five litters can be produced in a year, each litter containing 1 to 16 young. In Saudi Arabia, remains were found in pellets of the Pharaoh Eagle Owl, *B. ascalaphus* [22]. Al-Ahmed and Al-Dawood [41] collected *Xenopsylla* sp., and *Rhipicephalus turanicus* while El Bahrawy and Al Dakhil [39] recovered two fleas, *X. cheopis* and *C. felis* and one louse, *Polyplax spinulosa* parasitizing this species in the vicinity of Riyadh. At Al lith Island, it was found to feed on eggs of the vulnerable Sooty Falcons, *Falco concolor*, causing considerable decline in its population growth.

***Rattus norvegicus* (Berkenhout, 1769)**

**Common name**: Brown Rat

Global distribution: All over the world.

**Distribution in Saudi Arabia**:

**Previous records**: Dammam, Hofuf, Jeddah [14], Riyadh [39], Aga, Alzobara, Barazan, Eljameayein, Elkhomashiya [43].

**Recent records**: Taif, Al Khobar, Jazan port area.

**Habitat and ecology**: This rat inhabits urban areas, especially sea ports as well as farm lands or where there is fresh water (canals, sewers, etc.) possibly with muddy banks, where it is possible to build dens. It is not as common as the Black Rat. From Hail region, it seems common in farms and around human habitation [43].

**Biology**: El Bahrawy and Al Dakhil [39] recovered two fleas, *X. cheopis* and *C. felis* and one lice, *P. spinulosa* parasitizing this species in the vicinity of Riyadh.

***Mus musculus* Linnaeus, 1758**

**Common name**: House Mouse

**Global distribution**: Spread over the world's continents and islands (except Antarctica) through its close association with humans.

**Distribution in Saudi Arabia**:

**Previous records**: Harrat Al Harrah [10], Wadi As Sulai [13,22], Al Khardj, Al Khubra, Bani Sar, Buridah, Dammam, Hofuf, Jeddah, Riyadh, Wadi Turabah, [14], Bsitah [25], Abu Ali Island, Al Aba Oasis, Hazm an Nuquriya, Karan Island, Jana Island, Jubail, Ras al Abkhara [35], Alogl [62].

**Recent records**: Jazan.

**Habitat and ecology**: The House Mouse is a very successful species that is found in all types of habitats, including deserts. The House Mouse is commonly found in modern and old houses, shops, hotels, farms.

**Biology**: They breed about 12 times per year giving birth to about 5-8 new born each time. Within six weeks, the young's are able to reproduce. In Saudi Arabia, remains were found in pellets of the Pharaoh Eagle Owl, *B. ascalaphus* [22]. El Bahrawy and Al Dakhil [39] recovered two fleas, *X. cheopis* and *C. felis* and one lice, *P. spinulosa* parasitizing this species in the vicinity of Riyadh.

***Myomyscus yemeni* (Sanborn & Hoogstraal, 1953)**

**Common name**: Yemen White-footed Rat

**Global distribution**: N Yemen and SW Saudi Arabia.

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**Distribution in Saudi Arabia**:

**Previous records**: Al Haniq, Thamniyah [14], Wadi Dalaghan [16], Alogl, Wosanib [62], Asir National Park [71].

**Recent records**: Al Soudah, Raydah.

**Habitat and ecology**: This species is endemic to Yemen and south-western Saudi Arabia. Al-Khalili et al. [16] gave a comprehensive account on the ecology of the Yemen White-footed Rat. It was found at altitudes reaching 2100 m asl in areas covered by seasonal grasses such as Bromus spp., *Chrysopogon* sp., *Pennisefum* sp.) and with small trees of *Vachellia tebaica* and *Lycium shawii* shrubs [16]. Density estimates for this species ranged from 0.6- 4.49 individuals per hectare. Home range ranged from 1375-1700 m$^2$.

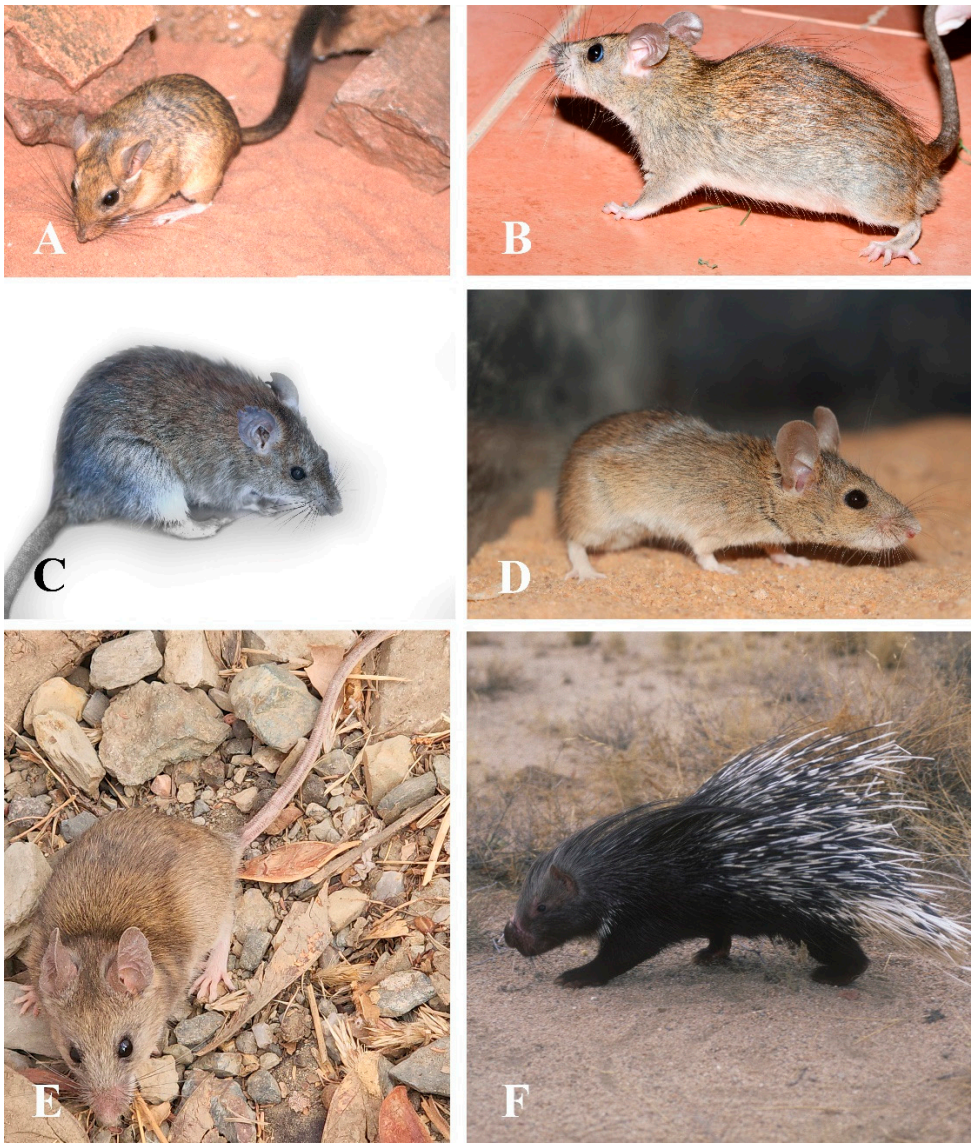


**Figure 4.** A. Sekeetamys calurus (Photo by M. Abu Baker). B. Rattus rattus. C. Rattus norvegicus. D. Mus musculus. E. Myomyscus yemeni (Photo by C. Bocos). F. Hystrix indica.

**Biology**: Khalili et al. [16] gave a comprehensive account on the biology of this species in Wadi Dalaghan in the Al Sarawat Mountains. Pregnancy was found to occur in December to March and from May and October; Lactating females were observed in April and June. Number of embryos ranged 4-6. This species was found to feed on a variety of items including leaves, shoots, buds and seed, as well as insects, spiders, spiny mouse of the genus *Acomys*, lizards and Savigny's green tree frog *Hyla savignyi*. The ectoparasites recorded from this species include *X. conformis* and *R. sanguineus*

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[16]. Stekolnikov et al. [44] described a new species of chigger mites, *Schoutedenichia asirensis*, from the Yemen White-footed Rat, in addition to other species.

**Remarks**: This species was previously listed as a subspecies of the African species *Praomys fumatus* i.e. as *Praomys fumatus yemeni*.

**Family Hystricidae**

This family includes the Old World porcupines. The head and neck are covered with a crest of long bristles. The dorsal side is covered with spines of various sizes. Porcupines are nocturnal animals that feed entirely on roots, bulbs and other cultivated crops.

***Hystrix indica* Kerr, 1792**

**Common Name**: Indian Crested Porcupine

**Global distribution**: Transcaucasus; Turkey; Arabia to S Kazakhstan and India; Sri Lanka; Tibet.

**Distribution in Saudi Arabia**:

**Previous records:** Harrat Al Harrah (Spines) [10], Turaif [12], between Abha-Al Darb, Al Qarrah, Khulays, Qalat Al Muazzam, Taif, Wadi Amag, Wadi Habagah, Wadi Hiswa, Wadi Hizma, Wadi Turabah [14], Jabal Shada [24], Median Salih [72], Summan [73], Abha, Al Masgi, Qunfuda, Riyadh, Tanuma [74].

**Recent records**: Al Baha, Al Khunfa, Al Juf, An Namas, Al Sarhan, Raydah, Rijal Alma'a, Wadi Arsha, Wadi Eia.

**Habitat and ecology**: The Indian Crested Porcupine favours rocky habitats with boulders and large and deep cervices. It lives in a wide variety of habitats, ranging from arid to humid areas in south-western Saudi Arabia. It occurs in Asir and Hijaz mountains in elevations reaching 1400-1450 m a.s.l. [14]. It shelters in wadis of rocky nature and may live in small caves or in constructed burrows. *Hystrix indica* is a generalist, adaptable animal with a wide range of distribution. It also frequents farmlands in the vicinity of human habitations. It is found in relatively high numbers in groups of four individuals in An Namas. They are active after dusk [75].

**Biology**: The Indian Crested Porcupine is a colonial animal. A female gives birth to 2-4 young. Kingdon [29] observed the courtship behaviour of *H. indica*, the female initiate courtship by moving closer towards the male in a proactive posture with the quills laid flat. They forage at night and can travel long distances away from their retreat.

### *3.2. Zoogeographical affinities of the rodents of Saudi Arabia*

The zoogeography of the mammals of the Arabian Peninsula was presented by Delany [76]. His discussion was based on distributional data before 1989 (Table 2). Recent studies expanded known range for several species that by now allow us to discuss in detail the zoogeographic affinities of the rodents in Saudi Arabia.

Three species, *G. nanus, M. crassus* and *M. libycus*, representing 15% of the rodents of Saudi Arabia have a wide range of distribution throughout the Afrotropical-Palaearctic–Oriental range. Three species (15%) are endemic to Saudi Arabia and Yemen i.e. *G. poecilops*, *M. rex* and *M. yemeni*, while six species (30%), have Afrotropical - Palaearctic affinities (Table 1). Four species (20%) are considered of Palaearctic affinities i.e. *J. loftusi, S. euphratica*, *G. cheesmani* and *G. dasyurus*. The Indian Crested porcupine is the only representative of Palaearctic-Oriental affinity. Three species are known as cosmopolitan species, i.e. *R. rattus, R. norvegicus*, and *M. musculus*.

**Table 1.** Zoogeographical affinities of the rodents of Saudi Arabia.

| Species | Present study | Delany [76] |
|---|---|---|
| *Eliomys melanurus* | Afr-Pal | Afr-Pal-Or |
| *Jaculus loftusi* | Pal | Afr-Pal |
| *Scarturus euphratica* | Pal | Not listed |
| *Gerbillus cheesmani* | Pal | Pal |
| *Gerbillus dasyurus* | Pal | Pal |

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| | | |
|---|---|---|
| *Gerbillus henleyi* | Afr-Pal | Afr |
| *Gerbillus nanus* | Afr-Pal-Or | Afr-Pal-Or |
| *Gerbillus poecilops* | Endemic | Endemic |
| *Meriones crassus* | Afr-Pal-Or | Afr-Pal |
| *Meriones libycus* | Afr-Pal-Or | Afr-Pal |
| *Meriones rex* | Endemic | Endemic |
| *Psammomys obesus* | Afr-Pal | Not listed |
| *Sekeetamys calurus* | Afr-Pal | Not listed |
| *Acomys dimidiatus* | Afr-Pal | Afr-Pal |
| *Acomys russatus* | Afr-Pal | Afr-Pal |
| *Mus musculus* | Cosmopolitan | Introduced |
| *Myomyscus yemeni* | Endemic | Endemic |
| *Rattus norvegicus* | Cosmopolitan | Introduced |
| *Rattus rattus* | Cosmopolitan | Introduced |
| *Hystrix indica* | Pal-Or | Pal-Or |

*3.3. Species richness of rodents in Saudi Arabia*

Figure 5 shows the species richness of the rodents across Saudi Arabia. The eastern central part of Saudi Arabia covering Tuwiq mountains plateau, including the vicinity of Riyadh, hosts the highest number of rodent species. This could be interpreted due to the several studies and collections made from this area. Also, it represents suitable habitats for several species of the genera *Acomys, Gerbillus, Meriones,* and *S. calurus* where it was found only from this area, as well as *J. loftusi*. It is followed by the southwestern region that includes three endemic species, however, with no occurrence of desert adapted species including sand and gravel dwellers (i.e. *G. cheesmani, G. henleyi, G. nanus, M. crassus*, and *M. libycus*).

The other parts of Saudi Arabia, hosts from 3-6 species, according to habitat types. One species, *A. dimidiatus*, stands to have a wide range of distribution that is associated with rocky and mountainous areas across the country. It was found along the Red Sea mountains, sandstone deserts and the Tuwiq mountains plateau. Commensal and/or cosmopolitan species are associated with human settlements and farming areas.

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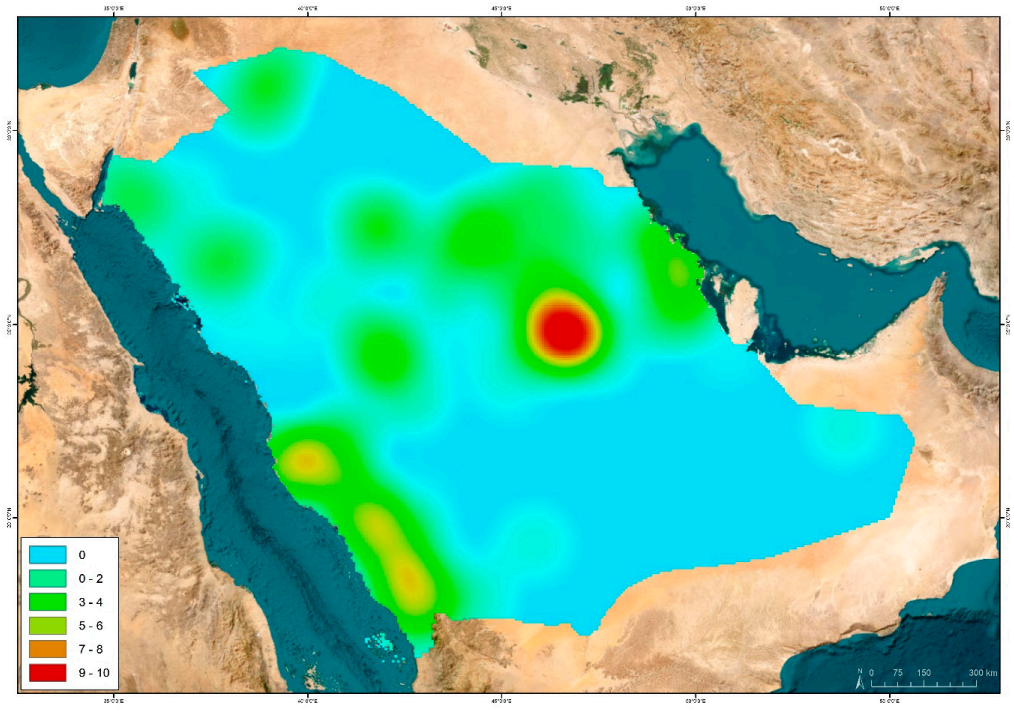


**Figure 5.** Heat map showing rodents species richness in Saudi Arabia.

*3.4. Conservation of rodents in Saudi Arabia*

Most rodent species of Saudi Arabia were listed as Least Concern according to the IUCN Red List in both the global and Mediterranean assessments [77], however, national assessment for the rodents of Saudi Arabia listed some species as Endangered for the Euphrates Jerboa, *S. euphratica*, and Near Threatened for the Indian Crested Porcupine, *H. indica*, and three species listed as Data Deficient, while the rest are considered as Least Concern (Table 3).

The Indian Crested Porcupine is considered as a delicacy and is used in traditional medicine in many parts of Saudi Arabia [78] and the Middle East. It is as being poached on a wide scale causing a drastic decline in its population. In addition, farmers consider it as pest that causes damage to crops. This species is in trade whereas animals are offered for sale in Taif local markets. Several violations were issued for poaching this species in Abha region. The Indian Crested porcupine is the only rodent species listed under the executive regulations for hunting wildlife organisms (No. 312179/1/1442). The fine for hunting *H. indica* is 70,000 SR (about 18,600 US$).

Populations of the Euphrates Jerboa, *S. euphratica,* are declining in Saudi Arabia and elsewhere within its distribution range. It is one of the main prey items for desert owls. Locals relish the meat of jerboas, but this is practiced at a low scale. This species should be included within the hunting list of prohibited species. In some parts of Saudi Arabia, *J. loftusi* is hunted and consumed as a food item. It is also sold in local markets and used as bait in falconry. Local markets should be monitored to reduce trade in this species. Falconers should be advised to abandon hunting using alive jerboas.

Habitat modifications and tourism in mountainous areas can pose a threat to *S. calurus*, which is known from few localities.

There are no major threats to the three cosmopolitan species; *M. musculus*, *R. rattus* and *R. norvegicus*. They are considered as a serious pest to agriculture and invade houses, farms, storage areas causing severe financial losses and associated with diseases transmission.

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**Table 3.** Conservation status of rodents in Saudi Arabia.

| *Species* | IUCN global assessment | IUCN Mediterranean assessment [77] | IUCN national assessment |
|---|---|---|---|
| *Eliomys melanurus* | LC | LC | LC |
| *Jaculus loftusi* | LC | LC* | LC |
| *Scarturus euphratica* | LC | NT | EN |
| *Gerbillus cheesmani* | LC | LC | LC |
| *Gerbillus dasyurus* | LC | LC | LC |
| *Gerbillus henleyi* | LC | LC | DD |
| *Gerbillus nanus* | LC | LC | LC |
| *Gerbillus poecilops* | LC | NA | DD |
| *Meriones crassus* | LC | LC | LC |
| *Meriones libycus* | LC | LC | LC |
| *Meriones rex* | LC | NA | LC |
| *Psammomys obesus* | LC | LC | LC |
| *Sekeetamys calurus* | LC | LC | DD |
| *Acomys dimidiatus* | LC | LC | LC |
| *Acomys russatus* | LC | LC | LC |
| *Mus musculus* | LC | LC | LC |
| *Myomyscus yemeni* | DD | NA | LC |
| *Rattus norvegicus* | LC | LC | LC |
| *Rattus rattus* | LC | LC | LC |
| *Hystrix indica* | LC | LC | NT |

Two of the endemic species, i.e. *M. yemeni* and *M. rex* are not threatened as seem to be abundant. On the contrary, little is known about *G. poecilops*, since it is known from limited localities.

## 4. Discussion

The present study documents the rodent fauna of the Kingdom of Saudi Arabia, with a total of 20 extant species. In comparison with the surrounding countries in the Arabian Peninsula, it is relatively high, with presence of three endemic species. Twenty-eight extant species of rodents have recorded from Iraq [79], 28 from Jordan [80], five from Bahrain [81], nine from Kuwait [82], four from Qatar [83], 10 from United Arab Emirates [84], 13 from Oman [27,85] and 20 from Yemen [86]. Higher number of rodents in Iraq and Jordan is due to the presence of voles, squirrels and temperate forests species of the genus *Apodemus*.

The status and biology of some endemic species in Saudi Arabia requires further investigation such as the Large Aden Gerbil, *G. poecilops.* Genetic variations among species with a wide range of distribution such as *A. dimidiatus*, *Eliomys melanurus* and *Gerbillus dasyurus* deserve closer investigation.

More efforts to protect *H. indica* and *S. euphratica* are among the highest priorities by authorities, and more enforcement is required to preserve this Near Threatened and vulnerable species respectively. On other hand, role of cosmopolitan species, which can sometimes become invasive, in diseases transmission should be addressed and control measures of environment-friendly methods should be adopted.

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**Data Availability Statement:** Data are presented in the study.

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**Conflicts of Interest**: The authors declare no conflict of interest.

## Appendix A

| Locality | N | E | Locality | N | E |
|---|---|---|---|---|---|
| Abha | 18° 14' | 42° 31' | Kamis Mushayat | 18° 18' | 42° 44' |
| Abqaiq | 25° 57' | 49° 41' | Karan Island | 27° 43' | 49° 50' |
| Abu Ali Island | 27° 20' | 49° 33' | Khulays | 22° 09' | 43° 55' |
| Abu Hadriya | 27° 05' | 49° 00' | Kushm Buwaybiyat | 25° 12' | 46° 52' |
| Adama | 19° 19' | 42° 04' | Kushm Dibi | 24° 18' | 46° 09' |
| Adnan | 20° 26' | 41° 31' | Luga | 29° 46' | 42° 38' |
| Adwa | 27° 20' | 42° 15' | Mahazat as-Sayd | 22° 14' | 41° 50' |
| Aga | 27° 26' | 41° 35' | Makkah-Lith | 21° 22' | 39° 38' |
| Ajibba | 27° 20' | 44° 20' | Maqna | 28° 24' | 34° 45' |
| Al Aba Oasis | 26° 42' | 49° 46' | Medain Salih | 26° 50' | 38° 00' |
| Al Arf | 22° 01' | 40° 55' | Mekka by pass | 21° 15' | 39° 42' |
| Al Azizah | 18° 13' | 42° 25' | Nabek | 24° 27' | 50° 49' |
| Al Baha | 20° 01' | 41° 28' | Nabhaniyah | 25° 51' | 43° 04' |
| al Beda'a | 28° 29' | 35° 02' | Najran | 17° 30' | 44° 20' |
| Al Daba'ah | 28° 44' | 37° 58' | Neom | 28° 05' | 35° 29' |
| Al Dalhan | 18° 01' | 43° 24' | Nuayriyah | 27° 32' | 48° 24' |
| Al Hadda | 21° 26' | 39° 35' | Qaisumah | 28° 20' | 46° 06' |
| Al Haniq | 19° 45' | 41° 57' | Qalat Al Muazzam | 27° 44' | 37° 30' |
| Al Jawf | 29° 52' | 39° 26' | Qasab | 24° 14' | 38° 53' |
| Al Khardj | 23° 55' | 47° 30' | Qbah | 27° 24' | 44° 20' |
| Al Khubra | 25° 05' | 43° 39' | Qubat Al Zbair | 24° 52' | 39° 56' |
| Al Khunfa | 28° 38' | 39° 19' | Qunfidah | 19° 09' | 41° 07' |
| Al Masgi | 17° 58' | 42° 52' | Quwaywiyah | 23° 27' | 44° 39' |
| Al Na'amah | 20° 14' | 41° 16' | Ras al-Abkhara | 27° 24' | 49° 14' |
| Al Qarrah | 18° 07' | 42° 42' | Ras az Zaur | 27° 29' | 49° 12' |
| Al Qasab | 25° 24' | 45° 47' | Raudha Tinhat | 26° 15' | 46° 00' |
| Al Saiyarat | 27° 10' | 44° 50' | Raydah Protected Area | 18° 11' | 42° 24' |
| Al Sarhan | 18° 16' | 42° 22' | Rijal Alma'a | 18° 09' | 42° 09' |
| Al Souda | 18° 15' | 42° 24' | Risayah | 18° 57' | 42° 11' |
| Al Thumamah | 25° 22' | 46° 36' | Riyadh | 24° 30' | 38° 49' |
| Al Uquar | 25° 39' | 50° 13' | Rumah | 25° 37' | 47° 07' |
| Al Wajh | 26° 20' | 37° 30' | Rumaihiya | 25° 30' | 47° 00' |

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| | | | | | |
|---|---|---|---|---|---|
| Alagan | 28° 23' | 36° 33' | Safaha Desert | 27° 19' | 42° 23' |
| Alogl | 18° 34' | 42° 32' | Saja/Umm Ar-Rimth | 22° 30' | 42° 28' |
| Alous | 18° 26' | 42° 30' | Salim | 23° 06' | 42° 18' |
| Alzobara | 27° 50' | 41° 70' | Sanam | 23° 42' | 44° 45' |
| An Namas | 19° 11' | 42° 19' | Sarhan | 18° 16' | 42° 22' |
| Anaiza | 26° 05' | 44° 03' | Sha'ib Al Shoki | 25° 42' | 45° 51' |
| Ar Rayn | 23° 32' | 45° 30' | Shaib al Tawqi | 25° 30' | 46° 33' |
| Artawiya | 26° 30' | 45° 30' | Shaib Hajlil | 27° 30' | 44° 30' |
| Ash Sharayi | 21° 40' | 40° 40' | Shaib Hanjur | 18° 15' | 42° 45' |
| Asir National Park | 18° 12' | 42° 29' | Sharma | 28° 01' | 35° 13' |
| Athnen | 18° 46' | 42° 16' | Shaybah | 22° 32' | 53° 58' |
| Bahara | 21° 23' | 39° 27' | Summan Plateau | 27° 00' | 47° 00' |
| Balum wells | 27° 15' | 44° 00' | SW Al Ula | 26° 38' | 37° 54' |
| Bani Musayqirah | 20° 21' | 44° 30' | Tabuk | 28° 23' | 36° 36' |
| Bani Sar | 20° 08' | 41° 45' | Taif | 21° 15' | 40° 21' |
| Barazan | 27° 52' | 41° 70' | Tala'a | 18° 04' | 43° 57' |
| between Abha-Al Darb | 18° 01' | 42° 25' | Tanomah | 18° 55' | 42° 09' |
| Birka | 27° 30' | 44° 30' | Thamami wells | 27° 40' | 45° 00' |
| Bsitah | 30° 44′ | 38° 31′ | Thamniya | 18° 01' | 42° 45' |
| Buridah | 26° 20' | 43° 59' | Todiah | 24° 12' | 48° 03' |
| Dailami | 20° 20' | 42° 40' | Tumeir | 25° 43' | 45° 51' |
| Dammam-Dhahran Rd. | 26° 16' | 49° 59' | Turaif | 31° 39' | 38° 39' |
| Dar el Harma | 26° 50' | 38° 20' | Tuwaiq Escarpment | 24° 23' | 46° 30' |
| Dauhat ad Dafi | 27° 03' | 49° 24' | Umm Ad Dabah | 23° 47' | 45° 04' |
| Dauhat al Musallamiya | 27° 26' | 49° 12' | Uruq Bani Ma'arid | 19° 20' | 45° 54' |
| Dirab | 24° 29' | 46° 36' | Wadi Amag | 18° 40' | 42° 17' |
| Duba | 27° 21' | 35° 48' | Wadi Arsha | 19° 45' | 41° 36' |
| Eljameayein | 27° 29' | 41° 41' | Wadi As Sulai | 24° 36' | 46° 55' |
| Elkhomashiya | 27° 28' | 41° 42' | Wadi Awsat | 24° 18' | 46° 29' |
| Farasan Al-Kebir | 16° 42' | 41° 58' | Wadi Bin Hashbal | 18° 58' | 43° 06' |
| Farasan Island | 16° 44' | 41° 50' | Wadi Dalaghan | 18° 02' | 42° 50' |
| Fayfa | 17° 15' | 43° 06' | Wadi Eia | 18° 52' | 42° 28' |
| Gariya | 27° 35' | 47° 40' | Wadi Habagah | 29° 47' | 42° 40' |
| Hafir Kishb | 22° 49' | 41° 08' | Wadi Hanifah | 24° 35' | 46° 42' |
| Hafr Al Batin | 28° 12' | 46° 07' | Wadi Hiswa | 18° 15' | 42° 28' |
| Hail | 27° 31' | 41° 45' | Wadi Hizma | 18° 05' | 43° 56' |
| Hamid | 18° 48' | 42°56' | Wadi Hureimala | 25° 06' | 46° 05' |
| Harrart Al Harrah | 30° 56' | 39° 11' | Wadi Karj | 24° 21' | 47° 11' |
| Hazm al Faidah | 27° 17' | 49°1 0' | Wadi Karrar | 21° 18' | 40° 07' |
| Hazm an-Nuquria | 27° 18' | 49° 17' | Wadi Khumra | 24° 55' | 46° 11' |

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|---|---|---|---|---|---|
| Hesua | 18° 14' | 42° 22' | Wadi Liya | 21° 15' | 40° 20' |
| Hijla | 18° 15' | 42° 38' | Wadi Nissah | 24° 12' | 46° 04' |
| Hofuf | 21° 30' | 39° 12' | Wadi Qatan | 18° 07' | 44° 07' |
| Ibex Reserve | 23° 21' | 46° 26' | Wadi Rasid | 24° 17' | 46° 16' |
| Jabal Al Alam | 25° 36' | 41° 04' | Wadi Sanakhah | 18° 01' | 44° 07' |
| Jabal Al Aswad | 17° 39' | 42° 39' | Wadi Shaib Luha | 24° 25' | 46° 48' |
| Jabal Ammariyah | 24° 48' | 46° 14' | Wadi Sharayi | 21° 30' | 39° 55' |
| Jabal Banban | 25° 23' | 46° 36' | Wadi Shija | 24° 51' | 46° 10' |
| Jabal Farrash | 19° 37' | 43° 26' | Wadi Shuqub | 20° 40' | 41° 15' |
| Jabal Maniq | 24° 19' | 46° 07' | Wadi Sirhan | 18° 16' | 42° 22' |
| Jabal Shada | 19° 50' | 41° 18' | Wadi Thalham | 18° 24' | 44° 08' |
| Jabal Shar | 27° 23' | 35° 27' | Wadi Turabah | 20° 37' | 41° 17' |
| Jabal Thamamah | 25° 21' | 46° 51' | Wadi Uranah | 21° 21' | 39° 57' |
| Jana Island | 27° 22' | 49° 18' | Wadi Wajj | 21° 10' | 40° 16' |
| Jeddah | 21° 30' | 39°12' | Wosanib | 18° 34' | 42° 23' |
| Jizan | 16° 56' | 42°33' | | | |
| Jubail | 26°57' | 49° 34' | | | |

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