GSC Biological and Pharmaceutical Sciences

eISSN: 2581-3250 CODEN (USA): GBPSC2

Cross Ref DOI: 10.30574/gscbps

Journal homepage: https://gsconlinepress.com/journals/gscbps/

(RESEARCH ARTICLE)

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Assessing animal biodiversity in Nafud al-'Urayq natural reserve, Qassim region, Saudi Arabia: A preliminary study

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GSC Biological and Pharmaceutical Sciences, 2023, 25(02), 066–070

Publication history: Received on 07 September 2023; revised on 23 October 2023; accepted on 26 October 2023

Article DOI: https://doi.org/10.30574/gscbps.2023.25.2.0425

Abstract

Nafud al-'Urayq is a protected natural reserve, it is located in the arid zone in central Saudi Arabia's Qassim area, covering 2036.1 square kilometers, and gained protected status in 1995. Only during two months, we roughly documented the status of 15 species belonging to three major taxonomic classes of animals, which include reptiles, birds, and mammals, including the sand boa, the Saudi fringe-fingered lizard, the Arabian fringe-fingered lizard, and the Egyptian mastigure. Three mammal species were observed, namely the fennec fox, the sand cat, and the gerbil. Birds constituted the most diverse group, with a total of eight species recorded, including the hoopoe, lesser sand plover, Egyptian nightjar, Lanner falcon, Great bustard, Bonelli's eagle, Yemen serin, and the hoopoe lark. The study recommends further research to monitor and identify all vertebrates and invertebrates residing in the reserve due to the lack of precise data about them. The study also advises the preservation of the environment for these animals and the introduction of more wildlife into the reserve while considering ecological balance criteria.

Keywords: Wildlife; Animals; Reserves; Biodiversity; Saudi Arabia; Qassim

1. Introduction

Throughout history, human-wildlife interactions have been diverse and enduring, viewed from three main perspectives:

- Utilitarian: Focusing on the practical benefits of wild species, including food, clothing, transportation, tools, raw materials, and companionship;
- Affective: Involving emotional bonds with animals based on sentiments like sympathy, admiration, and respect, often stemming from religious, mystical, or philosophical beliefs, contributing to global cultural development; and
- Conflictive: Arising from real or potential harm caused by wildlife to human interests, leading to the historical and ongoing killing of animals in response to conflicts (Castillo-Huitrón et al., 2020).

Human well-being derives numerous benefits from natural ecosystems. These advantages encompass aesthetic and cultural enrichment, the delivery of vital ecological services, including climate regulation, soil development, and nutrient cycling, and the direct utilization of wild species for sustenance, energy, textiles, and pharmaceuticals. Despite mounting environmental challenges due to human activities, these advantages should serve as compelling motivations for the preservation of natural environments (Balmford et al., 2002). Recently, profound worldwide environmental alterations have led to unparalleled declines in biodiversity, as more than 28% of species, as evaluated by the International Union for Conservation of Nature (IUCN), now face the imminent risk of extinction (Huang et al., 2021).

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Saudi Arabia encompasses an expansive land area of approximately 1,969,000 square kilometers, representing a substantial portion of the Arabian subcontinent, constituting approximately two-thirds of its total expanse. The region is characterized by a spectrum of vital biological sites, including wide desert zones, freshwater wetlands, isolated mountain massifs, juniper woodlands, marine islands, sea grass beds, mangrove thickets, coral reefs, salt marshes, algal beds, acacia woodlands, rawdahs (meadows), and wadis (valleys). These key biological sites, often referred to as hotspots, stand as veritable bastions of biological diversity and productivity. Their collective significance lies in their integral role within the interdependent framework of associated ecosystems (Abuzinada et al., 2005). Within Saudi Arabia, a network consisting of 15 protected areas has been established, aligning with international standards, with the aim of safeguarding and promoting biodiversity (Abuzinada, 2003). The current study aimed to conduct an initial evaluation of the animal biodiversity inhabiting the protected area in the Qassim region of Saudi Arabia, specifically the Nafud al-Urayq Natural Reserve (URQ). To the best of our knowledge this is the first scientific study carried out in (URQ) reserve.

1.1. Study area

Nafud al-Urayq Natural Reserve is situated in the central region, southwest of Al-Qassim city (it's given code from the NCW is URQ). It covers an area of 2036.1 square kilometers and is characterized by its sandy gravel plains, along with some granite and basalt mountains (Figure 1). The reserve boasts a thriving plant cover, particularly conducive to the resettlement of certain bird species, notably the larks. Historically, the region has served as a sanctuary for almsgiving camels. Several factors, such as the presence of rich plant species like grasses, tamarisks, and acacias, in addition to the rugged terrain of the area, make it a suitable location for the resettlement of larks (NCW,2023). This area stands out for its rich vegetative cover, sand dunes, and rock formations that provide a suitable environment for various wildlife. Additionally, small lakes have formed in the region due to recent good rainfalls, particularly in the last three years.

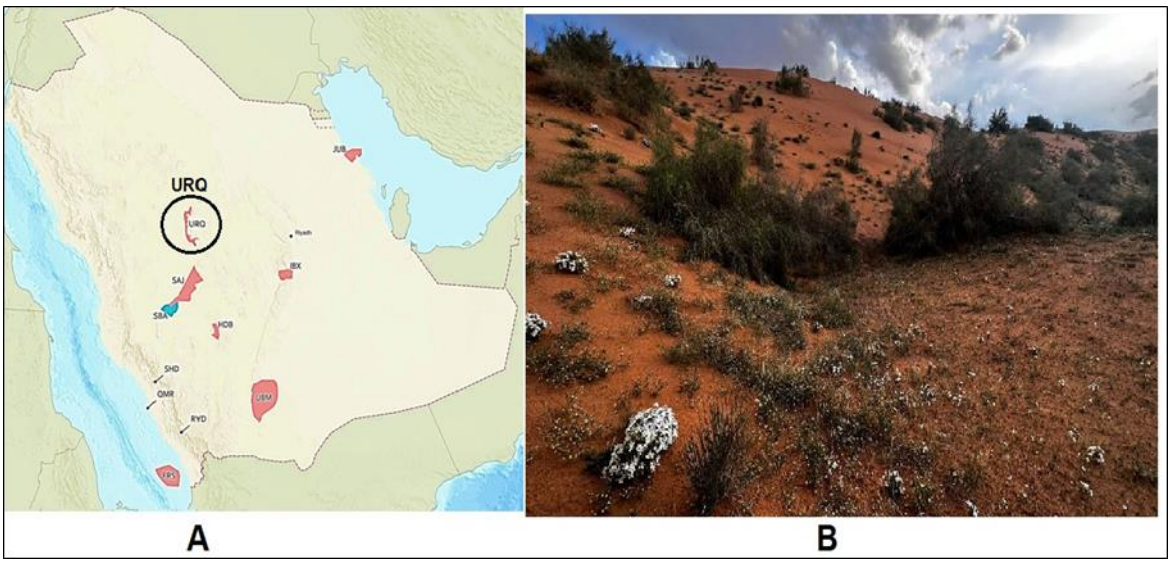

Figure 1 Location of Nafud al-Urayq Natural Reserve (URQ) in Saudi Arabia (A) and a view of a side of the URQ reserve (B)

2. Material and methods

The study was carried out in Nafud al-Urayq Natural Reserve (URQ) from April 2023 to May 2023. April and May in Saudi Arabia coincide with the spring season. During these two months, the weather is moderate and pleasant in most regions of the kingdom. Temperature varies depending on the specific area, but generally, daytime temperatures range from around 25 to 35 ^{o}C. Nights can be relatively cool, with nighttime temperatures ranging between 15 and 25 ^{o}C. Surveys were carried out in the morning from 5:00 am to 9:00 am. All observed animals were scientifically identified and documented, including their associated habitat types. Photographs of encountered animal species were taken using a camera, serving as a supplementary means for species identification when direct field identification was not feasible. Species identification was conducted by referencing field guides authored by (Porter and Aspinall, 2013; Powell et al., 2016; Wilson et al., 2011).

3. Results and discussion

The study revealed the presence of three major taxonomic groups of animals, which include reptiles, birds, and mammals. Among the reptiles, four species were identified: the sand boa, the Saudi fringe-fingered lizard, the Arabian fringe-fingered lizard, and the Egyptian mastigure. Three mammal species were observed, namely the fennec fox, the sand cat, and the gerbil. Birds constituted the most diverse group, with a total of eight species recorded, including the hoopoe, lesser sand plover, Egyptian nightjar, Lanner falcon, Great bustard, Bonelli's eagle, Yemen serin, and the hoopoe lark (Table 1).

Table 1 Animals observed during two months (April to May, 2023) in URQ reserve

No.	Common name	Scientific name	Family
1	Fennec Fox	*Vulpes zerda*	Canidae
2	Lynx can	*Felis Lynx*	Felidae
3	The desert monitor	*Varanus griseus*	Varanidae
4	Fringe-fingered lizard	*Acanthodactylus aegyptius*	Lacertidae
5	Arabian fringe-fingered lizard	*Acanthdactylus arabicus*	Lacertidae
6	Lesser Egyptian jerboa	*Jaculus jaculus*	Dipodidae
7	Egyptian mastigure	*Uromastyx aegyptius*	Agamidae
8	White stork	*Ciconia ciconia*	Ciconiidae
9	Lesser Sand Plover	*Charadrius mongolus*	Charadriidae
10	Egyptian vulture	*Neophron percnopterus*	Accipitridae
11	Steppe Eagle	*Aquila nipalensis*	Accipitridae
12	American Flamingo	*Phoenicopterus ruber*	Phoenicopteriformes
13	European Griffon Vulture	*Gyps fulvus*	Accipitridae
14	European turtle dove	*Streptopelia turtur*	Columbidae
15	Upupa epops	*Upupa epops*	Upupidue

We observed that, while there is substantial enthusiasm for wildlife in Saudi Arabia, there remains a need for increased scientific attention and research in this field. To the best of our knowledge, this is the first study on the wildlife of animals in the URQ reserve. A study published in 1996 showed that, the National Commission for Wildlife Conservation and Development initiated a sand gazelle conservation program, involving captive breeding, habitat protection, and reintroduction. The first reintroduction took place at Mahazat as-Sayd Protected Area in February 1990. By June 1993, 135 gazelles had been successfully relocated. While no mortalities occurred during translocation, 25 (15%) of the translocated gazelles died in pre-release enclosures, with 12 within two weeks of translocation (Haque and Smith, 1996). Therefore, the introduction of more wildlife into the reserve while considering ecological balance criteria.

Wildlife studies typically focus on population-level enumeration, resource use, and demographics. However, the role of individual animal personalities in preserving genetic diversity and influencing research outcomes, interpretation, and conservation actions is often need more interest by wildlife practitioners (Merrick and Koprowski, 2017). Finally, Conservation efforts needn't focus solely on rare species. There are alternative approaches: studying related species for experience, examining common but locally rare species, or identifying general principles applicable to broader conservation issues (Sutherland,1998). The promotion of administration, applications, and initiatives aimed at enhancing and diversifying reserves, akin to Yellowstone National Park in North America, is of paramount importance. It is imperative to pursue the expansion of natural reserves in the Kingdom of Saudi Arabia to align with international benchmarks for total natural reserve area. Furthermore, fostering collaboration with various media outlets to disseminate informative programs that emphasize environmental awareness, the significance of reserves, and sustainable development within society is essential (Al-Ziabi G.A.G, Al-Suqayr, 2020). Finally, bolstering cooperation between natural reserve administrations, universities, and national research centers is pivotal for the attainment of sustainable development milestones.

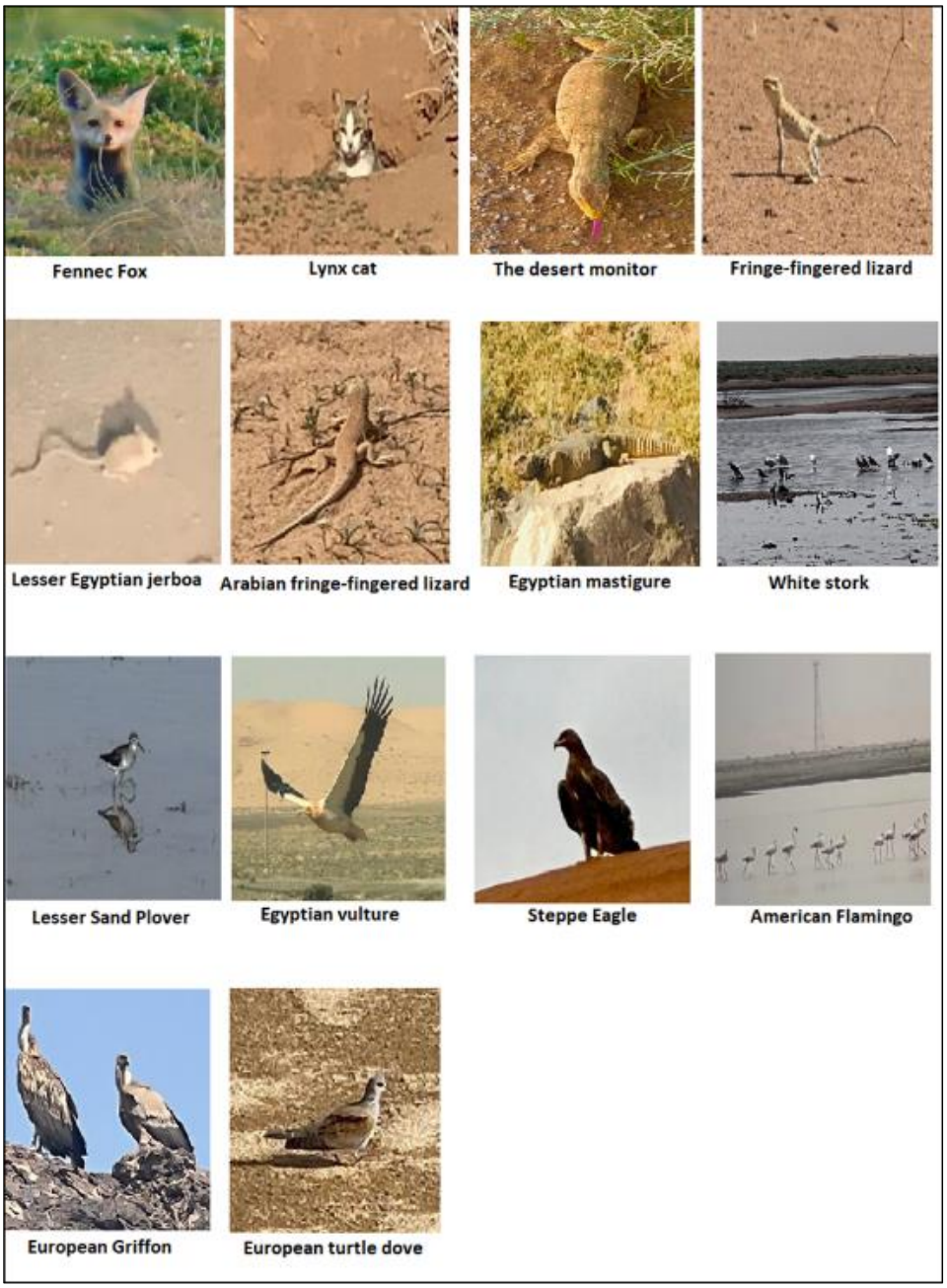

Figure 2 Various wildlife encountered at URQ reserve over a span of two months (from April 2023 to May 2023)

4. Conclusion

In conclusion, this study provides a preliminary snapshot of the biodiversity within Nafud al-'Urayq, a protected natural reserve in central Saudi Arabia's arid zone. The documented presence of 15 species from various taxonomic classes, including reptiles, birds, and mammals, underscores the ecological significance of this region. However, the limited timeframe of the study and the focus on only a subset of inhabitant animals highlight the need for comprehensive and ongoing research to better understand the full spectrum of both vertebrate and invertebrate species residing within the reserve. This knowledge gap calls for extended monitoring efforts and the implementation of rigorous biodiversity assessments to ensure the preservation of the entire ecosystem. Furthermore, as part of conservation efforts, it is imperative to maintain the integrity of the environment and ecosystem within Nafud al-'Urayq. This includes fostering an understanding of ecological balance and promoting practices that sustain and enhance the habitat for the resident wildlife. Additionally, considering the introduction of additional wildlife species into the reserve should be carried out cautiously, taking into account the ecological compatibility of such introductions. Overall, the study's findings offer a foundation for future research endeavors and conservation initiatives in Nafud al-'Urayq, emphasizing the importance

of sustained and comprehensive efforts to protect the unique biodiversity of this natural reserve while promoting ecological equilibrium.

Compliance with ethical standards

Acknowledgments

We would like to thank our supervisor, Prof. Dr. Emad M. Abdallah, for his great support and helpful guidance throughout the study. We would like also to thank Mr. Abdullah Mohammed Nukhailan ALHarbi, the officer of partnership and tourism in URQ reserve, and his colleagues to facilitate all our work in the reserve and help us monitor animals.

Disclosure of conflict of interest

There is no conflict of interest regarding this paper.

Availability of data and materials

The data and materials used to support the findings of this study are publicly available.

Author contribution

All author contributed significantly to design and development of this work

References

[1] Abuzinada, A. H., Al-Wetaid, Y. I., & Al-Basyouni, S. Z. M. (2005). The National Strategy for Conservation of Biodiversity in the Kingdom of Saudi Arabia. Prepared and issued by: The National Commission for Wildlife Conservation and Development. Conservation of Biological Diversity, Riyadh, Saudi Arabia.

[2] NCW (2023) National Center for Wildlife Available at: https://www.ncw.gov.sa/centers.html

[3] Merrick, M. J., & Koprowski, J. L. (2017). Should we consider individual behavior differences in applied wildlife conservation studies?. Biological Conservation, 209, 34-44.

[4] Sutherland, W. J. (1998). The importance of behavioural studies in conservation biology. Animal behaviour, 56(4), 801-809.

[5] Al-Ziabi G.A.G, Al-Suqayr A.R.A. (2020). Natural reserves and their role in promoting sustainable development from the perspective of employees of the Saudi Authority for Wildlife Development and those working in reserves: a comparative study. Naif Arab University for Security Sciences - College of Administrative Science. PhD. Thesis. Available at: https://repository.nauss.edu.sa/handle/123456789/66688

[6] Balmford, A., Bruner, A., Cooper, P., Costanza, R., Farber, S., Green, R. E., ... & Turner, R. K. (2002). Economic reasons for conserving wild nature. science, 297(5583), 950-953.

[7] Huang, G., Ping, X., Xu, W., Hu, Y., Chang, J., Swaisgood, R. R., ... & Wei, F. (2021). Wildlife conservation and management in China: achievements, challenges and perspectives. National science review, 8(7), nwab042.

[8] Abuzinada, A. H. (2003). The role of protected areas in conserving biological diversity in the kingdom of Saudi Arabia. Journal of Arid Environments, 54(1), 39-45.

[9] Castillo-Huitrón, N. M., Naranjo, E. J., Santos-Fita, D., & Estrada-Lugo, E. (2020). The importance of human emotions for wildlife conservation. Frontiers in Psychology, 11, 1277.

[10] Porter, R., & Aspinall, S. (2013). Birds of the Middle East. Bloomsbury Publishing.

[11] Powell, R., Conant, R., & Collins, J. T. (2016). Peterson field guide to reptiles and amphibians of eastern and central North America.

[12] Wilson, D. E., Wilson, D. E., & Mittermeier, R. A. (2011). Handbook of the mammals of the world, volume 2: hoofed mammals (p. 885). Barcelona, Spain: Lynx Ediciones.

[13] Haque, M. N., & Smith, T. R. (1996). Reintroduction of Arabian sand gazelle Gazella subgutturosa marica in Saudi Arabia. Biological Conservation, 76(2), 203-207.