## First record of *Paraechinus hypomelas* from the Prince Mohammed bin Salman Royal Reserve, Saudi Arabia (Eulipotyphla: Erinaceidae)

Ali AL FAQIH<sup>1</sup>, Salman AL ANAZI<sup>1</sup>, Usama GHAZALI<sup>1</sup> & Ehab EID<sup>2,\*</sup>

<sup>1</sup> Prince Mohammed bin Salman Royal Reserve Development Authority, Al-Wajh 43929,

Abdulla bin Abdul Aziz Street, Tabuk Governorate, Saudi Arabia

<sup>2</sup> IUCN SSC Steering Committee, Amman 11610, Jordan

\* corresponding author: info@pmbsr.gov.sa, eha\_jo@yahoo.com

received on 19 April 2024

**Abstract**. The first record of the Brandt's hedgehog (*Paraechinus hypomelas*) from the Prince Mohammed bin Salman Royal Reserve and new range extension of this species in Saudi Arabia are presented. The record was made in Bida (26.8478°N, 36.9064°E) on 12 February 2024. The morphological description, including body measurements, is provided in addition to the most up-to-date distribution map. Despite being classified in the "least concern" (LC) category of the IUCN Red List, very limited knowledge of its population trends, ecology, and distribution is available globally. This record contributes to making the distribution picture of the Brandt's hedgehog in Saudi Arabia more accurate and opens the opportunity of research of this species and threats impacting its populations.

Key words. Brandt's hedgehog, distribution, roadkill, Tabuk Region.

The Brandt's hedgehog, *Paraechinus hypomelas* (Brandt, 1836) is a Saharo-Arabian faunal element (YU-SEFI et al. 2019); it is considered a species of least concern in the global IUCN Red List and regionally at the level of the Arabian Peninsula with an unknown population trend (BHATTACHARYYA et al. 2017, MALLON et al. 2023). The species is distributed in the desert regions of the Middle East and Central Asia (HARRISON & BATES 1991, ROBERTS 1997, HABIBI 2004, YUSEFI et al. 2019). In Arabia, its records have been confirmed from the southwestern part of Saudia Arabia, from Oman, Yemen, and the United Arab Emirates (BHATTACHARYYA et al. 2017), and recently from the Kurdistan region of northeastern Iraq (AL-SHEIKHLY et al. 2024).

In Saudi Arabia, *Paraechinus hypomelas* seems to be limited to the Sarawat and Hijaz mountains, as it was recorded from the northern part of the Jazan Province to the Al Madinah Province, according to MALLON et al. (2023). Additional findings include an individual of *P. hypomelas* which was collected in Taif in October 2014 where it was to be sold in the local animal market, and another specimen captured in a rodent trap east of Jeddah in October 2016. A third record of two specimens caught using Sherman traps in a cultivated field was obtained east of Sabya, southern Saudi Arabia, in October 2022 (our own data).

A limited knowledge is available on the ecology and population structure and trends of *P. hypomelas* globally and in Saudi Arabia particularly. However, it is mainly a nocturnal solitary animal that changes its shelters throughout the year, it hides under overhanging ledges, in crevices between rocks, and occasionally in burrows; it occurs in the dry steppe of semi-desert and desert habitats (BEST 2018). Although it is primarily insectivorous, it is a voracious feeder preying on a wide range of food, including snakes,

doi: 10.37520/lynx.2024.012

scorpions, beetles, desert locusts, and several other invertebrate species, eggs of ground-nesting birds, and fruits (MALLON et al. 2023). The average lifespan of *P. hypomelas* is three years (BEST 2018).

Here, we provide additional data on the distribution range and morphological measurements of *P. hypomelas* from Saudi Arabia. A roadkill individual was found in farmland in Bida located within the Prince Mohammed bin Salman Royal Reserve (PMBSRR). The reserve is located in the northwest of the Kingdom of Saudi Arabia and covers an area of 24,500 km<sup>2</sup> (ELARD 2022). Bida experiences a desert climate, with an extremely hot summer, daily temperatures often exceeding 40 °C, and milder winter, with temperatures in the range of 10–20 °C, rainfall is minimal and sporadic, mainly during winter. The vegetation in Bida is primarily represented by drought-resistant plants such as the acacia tree (*Vachellia tortilis*), doum palm (*Hyphaene thebaica*) and *Maerua crassifolia* associated with desert shrubs such as the Rimth saltbush (*Haloxylon salicornicum*), harmal (*Rhazya stricta*), giant milkweed (*Calotropis procera*) and karira (*Capparis decidua*).

The roadkill specimen is a female found in Bida (26.8478°N, 36.9064°E) at 350 m a. s. l. on 12 February 2024 around 10:30 am. It shows a striking dark pelage colouration of the dorsum and a dark grey abdomen. The face is entirely dark, with a mixture of dark grey and black hairs, the ears are large and protrude beyond the adjacent spines. The throat has an admixture of few creamy-white hairs. The legs are long with dark pads, and the spines have black tips and bases (Fig. 1). The obtained external measurements of the individual are as follows: head and body length 226 mm, tail length 320 mm, ear length 360 mm, forearm length 270 mm, hindfoot length 320 mm, spine lengths <36 mm. It was not possiblet to get the weight of the specimen as decomposition had begun, but the specimen size is generally larger than that of the desert hedgehog, *Paraechinus aethiopicus* (Ehrenberg, 1832).

The PMBSRR is characterized by hot, dry weather, minimal rainfall, and low humidity levels, creating conditions suitable for desert-adapted vegetation types, to which many species have adapted (AL-GHAMDI 2018, AL-AMRI 2019). While several mammalian species have been documented in the reserve through systematic baseline studies and the recording of roadkill specimens, until recently, only one species of



Fig. 1. Roadkill individual of the Brandt's hedgehog (*Paraechinus hypomelas*) found in Bida, Prince Mohammed bin Salman Royal Reserve, Saudi Arabia. Photo by Ali AL FAQEH.



Fig. 2. The distribution range of the Brandt's hedgehog (*Paraechinus hypomelas*) and its known records worldwide, in Saudi Arabia including the new record from Prince Mohammed bin Salman Royal Reserve (inset).

hedgehog, *P. aethiopicus*, was commonly encountered and considered widespread. The record of *P. hypomelas* is a notable addition to the fauna of the PMBSRR that enhances our understanding of its presence in Saudi Arabia and globally.

Our finding underscores the significance of ongoing field surveys and careful species observation. Previous encounters with this species might have been overlooked due to misidentification with the other hedgehog species. The cryptic behavior and rarity might also explain this delayed recording. However, this record is considered significant as it paves the way for in-depth exploration of the species distribution, population dynamics, and potential threats, including those stemming from human activities. It also invites investigation of interactions with other species, like the desert hedgehog, including competition for niches and resources.

There have been limited records of *P. hypomelas* in Saudi Arabia, primarily documented in the northern region spanning from Jazan to Al Madinah (MALLON et al. 2023, own data). Our record in the PMBSRR aligns with previous findings, especially considering the similar geography and climate to the Al Madina region where this species has been documented (Fig. 2). The PMBSRR in the Tabuk and Al Madina Provinces experiences a hyper-arid climate and additionally, the soil composition in Bida comprises mainly clay and loose soil, which matches the preferred habitat that HABIBI (2004) identified for this species.

Despite the limited understanding of the threats to *P. hypomelas* in the PMBSRR, surveys conducted in the Bida area have confirmed habitat loss and fragmentation. These are primarily attributed to land clearance for farming, with over 120 farms existing in the area, over-pumping of groundwater, road construction, off-road activities, presence of invasive species, uncontrolled grazing pressure, and human-induced fires (TAUCHER et al. 2020, GHAZALI et al. 2024). Failure to address these threats could result in desertification,

identified by BHATTACHARYYA et al. (2017) as the primary global factor contributing to the population fragmentation of *P. hypomelas*.

Predation by feral dogs and cats poses a significant threat to young or injured hedgehogs (REEVE & HUIJ-SER 1999). Additionally, trade-related risks are evident, as exemplified by the specimen found in the Taif market (own data), highlighting the challenge of public awareness regarding hedgehog conservation. This trade is linked to zootherapy practices, the hedgehog meat, skin, and spines is used for various purposes. Furthermore, investigating the genetics of *P. hypomelas* in the PMBSRR could uncover adaptations in response to the local arid environment.

In conclusion, the record of *P. hypomelas* in the PMBSRR marks a notable extension of its documented range in Saudi Arabia, underscoring the value of continuous field surveys and species monitoring. Nonetheless, additional research is needed to enhance our understanding of this species in Saudi Arabia and worldwide, filling critical knowledge gaps.

## Acknowledgements

The authors thank all Prince Mohammed bin Salman Royal Reserve Development Authority members for their hard work and dedication to the conservation of species and ecosystems.

## REFERENCES

- AL-AMRI N. S., 2019: Climatic features and vegetation cover of Tabuk Region, Saudi Arabia. International Journal of Climate Change Strategies and Management, 11: 651–664.
- AL-GHAMDI A. S., 2018: The geomorphology of Medina Region, Saudi Arabia: A brief review. *Journal* of Geography, Environment and Earth Science International, **14**(2): 1–15.
- AL-SHEIKHLY O. F., AHMED S. H., MAJEED S. I., KRYŠTUFEK B., YUSEFI G. H. & ARARAT K., 2024: Brandt's hedgehog, *Paraechinus hypomelas* (Brandt, 1836), new to the mammal fauna of Iraq. *Mammalia*, 88: 133–138.
- BEST T. L., 2018: Family Erinaceidae (Hedgehogs and gymnures). Pp. 288–330. In: WILSON D. E. & MIT-TERMEIER R. A. (eds.): *Handbook of the Mammals of the World. 8. Insectivores, Sloths and Colugos.* Lynx Editions, Barcelona, 709 pp.
- BHATTACHARYYA T., SRINIVASULU C. & MOLUR S., 2016: Paraechinus hypomelas (errata version published in 2017). The IUCN Red List of Threatened Species 2016: e.T40610A115174910. https://dx.doi. org/10.2305/IUCN.UK.2016-3.RLTS.T40610A22326573.en. Accessed on 13 February 2024.
- ELARD, 2022: Restoration, Reintroduction, Rewilding Strategy at Prince Mohammed bin Salman Royal Reserve. ICS & Biodiversity by Design.
- GHAZALI U., EID E., AL-FAQIH A. & AL ANAZI S., 2023: Doum Palm (Hyphaene thebaica) Distribution and Assessment in Bida Area at Prince Mohammed bin Salman Royal Reserve Development Authority. Unpubli. report, 64 pp.

HABIBI K., 2004: Mammals of Afghanistan. Zoo Outreach Organisation/USFWS, Coimbatore, 168 pp.

- HARRISON D. L. & BATES P. J. J., 1991: *The Mammals of Arabia*. Harrison Zoological Museum, Sevenoaks, 354 pp.
- MALLON D. P., HILTON-TYLOR C., AMORI G., BALDWIN R., BRADSHAW P. L. & BUDD K., 2023: *The Con*servation Status and Distribution of the Mammals of the Arabian Peninsula. IUCN & Environmental and Protected Areas Authority, Gland & Sharjah, vii+152 pp.
- REEVE N. J. & HUIJSER M. P., 1999: Mortality factors affecting wild hedgehogs: A study of records from wildlife rescue centres. *Lutra*, **42**: 7–24.
- ROBERTS T. J., 1997: The Mammals of Pakistan. Oxford University Press, Karachi, 552 pp.
- TAUCHER A. L., GLOOR S., DIETRICH A., GEIGER M., HEGGLIN D. & BONTADINA F., 2020: Decline in distribution and abundance: urban hedgehogs under pressure. *Animals*, **10**(9; 1606): 1–22.
- YUSEFI G. H., FAIZOLAHI K., DARVISH J., SAFI K. & CAR J., 2019: The species diversity, distribution, and conservation status of the terrestrial mammals of Iran. *Journal of Mammalogy*, 100: 55–71.