

REDISCOVERY OF THE PALE FOX (*VULPES PALLIDA* CRETZSCHMAR, 1827) IN ALGERIA: FIRST CONFIRMED RECORD IN OVER FIFTY YEARS AND ASSESSMENT OF ITS CURRENT DISTRIBUTION

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Boulaouad, B.A., Ayyach, K., Harzallah, B., Belkacem, M., Missoum, M., Hadj Aissa, D., Attouche, K., De Smet, K. 2024. Rediscovery of the pale fox (*Vulpes pallida* Cretzschmar, 1827) in Algeria: First confirmed record in over fifty years and assessment of its current distribution. *Zoology and Ecology* 34(2), 140–143. <https://doi.org/10.35513/21658005.2024.2.7>

Article history

Received: 11 July 2024;
accepted: 21 October 2024

Keywords:

Mammalian inventory;
Algeria; African sand fox
Vulpes pallida; Mammalia;
Tawandert; update status

Abstract. The pale fox, *Vulpes pallida*, is a relatively elusive small carnivore sparsely distributed across the Sahel region in Africa. In this report, we document a new locality record of this species in Algeria, where its presence has remained unconfirmed for over fifty years. Using camera traps, we captured photographic evidence of the species in the extreme southern region of Algeria, specifically in the Tin Zaouatin area. A mix of camera traps were deployed at different locations in the region, operating during the night. The area's climate is classified as hot desert, with vegetation in the Tawandert Valley predominantly consisting of Sahelian plants, such as *Acacia* and *Balanites*. This record marks the first officially documented occurrence of the pale fox in Algeria and represents the northernmost boundary of the species' geographic distribution.

INTRODUCTION

Given its expansive territory in Africa and its position as the largest country in the Mediterranean basin, Algeria encompasses two biogeographic regions: the northern part belonging to the Palearctic region and the southern part to the Afrotropical region. Despite its extensive size and the diversity of biogeographic zones, biodiversity in Algeria has been insufficiently studied. The Sahara Desert in Algeria encompasses over 4/5 of the country's total land area. The southernmost region, constituting a significant portion, has remained relatively unexplored, with limited scientific studies conducted in recent years. Over the last two decades, numerous species have been discovered for the first time in Algeria. Notably, in terms of mammals, the rediscovery of the cheetah and leopard took place in the Ahaggar National Park (Busby et al. 2009; Belbachir et al. 2015; Moussouni et al. 2022).

The mammalian fauna of Algeria comprises 107 species across 13 orders, 36 families, and 76 genera, including 11 marine mammals. Among these, the Canidae family

is represented by three genera: *Vulpes*, *Canis* and *Lycan* (Kowalski and Rzebik-Kowalski 1991). The genus *Vulpes* comprises mesocarnivores that are characterized by ecological diversity and high mobility (Sillero-Zubiri et al. 2004). In North Africa, four species characterized by partially overlapping ranges and distinct ecological roles are encountered: the pale fox (*Vulpes pallida*), Rüppell's fox (*Vulpes rueppellii* Schinz, 1825), red fox (*Vulpes vulpes* Linnaeus, 1758) and fennec fox (*Vulpes zerda* Zimmermann, 1780) (Sillero-Zubiri et al. 2004; Leite et al. 2015; Castelló 2018).

In Algeria, the genus *Vulpes* is represented officially by three species: red fox, Rüppell's fox, and fennec fox (*Vulpes zerda*) in addition to the pale fox (*Vulpes pallida*) observed for the last time in 1971 (Le Berre 1990; Kowalski and Rzebik-Kowalska 1991; Ahmim 2019). The red fox is present in Algeria's northern region, particularly in the coastal region known as the Tell Atlas, and on the high plateaus, which are abundant in the Saharan Atlas. The Rüppell's fox is distributed throughout the Sahara, with Djelfa in the high plateau as

its northern limit (Kowalski and Rzebik-Kowalska 1991; Ahmim 2019). The fennec fox inhabits sandy regions throughout the Algerian Sahara, with its northern range reaching up to the Sahara's northern border (including Laghouat, Ngoussa, Ouargla, Touggourt and Biskra). While the species can be found in the southern regions of Algeria, extending to the country's southern border, it is notably scarce in larger mountainous areas lacking sand dunes, such as the central part of the Hoggar Mountains (Kowalski and Rzebik-Kowalska 1991; De Smet 1989, and personal communication with De Smet Koen).

The pale fox, a small fox species with longish legs, large rounded ears, and a bushy reddish-brown tail, is distributed throughout Africa's Sahel region, with reported sightings in Algeria including one at Erg Admer in 1926 by Lavauden and another at Tamanrasset in 1971, catalogued under NMNH with the identification *Vulpes pallida harterti* (USNM 482511) (Le Berre 1990; Sillero-Zubiri and Wacher 2012; Castello 2018; Brito et al. 2022). The pale fox's range mainly overlaps with the desert and semi-desert sub-Saharan areas, characterized by dry, sandy and stony soils (Castello 2018).

However, it can also be found in more humid savannah regions as well as near human settlements and cultivated fields (Sillero-Zubiri and Wacher 2012; Castello 2018). This note aims to provide an updated overview of the current status of the pale fox in Algeria, incorporating new findings.

MATERIALS AND METHODS

An animal diversity inventory was conducted in the extreme south of Algeria (Tin Zaouatin) by a group of naturalists from the Algerian Wildlife Watchers Association (AWWA) between 1st and 8th November 2023 to record nocturnal mammals. Tin Zaouatin is situated in the far southern part of Ahaggar National Park. The climate in this area is of hot desert type (Köppen climate classification BWh). Summers endure extreme heat, whereas winters tend to be more moderate. The region encounters very little summer precipitation, averaging 47.7 mm per year. Most rainfall occurs during July and August, with minimal to no precipitation throughout the

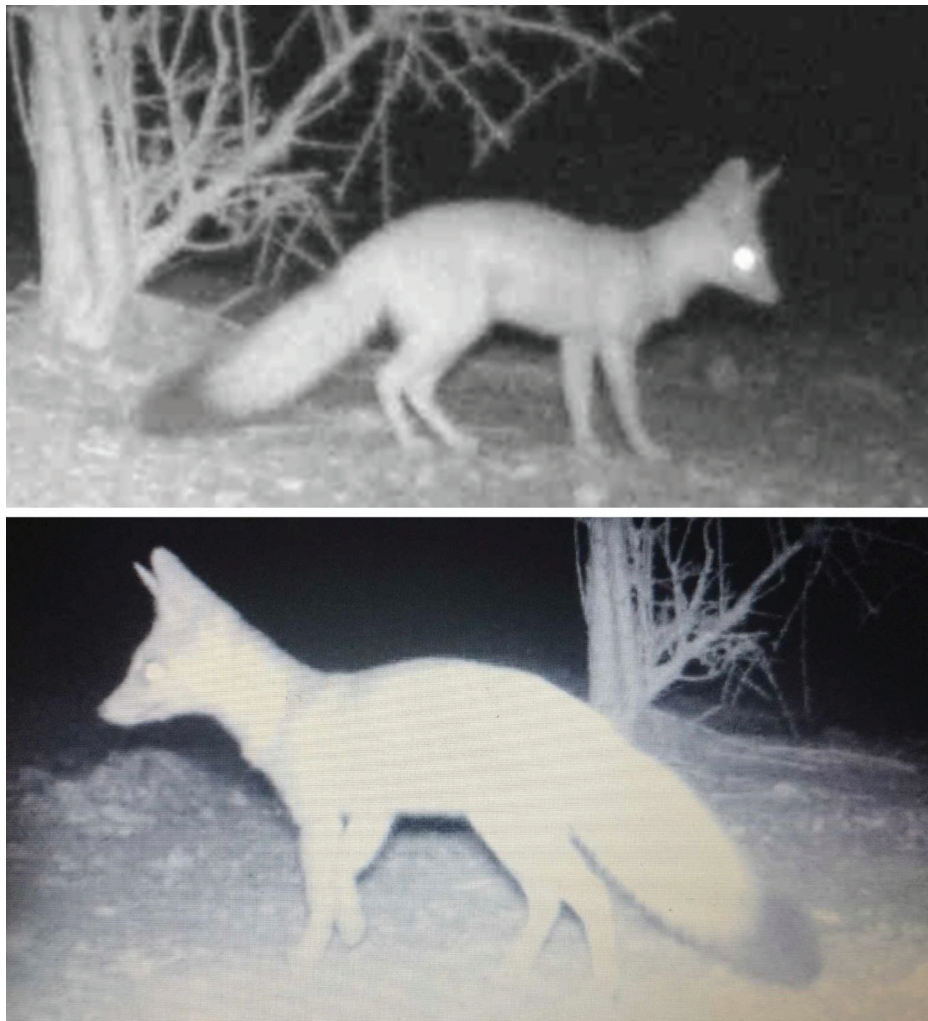


Figure 1. Camera trap photos of the pale fox *Vulpes pallida* in the extreme south of Algeria.

rest of the year. The annual average temperature stands at 27.7°C. The vegetation in the Valley of Tawandert consists mainly of *Balanites aegyptiaca*, *Salvadora persica*, and *Acacia* trees.

We placed a mix of camera traps models (COOLIFE H8201, COOLIFE H953, LK-HOME Wildlife Trap Camera, Hunting Camera HC200) for taking pictures and recording video. The camera traps were deployed in two locations in the Tin Zaouatin region: the first in the Tawandert Valley (20°27'05"N, 2°22'29"E) and the second near Tin Zaouatin (19°59'30"N, 2°54'44"E). After completing the survey, photos and videos were downloaded, and the images were identified as species using a guide for canids (Castello 2018).

RESULTS AND DISCUSSION

On 5 November 2023, by night at the second station in Tawandert Valley (near Tin Zaouatin), we recorded three videos that featured pale foxes (Figures 1 and 2). In addition to our inventory, we documented three other canid species, which included Rüppell's fox, African golden wolf, and domestic dogs captured on camera.

According to the local Touareg people, they also observed African wild dogs (*Lycaon pictus*) and striped hyenas (*Hyaena hyaena*) in the Tin Zaouatin region of Ahaggar National Park in 2022.

In Algeria, two sightings of the pale fox have been recorded over more than half a century: one at Erg Admer and another at Tamanrasset (Le Berre 1990). These observations, considered rare, have not been mentioned by either Kowalski and Kowalska (1991) or Ahmim (2019) in their research on Algerian mammals. De Smet (1989) did not confirm the presence of the species in south Algeria, specifically at Erg Admer, but it is important to note that he never visited the area where our observations were made.

The pale fox is present in the Sahelian zone, spanning from Senegal to Sudan (Sillero-Zubiri et al. 2004), yet its presence in southern Algeria was not mentioned. The scarcity of information about the pale fox in southern Algeria, particularly in the region inhabited by the Touareg people, could be attributed to potential confusion between this species and the fennec fox. Locals have reported the presence of two species of foxes, identifying them as the Rüppell's fox and the fennec fox.

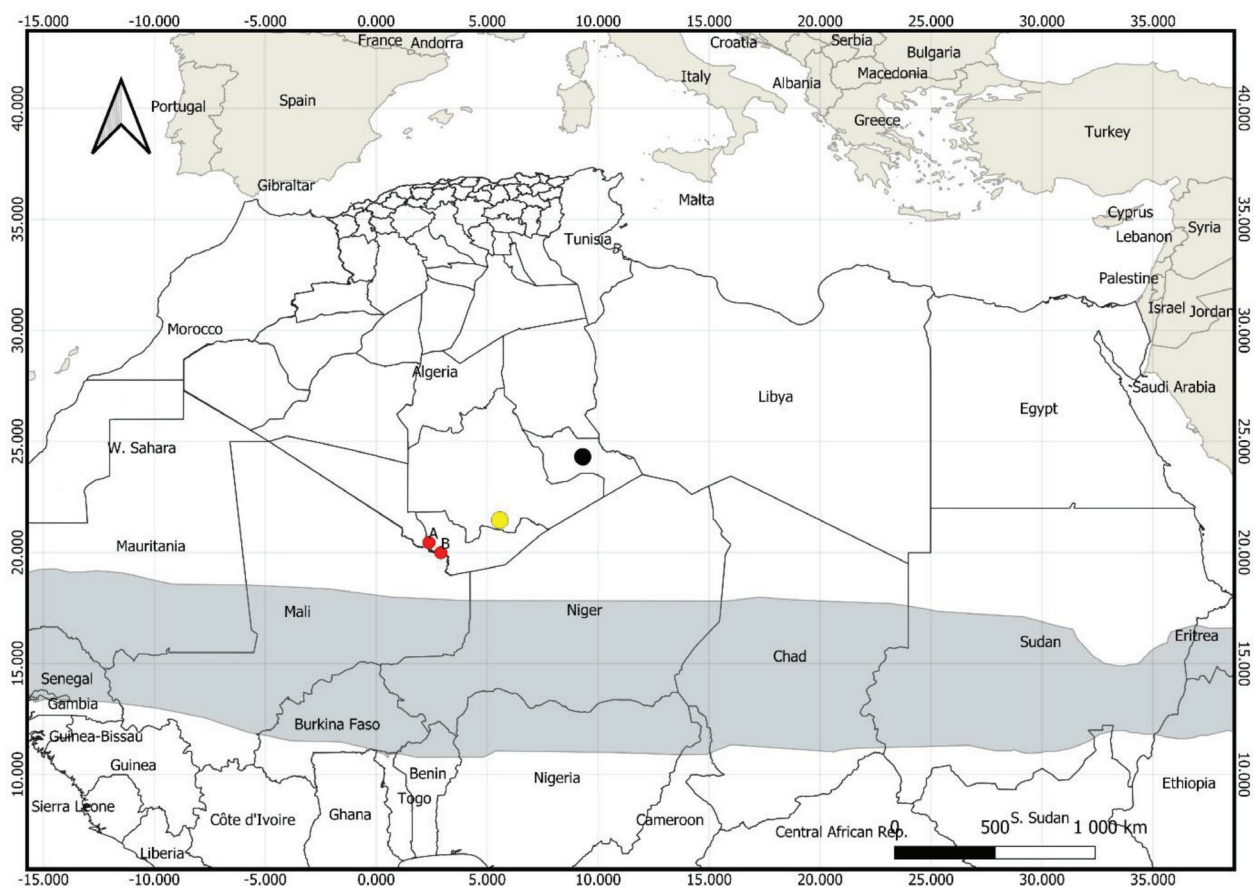


Figure 2. Known global distribution (in grey) of the pale fox *Vulpes pallida* (adapted from Sillero-Zubiri and Wachter 2012), with various localities in Algeria. The red dot (A) represents the new locality record in Tawandert, and (B) the second site of Tin Zaouatin of the present study. The yellow dot represents USNM 482511, located 200 km south of Tamanrasset, and the black dot indicates a record in Erg Admer (Le Berre 1990).

ACKNOWLEDGEMENTS

We are very grateful to the reviewers for their helpful comments and suggestions. We also thank the AWWA association and all individuals who assisted us during fieldwork.

REFERENCES

- Ahmim, M. 2019. *Les mammifères sauvages d'Algérie: Répartition et Biologie de la Conservation* [Wild mammals of Algeria: Distribution and Conservation Biology]. Les Éditions du Net.
- Belbachir, F., Pettorelli, N., Wachter, T., Belbachir-Bazi, A., & Durant, S.M. 2015. Monitoring rarity: the critically endangered Saharan cheetah as a flagship species for a threatened ecosystem. *PLoS One* 10(1), e0115136. <https://doi.org/10.1371/journal.pone.0115136>
- Brito, J.C., Sow, A.S., Vale, C.G., Pizzigalli, C., Hamidou, D., Gonçalves, D.V., ..., & Álvares, F. 2022. Diversity, distribution and conservation of land mammals in Mauritania, North-West Africa. *Plos one* 17(8), e0269870. <https://doi.org/10.1371/journal.pone.0269870>
- Busby, G.B., Gottelli, D., Wachter, T., Marker, L., Belbachir, F., De Smet, K., ..., & Durant, S.M. 2009. Genetic analysis of scat reveals leopard *Panthera pardus* and cheetah *Acinonyx jubatus* in southern Algeria. *Oryx* 43(3), 412–415. <https://doi.org/10.1017/S0030605309001197>
- Castelló, J.R. 2018. *Canids of the world: Wolves, wild dogs, foxes, jackals, coyotes, and their relatives*. Princeton University Press.
- De Smet, K.J.M. 1989. *The distribution and habitat choice of larger mammals in Algeria with special reference to nature protection*. Doctorate RUGent, 1989, 355 pp.
- Kowalski, K., & Rzebik-Kowalska, B. 1991. *Mammals of Algeria*. Wrocław: Polish Academy of Science.
- Le Berre, M. 1990. *Faune du Sahara. Volume 2. Mammifères* [Saharan Fauna. Volume 2. Mammals]. Paris: Chabaud-Lechevalier.
- Leite, J.V., Álvares, F., Velo-Antón, G., Brito, J.C., & Godinho, R. 2015. Differentiation of North African foxes and population genetic dynamics in the desert – insights into the evolutionary history of two sister taxa, *Vulpes rueppellii* and *Vulpes vulpes*. *Organisms Diversity & Evolution* 15, 731–745. DOI: [10.1007/s13127-015-0232-8](https://doi.org/10.1007/s13127-015-0232-8)
- Moussouni, A., Behloul, R., Amokrane, S., Amoura, W., & Gharriche, A. 2022. Monitoring of the Saharan cheetah and large fauna in the Ahaggar Cultural Park (southern Algeria). *Biodiversity Journal* 13. DOI: [10.31396/Biodiv.Jour.2022.13.4.853.863](https://doi.org/10.31396/Biodiv.Jour.2022.13.4.853.863)
- Sillero-Zubiri, C., & Wachter, T. 2012. *Vulpes pallida*. *The IUCN Red List of Threatened Species* 2012, eT23052A16813736. <https://dx.doi.org/10.2305/IUCN.UK.2012.RLTS.T23052A16813736.en>. Accessed on 19 November 2023.
- Sillero-Zubiri, C., Hoffmann, M., & Macdonald, D.W. (eds) 2004. *Canids: foxes, wolves, jackals, and dogs: status survey and conservation action plan* 95. IUCN – The World Conservation Union.