Fundación Miguel Lillo
Tucumán
Argentina



# Bird diversity and annotated checklist of Afrotropical species in extreme south of Algeria

## Diversidad de aves y lista comentada de especies afrotropicales en el extremo sur de Argelia

Belkacem Aimene Boulaouad[1,5*]; Tayeb Djetti[2,5]; Mohamed Belkacem[3,5]; Oussama Ailam[4,5]; Bachir Harzallah[5]; Mohamed Missoum[5]; Khaled Ayyach[5]; Saleh Telailia[6]

[1] Department of Agronomy, SNV-TU Faculty, Mohamed El Bachir El Ibrahimi Bordj Bou Arreridj University, 34000, Algeria.
[2] Laboratoire de recherche agronomie et environnement, Département des sciences de la nature et de la vie, faculté des sciences et de la technologie, Université de Tissemsilt, Algeria.
[3] Laboratory of Biotechnologies and Protection of Agricultural and Natural Ecosystems, Faculty of Natural and Life Sciences and Earth Sciences, University of Bouira, 10000 Bouira, Algeria.
[4] Faculté des sciences, Département science de la nature et de la vie, Université de M'sila, 28000 M'sila, Algeria.
[5] Algerian Wildlife Watchers Association.
[6] Chadli Bendjedid University, Laboratory of Agriculture and Ecosystem Functioning, Department of Agronomy Sciences, Faculty of Natural and Life Sciences, El Tarf, Algeria.
* Corresponding author: <belkacemaimene.boulaouad@univ-bba.dz>

## ABSTRACT

The effort to uncover avifauna in the extreme south of Algeria has been concentrated within the Timiaouine region. This region is an understudied area in the extreme south of Algeria and the northern part of Adrar of Ifoghas. 67 species were recorded, belonging to 32 families and 12 orders. The African Collared Dove (*Streptopelia roseogrisea*) was recorded for the first time in Algeria, additionally, there is a noteworthy mention of eleven Afrotropical bird species (*Clamator jacobinus*, *Pterocles exustus*, *Oena capensis*, *Urocolius macrourus*, *Merops albicollis*, *Dendropicos goertae*, *Eremopterix nigriceps*, *Eremalauda dunni*, *Spiloptila clamans*, *Lamprotornis pulcher*, *Cercotrichas podobe*, *Passer griseus* and *Corvus albus*) that were either newly observed or rarely documented in the extreme southern region of Algeria.

**Keywords** — Birds, New record, Checklist, Afrotropical, Algeria.

➤ Ref. bibliográfica: Boulaouad, B. A.; Djetti, T.; Belkacem, M.; Ailam, O.; Harzallah, B.; Missoum, M.; Ayyache, K.; Telailia, S. 2024. "Bird diversity and annotated checklist of Afrotropical species in extreme south of Algeria". *Acta zoológica lilloana 68* (1): 17-27. DOI: https://doi.org/10.30550/j.azl/1849
➤ Recibido: 9 de septiembre 2023 – Aceptado: 1 de noviembre 2023.
➤ URL de la revista: http://actazoologica.lillo.org.ar

## RESUMEN

Los esfuerzos realizados para descubrir la avifauna en el extremo sur de Argelia se han concentrado dentro la región de Timiaouine. Esta región es un área poco estudiada en el extremo sur de Argelia y la parte norte del Adrar de los Iforas. Se registraron 67 especies pertenecientes a 32 familias y 12 órdenes. La paloma de collar africana (*Streptopelia roseogrisea*) fue registrada por primera vez en Argelia, además de once especies de aves afrotropicales (*Clamator jacobinus*, *Pterocles exustus*, *Oena capensis*, *Urocolius macrourus*, *Merops albicollis*, *Dendropicos goertae*, *Eremopterix nigriceps*, *Eremalauda dunni*, *Spiloptila clamans*, *Lamprotornis pulcher*, *Cercotrichas podobe*, *Passer griseus* and *Corvus albus*) que fueron recientemente observadas o raramente documentadas en la región del extremo sur de Argelia.


**Palabras clave** — Aves, Nuevo registro, lista de chequeo, Afrotropical, Argelia.

## INTRODUCTION

The Badji Mokhtar region, and more particularly the area of Timiaouine in the extreme south of Algeria near the Malian border, is an ecoregion situated between the Palearctic and tropical zones. The main types of habitats include predominantly rocky mountainous regions, riverbeds, flat sandy or rocky "regs," and wet depressions resulting from sporadic rainfall.

The limited information regarding avifaunal biodiversity and the phenological status of birds species in the region dates back to the last century (Heim de Balsac and Mayaud, 1962; Ledant et al., 1981; Isenmann and Moali, 2000; Brito et al., 2014). The emergence of national amateur naturalists organized within non-governmental organisations (NGOs) has motivated them to conduct more comprehensive field surveys in these geographically challenging and difficult-to-reach areas.

These efforts have resulted in the observation of bird species that were previously undocumented in Timiaouine. As an example, new bird species recorded for Algeria include the Rüppell's Warbler (*Sylvia ruppeli*) (Haddad and Afoutni, 2019). Other recently observed species include the Dunn's Lark (*Eremalauda dunni*) (Harzallah, Ayyach, Benmokhtar, Telailia, 2021), and the Jacobin Cuckoo (*Clamator jacobinus*) (Haddad and Aftouni, 2020). Furthermore, the White-throated Bee-eater (*Merops albicollis*), Cut-throat Finch (*Amadina fasciata*), and Village Indigobird (*Vidua chalybeata*) have been recorded (Boulaouad et al., 2022). The Goertan Woodpecker (*Dendropicos goertae*) (Haddad and Aftouni, 2022), and the Namaqua Dove (*Oena capensis*) have also been observed in the region.

Our understanding of the avian diversity in the southernmost region of Algeria is currently limited. This study aims to fill this knowledge gap by providing the initial findings regarding bird species in this extreme southern area of Algeria and discussing the presence of afrotropical species in this region.

## MATERIALS AND METHODS

### Study Area

The study area, Timiaouine, is situated in the southwestern region of Algeria, spanning between longitudes 1° 20' and 2° 30' East, and latitudes 20° and 22° North, near the border with Mali. It covers a distance of 950 km southeast of Adrar, 150 km southeast of Bordj Badji Mokhtar, 465 km southwest of Tamanrasset, and 1820 km south of Algiers (Fig. 1). The area's elevation is 582 meters (1,909 ft), located in the northern part of the Adrar des Ifoghas, a vast massif within the Sahara Desert that extends further south to Kidal, Mali.

The climate within the study area is classified as a hot desert type (Köppen climate classification BWh). Summers are extremely hot, while winters are more moderate. The region experiences very low summer precipitation, with an average of 47.7 mm per year. The majority of precipitation falls between July and August, whereas the rest of the year sees minimal to no rainfall. The annual average temperature is 27.7°C (Nasri, Benatiallah, Kaloum, Soulimani, 2017).

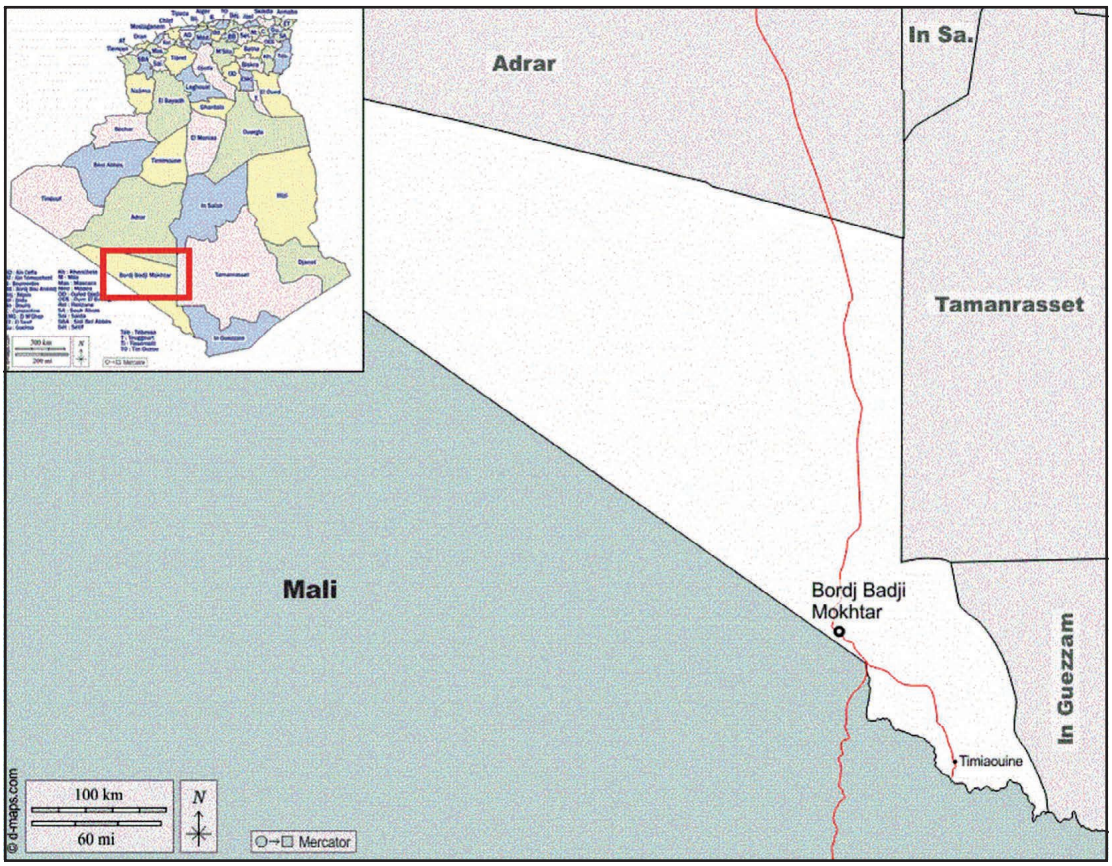


**Figure 1.** Location of Timiaouine region, Algeria.

**Figura 1.** Ubicación de la región de Timiaouine, Argelia.

### Data Collection

Bird surveys were carried out between October and November 2022 in the Timiaouine region. These inventories employed direct observation, utilizing camera equipment including a Nikon P900 camera (with an ×83 zoom) and a Canon 7D II with a 150-600 mm lens. Additionally, the line transect method has been used in this study. This technique consists of walk in the study locality, a well-defined route several times, while advancing at a steady speed (1 to 2 km/h), marking a stop every 20 meters, and noting and photographing all birds seen and heard by locating them in the course (Bibby, Burgess, Hill, Mustoe, 2000; Boulaouad et al., 2021, 2022). Identification of bird species was conducted using standard field guides(Svensson, 2012). We utilised information from Isenmannand and Moali (2000) regarding the geographic distribution and phenological status of birds in Algeria.

## RESULTS

During the course of this study, a comprehensive inventory of bird species in the Timiaouine area was conducted, resulting in the identification of 66 species (Table 1). These species were classified into 15 orders and 32 families. The dominant bird families observed were Muscicapidae and Alaudidae, each comprising seven species, followed by Columbidae with six species.

In this region, the distribution of bird species based on their origins is as follows: Palaearctic species (PA) constitute the predominant category, representing approximately 42.42% of the total 66 observed species. saharo-sindien (SS) species account for around 15.15%, while Afro-Tropical (AT) species make up about 16.67%. The species with origin Saharan/Sahelian (SA/SL) make up roughly 4.55% of the total, followed by Palaearctic/Afro-Tropical (PA/AT) species at approximately 7.58%. Palaearctic/Sahelian (PA/SL) species are less represented, accounting for only about 1.51%. Lastly, Sahelian species (SL) represent approximately 10.61% of the total. This distribution of species provides insights into the avian diversity in the region based on their respective origins.

Among the 66 species observed, insectivores constitute the majority, accounting for more than 54% (36 insectivorous species), followed by granivorous species (23 species; 34%). Additionally, five carnivorous species are primarily represented by diurnal raptors. It's worth noting that in this particular region, only the Brown-necked Raven and the Egyptian Vulture are considered scavenger birds.

## BRIEF REMARKS ON THE AFROTROPICAL SPECIES OBSERVED IN THE EXTREME SOUTH OF ALGERIA

### Jacobin or Pied Cuckoo
### *Clamator jacobinus*

The Jacobin or Pied Cuckoo (*Clamator jacobinus*) was observed by Haddad and Afoutni in 2020 in Tamanrasset. A second observation of a juvenile bird took place in

**Table 1.** Checklist of birds observed in the extreme south of Algeria.
**Tabla 1.** Lista de aves observadas en el extremo sur de Argelia.

| Ordre | Famille | Latin | Anglais | Origine | R.A. |
|---|---|---|---|---|---|
| Caprimulgiformes | Caprimulgidae | *Caprimulgus europaeus* | European Nightjar | PA | In |
| | | *Caprimulgus aegyptius* | Egyptian Nightjar | SS | In |
| Apodiformes | Apodidae | *Apus apus* | Common Swift | PA | In |
| Cuculiformes | Cuculidae | *Clamator glandarius* | Great Spotted Cuckoo | PA/AT | In |
| | | *Clamator jacobinus* | Jacobin Cuckoo | AT | In |
| Pterocliformes | Pteroclidae | *Pterocles exustus* | Chestnut-bellied Sandgrouse | SS | G |
| | | *Pterocles senegallus* | Spotted Sandgrouse | SS | G |
| Columbiformes | Columbidae | *Columba livia* | Rock Dove | PA | G |
| | | *Streptopelia turtur hoggara* | European Turtle Dove | PA | G |
| | | *Streptopelia decaocto* | Eurasian Collared Dove | PA | G |
| | | *Spilopelia senegalensis* | Laughing Dove | AT | G |
| | | *Streptopelia roseogrisea* | African Collared Dove | SL | G |
| | | *Oena capensis* | Namaqua Dove | AT | G |
| Charadriiformes | Recurvirostridae | *Himantopus himantopus* | Black-winged Stilt | PA | In |
| | | *Recurvirostra avosetta* | Pied Avocet | PA | In |
| | Charadriidae | *Charadrius dubius* | Little Ringed Plover | PA | In |
| | | *Calidris alpina* | Dunlin | PA | In |
| | | *Tringa stagnatilis* | Marsh Sandpiper | PA | In |
| | | *Tringa glareola* | Wood Sandpiper | PA | In |
| | Glareolidae | *Cursorius cursor* | Cream-colored Courser | PA/SL | In |
| Ciconiiformes | Ciconiidae | *Ciconia ciconia* | White Stork | PA | In |
| Pelecaniformes | Threskiornithidae | *Platalea leucorodia* | Eurasian Spoonbill | PA | In |
| | Ardeidae | *Bubulcus ibis* | Western Cattle Egret | AT | In |
| | | *Ardea cinerea* | Grey Heron | PA/AT | In |
| | | *Egretta garzetta* | Little Egret | PA/AT | In |
| Accipitriformes | Accipitridae | *Neophron percnopterus* | Egyptian Vulture | PA | Cr |
| | | *Circus aeruginosus* | Western Marsh Harrier | PA | Cv |
| | | *Circus pygargus* | Montagu's Harrier | PA | Cv |
| | | *Buteo buteo* | Common Buzzard | PA | Cv |
| Coliiformes | Coliidae | *Urocolius macrourus* | Blue-naped Mousebird | AT | |
| Bucerotiformes | Upupidae | *Upupa epops* | Eurasian Hoopoe | AT | In |
| Coraciiformes | Meropidae | *Merops albicollis* | White-throated Bee-eater | AT | In |
| Piciformes | Picidae | *Dendropicos goertae* | African Grey Woodpecker | SL | In |
| Falconiformes | Falconidae | *Falco tinnunculus* | Common Kestrel | PA/AT | Cv |
| | | *Falco biarmicus* | Lanner Falcon | AT | Cv |
| Passeriformes | Laniidae | *Lanius excubitor meridionalis* | Great Grey Shrike | SA/SL | In |
| | Corvidae | *Corvus ruficollis* | Brown-necked Raven | SA/SL | Cr |
| | Alaudidae | *Alaemon alaudipes* | Greater Hoopoe-Lark | SS | G |
| | | *Ammomanes deserti* | Desert Lark | SS | G |
| | | *Eremopterix nigriceps* | Black-crowned Sparrow-Lark | AT | G |
| | | *Galerida cristata* | Crested Lark | PA/AT | G |
| | | *Calandrella brachydactyla* | Greater Short-toed Lark | PA | G |
| | | *Melanocorypha calandra* | Calandra Lark | PA | G |
| | | *Eremalauda dunni* | Dunn's Lark | SL | G |
| | Hirundinidae | *Ptyonoprogne obsoleta* | Pale Crag Martin | SS | In |
| | | *Hirundo rustica* | Barn Swallow | PA | In |
| | Phylloscopidae | *Phylloscopus collybita* | Common Chiffchaff | PA | In |
| | Cisticolidae | *Spiloptila clamans* | Cricket Warbler | SL | In |
| | Sylviidae | *Curruca melanocephala* | Sardinian Warbler | PA | In |
| | Leiothrichidae | *Argya fulva* | Fulvous Babbler | SS | In |
| | Sturnidae | *Lamprotornis pulcher* | Chestnut-bellied Starling | SL | G |
| | Muscicapidae | *Cercotrichas podobe* | Black Scrub Robin | SL | In |
| | | *Cercotrichas galactotes* | Rufous-tailed Scrub Robin | AT | In |
| | | *Muscicapa striata* | Spotted Flycatcher | PA | In |
| | | *Oenanthe oenanthe* | Northern Wheatear | PA | In |
| | | *Oenanthe deserti* | Desert Wheatear | PA | In |
| | | *Oenanthe hispanica* | Western Black-eared Wheatear | PA | In |
| | | *Oenanthe leucopyga* | White-crowned Wheatear | SS | In |
| | Passeridae | *Passer simplex* | Desert Sparrow | SS | G |
| | | *Passer luteus* | Sudan Golden Sparrow | SL | G |
| | | *Passer griseus* | Northern Grey-headed Sparrow | AT | G |
| | Estrildidae | *Euodice cantans* | African Silverbill | AT | G |
| | Motacillidae | *Motacilla flava* | Western Yellow Wagtail | PA | In |
| | | *Motacilla alba* | White Wagtail | PA | In |
| | Fringillidae | *Bucanetes githagineus* | Trumpeter Finch | SS | G |
| | Emberizidae | *Emberiza sahari* | House Bunting | SA/SL | G |

Tawandert in October 2022, followed by a third observation in the same area by Soukkou, Hadoun and Seddiki in November 2022.

**Chestnut-bellied Sandgrouse**
***Pterocles exustus***

The Chestnut-bellied Sandgrouse was recorded for the second time in May 2019 within the Tinzawatine region, situated 450 km southwest of Tamanraset city (Boulaouad et al., 2021). According to Isenmann and Moali (2000), the initial observation of this species occurred on May 23th 1987, between Gara Ekar and Asamakka along the Algerian-Niger border.

**The African Collared Dove**
***Streptopelia roseogrisea***

It was observed for the first time in Algeria in the valley of Tawendart on October 16th, 2022. This sighting included a group of companion species: *Streptopelia turtur hoggara*, *Streptopelia decaocto*, *Spilopelia senegalensis*, *Streptopelia roseogrisea*, and *Oena capensis*.

**Namaqua dove**
***Oena capensis***

The first observation involved two collected birds in April 1952 at Tamanrasset. This species was reported exclusively between 1950 and 1980 in a limited number of Algerian villages, specifically Tinzawatine, Timiaouine, and Bordj Moktar, all situated in the Adrar des Iforas region, an area bordering Algeria and Mali. A notable observation occurred in October 2022 and was followed by another in November 2022, during which multiple individuals including adults and juveniles of this species were sighted along the route from Timiaouine to Tawandert.

**Blue-naped Mousebird**
***Urocolius macrourus***

The Blue-naped Mousebird (*Urocolius macrourus*) was initially observed by Haddad and Bekkouche in 2018 in Tawandert. This marked the first recorded sighting of several individuals (Haddad and Bekkouche, 2021; Boulaouad et al., 2021). A second observation occurred in October 2022, followed by a third sighting in November of the same year, all within the same region. These observations lead us to believe that this species resides in the southernmost part of Algeria.

**White-throated Bee-eater**
***Merops albicollis***

It was initially observed with a single individual in Tamanrasset by Boulaouad et al., in 2022. A second observation revealed the presence of multiple individuals of this species in the southern region of Timiaouine during October 2022.

**African Grey Woodpecker**
***Dendropicos goertae***

The African Grey Woodpecker (*Dendropicos goertae*) was first observed by Haddad and Afoutni in 2022. Later, three individuals were observed in Tawandert in October 2022, the third observation in the same region in November 2022.

**Black-crowned sparrow-lark**
***Eremopterix nigriceps***

The first record of this sub-Saharan species was collected or sighted 150 km west of Tamanrasset/Ahaggar in January 1954. Initially identified as Dunn's Lark (*Eremalauda dunni*), it was later determined to be Black-crowned Sparrow-lark. The second observation and confirmation of breeding took place in October 2022, with the presence of both parents and juveniles observed in the Timiaouine region (Boulaouad et al., 2022).

**Dunn's Lark**
***Eremalauda dunni***

The fourth observation of Dunn's Lark occurred in the Timiaouine region, marking the first breeding record for Algeria, with the presence of both parents and juveniles observed in October 2022. This follows the initial record on Chegga Hamada (Algeria/Mauritania) on February 28, 1930. The second record of Dunn's Lark was documented to the west of Tamanrasset (Ahaggar) in January 1954, and the third observation took place in Djanet (Harzallah, Ayyache, Benmokhtar, Telailia, 2021).

**Cricket Warbler**
***Spiloptila clamans***

This Afrotropical Sahelian species was discovered in October 2022 along the route from Timiaouine to Tawandert, covering a distance of approximately 80 km (Boulaouad, Harzallah, Ayyache, Missoum, Ailam, 2023). It was observed within well-vegetated steppes, often within the dry riverbeds, dominated by substantial clumps of grasses and a varying density of acacia shrubs.

**Chestnut-bellied Starling**
***Lamprotornis pulcher***

Originates from the Afrotropical region and belongs to the Sturnidae family. The first observation of this species in Algeria and the Maghreb took place in November 2022 within the Tawandert region. The habitat features vegetation characterized by the presence of a few shrubs such as *Balanites aegyptiaca*, *Salvadora persica*, and Acacia (Soukkou, Hadoun, Seddiki, Boulaouad, Ailame, 2023)

**Black Scrub Robin**
***Cercotrichas podobe***

The fourth and fifth observations of the Black Scrub Robin in the Tawendert region occurred in October and November 2022. This Sahelian species was initially spotted on February 8, 1968, in Tamanrasset and possibly again on February 12th, 1968, in the Central Hoggar (Isenmann and Moali, 2000).

**Northern Grey-headed Sparrow**
***Passer griseus***

The Northern Grey-headed Sparrow, a Sahelian species, is increasingly being noted and is a potential breeder in the Timiaouine region. The first recorded observation in Algeria was in the town of Timiaouine, located in the far south of the country, on October 16th, 2022. The second locality was within the Tawendart region (Boulaouad et al., 2023).

**Pied Crow**
***Corvus albus***

This Sahel species occasionally reaches the southernmost part of Algeria. There was one recorded instance in 1961, and another in December 1964 near in Azaoua. The species has also been reported in the Algerian sector of the Adrar des Iforas region, situated near Mali. Furthermore, a second observation occurred in December 2021, this time near the city of Ain Guezzam.

## DISCUSSION

A total of 67 species were observed in the study area. The observed bird species represent (67/350) of the avifauna mentioned by Ledant et al., (1981) and (67/406) documented by Isenmann and Moali (2000). A similar number of species (56) and (62) were observed in Tamanrasset and In Guezzam (Boulaouad et al., 2021, 2022). The species richness, and the number of birds confined to deserts and semi-deserts are low compared to more mesic areas (Dean, 2004).

The timing of our surveys did not allow us to observe all the Palearctic migrants that could potentially stop in the region after crossing the Sahara. Instead, only a few species during their migration were observed the case of (*Hirundo rustica*, *Muscicapa striata, Oenanthe oenanthe and Motacilla flava*).

We were able to observe the breeding of many encountered species, including those that nest during the rainy season, such as the *Emberiza sahari*, *Argya fulva*, *Cercotrichas galactotes*. This is the first mention of autumnal nesting in the south of Algeria (Ledant et al., 1981; Isenmann and Moali, 2000).

The onset and duration of reproduction depend on the timing and intensity of rainfall, occurring between October and early July in different years. Reproduction does not take place during extended periods of drought, which hinders the growth of herbaceous vegetation that provides the seeds on which the species feeds (Bergi-

er and Thevenot, 2019; Clouet, 2008). Moreover, our findings emphasize the close relationship between rainfall patterns and avian reproduction, reinforcing the importance of environmental factors in shaping avian populations. The richness of the Sahel region's avifauna, as documented by Dean (2004), underscores the significance of our observations in this context.

Furthermore, there is potential for additional Sahelian bird species from this mountainous region to be considered as prospective newcomers to the species list in the southernmost part of Algeria in the future, including, for example *Gyps africanus, Cypsiurus parvus, Melierax metabates, Lybius vieilloti, Trachyphonus margaritatus, Pogoniulus chrysoconus, Corvus rhipidurus, Oenanthe melanura, Lonchura malabarica, Hedydipna platura*, *Falco alopex*, *phoeniculus purpureus* underscores the dynamic nature of this ecosystem (Lamarche, 1980; Newby, Grettenberger, Watkins, 1987; Clouet and Goar 2003; Clouet and Joachim 2013; Borrow and Demey 2014).

Our research not only contributes to the ornithological understanding of this region but also provides a platform for continued exploration and inquiry. The coexistence of Palearctic migrants, Afrotropical species, and resident birds in this area offers a rich tapestry for future studies, focusing on the interplay of environmental factors and avian diversity.

In the grander scheme, our work highlights the importance of conservation efforts in protecting the habitats and migratory pathways of these remarkable birds. With this understanding, we hope to contribute to the preservation of avian biodiversity in the face of changing environmental conditions and evolving populations.

## ACKNOWLEDGMENTS

We express our gratitude to the residents of the region for their invaluable assistance and extend our appreciation to reviewers for their thorough corrections and insightful comments.

## FINANCIAL SUPPORT

This research was conducted without external funding.

## CONTRIBUTIONS

BAB was involved in all stages of the research. TD, MB, and OA contributed to the writing of the article and the analysis of the results. BH, MM, and KA participated in the fieldwork, data collection, and species identification. ST was actively involved in species identification.

## CONFLICT OF INTEREST

The authors declare no potential conflicts of interest.

## CITED LITERATURE

Bergier, P., Thevenot, M. (2019). Afrotropical species in the southwestern Palearctic: Recent changes in the Atlantic Sahara (Morocco). Alauda 87, 25-39.

Bibby, C. J., Burgess, N. D., Hill., D. A., Mustoe, S. H., (2000). Bird census techniques. 2nd edition, Elsevier.

Borrow, N., Demey, R. (2014). Field guide to birds of Western Africa. Christopher Helm, London.

Boulaouad, B. A., Ailam, O., Telailia, S., Harzallah, B., Ayyach, K., Missoum, M., Bekkouch, A., and Lamia, B. (2021). Preliminary checklist of avifauna of Tamanrasset (South of Algeria) with two new records in Algeria. Journal of Bioresource Management, 8, 01-10. doi: 10.35691/JBM.1202.0199

Boulaouad, B. A., Harzallah, B., Ayyach, K., Attouche, K., Soukkou, W., Aissa, D. H., Faidi, H., and Missoum, M. (2022). A new species for Algeria, White-throated Bee-eater (*Merops albicollis*), observations of probably escaped individuals of Cut-throat Finch (*Amadina fasciata*) and Village Indigobird (*Vidua chalybeata*) and a checklist of southern Sahara birds. Ornis Hungarica, 30, 195-207. doi: 10.2478/orhu-2022-0030.

Boulaouad, B. A., Ayyach, K., Harzallah, B., Missoum, M., Ailam, O., & Telailia, S. (2023). Northern Grey-headed Sparrows in southern Algeria in October 2022. Dutch Birding, 45, 187-189.

Boulaouad, B. A., Harzallah, B., Ayyach, K., Missoum, M., & Ailam, O. (2023) . First Records of the Cricket Warbler *Spiloptila clamans* (Cretzschmar, 1826) (Passeriformes: Cisticolidae) in Algeria. Acta Zoologica Bulgarica, 75, 1-3.

Brito, J. C., Godinho, R., Martínez-Freiría, F., Pleguezuelos, J. M., Rebelo, H., Santos, X., Vale, C. G., Velo-Anton, G., Boratynski, Z., Carvalho, S. B., Ferreira, S., Goncalves, D. V., Silva, T. L., Tarroso, P., Campos, J. C., Leite, J. V., Nogueira, J., Alvares, F., Sillero, N., Sow, A. S., Fahd, S., Crochet, P. A., Carranza, S. (2014). Unravelling biodiversity, evolution and threats to conservation in the Sahara-Sahel. Biological Reviews, 89, 215-231.

Clouet, M. (2008). Sur l'avifaune de l'Adrar des Ifoghas (Mali). Alauda (Dijon), 76, 65-69.

Clouet, M., Goar, J. L. (2003). L'avifaune de l'Adrar Tirharhar/Adrar des Iforas (Mali). Alauda (Dijon), 71, 469-474.

Clouet, M., Joachim, J. (2013). Variations in bird communities of the Saharan mountains. Ostrich, 84, 205-211. doi: 10.2989/00306525.2013.867550.

Dean, W. R. J. (2004). Nomadic Desert Birds: With 32 Tables. Springer Science and Business Media.

Haddad, K., Afoutni, L. (2019). Première observation documentée d'une Fauvette de Rüppell Sylvia ruppeli en Algérie. Alauda, 87.

Haddad, K. Aftouni, L. (2020). Première observation du Coucou Jacobin *Clamator-jacobinus* en Afrique du Nord. Alauda, 88, 71-72.

Haddad, K. Afoutni, L. (2022). Premier signalement du Pic Goertan *Dendropicos goertae* en Afrique du Nord. [First record of African grey woodpecker *Dendropicos goertae* in North Africa]. Alauda, 90, 73-76.

Haddad, K., Bekkouche, S. (2021). Blue-naped Mousebird and Black Scrub Robin at Tamanrasset, Algeria, in 2018-19. Dutch Birding, 43, 147-149.

Harzallah, B., Ayyach, K., Benmokhtar, A., Telailia, S. (2021). Première observation de l'Alouette de Dunn *Eremalaudadunni* en Algérie [First observation of Dunn's Lark in Algeria]. Alauda, 89, 293-294.

Heim de Balsac, H. Mayaud, N. (1962). Les oiseaux du Nord-Ouest de l'Afrique. Ed. Lechevalier, Paris. 488 p.

Isenmann, P., Moali, A. (2000). Oiseaux d'Algérie [Birds of Algeria]. Société d'études ornithologiques de France, Paris (in French).

Lamarche, B. (1980). Liste commentée des oiseaux du Mali: passereaux. Malimbus, 2, 121-158.

Ledant, J. P., Jacob, J. P., Jacobs, P., Malher, F., Ochando, B., Roche, J. (1981). Mise à jour de l'avifaune Algérienne [Update of the Algerian avifauna]. Gerfaut, 71, 295-394. (in French).

Nasri, B., Benatiallah, A.,Kaloum, S., Soulimani, S. (2017). Nitrate Impact on the Groundwater Quality Degradation in Arid Areas (Timiaouine Region South of Algeria), in: Euro-Mediterr. Conf. Environ. Integr., Springer, 2017, 669-672. doi: 10.1007/978-3-319-70548-4_198.

Newby, J., Grettenberger, J., and Watkins, J. (1987). The birds of the Northern Air, Niger. Malimbus, 9, 4-16.

Soukkou, W., Seddiki, F., Hadoun, A., Boulaouad, A. B., Aillam, O. (2023). First sighting of the Chestnut-bellied Starling *Lamprotornis pulcher* in Algeria. Alauda, 91, 209-210

Svensson, L. (2012). Le guide ornitho [The Ornitho Guide]. Delachaux et Niestlé (in French).