

Original Research Article

First record of grey plover *pluvialis squatarola* in the sahara and an update on its distribution in algeria

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Abstract: Grey Plover *Pluvialis squatarola*, is one of Algeria's rare bird species. During the international waterbird census in the month of May for the year 2023 using the direct observation method, a single individual of the Grey Plover was spotted at Kef Doukhane wetland in Ghardaïa on May 16, 2023. This is the first observation in the Sahara with a new locality in Algeria.

Keywords: *Pluvialis squatarola*, New locality, Sahara, Algeria

1. Introduction

As a result of fluctuating environmental conditions, species' ranges have repeatedly shrunk and grown over the course of evolution^[1]. Due to the large area of Algeria and the diversity of ecosystems, it contributed to plant diversity, which in turn influenced animal biodiversity, in addition to the expansion of research activity, which has recently led to the addition of many species to the list of Algerian birds and the reporting of new expansion ranges and also new breeding sites^[2,3]. Algeria has 2,375 natural and 319 artificial wetland areas, 50 of which are listed on the Ramsar list of internationally important wetlands^[4].

The reproductive distribution of the Grey Plover, *Pluvialis squatarola*, is nearly circumpolar in the high Arctic north, extending from the Kanin Peninsula east to the Bering Strait and from Alaska to the western side of Baffin Island^[5]. There are three subspecies: *P. s. squatarola*, *P. s. tomkovichii*, and *P. s. cynosurae*^[6]. In North Africa, we have *P. s. squatarola*. Their distribution is restricted to suitable habitats outside of the reproductive season, primarily larger, muddier estuaries and coastlines with porous substrates. This subspecies' wintering grounds span from western Europe through Africa and Asia to the western Pacific littoral^[7].

In Algeria, this species is rarely reported; it is mentioned in the north-eastern part of the country in Costantine and Skikda, in the west in Oran, and in the center in Boughezoul at Media^[8].

This note describes the first recent sighting of the Grey Plover in the Sahara and a new locality for the species in Algeria (Kef Doukhane wetland, Ghardaïa).

2. Materials and methods

The M'Zab region lies within the bioclimatic zone of the Sahara, which is characterised by moderate

winters, intermittent and low annual precipitation, and high temperatures. It has a significant variety of flora and fauna^[9]. Kef Doukhane is one of the most diverse wetlands in the region; it is an artificial permanent wetland. Its creation dates back to the 2012 construction of the El Atteuf wastewater treatment plant (32°26'26.63"N; 3°48'38.44"E) on an area of 550 ha^[10] (Figure 1).

In the present study, surveys were conducted during the international waterbird census (IWC) in January for the year 2023, throughout the Ghardaïa territory, in the first five hours of the day beginning at 6:30, using the direct observation method with a pair of binoculars (10×50) and a Nikon P900 camera (×83) for additional support. We carried out an individual count when a group of birds numbering less than 200 was near the observation point and a visual estimate when the number was higher and the birds at a significant distance (e.g., ^[11,12]). Identification of bird species was facilitated by ornithological guidebooks^[13].

Finally, using version 3.16.14-Hanover of the QGIS software, create a geographical location map and a distribution map with the old and new observations.

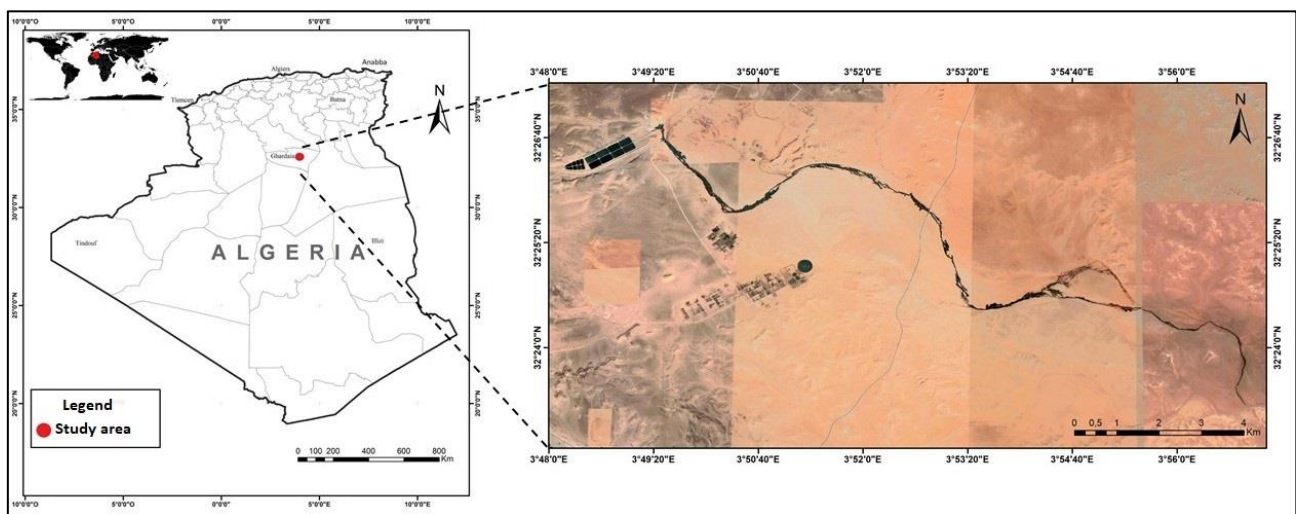


Figure 1 Location of Kef Doukhane wetland, Algerian Sahara^[14].

3. Results and discussion

During this study, 24 species of waterbirds were recorded across the entire Kef Doukhane wetland in Ghardaïa, representing 7 orders and 10 families, with Anatidae (5 species) and Charadriidae (4 species) being the most abundant families. On May 16, 2023, a single individual of the Grey Plover was observed exactly in the wastewater treatment plant (3.810304°; 32.441326°; 430m a.s.l.) (Figure 2). In the same place, we have spotted some species of the Charadriidae and Scolopacidae families, like the Little Stint (*Calidris minuta*), the Green Sandpiper (*Tringa ochropus*), the Kentish Plover (*Charadrius alexandrinus*), and the Little Ringed Plover (*Charadrius dubius*).

This area is an essential stopover for land- and waterbird species, as well as an important wintering and breeding site, where in previous studies a total of 57 waterbird species were recorded^[9,10,15].

The great migration route of this species, connecting the Arctic to tropical Africa, follows the Atlantic coast, thus avoiding Algeria. Therefore, it is considered a rare species. Winter or passage visitors are seen at both crossings (September to November and March to May)^[8], but despite this, the range distribution of this species is concentrated mainly in coastal areas like Skikda and Oran^[16], with some observations recorded in the inland part of the country at Media and Costantine^[8], in addition to other recent observations in several regions such as Bordj Bou Arreridj, Sétif, Alger, Batna, Tissemsilt, Djelfa, and Tiaret (^[17], Dhamani, pers. obs.) (Table 1, Figure 3). Meanwhile, there have been no sightings in the entire Algerian Sahara territory. Consequently, our observation in the Kef Doukhane wetland in Ghardaïa is considered the first in the Algerian Sahara, where it is a rare visitor and where it has not been mentioned in studies as old as^[8], nor in the most recent update of birds in

this region by^[9]. Despite the immensity of Algeria, it has only been observed in 14 regions (including ancient observations), all in the northern regions, except our observation in the Sahara, and in different bioclimatic stages (humid, semi-arid, arid, Saharan) at different altitudes (between 1 and 980m a.s.l.), in the main post- and prenuptial migration seasons between August to November and March to April, and during the winter period from November to February (Table 1, Figure 3).



Figure 2 Grey Plover at Kef Doukhane, Ghardaïa (Photo A. Chedad, May 16, 2023).

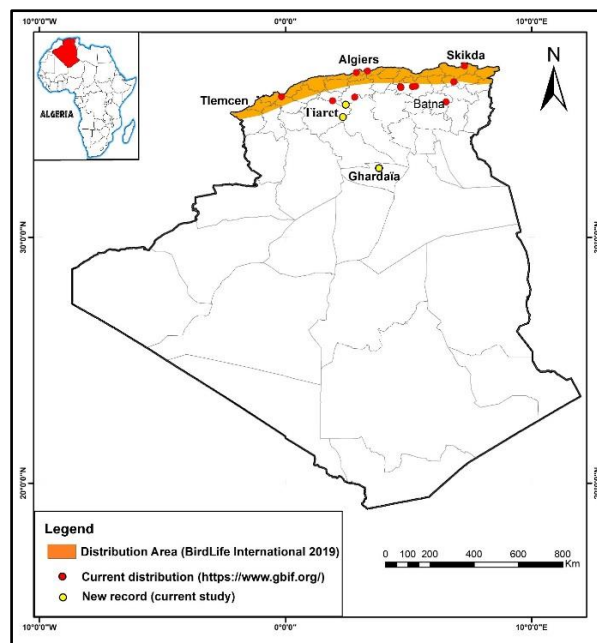


Figure 3 Distribution map of Grey Plover sites in Algeria.

The Grey Plover is classified as a species of least concern (LC) on the IUCN Red inventory^[17] and at the national level; it is protected by Algerian executive Fiat 12-235 of May 24, 2012, establishing the inventory of non-domestic animal species that are protected. It is considered a wintering species in some coastal regions and a passing visitor in others.

In Kef Doukhane wetlands (Algerian Sahara), several species were discovered for the first time: Black stork (*Ciconia nigra*), Western Reef Heron (*Egretta gularis*), and Ring-necked Duck (*Aythya collaris*)^[16,17], in addition to expanding the nesting range of many other species, including the Little Egret (*Egretta garzetta*), Squacco Heron (*Ardeola ralloides*), and Black-crowned Night Heron (*Nycticorax nycticorax*)^[14, 18,20].

Table 1 All observations of the Grey Plover in Algeria (old and recent).

N°	Wetland	Altitude (m)	Bioclimatic stage	Type	References
01	Reghaia lake (Algiers)	1	Humid	Natural	[15,17]
02	Zeralda (Algiers)	26	Humid	Natural	[15,17]
03	El Macta (Oran)	1	Humid	Natural	[8,15,17]
04	Oued El-Kebir (Skikda)	34	Humid	Natural	[8,15,17];
05	Medjana Dam (Bordj Bou Arreridj)	980	Semi-arid	Artificial	[17]
06	Ain Zada Dam (Bordj Bou Arreridj)	847	Semi-arid	Artificial	[17]
07	El Aria Dam (Constantine)	755	Semi-arid	Artificial	[8,15,17];
08	Sétif (Ain Arnat)	957	Semi-arid	Artificial	[17]
09	Timgad Dam (Batna)	974	Semi-arid	Artificial	[17]
10	Bouhrara Dam (Tissemsilt)	814	Semi-arid	Artificial	[17]
11	Boughezoul (Media)	630	Semi-arid	Natural	[8]
12	Zmalet El Emir Abdelkader (Tiaret)	826	Arid	Natural	Current study(Dhamani, pers. obs.)
13	Malha (Djelfa)	697	Semi-arid	Natural	Current study (Dhamani, pers. obs.)
14	Kef Doukhane (Ghardaïa)	430	Saharan	Artificial	Current study (Chedad, pers. obs.)

In general, the Algerian Sahara is noted whenever there are range expansions or new records for some waterbird species, such as the Spur-winged Lapwing (*Vanellus spinosus*) at Djamaa^[21], the Common Crane (*Grus grus*), and the European Golden Plover (*Pluvialis apricaria*) in Ghardaïa and El Ménéa^[18], the Red Phalarope (*Phalaropus fulicarius*) in Illizi^[22], the Striated Heron (*Butorides striata*) in Illizi and Tamanrasset^[23,24], the White-headed Duck (*Oxyura leucocephala*) in Oued Righ at Touggourt^[25], and the African Crake (*Crecopsis egregia*) at Béni Abbès and Illizi^[26,27].

4. Conclusion

Due to the immensity of Algeria, especially the Sahara, each time new species are added to the bird list of Algeria, the range and breeding sites of some species expand. And it happened in the Kef Doukhane wetland at Ghardaïa on May 16, 2023, when a single individual of the Grey Plover was spotted at this site, where it is one of Algeria's rare species and is considered the first in Algeria's Sahara.

Since the plover species has not sufficiently exercised its right to study in Algeria, it is necessary to conduct research on it at the national level in order to ascertain the number of breeding pairs with nesting areas, the number of individuals wintering, and the possibility of ringing some adolescents to aid in the determination of these species' flight paths.

Author contributions

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Conceptualization, AC; methodology, AC, AHB and WD; software, AC and AHB; validation, AC, AHB, MAH and WD; formal analysis, AC; investigation, AC, AHB, ABA, WD, MAB, MM, AB and AHM; data curation, AC and AHB; writing—original draft preparation, AC; writing—review and editing, AC and AHB; visualization, AC; supervision, AC. All authors have read and agreed to the published version of the manuscript.

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Conflict of interest

The authors declare no conflict of interest.

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