

Greater Flamingo (*Phoenicopterus roseus*) breeding again in Morocco after more than half a century

M. Radi, E.M. Laghzaoui, R. El Hamoumi, A. Qninba, A. Rihane & M. Dakki

Introduction

The Greater Flamingo *Phoenicopterus roseus* is common passage migrant and winter visitor in Morocco. In winter, the species frequents more than 40 Moroccan wetlands (lagoons, bays, estuaries, dam reservoirs, sebkhas) with an average annual population of about 5,000 individuals (Dakki *et al.* 2020). The largest concentrations are found at the coastal sites of Khnifiss Lagoon, Oued Saquia Al Hamra wetland complex in Laâyoune, Dakhla Bay and at the inland site of Sebkhâ Zima (during wet years). During the summer season, several hundred birds, mostly immatures, frequent some Moroccan wetlands.

The Greater Flamingos observed in Morocco mainly come from breeding colonies in Algeria, Spain, France, Italy and probably also Mauritania for the individuals that frequent the wetlands of the Atlantic Sahara (Bergier *et al.* 2022). The west Mediterranean metapopulation numbers, at 2014-2018, is about 340 000,370 000 individuals (Waterbirds Populations Portal 2022) whereas it was only 165,000 individuals in 2004 (Béchet *et al.* 2005).

Over the last few decades and following the increase in breeding numbers, particularly in the Camargue (France) and Donâna (Spain), the Greater Flamingo has undergone a remarkable expansion in the Mediterranean area with the appearance of several new colonies in southern Europe (Spain, Italy, and Turkey) (Johnson and Cézilly 2007; Baccetti *et al.* 2008) and in North Africa (Johnson 1995; Samraoui *et al.* 2006).

In Morocco, the nesting of the Greater Flamingo was recorded at Lake Iriki (Middle Drâa) between 1957 and 1968, and breeding numbers varied between 500 and 1500 pairs (Panouse 1958, 1965; Robin 1966, 1968). The species deserted this nesting site after it dried up following the construction of the El Mansour Eddahbi dam near Ouarzazate in the 1970s. It should also be noted that breeding attempts were reported at Saquiat Al Hamra region (at Daoura and Laâyoune) (Valverde 1957) and nesting was suspected at Khnifiss Lagoon (Valverde 1957; Naurois 1961, 1969) and at Sebkhâ Zima (Robin 1967).

No other observation of nesting or attempted nesting of the species have been reported in Morocco during the last half-century. Recently, two of us, M. Radi and E.M. Laghzaoui, both members of GREPOM (Groupe de REcherche pour la Protection des Oiseaux au Maroc), discovered a breeding colony at the Khnifiss Lagoon.

Presentation of the Khnifiss Lagoon

The Khnifiss Lagoon (also known as Naïla by some locals) is located on the Moroccan Atlantic coast, 120 km south of Tan-Tan and 70 km north of Tarfaya. This wetland is characterised by a Saharan bioclimate with a warm winter, (Figure 1). With a total area of about 20,000 ha, the lagoon was classified as a Ramsar site in 1980 (reviewed again in 2005, Dakki *et al.* 2005), and was an integral part of the Khnifiss National Park since its creation in 2008. The wetland is a flagship of Moroccan protected areas, offering an astonishing diversity of biotopes in a harsh desert environment but with sumptuous landscape beauty. It corresponds to a complex that brings together several wetlands: the Khnifiss lagoon and the vast sebkhas that extend to the south (Sebkhâ Tazra) and to the west (Sebkhâ Mzeira), the adjacent marine coast, a temporary lake (Daya Laaouina) and the riffle of the Oued Awedri.

The Khnifiss Lagoon is a vital stopover area for hundreds of thousands, if not millions, of migratory birds using the East Atlantic flyway. It is also one of the best Moroccan wintering areas for the Greater Flamingo, with an average number of 1,365 individuals. During migration, higher numbers are observed with a maximum of 6,000 individuals recorded in October 2021 (GREPOM observation).



Figure 1. Aerial view of Khnifiss Lagoon and the surrounding desert area (from Google Earth).

Results

As part of GREPOM's strategy to monitor breeding waterbirds and in the framework of an East Atlantic Flyway Initiative project (see acknowledgements) a team from GREPOM's Marrakech-Safi regional unit, consisting of Professor M. Radi and PhD student E.M. Laghzaoui, surveyed the Khnifiss Lagoon and its extension towards Sebkha Tazra between 01 and 04 June 2022. The presence of a large number of adult flamingos (883 individuals) and the favourable conditions for their reproduction (abundance of food, lack of disturbance and the presence of a sandy-clay island surrounded by water), encouraged us to further prospect this wetland. Moreover, the nesting of the Greater Flamingo in the Khnifiss lagoon had already been suspected in the past (Valverde 1957; Naurois 1961, 1967; Robin 1967).

From an observation point located about 2 km from the colony, we estimated more than 120 the number of breeding pairs (Photos 1, 2, 3). This number could increase if birds seen in courtship (Photo 4) join the islet after the withdrawal of water.



Photo 1. Colony of Greater Flamingo observed on an island at Khnifiss Lagoon (M. Radi).



Photo 2, 3. Greater Flamingo incubating and building nests at Khnifiss Lagoon (M. Radi).



Photo 4. Greater Flamingo in courtship at Khnifiss Lagoon (M. Radi).

Conclusion

Following the discovery of this Greater Flamingo breeding colony at Khnifiss lagoon, remote monitoring will be carried out during this season to estimate the real size of the colony (number of occupied nests) and the breeding success (number of young flamingos fledged). The difficult access to the area will probably protect the colony from predators and human disturbance. In addition, the National Agency for Water and Forests (ANEF) will monitor and prohibit access to the site in order to limit disturbance and guarantee the long-term survival of this breeding colony.

This breeding event reinforces the strategy of the National Water and Forestry Agency and GREPOM/Birdlife Morocco developed during the last few years to encourage Greater Flamingo to nest in Morocco. These initiatives, which involves the construction of artificial nests, were carried out at the Khnifiss lagoon, and then at Sebkhia Bou Areg (a.k.a Marchica) in Nador, and a third experiment is planned the mouth of the Massa river (Souss-Massa National Park).

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Authors

Mohamed RADI

Département de biologie, Ecole Normale Supérieure Université Cadi Ayyad, Marrakech, Maroc / GREPOM-Birdlife Maroc.

El Mustapha LAGHZAOU

Laboratoire d'Eau, Biodiversité et Changement climatique. Faculté des Sciences Semlalia Université Cadi Ayyad, Marrakech, Maroc / GREPOM-Birdlife Maroc

Rhimou EL HAMOUMI

Laboratoire d'Ecologie et d'Environnement, Faculté des Sciences Ben M'sik, Université Hassan II de Casablanca, Maroc / GREPOM-Birdlife Maroc.

Abdeljebbar QNINBA

Laboratoire de Géo-Biodiversité et Patrimoine Naturel (GEOBIOL), Institut Scientifique, Université Mohamed V, Rabat, Avenue Ibn Battouta, BP 703 – 10090, Agdal, Rabat, Maroc.

Abdeslam RIHANE

Département des Sciences de la Vie et de la Terre, Centre Régional des Métiers de l'Education et la Formation (CRMEF) Casablanca-Settat, Casablanca / GREPOM-BirdLife. Maroc.

Mohamed DAKKI

Institut Scientifique, Université Mohamed V, Rabat, Avenue Ibn Battouta, BP 703 – 10090, Agdal, Rabat, Maroc / GREPOM-Birdlife Maroc.