



Biodiversity, Phenological Status and Community Composition of The Waterbirds In Eastern Hauts Plateaux Wetlands of Algeria

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ABSTRACT

This study was conducted at the level of seven (7) bodies of water in the Oum el Bouaghi wetland complex (highlands of eastern Algeria) in order to evaluate the structure and composition of the waterbird community that frequents the sites. Our results allowed us to inventory 41 species belonging to 13 different families. Among these families we note the family of Anatidae which is the richest in terms of species and abundance. The majority of the species observed in these wetlands have a phenological status of nesting and / or sedentary, which illustrates the essential role of this complex for the balance of birds between Algerian wetlands. On the other hand, no significant variation between sampled stations is noted during the years 2014 and 2015 respectively. Finally, we point out the importance of this complex for some endangered species cases of the Marbled Duck, the White-headed Duck and the Ferruginous Duck hence the need for a management plan for these wetlands.

Keywords: Wetland complex, Structure, Composition, Phenological status, Management plan.

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INTRODUCTION

Stochastic movements, as a response to spatiotemporal variations on an environmental gradient within an animal community, have long fascinated scientists (SAMRAOUI et al., 2012). Algeria is famous for the richness of these habitats and the potential of these wetlands (BOULKHSSAIM, 2007, KHELIFA et al., 2011). These wetlands are very rich in biodiversity and extremely productive (SEDDIK, 2010), they play a vital role as wintering and / or breeding areas or as staging areas for some birds of the Western Palearctic (Stevenson et al., 1988) and among these wetlands those of the highlands of East-Algeria. These wetlands of the highlands contain about twenty sites of international importance divided between 04 main wilayas: Khenchela, Batna, Sétif and Oum EL Bouaghi (Maazi, 2009). This contribution aims to expose the evolution of the number of waterbird community at the level of the seven wetlands located in the wilaya of Oum El-Bouaghi, the specific diversity within this community and to identify the phenological status and IUCN status of these waterbirds.

MATERIAL AND METHODS

Site description

The wetlands of the East-Algerian highlands (Figure 1) are, a set of salt water or soft water, located between the wilayas of Setif, Batna, Khenchela and Oum El Bouaghi (Bougoudjil et al.,

2015), dispersed on a surface of 150 Km and perched between 800 and 1200 m of altitude. This region is characterized by: a vast expanse, muddy ground and a harsh climate making its study and census very difficult (Ochando & Jacobs, 1978). These water bodies located south of Constantinois belong to the semi-arid bioclimatic stage (dry and cold in winter and hot in summer). It was noted that precipitation is infrequent during our study period. The majority of these bodies of water experience intense evaporation and are dry throughout the summer period. The flora that colonizes the region is atypical of saline environments where several halophytic plant species are noted at the level of this eco-complex: *Atriplex halimus*, *Sueda fruticosa*, *Moricondia arvensis* and *Salsoola fruticosa*, other cosmopolitan species such as *Carex divisa*, *Scirpus maritimus* and *Phragmites australis*. A crustacean (*Artemia salina*) essential for the diet of the Flamingo is very abundant in these wetlands (Maazi, 2009).

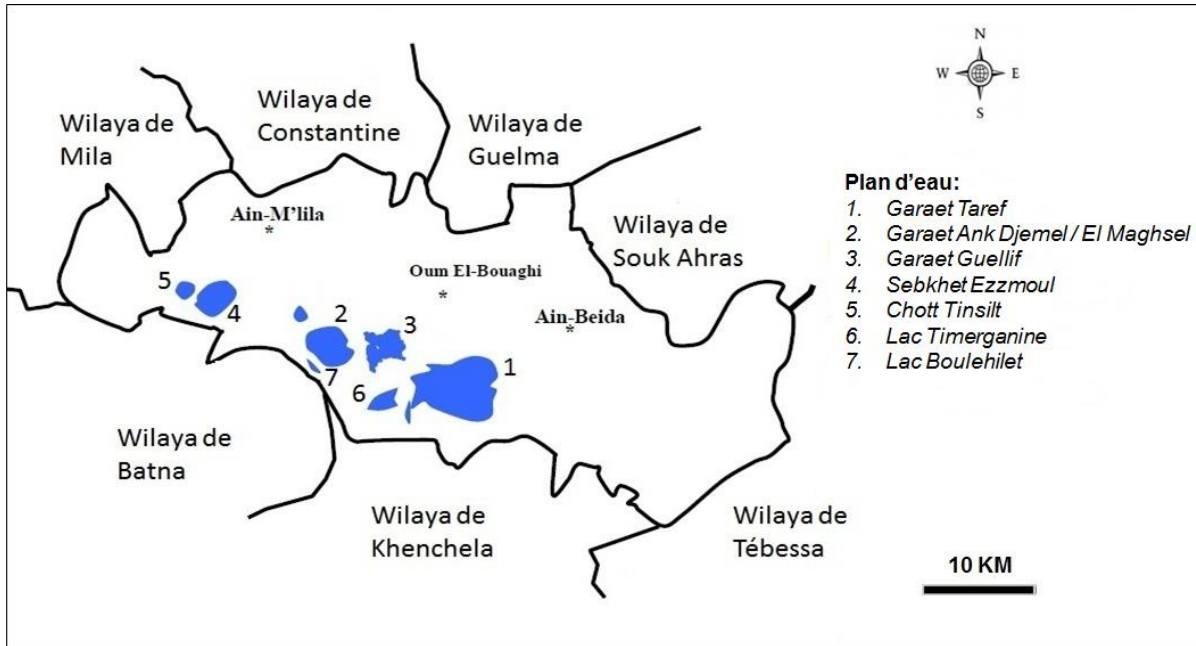


Figure 1. Location map of the study area.

Data Collection

Our study focuses on the counting of waterbirds at the seven (07) stations of the highland wetlands complex of eastern Algeria (Table 1), from the beginning of January 2014 to in December 2015. This count of these waterbirds was carried out using an Optolyth 80 telescope at a frequency of one exit per month.

The method chosen for the waterbird stand count is based on observer and stand size: The absolute method is chosen if the observer is at a distance of less than 200 m and the size of the

stand does not exceed 200 individuals, otherwise, if the stand exceeds 200 individuals and is more than 200 m from the observation point, the relative method is adopted (Lamotte and Bourliere, 1969; Blondel, 1975).

The level of legal protection of the stations visited during our study is noted according to the Ramsar Convention Report and BirdLife International's IBA Global Program for the Identification and Protection of Critical Bird Conservation Sites (Table 1) (Fishpool and Evans, 2001).

Table 1. Checklist of Oum El Bouaghi wetlands.

Station code	Name of the station	Area	Status
01	Garaet Tarf	25.500 ha	Ramsar / IBA
02	Garaet Ank-Djemel / ElMaghsel	8550 ha	Ramsar
03	Garaet Guellif	5.525 ha	Ramsar
04	Sebkhet Ezzmoul	4600 ha	Ramsar / IBA
05	ChottTinsilt	3600 ha	Ramsar / IBA
06	Lac Timerganine	250 ha	Ramsar
07	Lac Boulehilet	100ha	Ramsar

Data Analysis

A normality test of the census data distribution is performed. If the normality is not respected a transformation of the values in log10. The Kruskal-Wallis test is applied to compare the number of birds at the seven stations with a level of significance α which is considered at 5%.

RESULTS

During our field trips, we have noted the presence of 41 species belonging to 13 families, among these water birds we mention 4 species described in the Algerian legislation and

according to the IUCN red list as species: near-threatened, case Ferruginous duck and Eurasian Curlew; Vulnerable case of marbled Duck or in danger case of the White-headed Duck.

The Figure 2 shows the spatial and temporal variation of the waterbird population at the seven stations visited. The maximum number of people recorded at the station level is recorded in February 2014 (37229 individuals) and in April 2015 (31729 individuals) (Figure 3). No significant difference was recorded between the number of these waterbirds at the seven stations sampled during 2014 (Kruskal-Wallis test: $K = 7.85$, $p\text{-value} = 0.345$, $n = 12$) and during 2015 (test from Kruskal-Wallis: $K = 9.84$, $p\text{-value} = 0.197$, $n = 12$).

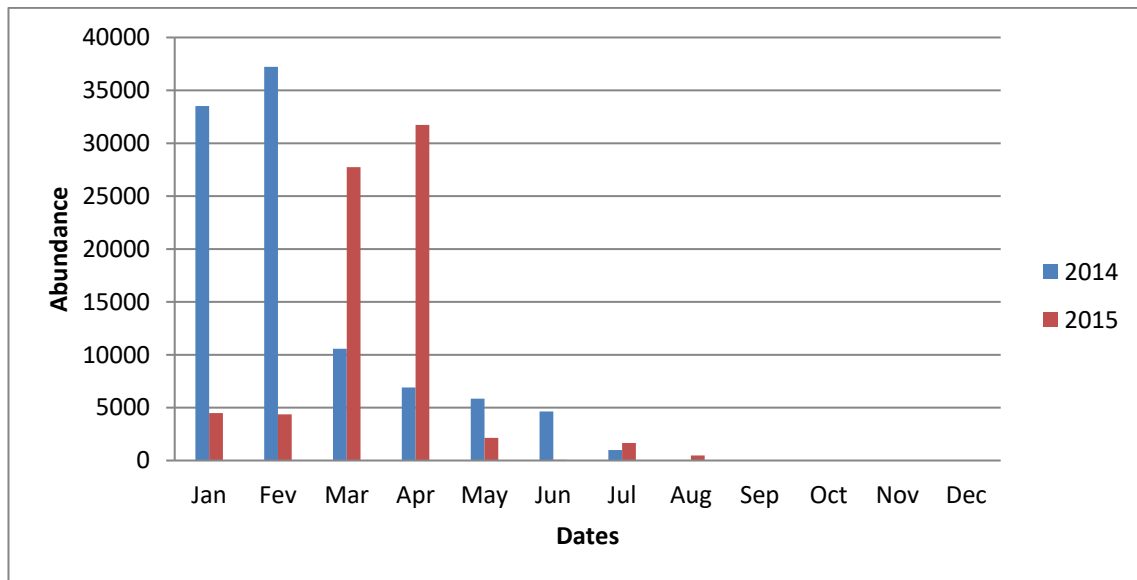


Figure 2. Temporal evolution of the number of waterbirds in the wetlands of Oum El-Bouaghi.

TAXONOMIC COMPOSITION OF THE AVIAN POPULATION

Anatidae

It is the most abundant family and richest in terms of species at the sampled stations, indeed 14 species were observed at the level of the seven (7) stations (Figure 1) of the eco-complex wetlands of the highlands.

Podicipididae

This family has a restricted distribution, represented only by two species, it is located at station 6 (Lake Timerganine).

Rallidae

This family is represented by two species, Eurasian coot that colonizes station 6 and the Sultan chicken hen that colonizes stations 1 and 3 (Garaet Taref and Garaet Guellif).

Gruidae

Rare and restricted in distribution, this family is represented by a single species observed at stations 1, 2, 3, 4 and 6. It is a common species in the highlands.

Recurvirostridae

Two species, the avocet and the Black-winged stilt are observed at stations 1, 2, 3, 4, 5 and 6. These species are common and breed in these wetlands.

Acciptiridae

Noted at three stations, station 1, 2, 6 and 7, this family is represented by a single species that is scarce in the stations visited. Generally, the census count never exceeds 4 individuals.

Laridae

Not very abundant and represented by only three (3) species, this family has a restricted distribution, observed at stations 1, 4 and 6 during the wintering period.

Sternidae

The Sternidae family is represented by two species, the Gull-billed tern which frequents the stations 1 (Garaet Taref), 4 (Sebkhat Ezzemoul), 5 (Chott Tinsilt) and 6 (Timerganine lake) and the Whiskered tern that frequents the stations 1 and 4 with a population of 80 at the beginning of April.

Scolopacidae

We observed 7 species of Scolopacidae, 2 Waders (the Common greenshank and the Spotted Redshank), 2 species of Sandpiper (the Dunlin and the Little stint), a single species of Curlew (Common Curlew (Eurasian curlew)) and a Common Snipe, their distribution is recorded in stations 1, 4, 5 and 6.

Phoenicopteridae

This family includes two species of Greater Flamingo and the

Lesser Flamingo located in saltwater and brackish water stations (Sebkhat Ezzemoul, Chott Tinsilt, Garaet Guellif, Garaet Taref and Timerganine Lake).

Phalacrocoracidae

It is formed by a single species, the Great Cormorant which is rare and restricted in distribution with only 3 individuals, station where the species is present: 6 (Timerganine Lake).

Threskiornitidae

Observed only in January, this family includes two species: the Glossy Ibis and the Eurasian spoonbill, which are scarce with localized distribution (at Station 6).

Ardeidae

The Ardeidae are represented by five common species of Algerian wetlands: The Cattle Egret, the Gray Heron, the Little Egret, the Great Egret and the Squacco Heron. This family is very abundant and widely distributed in all the stations visited.

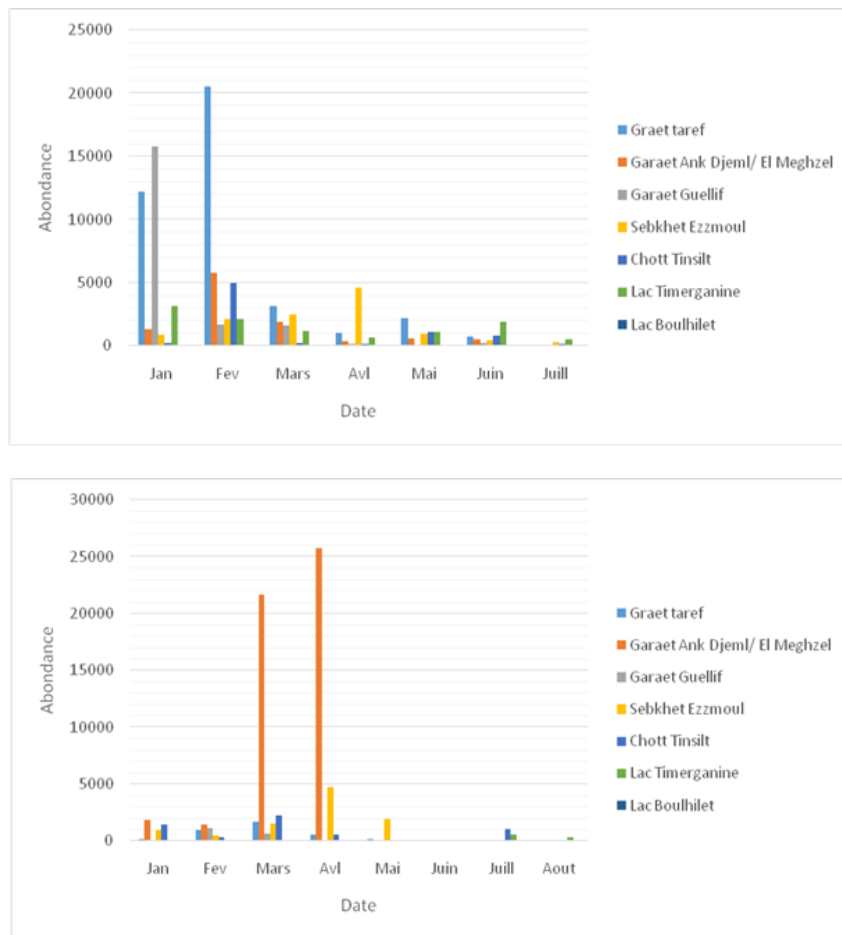


Figure 3. Spatial-temporal evolution of waterbirds number in Oum el Bouaghi wetlands

Phenological status of the avian population

The phenological status of the 42 species observed in the seven wetlands of Oum el Bouaghi is summarized in Figure 4. The majority of the species that frequent these water bodies have a status of wintering and / or sedentary breeder in Algeria. A single species that frequently overwinters in these wetlands but

reported as an occasional breeder in other Algerian wetlands after Isenmann and Moali (2000) is the Great Cormorant or only one nesting attempt was reported in the island of Agueli (Algiers) by Boukhalifa (Isenmann and Moali 2000). On the other hand, two species: the Slender-billed gull and the Common shelduck have a breeding status in these wetlands.

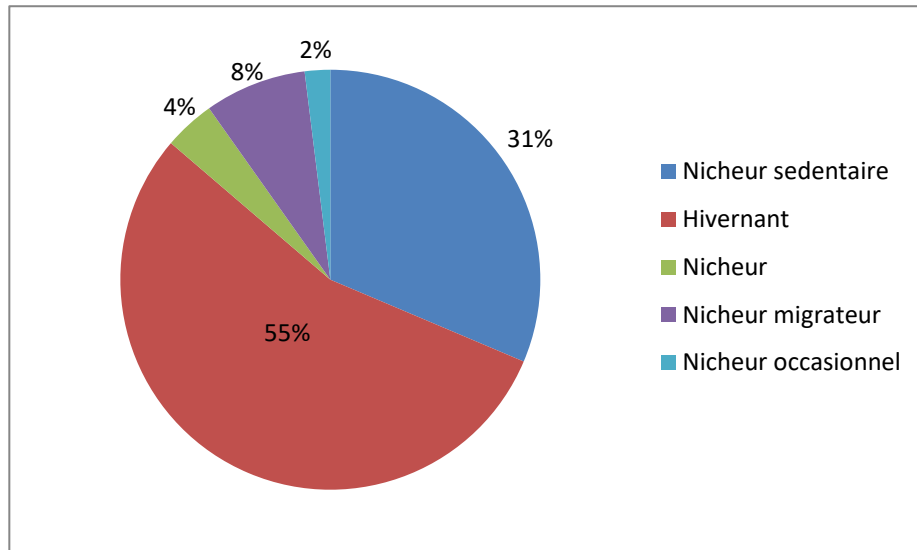


Figure 4. Phenological status of waterbirds observed in the wetlands of Oum El-Bouaghi.

DISCUSSION

Our study on the waterbirds of the wetlands of Oum el Bouaghi has demonstrated the interest of these water bodies for the maintenance of this birdlife in the region. The seven stations visited during the years 2014 and 2015 are frequented by 41 species belonging to 13 families. In another context, the maximum number of people accommodated in these wetlands is recorded during the period from January to April, which shows the role played by these wetlands as wintering quarters for birdlife (Boulakhssaim *et al.*, 2006, Saheb *et al.*, 2006, Samraoui *et al.*, 2006, Maazi *et al.*, 2010). Among these waterbirds that frequent the humid areas of the highlands of eastern Algeria (Oum el Bouaghi), three species are considered vulnerable, near threatened and / or critically endangered species: the marbled Duck, the Ferruginous Duck and the white-headed duck (Boulakhssaim 2007, Saheb 2008, Maazi 2009, Seddik 2011). Among the Anatidae observed in the wetlands of Oum el Bouaghi, one species (Red-crested pochard) reported in a single survey throughout the study period probably passing to the wetlands of the western highlands. These species reported in these wetlands have a variable phenological status; the majorities are wintering and / or sedentary breeders.

Guergueb *et al.*, (2014) reported that the use of an ecosystem by avifauna depends mainly on its impoundment, which confirms a sharp decrease in the number of waterbirds in these wetlands of Oum El-Bouaghi and especially in 2015 or almost the majority of these plans of water been dry during all the year.

CONCLUSION

Like our results, we have found that the wetlands of Oum El-Bouaghi (highlands of eastern Algeria) continue to play a key role as a stopover and / or as a wintering and nesting area for some key species despite low precipitation rates in the region. In addition, several endangered species frequent these sites, hence the need to take more measures in the management of these areas already protected by national and international legislation.

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