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Mohamed Dhaya El-Hak Khemis

A) Laboratoire Ecologie des
Systèmes Terrestres &
Aquatiques (EcoSTAQ).
Département de Biologie.
Faculté des Sciences, Université
Badji Mokhtar d'Annaba,
Algeria

B) Laboratoire Biologie, Eau &
Environnement (LBEE), Faculté
SNV-STU, Université 8 Mai 1945
Guelma, Algeria.

Mousslim Bara

A) Laboratoire Biologie, Eau &
Environnement (LBEE), Faculté
SNV-STU, Université 8 Mai 1945
Guelma, Algeria.

B) Département de Biologie,
Université de Bouira, Algeria

Okba Boumaaza

A) Laboratoire Ecologie des
Systèmes Terrestres &
Aquatiques (EcoSTAQ).
Département de Biologie.
Faculté des Sciences, Université
Badji Mokhtar d'Annaba,
Algeria.

B) Laboratoire Biologie, Eau &
Environnement (LBEE), Faculté
SNV-STU, Université 8 Mai 1945
Guelma, Algeria

Zihad Bouslama

Laboratoire Ecologie des
Systèmes Terrestres &
Aquatiques (EcoSTAQ).
Département de Biologie.
Faculté des Sciences, Université
Badji Mokhtar d'Annaba,
Algeria

Moussa Houhamdi

Laboratoire Biologie, Eau &
Environnement (LBEE), Faculté
SNV-STU, Université 8 Mai 1945
Guelma, Algeria

Correspondence

Mousslim Bara

A) Laboratoire Biologie, Eau &
Environnement (LBEE), Faculté
SNV-STU, Université 8 Mai 1945
Guelma, Algeria

B) Département de Biologie,
Université de Bouira, Algeria

Phenology and diurnal behavior of Northern Shoveler (*Anas clypeata*) and Eurasian Teal (*Anas crecca crecca*) at marsh of El-Feid (Northeast of Algeria)

Mohamed Dhaya El-Hak Khemis, Mousslim Bara, Okba Boumaaza, Kheireddine Boucherit, Zihad Bouslama and Moussa Houhamdi

Abstract

An ecological study of the Northern Shoveler (*Anas clypeata*) and Eurasian Teal (*Anas crecca crecca*) in the marsh of El-Feid was performed during two wintering season (2014/15 and 2015/16) which showed that these two species were regularly wintering in this ecosystem. The highest numbers were recorded during November 2014, when Eurasian Teal reach 637 individuals and Northern Shoveler reach 485 individuals. The population of these two Anatidae was highest during the first wintering season than the second. Sleeping activity (or diurnal resting) dominate the diurnal behaviors of these two Anatidae at marsh of El-Feid and represent 38% for the Northern Shoveler and 41% for the Eurasian Teal.

Keywords: Anatidae, Northern Shoveler, Eurasian teal, marsh of El Feid, diurnal behavior

1. Introduction

The Anatidae is the common waterbirds taxa in the wetlands of North Africa during the winter period [1, 2]. Sixteen species formed this family in the Algerian wetlands [3, 4]. Numidia which situated in north-east of Algeria is formed by exceptional wetlands in North Africa according to its dimensions, particular diversity and abiotic parameters such as water depth and salinity. These conditions determine biological wealth of the sites during the bird migration [5]. However the importance of the submerged areas is bounded to the precipitation. The marsh of El-Feid is a small area which is surrounded by the vegetation and set in water with early September. Among the wintering waterbirds in this wetland, the shoveler (*Anas clypeata*) and the Teal (*Anas crecca crecca*) which regularly are seen from the start of September. These two species were the subject of many works with interest to their phenology and wintering strategies. The aim of this work is to study the structure and wintering strategy of these two species in this wetland (marsh of El-Feid, northeast Algeria).

2. Site description

The marsh of El-Feid (Figure 1, 36 ° 08 ° 47' N, 7' E) is located in the eastern part of Numidia with an altitude of 11 m from the Mediterranean. It is an annex wetland to the largest marsh in the region: the Marshes of Mekhada which is classified as Ramsar site. The marsh of El-Feid resulted from water drainage channels built to protect the national road 44 against flooding. The annual rainfall varies between 700 and 960 mm and depth of this wetland varies between 0.3 and 1.2 m. The geographic position of this lake is about fifteen kilometers south of another Ramsar site (Lac des oiseaux 70 ha). The marsh of El-Feid is dominated by: *Scirpus maritimus*, *Scirpus lacustris*, *Typha angustifolia*, *Phragmites australis*, *Iris pseudacorus* *Juncus acutus*, *Juncus maritimus* that cover almost 70% of this pond.

3. Materials and methods

In order to determine the changes in number and the ecology of wintering of the Northern Shoveler (*Anas clypeata*) and Eurasian Teal (*Anas crecca crecca*) in the marsh of El-Feid from Septembers to April (2014/15 and 2015/16) this study was done. All observations were performed using a binocular 90 x 90 or a telescope *Konus* 20 x 60. First, count was done according to two methods depending on the population size, when the number did not exceed,

200 individuals, birds were counted individually, if the number exceed 200 individuals, birds were estimated [6-9]. Then, the diurnal time budget of these two ducks was made

following the scan method [10-14]. Five activities were measured: feeding, sleeping, swimming, flying and preening [15-17].

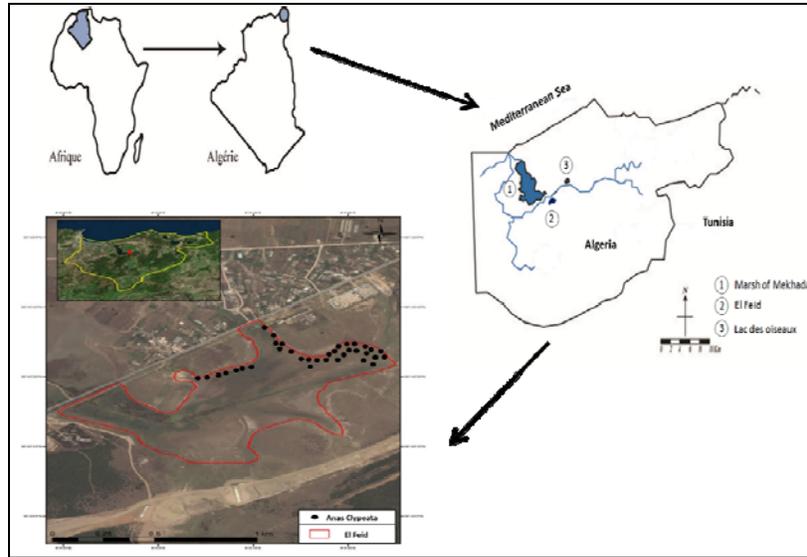


Fig 1: Location map of study area

4. Results

4.1 Abundance

Northern Shoveler and Eurasian Teal colonize the marsh of El-Feid early September and remain there until the end of March. The number of the Teal is highest than the Northern Shoveler (Figure 2A and Figure 2B). The peak of Teal number was noted in November (637 individuals and 421 individuals in 2014/15 and 2015/16 respectively). After that we observed downward phase corresponding to a gradual decline of numbers until the end of March (Fig. 2A). There was a significant difference between the two consecutive seasons (Student test =3.149, *p-value*=0.004). The Northern Shoveler number was different between the two wintering seasons (Student test = 3.58, *p-value*=0.001), two peaks were recorded during the study period, the first in November (485 individuals in 2014/15 and 310 individuals in 2015/16) and the second in mid-February (395 individuals in 2014/15 and 243 individuals in 2015/16). Also it is noted that the two species occupied the north eastern sector near the bank of the marsh.

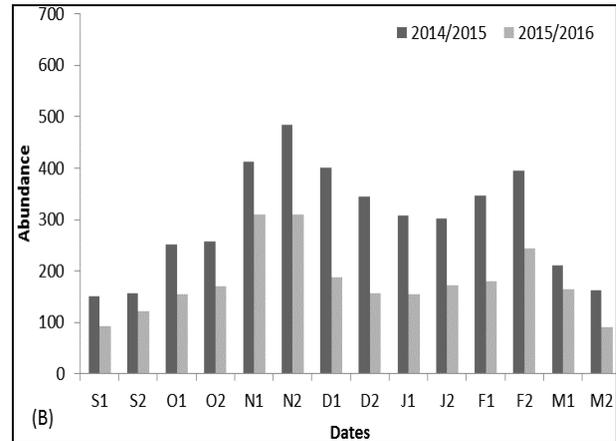
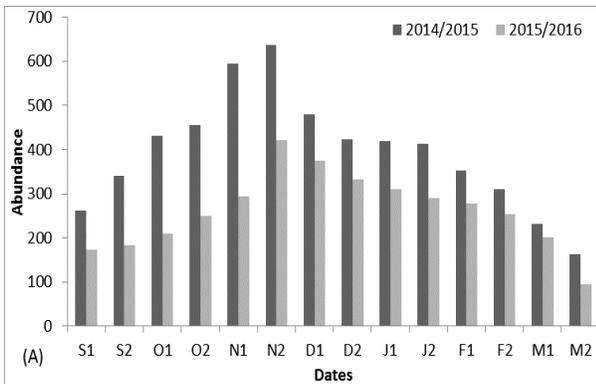


Fig 2: Numbers of Eurasian Teal *Anas crecca crecca* (A) and Northern Shoveler *Anas clypeata* (B) at El-Feid Marsh.



4.2 Diurnal time budget

The diurnal time budget of the Teal and the Shoveler was dominated by sleeping activity which hold more than a third of the total budget time (Figure 3). The Eurasian Teal sleeping proportion represented 41% of all activities, followed by the swimming activity (19%), the preening (17%), the feeding (13%) and the flying (10%) (Figure 3A). The diurnal time budget of the Northern Shoveler was also dominated by the sleeping (38%), then the swimming activity (21%), the feeding (17%), the preening (plumage maintenance) (13%) and finally the flying (11%) (Figure 3B).

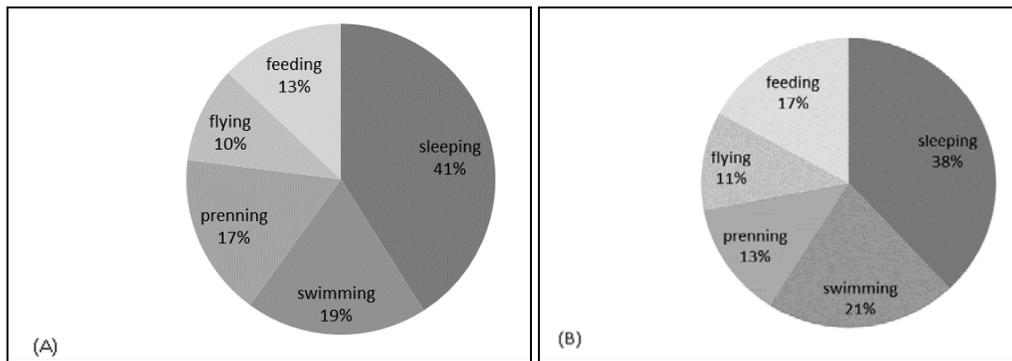


Fig 3: Diurnal time budget of Eurasian Teal *Anas crecca crecca* (A) and Northern Shoveler (B), at El-Feid Marsh.

5. Discussion

The marshes of El Feid is an important wintering wetland for two ducks, the Eurasian Teal and the Northern Shoveler. The Maximum number of these two birds was 485 individuals and 637 individuals respectively, these numbers were similar to that reported in previous study at Garaet Hadj Tahar (Guerbes-Sanhadja wetlands, North-East of Algeria) [18, 7]. The results of the time budget of these two ducks were similar to that reported in north bank Mediterranean Sea [19, 20, 14]. Also, the feeding was an important activity for the waterbirds especially that the marsh of El-Feid was dominated by zooplankton and phytoplankton species which formed the main diet of the ducks [19, 21, 22], in order to restore the energetic stock of birds [3].

The marshes of El-Feid is considered as an annex wetland to the marsh of Mekhada and a wintering area for two ducks in northeast of Algeria: the Northern Shoveler (*Anas clypeata*) and the Eurasian Teal *Anas crecca crecca*. It is interesting to study the behavior of these two ducks in different bioclimatic region and follow the breeding phenology and characteristics in order to preserve the biodiversity in this region.

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