



## Time Budget of Gadwall *Anas Strepera* Wintering at Garaet Hadj-Tahar (Guerbes-Sanhaja, Northeast Algeria)

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### ABSTRACT

The study site of Garaet Hadj-Tahar (36 ° 51 ' 50 ' ' N, 07 ° 15 ' 57 ' ' E) 112 ha, has classified Ramsar site since 01/02/2001. It is part of the Guerbes-Sanhaja complex (northeast of Algeria). Our contribution consists in making a count of the individuals of the wintering population of the duck Gadwalls *Anas strepa* who frequent this site for two seasons (2013-2014 and 2014-2015) and follow their diurnal activities. The wintering population of the Gadwalls Duck uses the pond during the wintering season and the sleep activity dominates with 75.04% showing the role of the wetland's delivery field. The maximum number of 1026 individuals is recorded during the month of February 2015.

**Keywords:** Diurnal Activity Rhythm, Hadj-Tahar, Wetland, Migration, Gadwalls Duck *Anas Strepa*.

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### 1. INTRODUCTION

The presence of water birds indicates the value and the importance of aquatic ecosystems. They are the biological models which most studied by researchers and scientists throughout history. Indeed, their biology and ecology has been the subject of several studies and the first studies began in the years 70 in the Camargue (France) by Siever et al. (1995); Alladlee et al. 1989 in Atoussi, 2014. In Algeria, the study of these birds began only at the end of this century but remain weak enough to show the true value of these circles.

The eco-complex of Guerbes-Sanhaja (north-eastern Algeria) occupies among the most important areas of reception, wintering and reproduction of the water birds of the Mediterranean basin. Garaet Hadj Tahar is part of this complex. It hosts large numbers of surface ducks and mainly ducks Gadwalls *Anas strepa* where we followed during two wintering seasons the ecology of its wintering from the phenology to monitoring the evolution of the workforce at the distribution and spatio-temporal occupation of this species in the study of diurnal behavior of these individuals. This study helps to improve our ecological knowledge about the role that wetlands of Guerbes-Sanhaja complex can play in maintaining this species whose ecological requirements are still poorly documented in our vast country.

### 2. MATERIAL AND METHODOLOGY

Garaet Hadj-Tahar is located at the level of the municipality of Ben-Azouz (36 ° 51 ' 50 ' ' N, 07 ° 15 ' 57 ' ' E). This water body is a 112 ha coastal pond designated as a Ramsar site since February 2, 2001. It is part of the Guerbes-Sanhaja wetland complex which is part of the Algerian North Numidia formed by several wetlands in the form of salt lagoons such as Garaet Dahria, freshwater lakes, such as Garaet Sidi Mackenzie and freshwater marshes as Ain Abdul (Fig. 1). This ensemble is located in the wilaya of Skikda, on the eastern coast of Algeria. It is bordered to the west by the coastal hills of Skikda and to the east by the coastal massif of Chetaïbi (Annaba) (Metallaoui and Houhamdi 2008, 2010).

Garaet Hadj-Taher is a bowl of fresh water fuelled by rainwater runoff (Fig. 2). It has an elongated oval shape and is characterized by plant diversification, including rare species in Algeria. The massifs of *Nymphaea alba*, *Typha angustifolia*, *Phragmites australis*, *Scirpus maritimus*, *S. lacustris*, *Iris pseudoacacurus*, also bordered by a belt of vegetation composed mainly of *Juncus acutus*, *J. maritimus*, *Olea europea*, *Asphodelus aestivus*, *Rubus ulmifolius*, and grass lawns dominated by *Cynodon typistn* and *Paspalum distichum* (Samraoui and De Belair, 1997). 47 species belonging to 15 bird families were seen, noting mainly three species are very important internationally. The tufted duck *Aythya nyroca* and the white-headed duck *Oxyura leucocephala* and the purple swamphen *Porphyrio porphyrio* nest in the Garaat (Metallaoui and Houhamdi 2008). The study began from November 2013 until May 2015. Bi-monthly outings were made from 9:00 a.m. to 4:00 p.m. Counts and follow-up of the studied individuals have been carried out from several observation points according to the site accessibility and the density of the present vegetation. Thus, using a pair of binoculars and a long view KONUS 20 × 65, we tried to carry out individual counts and follow-up of the daily activities of the waterfowl if the size of the group or the

population has fewer than 200 individuals and is at a Close distance not exceeding 200 m. Otherwise, if the group or population of waterfowl is remote and has a fairly large number, we make visual estimates (Blondel, 1975; Lamote and Bourlière, 1969). This method is most widely used in winter surveys of aquatic birdlife, but has a margin of error varying

between 5 and 10% depending on the experience of the observer, the material used and the study site structure, i.e. the Presence and abundance of vegetation as well as height of héliophytes (Lamotte and Bourlière, 1969, Houhamdi, 2002; Bara et al., 2014).

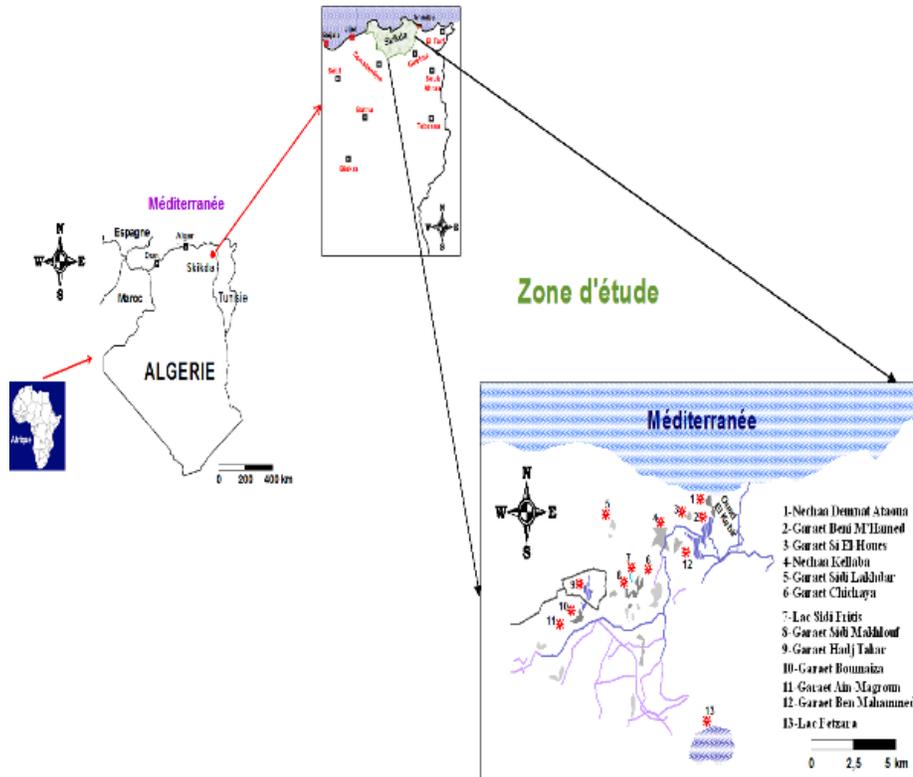


Figure 1. Location map of the study area



Figure 2. General View of Garaet Hadj-Tahar (personal photo 2015)

### 3. RESULTS

Generally, these gadwalls ducks, like the majority of waterfowl, prefer to use the central areas of the water body throughout

the wintering season and away from the disturbance (Fig. 3). The population of this duck often is divided into small groups that use different sectors.

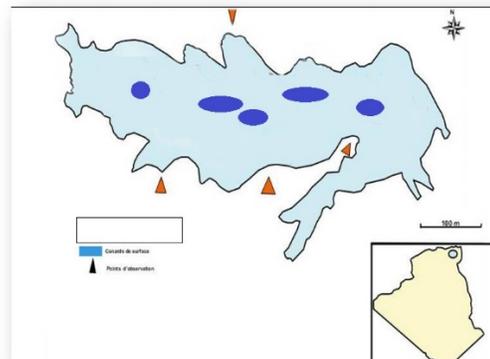


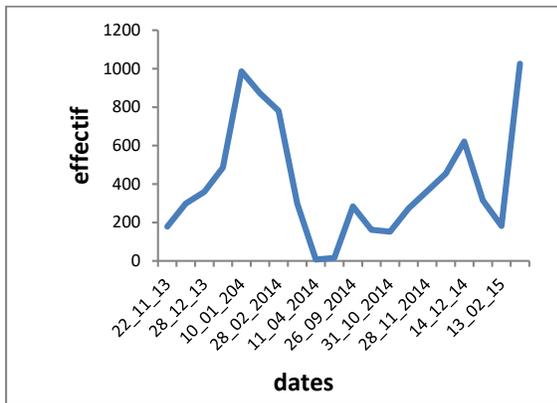
Figure 3. Spatial Occupation of individuals of the Gadwalls duck population *Anas strepera*

**3.1. Wintering Phenology**

The literature study conducted on the Gadwalls duck states that this species shows a status of wintering species often coming from the second decade of October with low numbers. The species is also wintering in the Garaet Hadj-Tahar and throughout the eastern Numidia with the other waterfowl (Samraoui and De Belair, 1997, Houhamdi 1998, Isenmann and Mouali, 2000, Houhamdi and Samraoui, 2002).

**3.2. Number of individuals Evolution:**

In general, following the monitoring of the evolution of the numbers of duck Gadwalls *Anas strepa* in the different wetlands of the Guerbes-Sanhaja complex indicate the presence of the latter at the level of Garaet Beni Hamed, Garaet Hadj-Tahar and Garaet El-Hammond. The numbers show an increase from the beginning of December and January, when we observe the most important numbers of duck gadwalls (Fig. 4). We note that the highest number recorded during the two wintering seasons studied is noted during the first decade of the month of March 2015 which corresponds to a maximum of 1026 individuals, which represents a fairly high numbers as well as the presence of other species wintering or breeding for the size of the site which is only 112h and even for the presence of this species during other seasons (Metallaoui, 2010). The lowest number was recorded during the first decade of April 2014, when we observed 7 individuals.

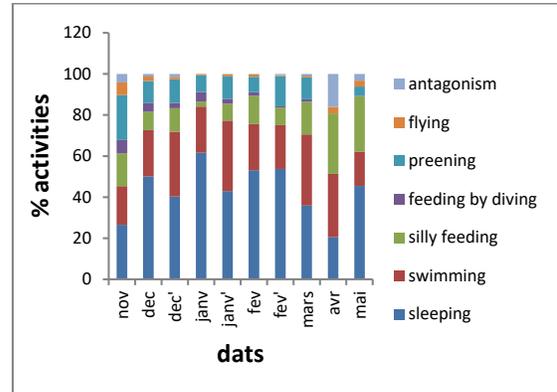


**Figure 4.** Temporal Evolution Numbers of Gadwall *Anas strepera* in Garaet Hadj-Tahar in 2013-2015

**3.3. Evolution of Activities**

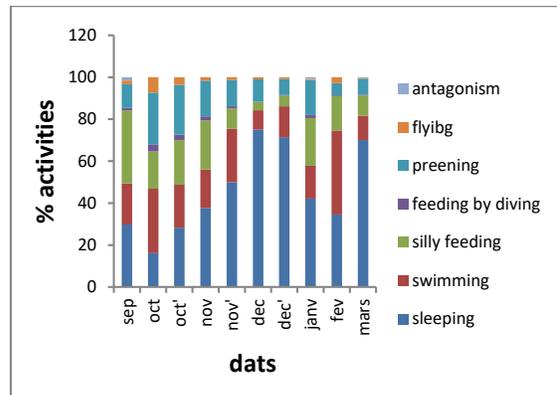
**Season 1:** The following data collected a 80 h follow-up allowed us to draw up an overall record of diurnal activity rhythms which show that the predominant activity is sleep with 61.64%, followed by swimming with 34.63% and 29.43% for the feeding per beak at the Water surface, 21.86% for grooming and maintenance of the body 16.07% and 4.11% antagonism and successive flight. During the 2013-2014 winter seasons, changes in the time allotted for each activity indicates that sleep or daytime rest is especially important in the mid-season, from January to February with values exceeding 50% (Fig. 5). Regarding sleep, this activity is well noticed in the morning between 10am and 1pm indicates that individuals need rest as they feed at night. Swimming is a very important activity in wintering individuals who exhibit a very strong gregarious behavior or the movement of a single individual leads to movements of the present set of birds, an

activity that evolves in a very Irregular and several peaks exceeding 30% are recorded during the season. For food and nutrition of gadwalls duck individuals during the day show that individuals some prey from time to time sting when swimming or moving to the surface of the water.



**Figure 5.** Evolution of the average of the activities (2013-2014) of the duck Gadwalls *Anas strepa* at the level of Gaaret Hadj-Taher

**Season 2:** The diurnal activity of the Gadwalls Duck is dominated in the first place by resting, even during the second season of our study or it reaches the rates of 75.04%. It is followed by swimming or moving in water with 40.02% (Fig. 6). Swimming rates are higher during the month of October and coincide with the mass arrival of the first winterers. This activity is noted in small groups of six to fifteen individuals. In ducks, this activity is often associated with the food activity (Houhamdi et al. 2009). The duck Gadwalls also swims to change places of rest and during disturbance. An average of 34.81% is noted for food activities where the per-Bec diet marked the month of September, expressing the need of individuals in energy to recover energy expenditures lost during their migratory movements. With regard to grooming, it is especially important in the afternoons and it reaches 24.64% in October, the other activities (theft, feeding by plunge and antagonism) are weak and fluctuate little. Displacement or theft of individuals usually occurs during a disturbance due to raptor over flights or by residents of this wetland.



**Figure 6.** Evolution of the Average of Activities (2014-2015) of Duck Gadwalls *Anas strepa* at the Garet Hadj-Taher

#### 4. DISCUSSION

Waterfowl are wintering avian species in the wetlands of the Mediterranean and Garaet Hadj-Tahar. Among the sites that host them with large concentrations (Metallaoui and Houhamdi 2008, 2010). Thus, during the two wintering seasons of follow-up (2013-2014 and 2014-2015), we recorded a peak consisting of 1026 birds. It should be noted that this number is low compared to what was previously recorded where 1560 individuals were registered in 2006-2007 by Metallaoui and Houhamdi (2008). The same authors estimated similar numbers in the following years: 1000 individuals in 2011, 2012 and in 2013 (Metallaoui, 2010). The fluctuation of the numbers from one season to the other can be a reflection of several factors, the stiffness of the winters and the presence of the farmers are the three elements that influence the winter success of our species. These clusters are indicative of preparation for pre-nuptial migration, translated by a gradual collapse of the total workforce.

The study and monitoring of diurnal behaviors of the Gadwalls Duck showed the sharing of the daily life in six activities. Sleep activity is 75.14% of the total balance sheet. It usually appears as soon as the first winter Gadwalls ducks arrive, which expresses the demand of individuals at rest. The activity of moving in water or swimming comes in second position with 40.02%. It is observed from the early hours of the morning and even the afternoons. It is used to find the best places and the right communities to eat. The food activity comes in third place. It is noted with 34.81% for beak feeding which occurs only in water and observed in individuals during their displacement or it appears that the swimming activity is linked sometimes to the activity of food. Grooming and maintenance of feathers in duck Gadwalls reached 24.64%. This activity is important during the first few days of the arrival of the first individuals. The flight to these gadwalls ducks is around 7.32%. It manifests itself after a disturbance (over flight of the Garaet by diurnal raptors such as the Harrier of the Reed Circus) or following a desire to change locality in the water body. This latter activity also allows birds to group together checking the results of Houhamdi et al. (2009). In general, it should be noted that the duration of the days, the temperature fluctuations and the duration of the lighting of the sky influence the behavior of the people in the wetlands.

#### 5. CONCLUSION

The Garaet Hadj-Tahar with its significant depth and plant diversity plays an important role in the wintering and maintenance of ducks. It hosts a large number of ducks' gadwalls and other waterfowl. The main role of this wetland and all the wetlands on the southern shore of the Mediterranean is to ensure a good wintering season and to allow the formation of couples after the good reception of the wintering birds during the Wintering season. They play a daytime delivery field for all species of waterfowl and mainly gadwalls ducks. The good health of our site also attracts concentrations of gadwalls duck from other wetlands in the area. The other sites, of low areas, close to national and communal roads and rich in aquatic vegetation (Aïn magroute, Garaet Sidi Mackenzie and La Garaet Chichaya) are not very

frequented by these ducks. It should be noted that the distribution of this species and all birds depends on the depth of water, the presence of hélophytes and the proximity of roads and agglomerations. It seems that these birds prefer the large and unobstructed wetlands where they often present a particular grégairisme, testifying that the tranquility conditions the distribution of the species.

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