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Phenology and Reproductive Biology of Common Coot Fulica Atra L in the Hauts Ptateaux, Northeast Algeria

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ABSTRACT

The current study was focused on the reproductive biology of the Common Coot Fulica atra at Ain Zada dam and lake El Aria, in the semi-arid Hauts-Plateaux. In order to study the phenology of this Rallida and to determine the breeding parameters, regular outings were made during the breeding season (between March to June 2017). Count of adults was carried out at weekly basis starting from March using a telescope Optholyth (20x60). The nests and the eggs were measured to determinate the reproductive parameters using a vernier callipes for the length and the breadth and a spring balance for the weight, and we calculated the results using the Microsoft Excel program 2007. The peak in number during the breeding season was recorded in March at these two sites with 415 individuals at lake El Aria and 349 individuals at Ain Zada dam. About the breeding parameters, 42 nest have been recorded at lake El Aria and 49 nest at Ain Zada dam, they were generally observed in the body of water near a mixed vegetation mainly composed of Phragmites (Phragmites australis). Breeding females lay between 1 and 14 eggs at lake El Aria and between 1 and 12 eggs at Ain Zada dam. The eggs' size measured was almost similar in the two sites. Our results indicated that reproductive success was significantly influenced by predation and anthropogenic activities.

Keywords: *Fulica Atra, Numbers, Hauts Plateaux, Reproductive Biology, Phenology, Wetlands, Northeast Algeria.*

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1. INTRODUCTION

The Common Coot *Fulica atra* population is composed of two parts of water bird; a sedentary part and a migratory part (Harrison, 1982). It frequents all humid milieus such as lakes, marshes, rivers, ponds, reservoirs, dams, and channels. As an herbivorous bird, it feeds mainly diurnally on algae and vegetative parts of floating or submerged aquatic plants (Cramp & Simmons, 1980; Tamisier & Dehorter, 1999) and grazes in flocks on grassland in winter (Irwin & O'Halloran, 1997). Despite being widespread, essentially breeding ecology of these species remains relatively poorly studied (Guillemain et al., 2014).

The vast distribution of Coots in Algeria provides a rare opportunity to understand the geographical variation of breeding performances of this species and to identify key ecological requirement of the species for management purposes.

This study aims to present new results on the reproductive biology of Common Coot *Fulica atra L* in the Hauts Plateaux, Northeast Algeria.

2. MATERIALS AND METHODS

2.1 Study sites

The dam of Ain Zada is located in the wilaya of Bordj Bou Arreridj, 25 km to the west of Sétif and 40 km east of Bordj Bou Arreridj (Figure 01). It is established in the municipality from Ain-Taghrout on Oued Boussellam. The study area receives constantly an enormous variety of waterfowl such as Coots, Ducks, Scaups, etc.

The lake El Aria is located in the commune of Ibn Badis in the wilaya of Constantine. It's an important water-body of Common Coot for wintering and breeding. It is very little studied, this freshwater wetland is spacious and it hosts every year a wide variety of water-birds which find in this environment a very favorable place during their migratory transit (Benlaharche & Boulkhssaim, 2018). The biological diversity of the region is very rich in animals, the water quality is very good coming from the storm water discharge of the Bouhamdane watershed. It is a home of a large proportion of fish used as food for the birds sedentary and migratory (Figure 02).

2.2 Methodology

The methods of bird's observation are numerous and dependent on studied species and on study purpose. Two methods are usually used:

a. The absolute method

In this case, the census is called exhaustive because we consider that the population is estimated directly in its absolute value and all the individuals are counted. It is the kept method when the population is close to observation point and the total number of birds does not exceed 200 individuals (Ramade, 1984).

b. The relative method

In this method, the population is estimated by using sampling that includes only a part of the population, we estimated a sample of an average size, then we divided field of vision into several bands and report as many times as number of bands. This method is generally used when individual number exceeds 200 individuals and when the population is far from the observation point (Tamisier & Dehorter, 1999; Altmann, 1974).

The Breeding ecology of the species was studied at two main sites (lake El Aria and Ain Zada dam) from March to June 2017. During breeding season, count of adults was carried out at weekly basis starting from March using a telescope *Optholyth* (20x60). The nests were measured to determinate the environmental parameters (water depth, nests height, internal diameter of the nests and the external diameter). The eggs dimensions were measured using a vernier callipes for the length and the breadth (nearest 0.1 mm) and/or a spring balance for the weight (nearest 1 g).

A nest was considered predated if one egg or the entire contents of the nest showed signs of predation.

2.3 Statistics and Analysis

We used Microsoft Excel 2007 to do the basic statistics (average, maximum and minimum), as well as the different graphs (histograms and sectors).

3. RESULTS AND DISCUSSION

This study indicates the importance of the Hauts Plateaux wetlands of Northeast Algeria as a breeding for the Common Coot (Samraoui & Samraoui, 2007) like many other waterfowl (Boulekhssaïm et al., 2006; Saheb et al., 2006; Samraoui & Samraoui, 2008).

3.1 Phenology of the Common Coot

The Common Coot was seen during the study period in the two study areas. The peak was recorded in March at the lake El Aria with a peak of 415 individual and at Ain Zada dam with 349 individual. According to the (Figure 03), the number of Coots was decreasing progressively from March to June.

The number of Coots is defferent between the two sites, and that might be intributed to some reasons such as the climatic conditions, adequate water depth and quality (Salathé & Boy, 1987),

3.2 Reproductive parameters

a. Number of nests

According to the (Figure 04), during the breeding season the total number of nests installed was 42 at the lake El Aria (25 during the month of April, 13 during the month of May and 4 in the month of June) and 49 at Ain Zada dam (34 during the month of April, 14 during the month of May and 1 during the month of June). There was no installed nest during the month of March. The maximum number of nests was registered during the 3nd decade of April in both sites with 19 nest at the Ain Zada dam and 21 nest at the lake El Aria (Figure 04).

The majority of the Coot's nests were installed in *Phragmites australis (with a high percentage)*, *Typha angustifolia* and *Scirpus triqueter*. The data of nest site selection was similar to those of (Samraoui & Samraoui, 2007) and (Zitouni et al., 2013). The high number of nests found in the large *Phragmites* patch may be explained by; the necessity of Coot to find and to locate in large zone which may, in turn, hold a high trophic resources and suitable nest sites (Huhta et al., 1998) and to be safe.

b. Characteristic of the nests

At Ain Zada dam, the nests were characterized by a mean internal diameter of 19.1 cm, an average external diameter of 33.6 cm, an average depth of 8.1 cm and a mean nest height was 16.8 cm. The average depth of water in nesting areas was 68.9 cm. While, at El Aria dam; the mean internal diameter was 20.4 cm, the mean external diameter was 35.1 cm, average depth was 7.9 cm and the average nest height was 12.7 cm. The average depth of water in nesting areas at this site was 62.3cm (Table 1).

In our results we found a similarity with those of (Metna et al., 2016) at lake Réghaïa and with (Samraoui & Samraoui, 2007) at lake Timerganine in North-Algeria with a little bit of difference compared to ours. We observed a difference between these nests characteristics and the data found by (Nouri et al., 2013) at lake Timerganine, we supposed it was due to the influence of weather on the nests characteristics.

c. Laying period, laying date and laying size

The laying period lasted 3 months with a first egg laid on April 9th and a last noted on June 9th at Ain Zada dam and a first egg laid on 7th and a last noted on June 8th at lake El Aria. Breeding females lay between 1 and 14 eggs at lake El Aria and between 1 and 12 eggs at Ain Zada dam.

The data of the laying date and laying period is similar with those cited by (Metna et al., 2016; Nouri et al., 2013; Samraoui & Samraoui, 2007) in Algeria and with those of (Bezzel, 1967; Havlin, 1970) in Euroupe. The results of the laying size are similar with those cited by (Metna et al., 2016; Nouri et al., 2013).

The laying date and laying period might be influenced by the weather condition, pair age (Perdeck & Cavé, 1989), individuals, ponds (Havlin, 1970) and outgrowth of aquatic vegetation adequate for nesting materials (Sage, 1969; Salathé, 1986).

d. Eggs characteristics

The eggs' size was summarized in the (Table 2), the mean eggs' weight was 37.5g. The mean eggs length noted was 52.3 mm and the mean eggs breadth was 36.2 mm.

The data was similar with those of (Metna et al., 2016) at the lake Réghaïa, (Samraoui & Samraoui, 2007) at lake Timerganine and with those of (Zitouni et al., 2013) in the National park of El Kala**.** We support the suggestion of (Samraoui & Samraoui, 2007) when they reported that no latitudinal gradient influence on the eggs size.

e. Hatching and success of reproduction

First hatchings were recorded in April and the last in June. Maximum number of hatching was observed in April at Ain Zada dam and ranging from 19 April to May 19th at lake El Aria.

During our fieldwork, monitoring of the nests of this species showed a hatching success of 97% for Coot at Ain Zada dam and 92% at lake El Aria, when 3% of eggs failed to hatch at Ain Zada dam and 8% of eggs failed at lake El Aria. Predation and anthropogenic activities had a significant effect on the success of bird reproduction (Figure 05).

High hatching and breeding successes for the Common Coot were recorded in this study. Our data are supported by those of (Rizi et al., 1999; Samraoui et al., 2013; Samraoui et al., 2015; Metna et al., 2016; Boukrouma et al., 2016) for the

Algerian population of Common Coot and it was not supported by those of (Nouri et al., 2013).

The breeding success was influenced by several factors such as water depth and predation (Salathé, 1986; Salathé, 1987), the nature of the habitat (high vegetation density), humans (Salathé, 1987), the nutrient reserve in the body (Hepp, 1984), Food supply and timing of breeding (Perdeck & Cavé, 1992; Brinkhoff et al., 1993; Brinkhoff, 1997; Brinkhoff & Cavé, 1997).

4. CONCLUSION

For water-birds, breeding success depends largely on the choice of nesting site. This choice must respond to certain conditions such as density and height of the aquatic vegetation, water depth, food supply and timing of breeding and quietness.

The sites of nesting were characterized by a high and dense vegetation such as *Phragmites australis*, *Typha angustifolia* and *Scirpus triqueter*.

The results obtained in this study showed that there was a little bit of difference between these nesting sites.

The maximum number of nests was registered during the 3nd decade of April in both sites with 19 nest at the Ain Zada dam and 21 nest at the lake El Aria.

The laying period lasted 3 months with a first egg laid on April 9th and a last noted on June 9th at Ain Zada dam and a first egg laid on 7th and a last noted on June 8th at lake El Aria.

The data obtained in this study showed that there was a little bit of difference in the eggs characteristics in these sites.

In conclusion, this study suggests that Common Coot may be considered as birds almost constant in terms of life-history traits in Algeria. Further studies are necessary to improve knowledge of the ecology and breeding biology of this species which still poorly studied in Algeria.

5. ACKNOWLEDGEMENTS

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6. CONFLICT OF INTEREST STATEMENT

No conflict of interest disclosed for this study.

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Table 1. Caracteristic of the nests of Common Coot at Ain Zada dam and lake El Aria

Characteristic of the nests	Ain Zada dam	Lake El Aria
Mean internal diameter (cm)	19.1	20.4
Mean external diamater (cm)	33.6	35.1
Mean depht (cm)	8.1	7.9
Mean nest height (cm)	16.8	12.7
Mean water depht (cm)	68.9	62.3

Table 2. Eggs characteristics of Common Coot at Ain Zada dam and lake El Aria

Eggs characteristics	Ain Zada dam	Lake El Aria
Egg lenght (mm)	53.2	51.4
Egg breadth (mm)	36.6	35.8
Egg weight (g)	38.7	36.3

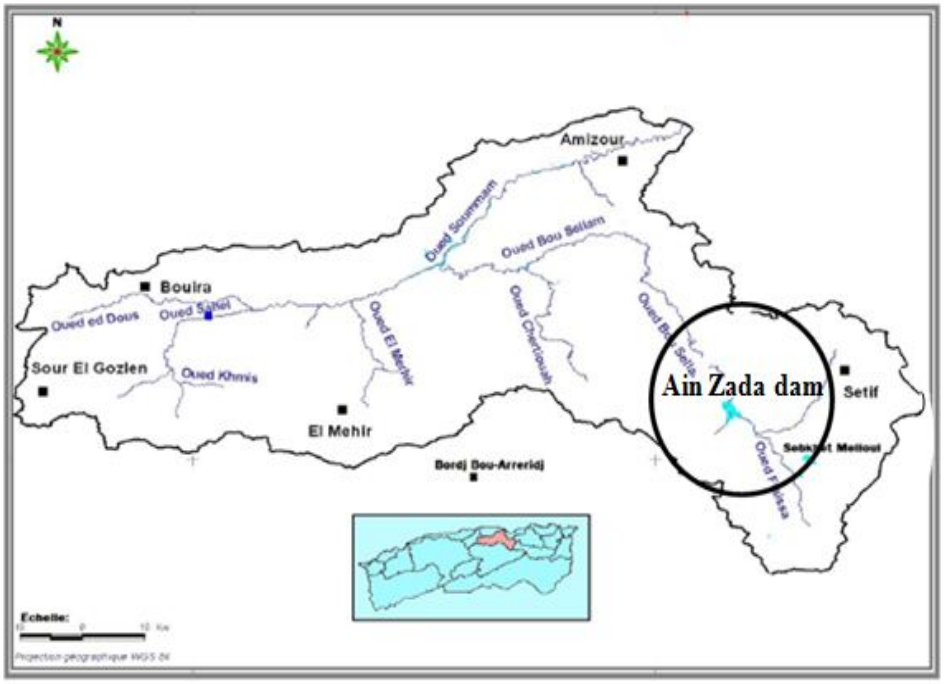

Figure 1. Localisation of Ain Zada dam

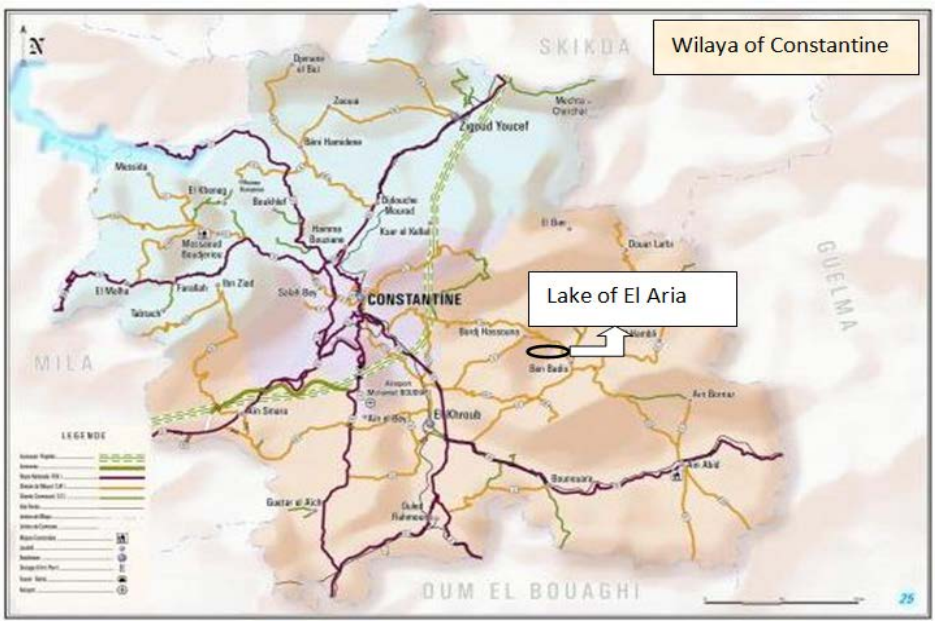

Figure 1. Localisation of lake El Aria

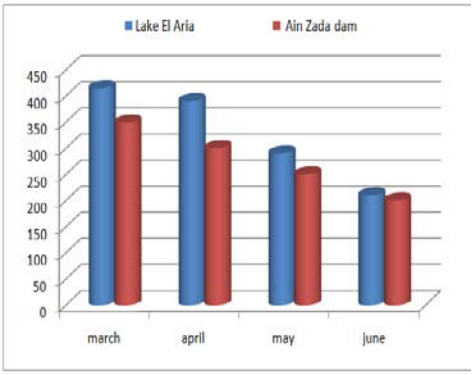

Figure 2. The number of the Common Coot recorded during the breeding season at two sites in the Hauts Plateaux, Northeast Algeria

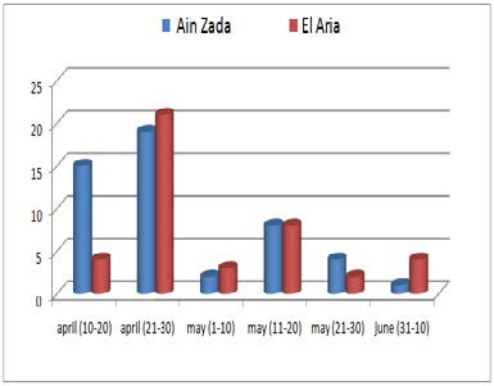

Figure 3. The number of nestes of the Common Coot recorded during the breeding season at Ain Zada dam and lake El Aria

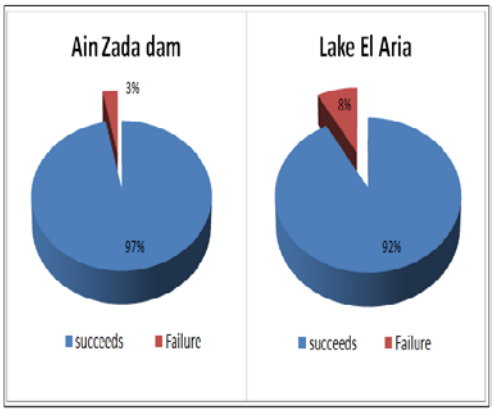

Figure 4. Breeding success of Common Coot in the study areas