

Importance of alder forests for Birds in the North-east of Algeria: composition and structure of breeding birds stands and the effect of Fragmentation

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ABSTRACT

This work attempts to highlight the composition and structure of alder nesting birds in Algeria, more specifically that of El Kala, and the effect of fragmentation on these nesting birds. We carried out the avifauna surveys in each area class by the I.P.A method which will allow us to measure the richness of the alder fowl. We have specified the composition and structure of the stands of pure alder groves in the El-Kala region (various sites). We have characterized the structure of the vegetation and its various parameters: (height of the different strata, overlapping of the strata, etc.) as well as the area (fragmentation). We calculated the different stand structure parameters and performed the stand analysis.

Key words: Alder Grasses, North East Algerian, Breeding birds, Effect of fragmentation.

Introduction

Riverine forests are plant formations that run along rivers and whose communities have a cross-sectional distribution. They take very different forms and aspects and are remarkable elements of natural landscapes. Indeed, it is an ecotone with edge effect, on one side of aquatic environments and on the other terrestrial environments, which promotes a great spatial and temporal heterogeneity of habitats (Décamps, 2003).

Among the great diversity of these wetlands in northeastern Algeria, *Alnus glutinosa* alder groves represent an ecosystem of northern affinity extremely original in North Africa (Junca, 1954; Bensettiti, 1992; Gehu *et al.*, 1994). These formations, although present in northern Morocco (Fennane *et al.*, 1999; Valdes *et al.*, 2002) and northwestern Tunisia (Negre, 1952; Pottier-Alapetite, 1979-1981), are

nowhere so extensive in North Africa only in the Annaba-El Kala and Guerbes-Senhadja wet complexes.

The choice of our biological model was focused on birds. They are good indicators for understanding ecological changes at the landscape scale for several reasons:

- They are sensitive to the dynamics and structure of vegetation (Prodon and Lebreton, 1981) and to a lesser extent to floristic composition (Rotenberry, 1985).
- The ecological requirements, particularly in terms of the habitat of the different species, are particularly well known (Cramp *et al.*, 1977-1994).
- The size of the territories, of the order of a few hectares for most passerines, is well suited to the study of landscape changes (Balent and Courtiade, 1992).

- Their sampling is well controlled (Blondel *et al.*, 1981; Bibby *et al.*, 1992) and has little bias apart from the variation in their intraspecies detectability (Boulinier *et al.*, 1998), depending on the meteorological conditions or the competence of the observers (Sauer *et al.*, 1994; Archaux, 2002).

Despite the large number of studies to date, the consequences of habitat loss and fragmentation on birdlife are still poorly known and relate primarily to forest species (Saunders *et al.*, 1991; Drolet *et al.*, 1999). Several authors have shown that species sensitive to fragmentation seem to be mainly affected by the area of available habitat (Andrén, 1994; Hinsley *et al.*, 1995; Hawrot and Niemi, 1996) and the isolation of the remaining plots (Opdam *et al.*, 1993; Schmiegelow *et al.*, 1997).

The present work attempts to highlight the composition and structure of the breeding alder bird and the effect of fragmentation.

Materials and Methods

Study zone

El-kala National Park is one of the most prestigious protected areas in the Western Mediterranean. Served by a set of natural conditions eminently favorable to an unusual biological richness, it constitutes in this respect one of the relictual landmarks of the geological and biogeographical history of the Mediterranean region.

The El Kala National Park delimits a territory entirely contained in the wilaya of El Tarf. Located in

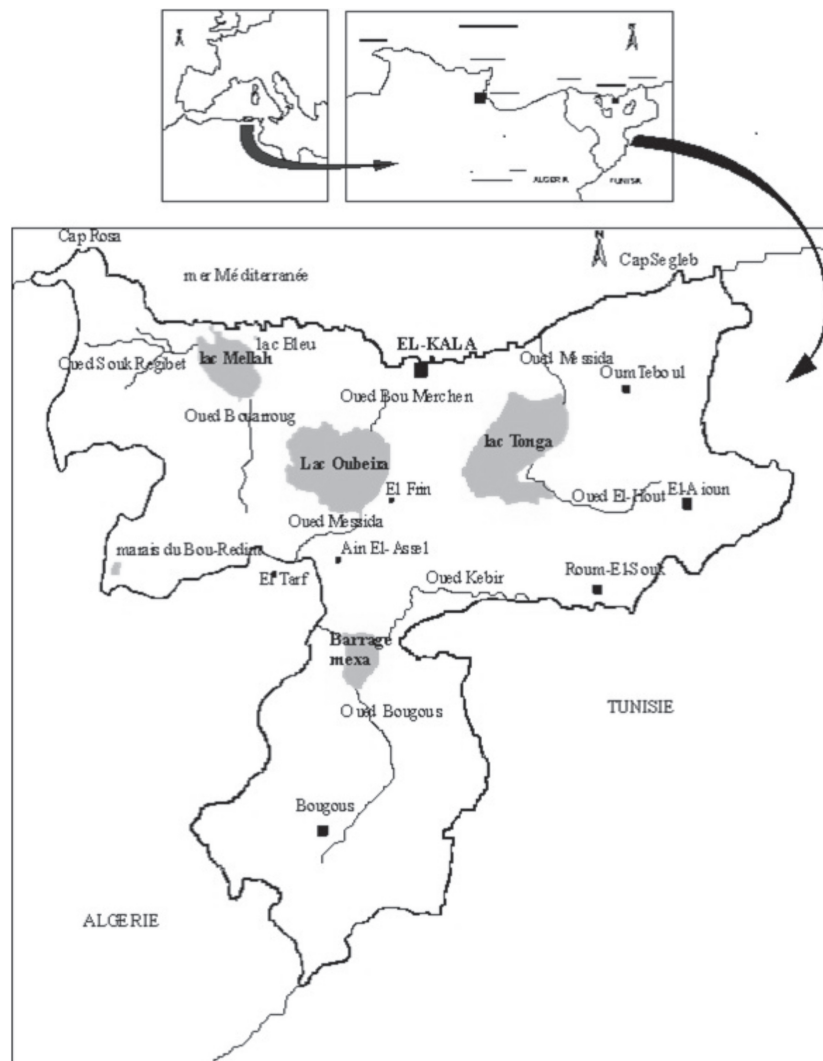


Fig. 1. Map of El Kala National Park (Benyacoub *et al.*, 1998)

the far north-east of Algeria (80 km east of Annaba), it is bounded on the east by the Algerian-Tunisian border, on the north by the Mediterranean Sea on the west by the end of the alluvial plain of Annaba and finally to the south by the foothills of the mountains of Medjerda.

Study site

Our study was carried out in the forest of Souk rguibet and the alder grove of the eastern shore of El Mellah. The first is *Alderus glutinosa* pure alder of Souk Errguibet It is located on the northwestern bank of Lake Mellah, at the foot of Koudiet Medouma; limited to the East, by the road leading to the beach of Cap Rosa and to the South, by Koudiet El Frien. The second is a pure alder at *Alnus glutinosa*, Rive Est Mellah, which is near an urbanized area. Located on the east bank of Mellah Lake, a few meters from the lake, it is surrounded by land cultivated by local residents, limited to the north by dune clusters also under human control, which surround a small depression occupied by the blue lake. It is limited to further east by Douar de Brabtia occupied by maquis high along the blue lake to the coast where it is confronted to the north to the pine forest "*Pinus halepensis*"

Point of abundance index sampling method (I.P.A)

The working method should be selected first and foremost on the basis of the type of results that are sought and then on its feasibility with regard to the means available. Among the different methods of counting that can be used, those of the Punctual Abundance Indices is the most reliable it was developed and described by (BLONDEL, FERRY and FROCHOT 1970), it leads the observer to perform a set of two partial counts of 20 mn each, started on different dates of the same breeding season, the first partial count at the beginning of the season for the early breeders from the end of March to the end of April, the second for the late nidifiers from the beginning of May to the end of month of June.

In the API method, the observer remains motionless on a specific point, for a fixed duration of 20 minutes and notes all the contacts he has with birds. This method allows to know the relative abundance of different species in a given environment.

Results

We note that the ripisylve of Souk Rguibet is characterized by a richer population than that of Al Mellah alder with 30 listed species, against 27. The total wealth is greater at the level of the riverine Souk Rguibet than in that of El Mellah. The total density of the Souk Rguibet river is much higher than that of El Mellah because of the higher total wealth. The diversity and equitability mea-

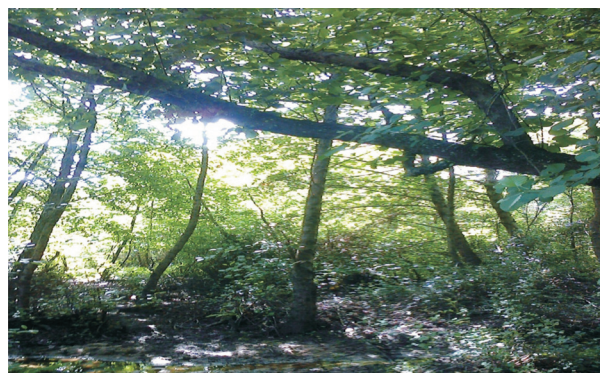


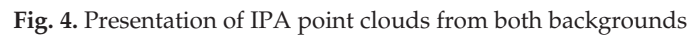
Fig. 2. Alder Grasses of Souk Rguibet



Fig. 3. Alder Grasses of Eastern Shore of El Mellah

Table 1. Comparison of the Structure Parameters of the Birds of the Two Alderlands

	Souk rguibet	Mellah
S: total wealth	30	27
D: The total density of a stand	70.657	41.591
H' Shannon: Diversity	4.266	4.282
E: equitability	0.869	0.9
Sup: area in hectare	22 ha (With 4 patches)	10ha (With 2 patches)



Figures 4 and 5 allow to detect the influence of the measured factors in the overall structure of the point cloud and to retain, where appropriate, the

The total wealth recorded for Souk Rguibet and El mellah is none other than a reflection of the com-

plexity of the vegetation of riparian environments which is a function of its vertical and horizontal stratification. The shape and physiognomy of this vegetation therefore directly influence the diversity of the birdlife.

The density of a bird stand depends on the richness of the stand, in the sense that an increase in this number leads to an increase in the number of birds (Ferry and Frochot, 1970).

The diversity of a stand reflects the difference in composition and distribution of birdlife at the two sites.

The diversity and fairness measured at the Souk Rguibet site are lower than that of El Mellah because of the difference in wealth.

The number of individuals per species increases linearly with the surface of the island but the densities remain constant (Brotons *et al.*, 2003). The densities increase with the surface of the fragments.

Conclusion

The alder trees of El Kala play a very important role for the breeding birds, they will have to be conserved because these environments represent less than 1% of the surface of the PNEK (Benyacoub *et al.*, 2000) harbor an avifauna of a great ecological interest. There are also many large species such as Columbidae, Waterbirds and Raptors. These habitats are threatened by various factors, which are the effect of fragmentation, which leads to a decrease in bird diversity or even extinction of species because they play a habitat role for birds, not to mention livestock and water pumping, which are exclusively dangerous for this environment.

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