THE STUDY OF THE PARASITES OF THE BIRD *Egretta garzetta* (Linnaeus, 1766) (AVES: ARDEIDAE) IN NORTHEASTERN WETLANDS OF ALGERIA

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Abstract. This study was conducted in three wetland sites located in the National Park of El Kala (PNEK), one of the richest wetlands in Algeria, between November 2016 and June 2017. Our work provides information about the external and internal parasites of the little egret (*Egretta garzetta*). Among 11 birds, 6 were infested. The hosts were parasitized by *Ardeicola expallidus* (Blagoveshtchensky, 1940) and *Ciconiphilus decimfasciatus* (Boisduval&Lacordaire, 1835) identified as ectoparasites. However, the internal parasites included 15 species belonging to 12 families. The study is reported for the first time in Algeria.

Keywords: Ardeidae, *Egretta garzetta*, internal parasites, ectoparasites, NPEK.

Rezumat. Studiul paraziților de la *Egretta garzetta* (Linnaeus, 1766) (Aves: Ardeidae), din zonele umede din nord-estul Algeriei. Acest studiu a fost realizat în trei zone umede, situri situate în Parcul Național de El Kala (PNEK), una dintre cele mai bogate zone umede din Algeria, între noiembrie 2016 și iunie 2017. Lucrarea noastră oferă informații despre paraziții interni și externi de la egreta mică (*Egretta garzetta*). Dintre 11 păsări, 6 au fost infestate. Gazdele au fost parazitate de *Ardeicola expallidus* Blagoveshtchensky, 1940 și *Ciconiphilus decimfasciatus* (Boisduval & Lacordaire, 1835), identificate ca ectoparaziți. Însă, paraziții lor interni includ 15 specii aparținând la 12 familii. Studiul este raportat pentru prima dată în Algeria.

Cuvinte cheie: Ardeidae, *Egretta garzetta*, paraziți interni, ectoparaziți, NPEK.

INTRODUCTION

The little egret *Egretta garzetta* is a widespread species, breeding in Europe, Asia and Africa, as well as in Australia (KUSHLAN & HANCOCK, 2005). In Algeria, the little egret was found breeding in several sites such as Chatt, Dakhla, Mekhada, Fetzara, Ile Rachgoun and Tonga and recorded from 40 sites (SAMRAOUI et al., 2011). This study was conducted in three wetlands, represented by Tonga Lake, Oubeira Lake and El-Mellah Lagoon. All are Ramsar sites of ornithological importance in El Kala region (SAMRAOUI & SAMRAOUI, 2008). The Algerian wetlands are important staging posts and wintering grounds for migrating Palearctic birds (BOULKHSSAÏM et al., 2006). However, the impact of such parasites and pathogens on population dynamics and dispersal of local birds is not documented in Algeria, excepting the work of TOUATI et al. (2015). Moreover, these bird will respond to any environmental change by fluctuations in the parameters of populations (TEMPLE & WIENS, 1989); so, they will serve as a basis for the study of the effects of external or internal parasite populations on their health status and consequently their survival and persistence and the results will obviously help us take the necessary conservation measures not only at the level of the region of El Kala, but also of North Africa.

MATERIAL AND METHODS

Study sites

This study was conducted in three lakes, belonging to the wetland complex of the National Park of El Kala region(36° 51’ N,8° 30’ E), Algeria, as part of the survey carried out on birds of the northeastern wetlands of Algeria between November 2016 and June 2017.

Sample data

This study was done on both live and dead birds (11 individuals in total).Biological material was brought to the laboratory of zoology in labeled plastic bags, numbered and closed well in coolers for preserving and preventing the escape of parasites. The ectoparasites were collected after spraying the synthetic pyrethroid insecticides or Avispray (Tetramethrin + Piperonil+ Butoxide) on all the plumage. Supplementary techniques were added in order to recuperate external parasites fixedon the plumage and fallen in the plastic bagsafer by removing the subjects using fine forceps under hind hand-held magnifying glass; then, we stored all of them in ethanol at 70° in order to determine and count them subsequently under binocular or microscope for even smaller ones. The research of internal parasites was carried out by two analyses, the first of which was the coprological examinations and the second was carried out at the level of the various organs and fragments of dead specimens, which had undergone a necropsy; then faecal samples as well as fragments were preserved in Pillboxes containing potassium dichromate for the conservation of long-term parasites. The two examinations were carried out by the floatation technique (HENDRIN & ROBINSON, 2006; SIVAJOTHI et al., 2014) and direct smear technique; then, the found parasites were determined under microscope (×10, ×40 and ×100) using keys of identification (SLOSS et al., 1994; ZAJAC & CONBOY, 2012).

Data analyses

Finally, the statistical analyses were realized by means of the software “Quantitative parasitology V 3.0.” (ROZSA et al., 2000) in order to process prevalence and other several parameters.

RESULTS AND DISCUSSIONS

During the period of study, we recorded 11 individuals of the little egret. Out of the 11 individuals 6 were infested by 14 individuals of ectoparasites. The external parasites belonged to one order, Phthiraptera. Two families were present in this order Philopteridae and Menoponidae. The first one was represented by one species *Ardeicola expallidus* (Blagoveshtchensky, 1940) and the second one by *Ciconiphilus decimfasciatus* (Boisduval & Lacordaire, 1835). PRICE et al. (2003) mentioned these two chewing louse species as typical ectoparasites for *Egretta garzetta* in the World checklist and Biological Overview of chewing lice, as well as VAS et al. (2012) in the checklist of lice of Hungary (Insecta: Phthiraptera). Regarding the internal parasites, *Egretta garzetta* was infected by a range of specimens represented by 13 species collected from trachea, crop and gizzard (Table 1).

Table 1. Total number of parasite identified and detected in *Egretta garzetta* at wetland complex of the National park of El Kala.

Phylum	Order	Family	Parasite species	Ectoparasites	Endoparasites	Number of parasites
Arthropoda	Phthiraptera	Philopteridae	*Ardeicola expallidus*	+		9
Arthropoda	Phthiraptera	Menoponidae	*Ciconiphilus decimfasciatus*	+		5
Apicomplexa	Eucoccidiorida	Eimeriidae	*Eimeria* sp.		+	1341
Apicomplexa	Eucoccidiorida	Eimeriidae	*Isospora* sp.		+	97
Nematoda	Spirurida	Diplotriaenidae	*Serratospiculum* sp. (Eggs)		+	246
Nematoda	Spirurida	Diplotriaenidae	*Serratospiculum* sp.(Larvae)		+	8
Nematoda	Rhabditida	Stephanuridae	*Stephanurus* sp.		+	55
Nematoda	Rhabditida	Strongylidae	*Strongylues* sp.		+	9
Nematoda	Ascaridida	Ascaridiidae	*Ascaridia* sp.		+	97
Nematoda	Ascaridida	Ascaridiidae	*Heterakis* sp.		+	423
Nematoda	Trichocephalida	Capillariidae	Capillaria sp.		+	11
Nematoda	Trichurida	Trichuridae	*Trichuris* sp.		+	7
Platyhelminthes	Strigeidida	Schistosomatidae	*Ornithobilharzia* sp.		+	23
Platyhelminthes	Cestodaindet.	/	Cestoda sp.Indet.		+	189
Amoebozoa	Entamoebida	Endamoebidae	*Entamoeba* sp.		+	74
Ciliophora	Vestibuliferida	Balantiidiidae	*Balantidium* sp.		+	249

Among these species, the most dominant were *Eimeria* sp. represented by 1341 individuals (45.72%), followed by *Heterakis* sp. with 423 individuals (14.42 %), *Balantidium* sp. with 249 individuals (8.49 %) and *Serratospiculum* sp. (Eggs) with 246 individuals (8.39%). The remaining were less present than the previous ones and thus their relative abundance varies between 0.24 to 6.44% (Fig. 1).

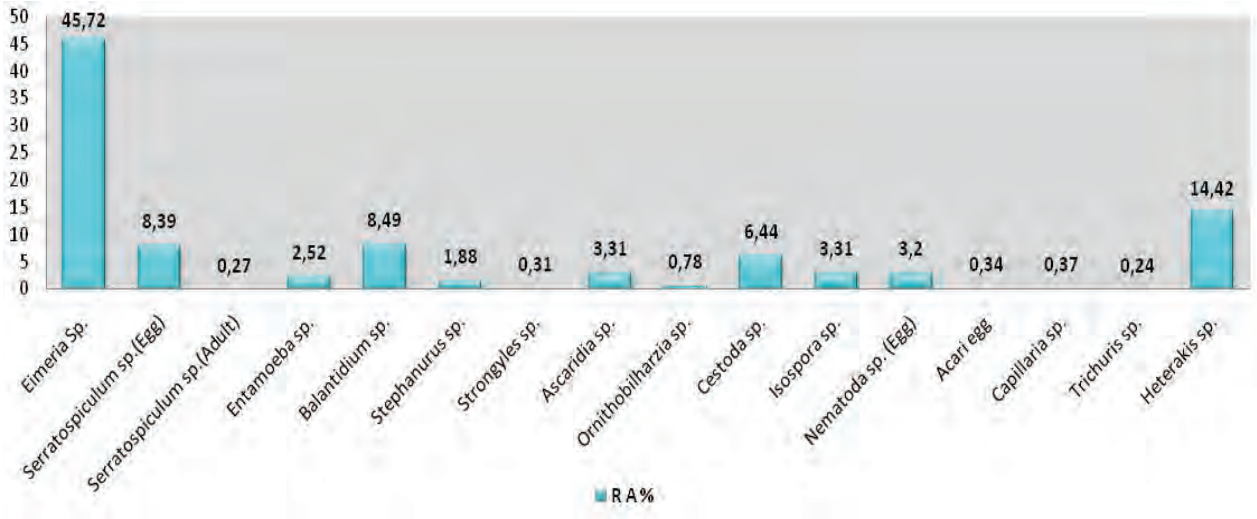

Figure 1. Relative abundance (RA) of internal parasites found in trachea, crop and gizzard of *Egretta garzetta.*

Coprological examinations emphasized that *Egretta garzetta* specimens were infested by 5 species including *Ascaridia* sp. 07 Acari eggs which they were ingested accidently by birds, Trematoda sp. *Eimeria* sp. and *Serratospiculum* sp. These species belonged to Nematoda, Arthropoda, Platyhelminthes and Apicomplexa phyl. NAVARRO et al. (2005) found Nematoda in *Egretta garzetta*. In 2008, Platyhelminthes were detected by ABD-AL-AAL et al. (2008), in the pharynx and esophagus of the little egret. The most prevalent in the 6 samples of feces was *Serratospiculum* sp. with 59 individuals, followed by *Eimeria* sp. with 52 individuals. All 6 samples of feces, were 100% infested by *Serratospiculum* sp. and *Eimeria* sp. and 83.3% by Trematoda sp. We also noted that 66.7% of the samples were infested by Acari eggs and *Ascaridia* sp. (Fig. 2).

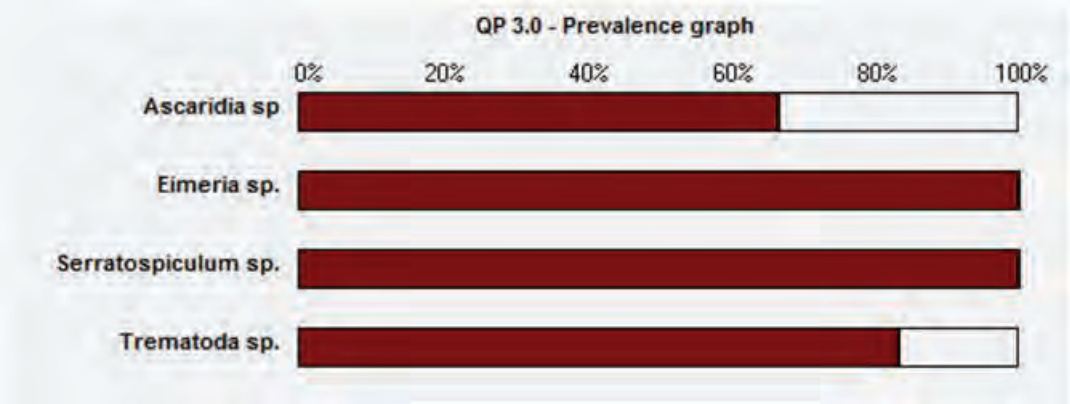

Figure 2. Endoparasites prevalence found in feces of *Egretta garzetta* with software "Quantitative parasitology V 3.0".

According to the classification of BILONG-BILONG & NJINE (1998), data of the average intensity were very low (=1.00) for all species of internal parasites. In Algeria, this study on *Egretta garzetta* is achieved for the first time.

CONCLUSIONS

Our work has revealed a great diversity of parasites in Little egret in the wetland complex of the National Park of El Kala. Few works have been carried out throughout the world, to study the health status of Ardeidae, especially *Egretta garzetta.* In Algeria, this study on *Egretta garzetta* is achieved for the first time. For this reason it will be interesting to study the external and internal parasites on other Ardeidae species to provide important data that can be used for the implementation of action plans for the preservation and conservation of this birds, and why not other birds family**.**

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