

First report of *Sciobia (Sciobia) bolivari* (Chopard 1937) (Orthoptera: Gryllidae), in the digestive tract of the Cattle egret (*Bubulcus ibis* (L. 1758)) in Algeria

Ines Temimi^{1,2*}, Faiza Marniche²

¹Laboratory of Evolutionary and Functional Ecology. Chadli Bendjedid University, El-Tarf, Algeria.

²Laboratory of Zoology, National School of Veterinary Superior of El Alia (ENSV), Algiers, Algeria.

*Corresponding author: TEMIMI Ines

Email: temimi1@hotmail.fr

ORCID: 0000-0003-4954-9523

Reçu le 14 mai 2019, accepté le 9 septembre 2020

In order to determine the diet of the cattle egret *Bubulcus ibis* (L. 1758), a study was carried out from January 2017 until July 2018 in two integral wetlands in El Kala National Park (PNEK). These two sites are included in the list of the Ramsar Convention on wetlands of international importance. They are located in northeast Algeria: Oubeïra Lake (36° 50' N, 08° 23' E) and Tonga Lake (36° 53' N, 08° 31' E). The results obtained on a total of 126 cattle egrets allowed us to detect among the ingested prey found in the stomach contents, one species of Orthoptera related to the Ensifera suborder: *Sciobia (Sciobia) bolivari* (Chopard 1937) for the first time in Algeria. This work provided the first report on *Sciobia (Sciobia) bolivari*.

Key words: Ensifera, Ardeidae, El Kala, cattle egret, stomach contents

Afin de déterminer le régime alimentaire du héron garde bœufs *Bubulcus ibis* (L. 1758), une étude a été menée de janvier 2017 jusqu'en juillet 2018 dans deux zones humides intégrales dans le Parc National d'El Kala (PNEK). Ces deux sites sont inscrits dans la liste de la convention de Ramsar sur les zones humides d'importance internationale et sont situés au Nord-est algérien : le Lac Oubeïra (36°50'N, 08°23'E) et le Lac Tonga (36°53'N, 08°31'E). Les résultats obtenus, sur un total de 126 individus de héron garde bœufs, ont permis de détecter, parmi les proies ingérées dans les contenus stomacaux, une espèce d'Orthoptères apparentant au sous-ordre des Ensifères : *Sciobia (Sciobia) bolivari* (Chopard 1937) pour la première fois en Algérie.

Mots clés : Ensifera, Ardeidae, El Kala, Héron, Contenus stomacaux

INTRODUCTION

The cattle egret, *Bubulcus ibis* (L. 1758) (Aves: Ardeidae), is a species of Indo-African origin that has become cosmopolitan today. It is a species with a large food spectrum. Its food is composed of invertebrate prey as well as vertebrate prey (Heim de Balsac & Mayaud, 1962; Etchecopar and Hue, 1964; Moali and Isenmann, 1993; Moali, 1999; Isenmann and Moali, 2000; Boukhemza, 2000; Si Bachir et al., 2001; Si Bachir, 2005; Setbel, 2008; Gherbi-Salmi, 2013). Among invertebrates, Orthoptera generally dominate the composition of the Cattle Egret feed. Kadry-Bey (1942) reported in Egypt 53.7%

of Orthoptera species in the Cattle Egret diet while Burns and Chapin (1969) reported 77% of Orthoptera in southern Louisiana. In northern Florida, the rate is even higher, reaching 96.8% (Fogarty and Hetrick, 1973). In Algeria, Doumandji *et al.*, (1992) estimated this rate at 78.8% of Orthoptera in Drâa EL-Mizan while Si Bachir *et al.*, (2000) found a rate of 63.2% in the Soummam Valley. Finally, the proportions are lower in other regions such as in the Boudouaou region (Mitidja) (Setbel *et al.*, 2004). The fluctuations in abundances of different Orthoptera found by these authors in the trophic menu of the cattle egrets is mainly related to their distribution and availability depending on the bioclimatic stages characterizing each study region, but also according to the seasons and the environments frequented by the cattle egret. Orthopteroids constituting an entomological super-order that have been well studied in Algeria on different points (inventory-bio-ecology-distribution), especially Orthoptera (Chopard, 1943; Damerdji, 1996; Doumandji-Mitiche *et al.*, 2014 and Lakhdari *et al.*, 2015). The Gryllidae fauna, targeted in this study, is known as true crickets belonging to the sub-order of the Ensifera. The genus *Sciobia* (Burmeister 1838) includes many species that have been described. As an example, López-Colón (2001) mentioned *Sciobia (Sciobia) lusitanica* (Rambur 1838) in Madrid, a typical species of open spaces with little vegetation measuring between 15 to 24 mm distinguished by its large cephalic extension and marked by the contrast between the elytral white and the dark color of the rest of the body, especially in males. This species is distributed across Portugal, the southern half of Spain and in Morocco (Eades *et al.*, 2013 in Vega & Segura, 2013). Mohamed Sahnoun *et al.*, (2010) mentioned in his checklist 12 species belonging to this genus in different local of the Algerian territories while Vega and Segura, (2013) reported the presence of 4 species in Iberian Peninsula belonging to two sub-genus including *S.(S.) lusitanica*. It is about *S.(S.) boscai* (Bolívar 1925), *S.(Thliptoblemmus) caliendrum* (Fischer 1853) and *S.(Thliptoblemmus) natalia* (Gorochoff 1985). *S.(S.) boscai* is an Orthoptera which is also present in three provinces located in the south of Spain (Jaén, Albacete and Ciudad), however *S.(Thliptoblemmus) caliendrum* and *S.(Thliptoblemmus) natalia* have a very restricted distribution. They are present in the province of Cadiz and also well distributed in North Africa (Morocco) (Eades *et al.*, 2013 in Vega & Segura, 2013).

The *Sciobia* genus has been reported by several authors as a food source for some species: it was consumed by barn owl (*Tyto alba* (Scopoli 1769) (Aves : Strigiformes)) in Morocco (Rihane, 2005), by coot (*Fulica atra* (L. 1758) (Aves : Rallidae)) in Algeria (Metna, 2012) and by Algerian hedgehog (*Atelerix algirus* (Lerboulet 1842) (Mammalia : Erinaceidae)) in Algeria (Mimoun, 2006). In this work during the characterization of the trophic menu of *Bubulcus ibis* in the El Kala region, we discovered for the first time the presence of the species *S.(S.) bolivari* (Chopard 1937) in Algeria.

MATERIAL AND METHODS

- Study site

This study was conducted in two sites located in El Kala (northeastern Algeria) and administratively attached to the El Tarf region : Oubeira Lake, an open endorheic lake spread over an area of 2200 hectares, located at 36° 50' N and 08° 23' E (Morgan, 1982) and Tonga Lake, an exoretic lake spreads over an area of 2600 hectares, located at 36° 53' N and 08° 31' E (Chettibi, 2014) (Fig 1)

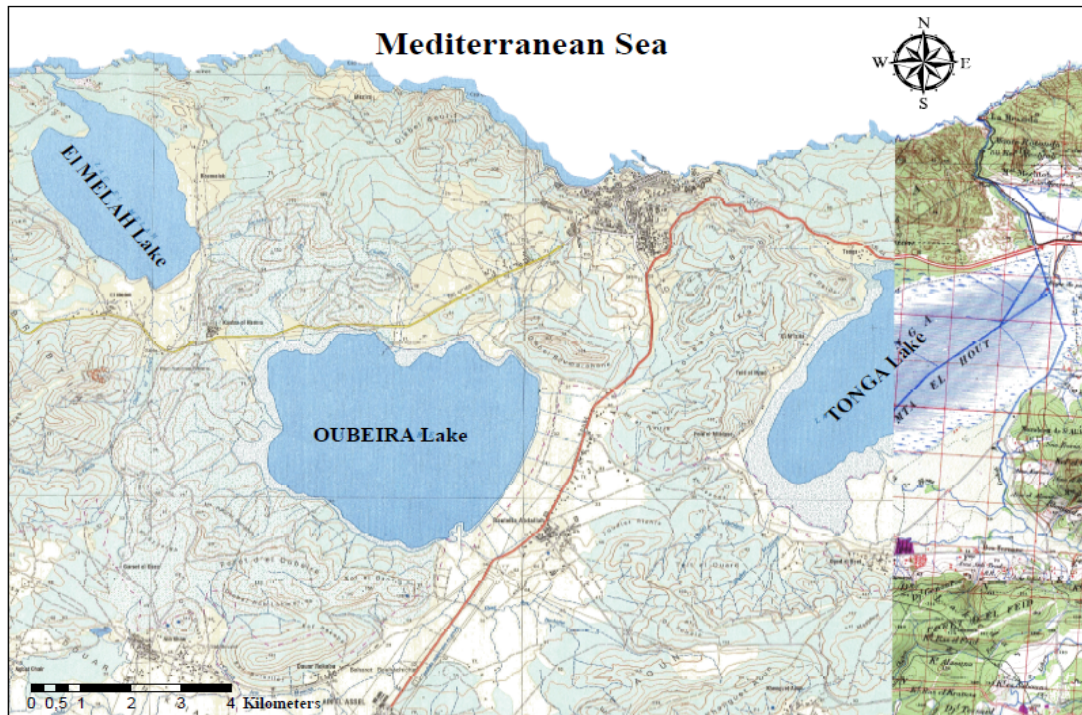


Figure 1 : Location of study sites (Oubeira and Tonga Lake) in PNEK of El Kala (Original, Guezgouz, 2017)

- **Methodology**

The study of the diet of *Bubulcus ibis* is essentially based on the examination of 126 stomach contents of adults collected from individuals died and sacrificed during the period which extends from the month of January 2017 until the month of July in 2018.

The prey analysis was done after dissection of these birds. Subsequently all the intact or fragmented prey consumed by this predator were pulled from the gizzard using entomological forceps and then stored them in alcohol 70%. The prey species were determined under a binocular magnifier (x10 and x 20) at the Zoology laboratory at the National Superior School of Veterinary at El Alia in Algiers, Algeria. The Orthoptera whose determination was confirmed by Professor Marniche F. relying on dichotomous keys from the work of Chopard (1943).

RESULTS AND DISCUSSION

Insects constitute the essential of the Cattle Egret's diet in terms of relative abundance with a frequency of 84% in Tonga Lake and 89% in Oubeira Lake. Orthoptera are among the insects which occupy a moderately large portion of the trophic menu of *Bubulcus ibis* in terms of numbers with a frequency of 16,4% in Tonga Lake and 9,03% in Oubeira Lake.

The results obtained on the prey species ingested by the 126 *Bubulcus ibis* of which 64 individuals are studied in Tonga Lake and 62 individuals in Oubeira Lake allowed us to detect for the first time in Algeria a total of 624 intact *S. (S.) bolivari* and 573 heads. This Orthoptera of 15 mm long (Fig. 3) of the Gryllidae family was a particular part of the diet of our bird species. From the morphological point of view, the external characters were largely sufficient to determine and differentiate the insect species. *S. (S.) bolivari* has a black colored head with some yellowish lines on the occiput, a regularly convex and extremely broad vertex as well as a flattened epicranium (Fig. 4). As for the posterior tibias, they consist of 5 solid spines (Fig. 5). The criteria considered in this research to determine our species are similar to

those described by Chopard in Orthopteroids of North Africa, who has already reported this species in Sker (Morocco) in 1936 (Chopard, 1943). Its synonym is *Mesoblemmus bolivari* (Chopard 1937) and *Lissoblemmus (Mesoblemmus) bolivari* (Chopard 1943). Since this work, *S.(S.)bolivari* has not been mentioned in any publication concerning Orthoptera, from where the objective of this present work to report its presence for the first time in Algeria.

The variation in the number of *S.(S.) bolivari* individuals consumed by the Cattle egrets along the study period in the two study sites is mentioned in (Fig. 2). These results are comparable with those of Bredin (1984) in Camargue, Boukhemza *et al* (2000), Kennouche and Allouche (2000) in Kabylie Algeria, Si Bachir (2005) in Bejaia region, like wise Nefla *et al* (2014) at Ichkeul in Tunisia and Bakour (2016) at Rachgoun Island (Oran, Algeria) who agreed that Orthoptera are a staple food item in Cattle egret.

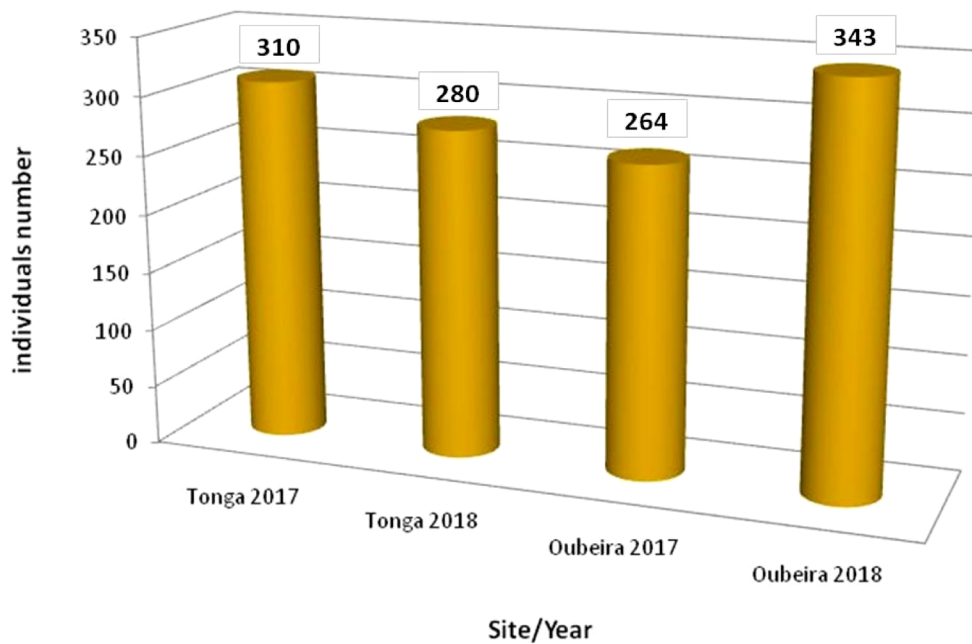


Figure 2 : Annual variation in the number of *Sciobia (Sciobia) bolivari* individuals in Tonga and Oubeira Lake



Figure 3 : Presentation of the species *Sciobia (Sciobia) bolivari* from the El Kala region (Original)

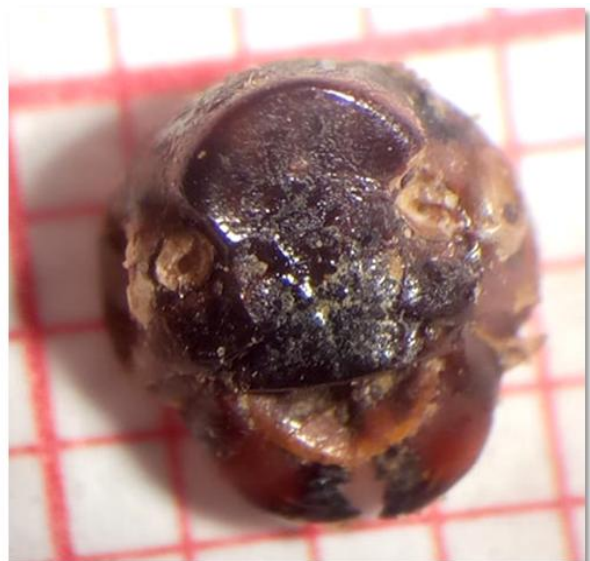
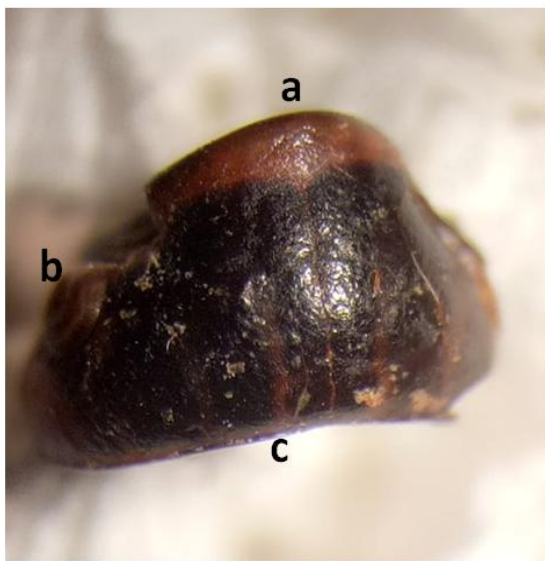


Figure 4 : To the left: Dorsal view of the head (right truncated a-vertex, b-compound eye, c-yellowish lines). To the right: Front view of *Sciobia (Sciobia) bolivari* (Original)



Figure 5: Posterior Tibia with 5 strong spines of *Sciobia (Sciobia) bolivari* (Original)

CONCLUSION

In this context *Sciobia (Sciobia) bolivari* was reported for the first time in Algeria from a study carried out for the analysis of the composition of the trophic menu of the Cattle egret. So in perspectives it will be interesting to follow the evolution of the population size of *S. (S.) bolivari* in Algeria, its phenology and its biogeographical distribution in the Algerian territory as well as to investigate its presence as prey in other species of Ardeidae and finally to be able to establish a checklist containing the species of Orthoptera present in the El Kala region.

ACKNOWLEDGMENT

We thank the staff of the Zoology laboratory of the National School of Veterinary Algiers (ENSV).

Conflict of interest

The authors declare that there is no conflict of interest in the present study and submission of this manuscript.

REFERENCES

- Bakour S., 2016. *Ecologie trophique du Héron garde bœuf Bubulcus ibis (Linné, 1758) de l'île Rachgoun (Oranie, Algérie)*. Thèse de magistère: Université Abderrahmane Mira de Bejaïa (Algérie).
- Boukhemza M., 2000. *Etude bio-écologique de la Cigogne blanche (Ciconia ciconia L., 1775) et du Héron garde bœufs (Bubulcus ibis L., 1775) en Kabylie: Analyse démographique, éthologique et essai d'interprétation des stratégies trophiques*. Thèse de doctorat : Institut National Agronomique I.N.A. El-Harrach d'Alger (Algérie).

- Boukhemza M., Doumandji S., Voisin C. & Voisin J.F., 2000. Disponibilités des ressources alimentaires et leur utilisation par le Héron garde-bœufs *Bubulcus ibis* en Kabylie, Algérie. *Revue d'écologie (Terre Vie)*, **55**, 361-381.
- Bredin D., 1983. *Contribution à l'étude écologique d'Ardeola ibis (L.) : Héron garde bœufs de Camargue*. Thèse de doctorat : Université de Paul Sabatier de Toulouse (France).
- Burns E.C., Chapin J.B., 1969. Arthropods in the diet of the Cattle egret in Southern Louisiana. *Journal of Economic Entomology*, **62**, 736-738.
- Chettibi F., 2014. *Ecologie de l'Érismatures à tête blanche Oxyura leucocephala dans les zones humides de la Numidie algérienne (du Littoral Est de l'Algérie)*. Thèse de doctorat : Université Badji Mokhtar Annaba (Algérie).
- Chopard L., 1943. *Orthoptéroïdes de l'Afrique du Nord. Faune de l'Empire français*. Paris : Lib. Larousse.
- Damerdji A., 1996. Contribution à la répartition de la faune Orthoptérologique (Caelifères-Ensifères) en Algérie. *Bulletin de Zoologie agricole et forestière*, **13**, 10-13.
- Doumandji S., Doumandji-Mitiche B. & Hamadache H., 1992. Place des orthoptères en milieu agricole dans le régime alimentaire du Héron garde bœufs *Bubulcus ibis* à Draâ El-Mizan en grande Kabylie (Algérie). *Mededelingen van de Faculteit Landbouwwetenschappen, Rijksuniversiteit Gent*, **57**(3a), 675-678.
- Doumandji-Mitiche B. et al., 2014. Biodiversité orthoptérologique dans quelques stations du Sahara algérien (Biskra, Adrar, Djanet et Tamanrasset). In : *Proceedings de la Dixième Conférence Internationale sur les ravageurs en agriculture, 22 et 23 Octobre 2014, Montpellier*.
- Etchecopar R.D. & HÜE F., 1964. *Les oiseaux du Nord de l'Afrique, de la mer rouge aux canaries*. Paris : Boubée & Cie.
- Fogarty M.J. & Hetrick W.M., 1973. Summer foods of nesting cattle egrets in north central Florida. *The Auk*, **90**, 268-280.
- Gherbi-Salmi R., 2013. *Etude de l'Éco éthologie trophique du Héron garde-bœufs Bubulcus ibis Linné, 1758 (Aves, Ardeidae) dans la Kabylie de la Soummam (Bejaia)*. Thèse de doctorat : Université Abderrahmane Mira de Bejaia (Algérie).
- Heim DeBalsac H. & Mayaud N., 1962. *Oiseaux du Nord-Ouest de l'Afrique*. Paris : P. Lechevalier.
- Isenmann P. & Moali A., 2000. *Les oiseaux d'Algérie : The birds of Algeria*. Paris : Soc. Etudes Ornithol France (S.E.O.F).
- Kadry-Bey I., 1942. The economic importance of the Buff-backed Egret (*Ardeola ibis* L.) to egyptian agriculture. *Bulletin of the Zoological Society of Egypt*, **4**, 20-26.
- Kennouche M., Allouche D., 2000. *Contribution à l'étude du régime alimentaire et de la biologie de reproduction du Héron garde-bœufs, Bubulcus ibis (Linné, 1758), en période de reproduction dans une colonie de la vallée de la Soummam (Kabylie, Algérie)*. Mémoire d'ingénieur en Écologie et Environnement : Université Abderrahmane Mira de Bejaia (Algérie).
- Lakhdari W., Doumandji Mitiche B., Dehliz A., Acheuk F., Hammi H., Mlik R. & Soud A., 2015. Some Elements of the bioecology of *Brachytrupes megacephalus* Lefebvre, 1827 (Orthoptera, Gryllidae) in

- the region of Oued Righ (Algerian Sahara). *American-Eurasian Journal of Agricultural & Environmental Sciences*, **15**(6), 1082-1089.
- López-Colón J.I., 2001. *Sciobia lusitanica* (Rambur, 1839), grillo endémico del área ibero-marroquí (Orthoptera, Gryllidae, Sciobiinae). *Boletín Sociedad Entomológica Aragonesa*, **28**, 66.
- Metna F., 2012. *Ecologie trophique, éthologie et biologie de la reproduction de la Foulque macroule Fulica atra* (Linné, 1758) dans la réserve naturelle du lac de Réghaia (Algérois) et dans le barrage de Djebba (Kabylie). Thèse de doctorat : Université Mouloud Mammeri de Tizi-Ouzou (Algérie).
- Mimoun K., 2006. *Insectivorie du Hérisson d'Algérie Atelerix algirus* (Lereboullet, 1842) dans la forêt de Beni Ghorbi (Tizi Ouzou). Thèse de magister : Institut National Agronomique I.N.A. El-Harrach d'Alger (Algérie).
- Moali A. & Isenmann P., 1993. Nouvelles données sur la distribution de certaines espèces en Kabylie (Algérie). *Alauda*, **61**, 215-218.
- Moali A., 1999. *Déterminisme écologique de la distribution et biologie des populations des oiseaux nicheurs en Kabylie*. Thèse de doctorat : Université Mouloud Mammeri de Tizi Ouzou (Algérie).
- Mohamed Sahnoun A.M., Doumandji S.E. & Desutter Grandcolas L., 2010. A check-list of Ensifera from Algeria (Insecta : Orthoptera). *Zootaxa*, **2432**, 1-44.
- Morgane N.C., 1982. An ecological survey of standing waters in North-West Africa : II. site description for Tunisia and Algeria. *Biological Conservation*, **24**, 83-113.
- Nefla A., Tlili W., Ouni R. & Nouira S., 2014. Place des insectes dans les régimes alimentaires de trois Aridéidés en Tunisie septentrionale. *Alauda*, **82** (3), 221-232.
- Rihane A., 2005. Contribution à l'étude du régime alimentaire de la Chouette effraie *Tyto alba* dans les plaines semi-arides du Maroc (compléments). *Go-South Bull*, **2**, 37-4.
- Setbel S., Doumandji S. & Boukhemza M., 2004. Contribution à l'étude du régime alimentaire du Héron garde bœufs *Bubulcus ibis* dans un nouveau site de nidification à Boudouaou (Est-Mitidja). *Alauda*, **3** (72), 193-200.
- Setbel S., 2008. *Expansion du Héron garde-bœufs en Algérie : Processus, problèmes et solutions*. Thèse de doctorat : Institut National Agronomique I.N.A. El-Harrach d'Alger (Algérie).
- Si Bachir A., Hafner H., Tourenq J. N. & Doumandji S., 2000. Structure de l'habitat et biologie de reproduction du Héron garde bœufs, *Bubulcus ibis*, dans une colonie de la Vallée de la Soummam (petite Kabylie, Algérie). *Revue d'écologie (terre et vie)*, **55**, 33-43.
- Si Bachir A., Hafner H., Tourenq J.N., Doumandji S. & Lek S., 2001. Diet of the adult Cattle egret (*Bubulcus ibis* L.) in a new north african colony (Petite Kabylie, Algérie) : taxonomic composition and variability. *Ardeola*, **48**(2), 217-223.
- Si Bachir A., 2005. *Ecologie du Héron garde-bœufs, Bubulcus ibis* (Linne, 1758) dans la région de Bejaia (Kabylie de la Soummam, Algérie) et suivi de son expansion en Algérie. Thèse de doctorat : Université Paul Sabatier de Toulouse (France).
- Vega P.B. & Segura A.A., 2013. Aportaciones al género *Sciobia burmeister*, 1838 en la Península Ibérica (Orthoptera, Gryllidae). *Boletín de la Sociedad Entomológica Aragonesa (S.E.A.)*, **52**, 165-172.