

Insects in the Diet of Common Chiffchaff *Phylloscopus collybita* Surroundings Tonga Lake, North East of Algeria

Bouaziz Abdeljalil, Daoudi-Hacini Samia and Doumandji Salaheddine

Ornithology Laboratory, Zoology Department, Agronomic National High School,
El Harrach, Algiers, Algeria

Abstract: Common Chiffchaff faeces were collected between January 2012 and April 2013 surroundings Tonga Lake, in the national park of El Kala situated in north east of Algeria. The study of the diet of *Phylloscopus collybita* yielded 365 individuals belonging to 73 species. The class of Insecta was dominated by far the other classes (86.6%). By frequency, Hymenoptera constituted 68.7% of insect items, Coleoptera 10.1%, Diptera 9.8% and Hemiptera 6.6%. The other orders represented between 0.3% and 1.9% of consumed insects.

Key words: Common Chiffchaff • *Phylloscopus collybita* • Diet • Insecta • Algeria

INTRODUCTION

The *Phylloscopus* genus, with 56 species of insectivorous warblers, colonizes Eurasian and some North African forested areas [1]. According to Schönfeld [2] many subspecies of common chiffchaff are recognized due to the wide distribution area (From the Canary Islands to eastern Siberia) and the large diversity of habitats occupied. In its extensive range, the common Chiffchaff was subject of many studies concerning its biology [3] diet [4, 5] reproduction [6] distribution [7-10] migration [11-13] and vocalization [14-16] Morphology [4, 17]. In Algeria, the behavior of this warbler remains unknown. The aim of this paper was to collect first information and to determinate the importance of insects in the diet of the Common chiffchaff near to Tonga Lake comparing to other studies around the world.

MATERIALS AND METHODS

The study was carried out around the Tonga lake in the north east of El Kala's national park (N 36°52'55'', S 8°30'40'', E 36°49'35'', O 8°28'15''). The dominant vegetation type was cork oak forest (*Quercus suber*). Diet of common chiffchaff was assessed by faecal analysis. 49 samples of common chiffchaff faeces were collected in monthly outing. Samples were collected

from brambles (*Rubus ulmifolius*) and Cape gum (*Acacia horrida*) leaves in which nests of *Phylloscopus collybita* was detected.

After faecal analysis, insects consumed were separated and identified using reference collections of the insectarium of the zoology department in the Agronomic national high school. Remains were mostly highly fragmented. In most faeces, it was not easy to determine the exact species of prey.

RESULTS AND DISCUSSION

A total of 365 prey items belonging to 73 species were recovered from the examined faeces. Insects were the main diet composition with 86.6% of the total number of prey items. The number of prey per sample balances between 0 and 35 individuals (Average 6.5 ± 6.5) belonging to 0 (Some faeces do not contain any insect traces) to 7 insect species.

Species of Hymenoptera order were the main prey in the common chiffchaff's diet, accounting for 68.7% of the total number of ingested insects. The order of Hymenoptera is represented by 21 species distributed on 7 families. Contrary to our results, Lopez-Iborra *et al.* [5] and Szentkirályi and Krištin [18] recorded lower presence of hymenopterans species (1% for the first author and 2.2% for the second). In terms of frequency of occurrence

Table 1: Number of individual, abundance and frequency of species of the Formicidae family noticed in the diet of *Phylloscopus collybita* surrounding Tonga Lake, north east of Algeria

	Individuals	Abundance (%)	Frequency (%)
undetermined Formicidae 1	8	2.5	16.3
undetermined Formicidae 2	1	0.3	2
<i>Tapinoma</i> sp.	3	0.9	6.1
<i>Tapinoma nigerrimum</i>	64	20.3	18.4
<i>Tapinoma minor</i>	2	0.6	4.1
<i>Camponotus</i> sp.	6	1.9	6.1
<i>Cataglyphis bicolor</i>	1	0.3	2
<i>Plagiolepis</i> sp.	3	0.9	2
<i>Plagiolepis barbara</i>	8	2.5	6.1
<i>Pheidole pallidula</i>	8	2.5	12.2
<i>Crematogaster</i> sp.	24	7.6	14.3
<i>Tetramorium biskrensis</i>	1	0.3	2
<i>Colobopsis</i> sp.	1	0.3	2
<i>Aphaenogaster</i> sp.	1	0.3	2
<i>Messor</i> sp.	10	3.2	4.1

species of Hymenoptera order were registered in 81.6% of analyzed faeces. Among this order, the family of Formicidae represents 44.6% of consumed insects. The list of ants present in the diet of common chiffchaff is detailed in Table 1. The dominant prey species was *Tapinoma nigerrimum* (20.3% of insects and 17.5% of total diet composition as shown in Figure 1) followed by an undetermined species of Chalcidae (12.7% of Insecta).

Remains of 32 (10.1%) individuals of the order Coleoptera belonging to 12 families and 17 species were recovered. Lopez-Iborra *et al.* [5] recorded 7 prey items corresponding to 0.7% of diet composition. This author point out the presence of Coleoptera in the content of six from 17 analyzed gizzard (35.3 %). In our study coleopterans were present with a frequency of occurrence equal to 40.8 %.

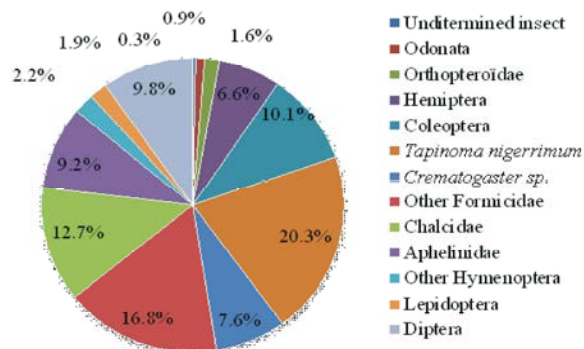


Fig. 1: Percentage of prey species of Insecta class recorded in the common chiffchaff faeces near to Tonga Lake

In our study Diptera represents 9.8% of insect prey. They were found in 38.8% of analyzed faeces. Contrary to Exnerova *et al.* [19] in central Europe who noted the predominance of Diptera (25.1 %) and Lopez-Iborra *et al.* [5] who indicate the net dominance of this order represented by 96.1% of analyzed items in which 95.3 % were individual of the family of Chironomidae. The high presence of this family in the diet *Phylloscopus collybita* was also observed by Laursen [20] with 50 % of identified species. According to Lopez-Iborra *et al.* [5] Diptera appeared in all analyzed gizzards (100%). In the current study, they are present in 19 of 49 analyzed faeces with a frequency of occurrence equal to 38.8 %.

Hemiptera made a contribution to the diet of *Phylloscopus collybita* with 6.6%. We noticed the presence of two suborders. Heteroptera (True bugs) were represented with 4 families: Lygaeidae, Cydnidae, Pentatomidae and undetermined family. One undetermined Cicadellidae was recorded (Homoptera). Bibby and Green [21] noticed the dominance of Aphidae with 72 %. Exnerova *et al.* [19] found that Homoptera take up the second place between common chiffchaff preys (23.7%) and true bugs represent 8.2%.

Six items, or 1.9%, of unidentified caterpillar were found especially in summer period, corresponding to breeding period. Caterpillars were shown to be associated to small bird's diet in breeding season in which they are considered as one of important food supply for young in nests [22-25].

Two Orthoptera families (Gryllidae and Acrididae) represented by one individual for each, one Dermaptera family, Labiduridae, represented by *Nala lividipes* and one undetermined Orthopteroidea. Order was the contribution of Orthopteroidea in common chiffchaff diet constituting 1.6%.

Wings of 3 individuals representing Odonata constituting 0.9% of recovered insects were detected.

The diet of common chiffchaff in the study area has the distinction of being based on geophile species. This indicates that *Phylloscopus collybita* in this part of country is a ground forager contrary to other authors who indicate that it is a foliage gleaner. This is due to the vegetation types and forest landscapes.

REFERENCES

1. Del Hoyo, J., A. Elliott and D.A. Christie, 2006. Handbook of the Birds of the World. Vol. 11. Old World Flycatchers to Old World Warblers. 1st ed. Barcelona, Spain: Lynx.

2. Schönfeld, M., 1978. Der Weidenlaubsanger *Phylloscopus collybita*. 1st ed. Wittenberg, Germany: Ziemsen. (In German).
3. Lapshin, N.V., 2000. Biology of the Chiffchaff *Phylloscopus collybita* in the taiga zone of northwestern Russia. Avian Ecol. Behav., 4: 1-30.
4. Forstmeier, W. and A. Kessler, 2001. Morphology and foraging behavior of Siberian *Phylloscopus* warblers. J. Avian Biol., 32: 127-138.
5. López-Iborra, G., R. Limiñana, S.G. Peñarrubia and R.T. Pinheiro, 2005. Diet of Common Chiffchaffs *Phylloscopus collybita* wintering in a wetland in south-east Spain. Revista Catalanad' Ornitologia, 21: 29-36.
6. Catry, P., I. Catry, T. Catry and T. Martins, 2003. Within and between-year winter-site fidelity of Chiffchaffs *Phylloscopus collybita*. Ardea, 91: 213-220.
7. Berggren, L., 1999. Nordligagransångaren *Phylloscopus collybita abietinus* I kris?. Ornis Svecica, 9: 86-90.
8. Hansson, M.C., S. Bensch and O. Brännström, 2000. Range expansion and the possibility of an emerging contact zone between two subspecies of Chiffchaff *Phylloscopus collybita* ssp. J. Avian Biol., 31: 548-558.
9. Ciach, M., 2006. First record of 'Siberian Chiffchaff' *Phylloscopus collybita tristis* in Carpathian Mountains. Kulon, 11: 113-115. (Article in Polish with an English abstract).
10. Lindström, Å., S. Svensson, M. Green and R. Ottvall, 2007. Distribution and population changes of two subspecies of Chiffchaff *Phylloscopus collybita* in Sweden. Ornisvecica, 17: 137-147.
11. Lövei, G.L., 1983. Wing shape variations of Chiffchaffs on autumn migration in Hungary. Ringing and Migration, 4(4): 231-236.
12. Pérez-Tris, J., Á. Ramírez and J.L. Tellería, 2003. Are Iberian Chiffchaffs *Phylloscopus (collybita) brehmii* long-distance migrants? An analysis of flight-related morphology: Iberian Chiffchaffs *Phylloscopus (collybita) brehmii* are genetically, morphologically and bioacoustically different from European Chiffchaffs (*Phylloscopus collybitacollybita*). Bird Study, 50(2): 146-152.
13. Catry, P., M. Lecoq, A. Araújo, G. Conway, M. Felgueiras, J.M.B. King and P. Tenreiro, 2005. Differential migration of chiffchaffs *Phylloscopus collybita* and *P. ibericus* in Europe and Africa. Journal of Avian Biology, 36(3): 184-190.
14. Helbig, A.J., J. Martens, I. Seibold, F. Henning, B. Schottler and M. Wink, 1996. Phylogeny and species limits in the Palaearctic Chiffchaff *Phylloscopus collybita* complex: mitochondrial genetic differentiation and bioacoustic evidence. Ibis, 138: 650-666.
15. Catry, P., S. Bearhop and M. Lecoq, 2007. Sex differences in settlement behavior and condition of chiffchaffs *Phylloscopus collybita* at a wintering site in Portugal. Are females doing better? J. Ornithol., 148: 241-249.
16. Mahler, B. and D. Gil, 2009. The Evolution of Song in the *Phylloscopus* Leaf Warblers (Aves: Sylviidae): A Tale of Sexual Selection, Habitat Adaptation and Morphological Constraints. Adv. Stud. Behav., 40: 35-66.
17. Salomon, M., J. Bried, A.J. Helbig and J. Riofrio, 1997. Morphometric differentiation between male Common Chiffchaffs, *Phylloscopus collybita collybita* Vieillot, 1817 and Iberian Chiffchaffs, *P. [c.] brehmii* Homeyer, 1871, in a secondary contact zone (Aves: Sylviidae). Zool. Anz., 236: 25-36.
18. Szentkirályi, F. and A. Krištín, 2002. Lacewings and snakeflies (Neuroptera, Raphidioptera) as prey for bird nestlings in slovakian forest habitats. Acta Zool. Acad. Sci., 48: 329-340.
19. Exnerová, A., P. Štys, A. Krištín, O. Volf and M. Pudil, 2003. Birds as predators of true bugs (Heteroptera) in different habitats. Biologia, 58: 253-264.
20. Laursen, K., 1978. Interspecific relationships between some insectivorous passerine species, illustrated by their diet during spring migration. Ornis Scand, 9: 178-192.
21. Bibby, C.J. and R.E. Green, 1983. Food and fattening of migrating warblers in some French marshlands. Ringing and Migration, 4: 175-184.
22. Krištín, A., 1991. Food of *Phylloscopus collybita* and *P. sibilatrix* nestlings in oak-beech forest of Central Slovakia. Acta Fac. Rerum. Zoo., 35: 137-142 (In German with English abstract).
23. Perrins, C.M., 1991. Tits and their caterpillar food supply. Ibis, 133: 49-54.
24. Tomiałojć, L., 1994. Breeding ecology of the Blackbird *Turdus merula* studied in the primaeval forest of Białowieża (Poland). Part 2. Reproduction and mortality. Acta Ornithol., 29: 101-121.
25. Maziarz, M. and T. Wesołowski, 2010. Timing of breeding and nestling diet of Wood Warbler *Phylloscopus sibilatrix* in relation to changing food supply. Bird Study, 57: 540-552.