

A bibliographic catalogue of the Cicadomorpha and Fulgoromorpha of North East Spain (Aragon)

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Abstract

The knowledge of a large number of Iberian Peninsula Hemiptera such as Cicadomorpha and Fulgoromorpha is still fragmentary. Nevertheless, these two groups are especially remarkable because many species are endemic to this region while others are pests and/or vectors of diseases to cultivated plants. Therefore, information on these Hemiptera is important not only for conservation purposes, but also necessary for agricultural pest management. Within Spain, Aragon -located in the northeast of the country- is especially interesting due to the great diversity of habitats, rich flora and the strategic geographic position. For this political region, a bibliographic catalogue of Cicadomorpha and Fulgoromorpha is here compiled. The results show that 136 species of 12 of the 15 families present in Iberian Peninsula have been reported in Aragon in previous works. Of these species, 17 percent are endemic to Spain and 15 percent were never mentioned in previous catalogues or checklists for the whole Iberian Peninsula. These results although exciting are clearly insufficient if we consider that several hundreds of species should be expected in this area; clearly more work should be done.

Key words: Auchenorrhyncha, Hemiptera, Cicadomorpha, Fulgoromorpha, Spain.

Introduction

The distribution of Cicadomorpha and Fulgoromorpha of the Iberian Peninsula is unknown. Although species records by country have been registered by Nast (1972; 1987) and more recently by Hoch (2004), within Spain and Portugal data on species distribution have never been compiled. This information is particular relevant because these two countries including their Macaronesian archipelagos have one of the highest proportions of endemic species in Europe. Thus, the knowledge of this group not only is important from an economic point of view due to the occurrence of agricultural pest species but also, for conservation purposes. However, while the distribution of Cicadomorpha and Fulgoromorpha in Europe is relatively well known for most countries, the knowledge of Cicadomorpha and Fulgoromorpha of the Iberian Peninsula and Macaronesian archipelagos is very scarce. This fact not only represents a remarkable gap to understand the general patterns of distribution of Cicadomorpha and Fulgoromorpha but also, is a great obstacle to carry out other studies on ecology, evolution, systematics and even applied research on areas of agricultural interest. The limited number of specialists working regularly on material from this large and complex geographic area explains why the available information is still so limited. In order to understand how species are distributed within this area, it is necessary to compile data from published works. This is the first of a series of works on this group that compiles data on distribution for a specific region, Aragon (NE Spain) (figure 1). This region which includes three provinces Huesca, Teruel and Zaragoza is particularly interesting because is in the southern part of the Pyrenees and also

steppe areas in Ebro valley (Monegros) which include many species with disjunct distribution here and Central Asia (Ribera and Blasco-Zumeta, 1998).

Materials and methods

The bibliography compiled included all published literature on the groups since the publication of *Systema Naturae* by Linnaeus (1758) up to the present. All published literature was considered valid including proceedings of congresses and PhD and Masters Thesis. The classification follows the criteria used by Bourgoin *et al.* (2004) and Hoch (2004).

Results and discussion

In this catalogue 136 species citations, were obtained from 46 works published by 36 authors. Of the species cited, 23 are endemic to Spain and 18 of these were described using material from Aragon. Also, as a whole there are 21 species that have never been listed for Spain in previous species checklists of Nast (1972; 1982; 1987) and more recently by Hoch (2004) in *Fauna Europaea* (table 1). Twelve of the 15 known families of Cicadomorpha and Fulgoromorpha in Spain are also present in Aragon. The data compiled showed that the different provinces of Aragon have not been studied with the same intensity. Of the three provinces, Huesca, with 82 species records is the better studied followed by Zaragoza with 54 and finally by Teruel with 36. We verified also that most species (72%) were only reported for one of these three provinces.



Figure 1. Localization of Aragon in the Iberian Peninsula.

The earliest records for Aragon of Cicadomorpha and Fulgoromorpha were published by Asso (1784), a local Spanish scientist who was the first to follow *Systema Naturae* principles. The authors with more species recorded for Aragon was Morris (1983, 1978) with 47 species records and Acha (1903) with 33 species records. All these records were done in only three publications. Another interesting fact is that most descriptions of new species from these area were done by Remane (10 new species) and by Asche (6 new species).

Table 1. Species not listed by Nast (1972; 1982; 1987) and Hoch (2004) for the Iberian Peninsula.

Suborder	Species
Cicadomorpha	<i>Adarrus taurus</i> Ribaut 1952
"	<i>Balclutha punctata</i> (F. 1775)
"	<i>Delphacinus mesomelas</i> (Boheman 1850)
"	<i>Dikraneura variata</i> Hardy 1850
"	<i>Doratura homophyla</i> (Flor 1861)
"	<i>Ebarrius cognatus</i> Fieber 1869
"	<i>Edwardsiana rhodophila</i> (Ceruti 1937)
"	<i>Emelyanoviana mollicula</i> (Boheman 1845)
"	<i>Eupteryx notata</i> Curtis 1837
"	<i>Eurysula lurida</i> (Fieber 1866)
"	<i>Fieberiella florii</i> (Stål 1854)
"	<i>Haematoloma dorsata</i> (Ahrens 1812)
"	<i>Hilaphura varipes</i> (Waltl 1837)
"	<i>Macrosteles laevis</i> (Ribaut 1927)
"	<i>Mendreus serratus</i> (Ribaut 1925)
"	<i>Paradoxium lanceolatum</i> (Burmeister 1839)
"	<i>Psammotettix striatus</i> (L. 1758)
"	<i>Rhopalopyx brevis</i> (Emeljanov 1962)
"	<i>Wagneriala sinuata</i> (Then 1897)
Fulgoromorpha	<i>Criomorphus albomarginatus</i> Curtis 1833
"	<i>Hyledelphax elegantulus</i> (Boheman 1847)

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References

- ACHA M., 1903.- Excursión del día 27 de octubre de 1903.- *Boletín de la Sociedad Aragonesa de Ciencias Naturales*, 2: 269-273.
- ASSO I., 1784.- Introductio in Oryctographiam et Zoologiam Aragoniae. Accedit Enumeratio stirpium in eadem Regione noviter detectarum.- *Catologus de la Entomofauna Aragonesa*, 8: 15-20 (facsimile edition).
- BOURGOIN T., SWZEDO J., LEFÈBVRE F., 2004.- About Hemiptera phylogeny and Classification, pp. 11-36. In: *Fossil Planthoppers (Hemiptera: Fulgoromorpha) of the world. An annotated catalogue with notes on Hemiptera classification* (SWZEDO J., BOURGOIN T., LEFÈBVRE F., Eds).- Studio 1, Warsaw, Poland.
- HOCH H. (Ed.), 2004.- Hemiptera: Fulgoromorpha, Cicadomorpha. Fauna Europaea version 1.1, [online] URL: <http://www.faunaeur.org> (viewed February 26, 2007).
- MORRIS M. G., 1978.- Studies of Auchenorrhyncha in the Spanish Pyrenees (Jacetania).- *Auchenorrhyncha Newsletter*, 1: 30-31.
- MORRIS M. G., 1983.- Apuntes preliminares sobre capturas sistemáticas de Hemiptera-Auchenorrhyncha del Alto Aragón Occidental en junio y julio de 1972.- *Pirineos*, 118: 63-70.
- NAST J., 1972.- *Palaeartic Auchenorrhyncha (Homoptera). An annotated check list.*- Polish Scientific Publishers, Warszawa, Poland.
- NAST J., 1982.- Palaeartic Auchenorrhyncha (Homoptera). Part 3. New taxa and replacement names introduced till 1930.- *Annales Zoologici Warszawa*, 36 (17): 289-362.
- NAST J., 1987.- The Auchenorrhyncha (Homoptera) of Europe.- *Annales Zoologici Warszawa*, 40 (35): 535-661.
- RIBERA I., BLASCO-ZUMETA J., 1998.- Biogeographical links between steppe insects in the Monegros region (Aragón, NE Spain), the eastern Mediterranean, and central Asia.- *Journal of Biogeography*, 25 (5): 969-986.
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