

## CONTRIBUTING TO A CHECKLIST OF NEUROPTERIDA IN PORTUGAL: THE *NATURDATA* PROJECT

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### ABSTRACT

*Naturdata* (<http://naturdata.com>) is a Portuguese biodiversity project established in 2009 to develop a database concerning all Portuguese biodiversity with the aim of collecting information about the taxonomy, ecology, morphology and distribution of species in Portugal.

Collaboration among neuropterologists and local naturalists has led to a significant increase in our knowledge of Neuropterida in Portugal: 13 families, 43 genera and 103 species of these insects are now recorded from Portugal (mainland + oceanic islands).

### RESUMO

O *Naturdata* é um projecto criado em 2009 com o objectivo de desenvolver uma base de dados de acesso livre sobre a biodiversidade de Portugal.

A informação é produzida por equipas de coordenadores, colaboradores e consultores com as mais diversas formações. É de uma destas equipas e das colaborações externas estabelecidas que surgem os resultados aqui apresentados com uma lista (checklist) actualizada de Neuropterídeos para todo o território português, com a descoberta de novas espécies e a redescoberta de uma ordem que se julgava extinta.

### INTRODUCTION

*Naturdata* is a web-based project established on 15 February 2009 to develop a free, open access, database of Portuguese biodiversity. Through text, photos, and videos, the *Naturdata* project collects and displays information on the taxonomy, ecology, morphology and distribution of plant and animal species in Portugal.

The project as a whole is coordinated by biologists Ricardo Silva and Pedro Cardoso, who are assisted by a team of thematic coordinators (including JA).

To accomplish its goals, *Naturdata* works in close partnership with many national and international organizations, including the Azores biodiversity project, Fauna Europaea, the Pan-European Species directories Infrastructure (PESI), and individual universities and institutes (such as ICAAM, Institute of Mediterranean Agricultural and Environmental Sciences, from Évora University, and the biodiversity research group from Azores University).

Information about particular taxa are produced and edited for the *Naturdata* project by teams of individuals – including a taxon

coordinators, collaborators and consultants – who possess a diversity of backgrounds and specializations.

Since its beginning, the *Naturdata* project has played an important role in advancing the discovery of new species in Portugal. One of us (AL) is currently the chief coordinator for the Neuropterida, and the neuropteroid working group has collaborated in recent years to enhance the knowledge of this superorder in Portugal.

In particular, work with the Italian Istituto per lo Studio degli Ecosistemi, Consiglio Nazionale delle Ricerche (ISE CNR) has contributed interesting new faunal data to *Naturdata* from recent field research in Northern Portugal.

## RESULTS AND DISCUSSIONS

The state of knowledge of Neuropterida in Portugal is far from exhaustive. Few focused studies have been undertaken on these insects in Portugal and the *Naturdata* project has an opportunity to make a significant contribution to the study of this group. The first lacewings reported from the Portuguese mainland were striking species, such as *Nemoptera bipennis* Illiger, 1812 (subsequently redescribed as *Nemopteryx lusitanica* by Leach in 1815) and *Ascalaphus ictericus* Charpentier, 1825 (now *Libelloides ictericus*); curiously these were followed by a much rarer and cryptic species, the dilarid *Dilar meridionalis* Hagen, 1866. Despite the isolated nature of early data, the first faunal paper treating the Neuropterida of Portugal was published in the late

19<sup>th</sup> century - a brief faunal note by McLachlan (1880), in which twelve species are listed. In the early 20<sup>th</sup> century, the numerous and intricate publications of the Catalan Jesuit priest L. Navás contain a variety of scattered records for Portugal, though his treatment of the Portuguese fauna was not nearly as complete as his extensive work on the Spanish fauna. Two Navás publications from this period are of particular note with respect to Neuropterida in Portugal: his synopsis of the Iberian neuropteran fauna (1908) and his description of the antlion *Solter liber* Navás, 1912 from San Fiel. The latter report was destined to remain a minor neuropterological mystery for many years (Aspöck *et al.*, 1980), though the presence of this predominantly North African species on the Iberian Peninsula is now well established.

In recent years, additional and more numerous records concerning the Portuguese distribution of this group of insects have become available, for example, records in Hölzel & Ohm (1972), Aistleitner (1980) and Letardi (2012), and, particularly, records in the numerous works of Monserrat and his collaborators, published over the course of 25+ years (Monserrat, 1985, 1986a, b, c, 1988, 1990, 1991a, b, 1993, 1994a, b, 2002, 2004, 2005, 2008a, b; Monserrat & Diaz-Aranda, 1989; Monserrat & Rodrigo, 1992; Monserrat & Acevedo, 2011). Still, few works have been published that focus exclusively on the Portuguese fauna, such as Carvalho's (1997), and the fauna remains understudied. Some, as yet un-synthesized, information on

neuropteran distributions may exist in the extensive literature on lacewings as predators in agro-ecosystems.

The relatively depauperate neuropterid fauna of the Azores and Madeira is relatively well known in comparison to the mainland fauna, having been treated, often together with those of the Canary Islands, in the faunal and taxonomic studies of Hagen (1865), McLachlan (1882), Tjeder (1940, 1948), Meinander (1962), Hölzel and Ohm (1991), and Ohm & Hölzel (1999).

Known general information concerning the Neuropterida of Portugal is summarized in the most recent European and western Palearctic synopses of this group of insects (Aspöck *et al.*, 1980; Aspöck *et al.*, 2001; Aspöck & Aspöck, 2011), and a checklist of Azorean Neuroptera, updated to 2008, is available on the web (<http://www.azoresbiportal.angra.uac.pt/listagens.php?sstr=8&lang=en>).

Our data (*Naturdata*, 2012; present study. See Table 1) document the presence of 13 families, 43 genera and 103 species of Neuropterida in Portugal (mainland + oceanic islands). This compares with 10 families, 33 genera, and 75 species documented in previous published sources. Worthy of particular notice in the expanded list is the “rediscovery” of the order Megaloptera in Portugal (Badano *et al.*, 2011), and photographic documentation by one of us (JA) (Figure 1, Figure 2) of both Mantispidae and Berothidae within the country (see also Tillier *et al.*, 2010).



FIGURE 1. *Mantispa styriaca* from Portugal, photo J. Almeida.



FIGURE 2. A female of *Isoscelipteron glaserellum* from Portugal, photo J. Almeida.

Fruitful collaborations established among neuropterologists, local naturalists, and a variety of on-going research projects (ISE CNR; Teixeira *et al.*, 2009) have significantly increased our knowledge of the Neuropterida of Portugal in a short period of time, mirroring similar recent success using the same model in Italy (Letardi, 2010).

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TABLE 1. Checklist of Neuropterida recorded from Portugal (mainland + oceanic islands).

ORDER Family species	MAINLAND	MADEIRA	AÇORES
NEUROPTERA			
Ascalaphidae			
<i>Bubopsis agrionoides</i> (Rambur, 1838)	X		
<i>Deleproctophylla dusmeti</i> Navás, 1914	X		
<i>Libelloides baeticus</i> (Rambur, 1842)	X		
<i>Libelloides hispanicus</i> (Rambur, 1842)	X		
<i>Libelloides ictericus</i> (Charpentier, 1825)	X		
<i>Libelloides longicornis</i> (Scopoli, 1763)	X		
Berothidae			
<i>Isoscelipteron glaserellum</i> (Aspöck, Aspöck & Hölzel, 1979)	X		
Chrysopidae			
<i>Atlantochrysa atlantica</i> (McLachlan, 1882)		X	
<i>Chrysopa formosa</i> Brauer, 1850	X		
<i>Chrysopa nierenbergi</i> Navás, 1908	X		
<i>Chrysopa nigricostata</i> Brauer, 1850	X		
<i>Chrysopa pallens</i> Rambur, 1838	X		
<i>Chrysopa regalis</i> Navás, 1915 *	X		
<i>Chrysopa viridana</i> Schneider, 1845	X		
<i>Chrysoperla agilis</i> Henry, Brooks, Duelli & Johnson, 2003	X		X
<i>Chrysoperla carnea</i> (Stephens, 1836)	X		
<i>Chrysoperla lucasina</i> (Lacroix, 1912)	X		X
<i>Chrysoperla pallida</i> Henry, Brooks, Duelli & Johnson, 2002	X		
<i>Chrysoperla mediterranea</i> (Hölzel, 1972)	X		
<i>Chrysoperla mutata</i> (McLachlan, 1898)	X		
<i>Cunctochrysa albolineata</i> (Killington, 1935)	X		
<i>Cunctochrysa baetica</i> (Hölzel, 1972)	X		
<i>Pseudomallada clathratus</i> (Schneider, 1845)	X		
<i>Pseudomallada flavifrons</i> (Brauer, 1850)	X		
<i>Pseudomallada genei</i> (Rambur, 1842)	X		
<i>Pseudomallada granadensis</i> (Pictet, 1865)	X		
<i>Pseudomallada ibericus</i> (Navás, 1903)	X		
<i>Pseudomallada inornatus</i> (Navás, 1901)	X		
<i>Pseudomallada picteti</i> (McLachlan, 1880)	X		
<i>Pseudomallada prasinus</i> (Burmeister, 1839)	X		
<i>Pseudomallada sensitivus</i> (Tjeder, 1939)		X	
<i>Pseudomallada subcubitalis</i> (Navás, 1901)	X		
<i>Pseudomallada venosus</i> (Rambur, 1842)	X		
<i>Italochrysa italica</i> (Rossi, 1790)	X		
<i>Nineta flava</i> (Scopoli, 1763)	X		
<i>Nineta pallida</i> (Schneider, 1846)	X		
<i>Rexa lordina</i> Navás, 1919	X		

ORDER	Family	MAINLAND	MADEIRA	AÇORES
	<i>species</i>			
	<b>Coniopterygidae</b>			
	<i>Aleuropteryx juniperi</i> Ohm, 1968	X		
	<i>Aleuropteryx loewii</i> Klapalek, 1894	X		
	<i>Helicoconis pseudolutea</i> Ohm, 1965	X		
	<i>Coniopteryx atlasensis</i> Meinander, 1963		X	
	<i>Coniopteryx borealis</i> Tjeder, 1930	X		
	<i>Coniopteryx esbenpeterseni</i> Tjeder, 1930	X		
	<i>Coniopteryx haematica</i> McLachlan, 1868	X		
	<i>Coniopteryx loipetsederi</i> Aspöck, 1963	X		
	<i>Coniopteryx tineiformis</i> Curtis, 1834	X		
	<i>Coniopteryx tjederi</i> Kimmins, 1934	X		
	<i>Conwentzia psociformis</i> (Curtis, 1834)	X		
	<i>Conwentzia pineticola</i> (Enderlein, 1905)	X		
	<i>Semidalis aleyrodiformis</i> (Stephens, 1836)	X		
	<i>Semidalis candida</i> Navás, 1916		X	
	<i>Semidalis pseudouncinata</i> Meinander, 1963	X		
	<i>Semidalis vicina</i> (Hagen, 1861)	X		
	<b>Dilaridae</b>			
	<i>Dilar saldubensis</i> Navás, 1902	X		
	<i>Dilar meridionalis</i> Hagen, 1866	X		
	<i>Dilar pumilus</i> Navás, 1903	X		
	<b>Hemerobiidae</b>			
	<i>Hemerobius azoricus</i> Tjeder, 1948			X
	<i>Hemerobius handschini</i> Tjeder, 1957	X		
	<i>Hemerobius humulinus</i> Linnaeus, 1758	X	X	X
	<i>Hemerobius madeirae</i> Tjeder, 1939		X	
	<i>Hemerobius nitidulus</i> Fabricius, 1777	X		
	<i>Hemerobius stigma</i> Stephens, 1836	X	X	X
	<i>Megalomus tineoides</i> Rambur, 1842	X		
	<i>Micromus angulatus</i> (Stephens, 1836)	X	X	X
	<i>Micromus paganus</i> (Linnaeus, 1767)	X		
	<i>Micromus variegatus</i> (Fabricius, 1793)	X		
	<i>Micromus sjostedti</i> van der Weele, 1910		X	
	<i>Sympherobius elegans</i> (Stephens, 1836)	X		
	<i>Sympherobius fallax</i> Navás, 1908	X	X	
	<i>Sympherobius gayi</i> Navás, 1910 [introduced]	X		
	<i>Sympherobius gratiosus</i> Navás, 1908	X		
	<i>Sympherobius pygmaeus</i> (Rambur, 1842)	X		
	<i>Sympherobius riudori</i> Navás, 1915	X		
	<i>Wesmaelius subnebulosus</i> (Stephens, 1836)	X	X	X
	<i>Wesmaelius navasi</i> (Andreu, 1911)		X	
	<i>Wesmaelius nervosus</i> (Fabricius, 1793)		**	



ORDER	Family	MAINLAND	MADEIRA	AÇORES
	<i>species</i>			
	Mantispidae			
	<i>Mantispa styriaca</i> (Poda, 1761)	X		
	<i>Perlamantispa perla</i> (Pallas, 1772)	X		
	Myrmeleontidae			
	<i>Palpares</i> sp.***	X		
	<i>Acanthaclisis occitanica</i> (Villers, 1789)	X		
	<i>Synclisis baetica</i> (Rambur, 1842)	X	X	
	<i>Creoleon lugdunensis</i> (Villers, 1789)	X		
	<i>Distoleon annulatus</i> (Klug, 1834)	X		
	<i>Distoleon catta</i> (Fabricius, 1775)		X	
	<i>Distoleon tetragrammicus</i> (Fabricius, 1798)	X		
	<i>Macronemurus appendiculatus</i> (Latreille, 1807)	X		
	<i>Macronemurus linearis</i> (Klug, 1834)	****		
	<i>Megistopus flavicornis</i> (Rossi, 1790)	X		
	<i>Myrmeleon alternans</i> Brullé, 1839		X	
	<i>Myrmeleon inconspicuus</i> Rambur, 1842	X		
	<i>Myrmeleon formicarius</i> Linnaeus, 1767	X		
	<i>Neuroleon distichus</i> (Navás, 1903)	X		
	<i>Neuroleon nemausensis</i> (Borkhausen, 1791)	X		
	<i>Neuroleon ocreatus</i> (Navás, 1904)	X		
	<i>Solter liber</i> Navás, 1912	X		
	Nemopteridae			
	<i>Nemoptera bipennis</i> (Illiger, 1812)	X		
	Sisyridae			
	<i>Sisyra dali</i> McLachlan, 1866	X		
	<i>Sisyra iridipennis</i> Costa, 1884	X		
	RAPHIDOPTERA			
	Raphidiidae			
	<i>Subilla aliena</i> (Navás, 1915)	X		
	<i>Atlantoraphidia maculicollis</i> (Stephens, 1836)	X		
	<i>Harraphidia laufferi</i> (Navás, 1915)	X		
	<i>Hispanoraphidia castellana</i> (Navás, 1915)	X		
	<i>Ohmella baetica</i> (Rambur, 1842)	X		
	Inocelliidae			
	<i>Fibla hesperica</i> Navás, 1915	X		
	MEGALOPTERA			
	Sialidae			
	<i>Sialis fuliginosa</i> Pictet, 1836	X		
	<i>Sialis fumosa</i> Navás, 1915	****		

## Footnotes:

\* *Chrysopa regalis* Navas, 1915 is considered synonym of *C. dorsalis* Burmeister, 1839 by Monserrat (2008a): currently, we treat them as different species.

\*\* A single female specimen from Madeira, belonging to the genus *Wesmaelius*, was doubtfully attributed to *W. nervosus* (Fabricius, 1793) by McLachlan (1882). Tjeder (1940) discounted the presence of the species on the island suggesting a misidentification.

\*\*\* There is only a single photographic record of this genus from Alvaiázere (Central Portugal) without visible characters to decide between the two Iberian species of the genus *Palpares* (*P. libelluloides* (Linnaeus 1764) and *P. hispanus* Hagen, 1860).

\*\*\*\* *Macronemurus ibericus* Navás, 1928 was described from a single female specimen allegedly from Porto, Portugal. Hölzel (1972) synonymized it with *M. linearis* (Klug, 1834) a middle-eastern species whose presence in Europe completely lacks further evidences; in this respect Hölzel (1987) suggested that it is very probably an error of locality.

\*\*\*\*\* *Sialis fumosa* Navás, 1915 has been described from Spain and Portugal; this name has been treated as a *nomen dubium* (Aspöck *et al.*, 2001). In our opinion, it must almost certainly be considered a synonym of *S. fuliginosa* Pictet, 1836.