

A FAUNAL AND HISTORICAL SURVEY OF SIALIDAE (INSECTA: MEGALOPTERA) IN CONTINENTAL PORTUGAL

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ABSTRACT

Despite the existence of two old, but well known, publications that cite Portuguese localities for the Sialidae (McLachlan, 1880; Navás, 1908), all more recent faunal works fail to report this family from Portugal (e.g., Monserrat, 1986; Aspöck *et al.*, 2001; Aspöck & Aspöck, 2011). We have recently reported Sialidae as a new taxon from Portugal (Badano *et al.*, 2011), but Megaloptera turn out to be relatively well known to aquatic biologists in Portugal (Teixeira *et al.*, 2009).

Here, a survey of the distribution of Sialidae in continental Portugal is presented within the framework of a collaboration with the Portuguese biodiversity project NaturData (<http://naturdata.com/>).

RESUMO

Apesar de duas publicações antigas bem conhecidas citarem localidades em Portugal com presença de Sialidae (McLachlan, 1880; Navas, 1908), várias referências recentes contudo não relatam esta família (e.g., Monserrat, 1986; Aspöck *et al.*, 2001; Aspöck & Aspöck, 2011). No entanto, mais recentemente, esta família foi reportada para Portugal (Badano *et al.*, 2011), sendo a ordem Megaloptera bem conhecida pelos limnólogos portugueses (Teixeira *et al.*, 2009).

No quadro de uma colaboração com o projecto NaturData (<http://naturdata.com/>) é apresentado um estudo de distribuição de Sialidae em Portugal Continental.

INTRODUCTION

The family Sialidae Leach in Brewster 1815 has a world wide distribution occurring in Europe, North and South America, Asia, eastern Australia, and Palearctic Africa, and about 80 living species. Ten species, all in the genus *Sialis* Latreille 1802, occur in Europe (Aspöck & Aspöck, 2011), and four of these (*Sialis gonzalezi* (Vhsivkova, 1985); *S. fuliginosa* (Pictet, 1836); *S. lutaria* (Linnaeus, 1758), and *S. nigripes* (Pictet 1865)) have been

recorded from the Iberian Peninsula (Monserrat, 1986). No known recent works prior to Badano *et al.* (2011) appear to report *Sialis* species from continental Portugal. There are, however, three older publications that do record sialid species in Portugal (McLachlan, 1880; Navás, 1908, 1915). McLachlan (1880; cfr. pag. 106) reported (with some doubts...) *Sialis lutaria* from two localities (Figure 1), one in central and a second in northern Portugal. Navás (1908; cfr. pag. 34) cited *Sialis fuliginosa* from the Portuguese locality of São Fiel (near

Castelo Branco) as San Fiel in a list of Spanish localities (Figure 2); seven years later, Navás (1915; cfr. pag. 202) ascribed the same specimen to the new described taxon *Sialis fumosa* Navás, 1915, a *nomen dubium* (Oswald, 2007) likely a synonym of *Sialis fuliginosa*. Older species-level identifications of *Sialis*, such as those of McLachlan and Navás, are generally regarded as unreliable, because the venational and general morphological traits used in such works are now known to be insufficient to accurately separate the modern concepts of species in the genus, which are based primarily on male terminalia (Elliott, 1996). A recent collecting trip to northern and central Portugal yielded two adult specimens of *Sialis fuliginosa* near Serra da Estrela National Park, allowing confirmation of the presence of that species in Portugal (Badano

et al., 2011), a century after Navás' report. An additional specimen of *Sialis fuliginosa* was collected in June of 2011 in the Peneda-Gerês National Park (northern Portugal; Oswald pers. com.) during the 'long excursion' following the XI International Symposium on Neuropterology (11ISN). A considerable volume of additional Portuguese sialid data has become available through the Aquariport Project (Teixeira *et al.*, 2009) and through collaborations with the staff of Portuguese biodiversity project NaturData (<http://naturdata.com/>).

Faunal data

The primary aim of this study is to document and summarize all known faunal information concerning the genus *Sialis* in continental Portugal.

PLANIPENNIA.

SIALIDÆ.

Sialis lutaria, L.—One ♀, Cintra, 27th April, in the ordinary condition. There is also one ♂ from near Salamonde, 2003 feet, 30th June, that I refer here with some hesitation. It has the dark coloration of *S. fuliginosa* (and even intensified), yet the anal structure is that of *lutaria*, only that the terminal ventral lobe appears slightly shorter, and slightly less obtuse at its apex. It is distinctly not the Spanish *S. nigripes*, Ed. Pict. (which I cannot separate from *fuliginosa*, *vide ante*, p. 62). At present, therefore, in the absence of sufficient materials, I am forced to consider it *lutaria*, with possibly slight modification in the anal parts, and with the coloration of *fuliginosa*.

FIGURE 1. *Sialis lutaria* in McLachlan's "Notes on the entomology of Portugal".

venación gruesa, parda ó negra. Antenas filiformes. Patas normales, con el cuarto artejo de los tarsos ensanchado en dos lóbulos.

1. ***Sialis lutaria*** L. — Costal amarillenta en la base. Membrana del ala casi hialina, teñida levemente de pardo en toda su extensión. Vértex con dos estrías amarillas longitudinales en el centro. Enverg. 25-30 mm.

Panticosa! (Vázquez), Miracle! (P. Marcet), Zaragoza!, Burgos! (Fernández Duro).

2. ***Sialis fuliginosa*** Pict. (*nigripes* E. Pict.). — Membrana del ala anterior visiblemente más oscura en la base (Lám. III, fig. 6); vena costal igualmente parda en toda su extensión. Callos en el vértex y occipucio apenas teñidos de amarillento. Enverg. 26-32 mm.

San Ildefonso (Ed. Pictet), Escorial! (Lauffer, Dusmet), Córdoba (Hern. Pacheco), San Fiel! (Silvano), Cangas de Tineo! (Flórez).

FIGURE 2. *Sialis fuliginosa* in Navás' "Neuropteros de Espana y Portugal".

These data are summarized in Table 1, based on a compilation prepared for a presentation at the 11ISN (Letardi, 2011).

To date, *Sialis fuliginosa* is the only sialid species that has been definitely confirmed from continental Portugal. However, many confirmed *Sialis* specimens that are not identifiable to species have been collected in Portuguese localities that exhibit micro-environmental conditions that are consistent with those where *Sialis lutaria* and *S. nigripes* might be expected. As the latter two species are known to be widely distributed in the Iberian Peninsula (Montserrat, 1986), it is likely that one or both of these additional species occur

in Portugal as well. In any case, recent documentation of collection localities for *Sialis* in Portugal (Figure 3), primarily larval specimens (>400) collected in association with the Aquariport project, clearly demonstrate that the Portuguese distribution of *Sialis* has been severely underestimated previously, and that the genus is broadly present in appropriate microhabitats throughout the north, center, and south of Portugal.

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TABLE 1. Available distributional data of *Sialis* specimens from continental Portugal. m s.l. altitude in meters at sea level; N, number of specimens; n.a., data not available; TAMUIC, Texas A&M University Insect Collection.

LOCALITY	SOURCE	COORDINATES		m s.l.	YEAR	N
R. Real, Minho	Aquarip	41°51'56"N	08°47'31"W	24	2005	1
R. Cunha, Minho	Aquarip	41°53'54"N	08°40'35"W	177	2005	14
R. Pantanha, Minho	Aquarip	41°56'20"N	08°32'24"W	424	2005	1
R. Pedreira, Minho	Aquarip	41°58'55"N	08°37'50"W	25	2005	1
R. Gadanha, Minho	Aquarip	42°03'03"N	08°30'18"W	49	2009	2
R. Trovela_Mon, Lima	Aquarip	41°43'32"N	08°33'50"W	76	2006	1
R. Trovela_Jus, Lima	Aquarip	41°45'24"N	08°36'12"W	24	2006	20
R. Cerdeira, Cávado	Aquarip	41°48'54"N	07°57'32"W	1124	2009	4
R. Viades, Ave	Aquarip	41°34'21"N	08°14'24"W	199	2007	3
R. Penacal_Mon, Douro	Aquarip	41°41'53"N	06°47'13"W	649	2004	19
R. Penacal_Jus, Douro	Aquarip	41°45'42"N	06°42'20"W	499	2004	31
R. S. Cibrão, Douro	Aquarip	41°43'51"N	06°56'01"W	700	2004	1
R. Macedo, Douro	Aquarip	41°39'48"N	07°02'52"W	351	2004	13
R. Teja, Douro	Aquarip	41°03'36"N	07°17'19"W	449	2004	32
R. Torto, Douro	Aquarip	41°00'39"N	07°20'15"W	727	2004	1
R. Onor, Douro	Aquarip	41°52'44"N	06°38'11"W	672	2004	19
R. Maças, Douro	Aquarip	41°40'40"N	06°33'55"W	724	2004	1
R. Côa, Douro	Aquarip	40°25'41"N	07°01'34"W	726	2006	2
R. Igrejas, Douro	Aquarip	41°52'54"N	06°40'20"W	728	2006	14
R. Terva, Douro	Aquarip	41°41'06"N	07°38'10"W	637	2006	8
R. Azibo, Douro	Aquarip	41°31'45"N	06°54'00"W	549	2007	19
R. Vale Moinhos, Douro	Aquarip	41°28'53"N	06°44'18"W	655	2007	22
R. Pinhão, Douro	Aquarip	41°16'15"N	07°33'02"W	252	2007	1
R. Paiva_Mon, Douro	Aquarip	40°50'18"N	07°44'26"W	748	2007	4
R. Granja, Douro	Aquarip	41°49'22"N	06°46'52"W	624	2008	3
R. Baceiro_Mon, Douro	Aquarip	41°55'54"N	06°50'59"W	849	2008	6
R. Baceiro_Jus, Douro	Aquarip	41°54'10"N	06°51'04"W	777	2008	23
R. Cabras_Mon, Douro	Aquarip	40°32'25"N	07°04'26"W	702	2009	18
R. Varoso, Vouga	Aquarip	40°45'42"N	08°09'05"W	299	2004	1
R. Troço, Vouga	Aquarip	40°44'09"N	08°01'03"W	300	2004	2
R. Teixeira, Vouga	Aquarip	40°47'47"N	08°15'25"W	157	2004	2
R. Alfusqueiro, Vouga	Aquarip	40°41'25"N	08°10'30"W	425	2004	3
R. Viques, Vouga	Aquarip	40°51'16"N	08°23'37"W	225	2006	4
R. Paço Matos, Vouga	Aquarip	40°51'40"N	08°18'41"W	626	2006	1
R. São João, Vouga	Aquarip	40°53'15"N	08°35'04"W	54	2006	2
R. Vouga, Vouga	Aquarip	40°46'26"N	07°39'58"W	591	2007	13

LOCALITY	SOURCE	COORDINATES		m s.l.	YEAR	N
R. Convento, Vouga	Aquarip	40°47'06"N	07°40'33"W	599	2007	4
R. Alcofra, Vouga	Aquarip	40°38'47"N	08°13'35"W	345	2007	1
R. Alva, Mondego	Aquarip	40°20'57"N	07°48'14"W	304	2004	7
R. Seia_Jus, Mondego	Aquarip	40°25'34"N	07°51'02"W	317	2004	2
R. Seia_Mon, Mondego	Aquarip	40°25'55"N	07°43'03"W	421	2004	1
R. Linhares, Mondego	Aquarip	40°34'54"N	07°32'50"W	410	2004	2
R. Sátão_Mon, Mondego	Aquarip	40°43'28"N	07°44'59"W	465	2004	5
R. Sátão_Méd, Mondego	Aquarip	40°40'23"N	07°48'07"W	423	2004	18
R. Arunca, Mondego	Aquarip	39°53'03"N	08°39'19"W	113	2006	4
R. Pranto, Mondego	Aquarip	39°57'16"N	08°42'13"W	50	2006	2
R. Dueça_Mon, Mondego	Aquarip	40°02'05"N	08°22'23"W	171	2006	10
R. Dueça_Jus, Mondego	Aquarip	40°03'34"N	08°21'45"W	169	2006	6
R. Mondego, Mondego	Aquarip	40°26'52"N	07°30'39"W	1037	2007	3
R. Parrozelos, Mondego	Aquarip	40°10'49"N	07°56'17"W	567	2007	2
R. Meimoa, Tejo	Aquarip	40°10'52"N	07°25'07"W	453	2004	2
R. Bazágueda, Tejo	Aquarip	40°13'25"N	07°01'52"W	664	2004	1
R. Margem, Tejo	Aquarip	39°20'51"N	07°53'57"W	198	2006	4
R. Mira_Méd2, Mira	Aquarip	37°30'33"N	08°27'14"W	133	2005	3
R. Telhares, Mira	Aquarip	37°28'53"N	08°29'17"W	248	2006	2
R. Mira_Méd1, Mira	Aquarip	37°33'36"N	08°15'47"W	235	2010	1
R. Soverete, Guadiana	Aquarip	39°14'48"N	07°16'12"W	473	2007	3
R. Odelouca_Mon, Algarve	Aquarip	37°21'08"N	08°09'43"W	260	2007	8
R. Odelouca_Méd1, Algarve	Aquarip	37°22'40"N	08°21'50"W	247	2007	5
R. Monchique_Jus, Algarve	Aquarip	37°17'42"N	08°29'26"W	231	2007	5
R. Monchique_Mon, Algarve	Aquarip	37°20'33"N	08°29'24"W	255	2007	2
Quinta da Ervamoira, Vila Nova de Foz Côa	Grosso-Silva	n.a.	n.a.	n.a.	n.a.	n.a.
Foz do Sabor, Torre de Moncorvo	Grosso-Silva	n.a.	n.a.	n.a.	n.a.	n.a.
Near the bridge over the stream "Água de Adega", Peneda-Gerês National Park	Grosso-Silva	n.a.	n.a.	n.a.	n.a.	n.a.
Serra da Estrela, Cantaros Torre	Sassari collection	n.a.	n.a.	n.a.	1996	2
Mira, Central Portugal	Caldas	n.a.	n.a.	n.a.	2010	1
Viana do Castelo District, Melgaço Municipality, 5.00 km SSW of Lamas de Mouro	TAMUIC	42°00'05"N	08°12'26"W	n.a.	2011	1
Penhas Juntas, Vinhais, Bragança	Andrade	41°44'28"N	07°00'38"W	n.a.	2011	1

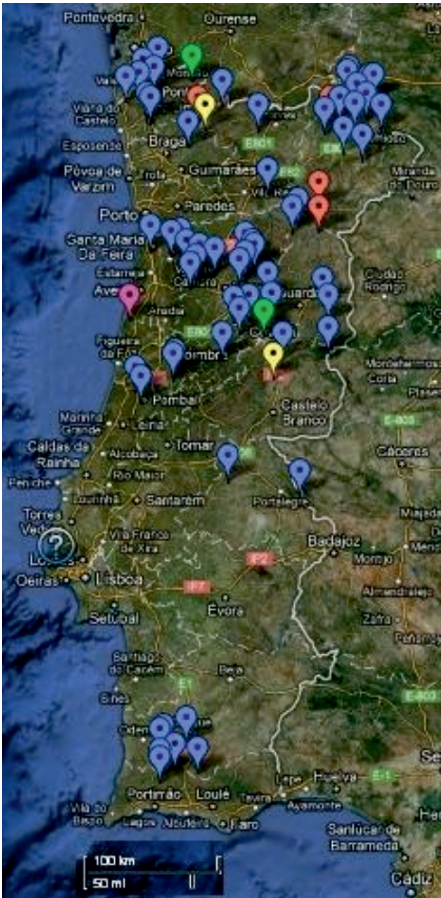


FIGURE 3. Map of the distribution of the genus *Sialis* in continental Portugal. Key: blue, data from Aquariport Project; green, *Sialis fuliginosa* from Badano *et al.*, 2011 and Oswald (pers. com.); yellow and question mark, old and uncertain data; orange, data from Portuguese colleagues (pers. com.); purple, data from Caldas (pers. com.). (modified after Google Maps - ©2012 Google).

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