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## An annotated check list of the Cicadomorpha and Fulgoromorpha (Hemiptera) of the Madeira and Salvages archipelagos

DORA AGUIN-POMBO<sup>1,2</sup>, CARLOS FREITAS<sup>2</sup>

<sup>1</sup>Department of Biology, University of Madeira, Campus da Penteadá, 9000-390 Funchal, Madeira, Portugal, e-mail: aguin@uma.pt

<sup>2</sup>CEM, Centre for Macaronesian Studies, Campus da Penteadá, 9000-390 Funchal, Madeira, Portugal

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### ABSTRACT

The volcanic archipelagos of Madeira and Salvages located respectively at 635 km and 373 km offshore of the north-eastern African coast are very rich in endemic species. These two archipelagos together with the Canary IIs and the archipelagos of Cape Verde and Azores represent part of the Mediterranean hot spot which is considered the richest area in flora and fauna of Europe. To synthesize the knowledge on these groups, an annotated checklist of Cicadomorpha and Fulgoromorpha of the archipelagos of Salvages and Madeira is presented based on published literature including data on distribution and food plants. In addition 9 new species records are reported: *Austragallia caboverdensis*, *Austragallia sinuata*, *Balclutha rufofascia*, *B. hebe*, *Cicadella viridis*, *Macrosteles sexnotatus*, *Recilia angusticeps*, *Tamaricella* cf *fasciolata* and *Zyginidia lineata*. The checklist comprises 79 species of 7 different families. Of these species 87% occur in Madeira and 10% in the Salvages archipelago. As a whole 27% are endemic to Madeira and 8% are endemic to Macaronesia. Despite this diversity, knowledge of their habitats and food plants is still very scarce.

**KEY WORDS:** Homoptera, Auchenorrhyncha, distribution, new records, Madeira, Hemiptera, Macaronesia

### INTRODUCTION

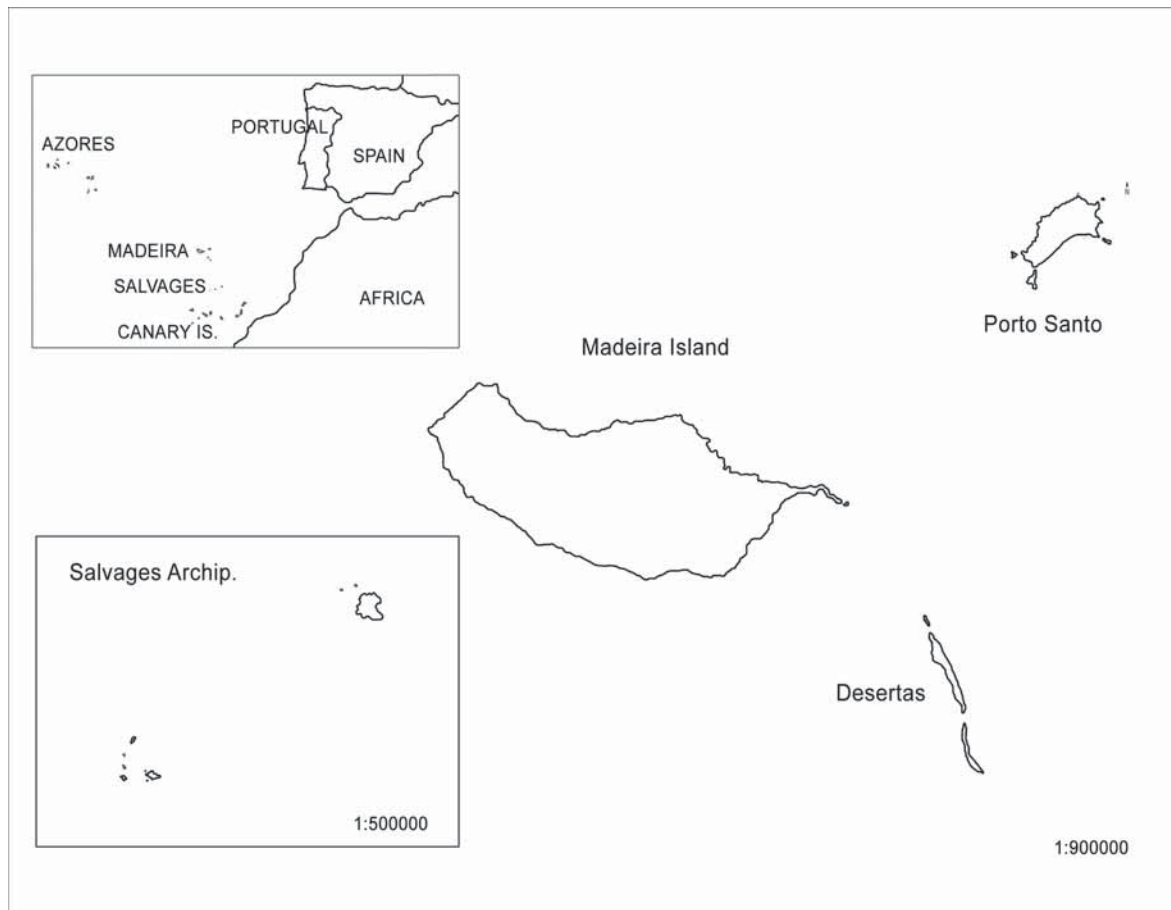
Macaronesian archipelagos are included in the Mediterranean hot spot which is the richest area in flora and fauna of the European Union (Médail and Quézel, 1999). The Macaronesia subregion located between Eurasia

and Africa includes parts of the west coast of Africa (Morocco and Mauritania) and five archipelagos of volcanic origin: Madeira, Azores, Salvages, Canary Islands and Cape Verde. The archipelagos of Madeira and Salvages although are small in surface (~800 km<sup>2</sup>) have an endemicity rate considerably high for oceanic islands, namely for land snails, Madeira shows among the largest number of endemic species per squared kilometre in the World, similar to other oceanic islands as Hawaii or Maurice Islands (Waldén, 1993). However, insular taxa show usually less genetic variability and are more prone of extinction than continental ones (Frankham, 1997; Vitousek, 1988) and these archipelagos are not an exception. In the last decades, major environmental modifications have occurred related to an increase in tourism pressure. Tourism represents for Madeira an opportunity for economic development but is also a threat to these fragile ecosystems. Madeira has a high population density with approximately 330 inhabitants per squared kilometre, the largest in Portugal. Thus, the intensive construction of houses, hotels and roads together with the threat of an increasing number of invasive species arriving through external commercial exchanges (Aguin-Pombo *et al.* 2007; Freitas and Aguin-Pombo, 2004; Wetterer *et al.* 2006), requires the implementation of conservation strategies for the native flora and fauna. To address planning and conservation issues, the first step is to have valid species checklists. In the neighboring archipelagos of Canary Isls, Azores and Cape Verde, a considerable effort has recently been made to compile checklists of all terrestrial taxa (Aguin-Pombo *et al.* 2005; Oromi *et al.* 2004, Quartau, 1993, Quartau and Borges, 2005), yet no recent similar checklists have been published for Madeira.

Cicadomorpha and Fulgoromorpha are not very diverse in the Macaronesia archipelagos but some genera like *Asianidia* Zachvatkin 1946, *Cyphopterus* Melichar, 1905, *Issus* Fabricius, 1803 and *Cixius* Latreille, 1804 have undergone remarkable radiations resulting in many endemic species and in a genus endemic to Madeira and the Canary Islands, *Makarorysa* Remane & Ashe, 1986. Concerning Cicadomorpha, a checklist of Madeira species was published some years ago (Quartau, 1993) but in recent decades nomenclature changes, corrections of misidentifications, reports of new records and revisions of several genera, have added new information for species of this area. This work updates the published knowledge on Cicadomorpha and Fulgoromorpha for the archipelagos of Madeira and Salvages. Information on distribution and food plants and/or habitat for species of both groups has been compiled and nine new species records to Madeira fauna are reported. Clearly the results of this work accentuate the disharmonic character of the fauna of these oceanic islands. Especially remarkable is the absence of Cicadoidea from all Macaronesian archipelagos, particularly considering that cicadas are well represented in the nearby regions of the Iberian Peninsula and North Africa. Other common continental families absent from the Macaronesian archipelagos were Membracidae and Ulopidae. Madeira also lacks representatives of some families which are present in the Canary Islands like Kinnaridae, Tettigometridae, Meenoplidae and Tropiduchidae. The isolation of Madeira from the mainland may account for these differences. Although some information has been published on host plant and habitat associations for species of Madeira, more field work on this group is clearly needed.

### Notes on the orography and vegetation of the Madeira and Salvages archipelagos

The Madeira archipelago is closer to the north-western African coast (~635 km) than to Europe (794 km from Portugal) and geologically isolated from the Salvages archipelago which is located only 175 km from the Canary Islands and 373 km from the African coast. These archipelagos consist of several oceanic islands and islets of volcanic origin occupying a surface of only about 800 km<sup>2</sup> (**Fig. 1**). Madeira comprises two main inhabited islands, Madeira and Porto Santo, and three islets known as the Desertas Islands -Ilhéu do Chão, Deserta Grande and Deserta Pequena or Bugio- and about 10 offshore rocks. The island of Madeira represents almost 93 % of the land surface and it is very steep with about 90 % of its surface above 500 m. In contrast, Porto Santo, located 42 km further north, and the Desertas Islands, about 24 km off the southeastern coast of Madeira, are rather flat, with their highest altitudes below 520 m.



**FIGURE 1.** Location of the archipelagos of Madeira and Salvages and their relative location to the Iberian Peninsula, north of Africa and Azores archipelagos.

The islands of the Madeira archipelago also differ ecologically. Madeira Island is the largest and the highest (1862 m) of all and also the most diverse in habitats. It shows a clear north-south differentiation due to different sun exposure, humidity and annual median temperature. The most characteristic vegetation is the coastal vegetation and the evergreen laurel forest (dry and wet) growing at medium altitudes which is considered a remnant of the Tertiary Age (Press and Short, 1994). The dry evergreen forest is much reduced and grows in areas with high mean temperature and low annual precipitation. This forest has as characteristic tree species *Apolonias barbuiana*, *Visnea mocanera* and *Picconia excelsa*. The wet laurel forest grows from 300-700 m up to 1300 m in more humid areas with lowest mean annual temperatures and has characteristic hygrophilous tree species of Lauraceae endemic to Macaronesia, such as *Laurus novocanariensis*, *Ocotea foetens* and *Persea indica*. From 1300 m up to 1500 m the vegetation consists mainly of shrubs, with *Erica arborea* and *Vaccinium padifolium* dominant; above this, only herbaceous vegetation occurs. The eastern part of the Island (Ponta de São Lourenço), is semi-arid with xerophytic vegetation due to the smooth landscape, low annual precipitation and strong winds. Porto Santo is a small, rather flat island, with only 42 square km and 517 m at its highest point, covered mainly by xeric vegetation. Here there is little differentiation between the southern and northern slopes in climate and plant communities.

The Salvages archipelago, located 174 km north of the Canaries and ~255 km south of Madeira, consists of three small islets and several rocks covered by halophytic vegetation. The biggest of the three is the Selvagem Grande, and the other two islets are Selvagem Pequena or Pitão Grande, and Ilhéu de Fora or La Salvajita. Selvagem Grande, ~2.45 km<sup>2</sup> in size, is flat and about 100 m above the sea surface with Pico the Atalaia

(163 m) as its highest point; Selvagem Pequena is only ~0.3 km<sup>2</sup> and 49 m at its high point while Ilhéu de Fora has ~0.08 km<sup>2</sup> and 18 m at the highest point.

### Notes on the checklist

The classification and information on the general distribution for each species mainly follows Hoch (2007). Families, subfamilies, genera and species of each suborder are arranged alphabetically and new species records are indicated by the symbol (\*). The material studied is in the collection of the first author. The distribution of each species in the Madeira and Salvages archipelagoes was compiled according to published records; excluding previous compilations with no original information. When it was necessary to add comments, these were reported under the heading *remarks*. Additional information on food plants and/or habitats in Madeira has been included (Table 2 and Table 3). A summary of the number of species, and endemics per island is shown in Table 1. Lindberg and China contributed greatly to the knowledge of the fauna of Madeira, however, many errors in identification have been reported especially for morphologically variable species. Therefore, additional material for these species together with further study of material from these previous authors will be necessary before a definitive species checklist is possible.

**TABLE 1.** Species of Cicadomorpha and Fulgoromorpha indicating the total number of species, endemic species and species per island of each family.

Island abbreviations: Porto Santo Island (PS); Madeira Island (Ma); Ilhéu Chão (IC); Deserta Grande (DG); Bugio (Bu); Selvagem Grande (Sg); Selvagem pequena (Sp); Pitão pequena (Pp).

Suborder	Family	Madeira					Selvagens			Endemic species	Species number
		Ps	Ma	Ic	Dg	Bu	Sg	Sp	Pp		
Cicadomorpha	Aphrophoridae	1	1		1					0	1
	Cicadellidae	14	46	3	4	1	2	4		10	53
Fulgoromorpha	Cixiidae		4	1						5	5
	Delphacidae	2	14							2	14
	Dictyopharidae		1							0	1
	Flatidae	1	2	1	1			2		4	4
	Issidae		1							1	1
Total		18	69	5	6	1	2	6		22	79
% of total species		23%	87%	6%	8%	1%	2%	8%		28%	

**TABLE 2.** Checklist, distribution of the species of Cicadomorpha and Fulgoromorpha of Madeira and Selvagens indicating the number of known food plants for each species on these archipelagos.

Present on the island (+); dubious record (#); new record (\*). Island abbreviations: Porto Santo Island (PS); Madeira Island (Ma); Ilhéu Chão (IC); Deserta Grande (DG); Bugio (Bu); Selvagem Grande (Sg); Selvagem pequena (Sp); Pitão Pequena (Pp). Archipelagos abbreviations: Mac (Macaronésia), Mad (Madeira); Sal (Salvages).

Species	Madeira								Number of Food Plants	Endemic species	
	Ps	Ma	Ic	Dg	Bu	Sg	Sp	Pp			
<b>Aphrophoridae Amyot &amp; Serville, 1843</b>											
1. <i>Neophilaenus angustipennis</i> (Horváth, 1909)	+	+		+						1	Mac
<b>Cicadellidae Latreille, 1825</b>											
2. <i>Acomurella prolixa</i> (Lethierry, 1885)	+	+								2	
3. <i>Alebra viridis</i> Rey, 1897		+									
4. <i>Anoscopus albifrons</i> (Linnaeus, 1758)		+									
5. <i>Anoscopus assimilis</i> (Signoret, 1879)	+	+		+	+						
6. <i>Aphrodes bicinctus</i> (Schrank, 1776)		#									Mad
7. <i>Aphrodes brachypterus</i> China, 1938		+									Mad
8. <i>Asianidia albula</i> (Lindberg, 1961)		+								4	Mad
9. <i>Asianidia atlantica</i> (China, 1938)	+	+		+						1	Mac
10. <i>Asianidia chinai</i> (Lindberg, 1961)		+								1	Mac
11. <i>Asianidia chrysanthemii</i> (Lindberg, 1954)	+	+								2	Mac
12. <i>Asianidia decolor</i> (Lindberg, 1936)		+									Mad
13. <i>Asianidia insulana</i> (Lindberg, 1961)		+									Mad
14. <i>Asianidia madeirensis</i> (China, 1938)		+									Mad
15. <i>Asianidia melliferae</i> Quartau & Remane, 1996		+								1	Mad
16. <i>Asianidia vallicola</i> (Lindberg, 1954)		+									Mac
17. <i>Asymmetrasca decedens</i> (Paoli, 1932)		+								6	
18. <i>Austroagallia caboverdensis</i> (Lindberg, 1958)		+						+		2	
19. <i>Austroagallia hilaris</i> (Horváth, 1909)		+									
20. <i>Austroagallia sinuata</i> (Mulsant & Rey, 1855)		*									
21. <i>Balclutha frontalis</i> (Ferrari, 1882)		+									
22. <i>Balclutha hebe</i> (Kirkaldy, 1906)		*									
23. <i>Balclutha pellicens</i> Horváth, 1909		+									Mac
24. <i>Balclutha rufofasciata</i> (Merino, 1936)		*									
25. <i>Brachypteron viairai</i> Quartau, 1981		+								4	Salv
26. <i>Chloropelix canariensis</i> Lindberg, 1936		+						+			
27. <i>Cicadella viridis</i> (Linnaeus, 1758)		*									

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TABLE 2 (continued).

Species	Madeira										Number of Food Plants	
	Ps	Ma	Ic	Dg	Bu	Sg	Sp	Pp				
28. <i>Cicadulina bipunctata</i> (Melichar, 1904)		+										
29. <i>Circulifer haematoceps</i> (Mulsant & Rey, 1855)												
30. <i>Circulifer opacipennis</i> (Lethierry, 1786)										+		2
31. <i>Empoasca alsiosa</i> Ribaut, 1936		+										
32. <i>Empoasca distinguenda</i> (Paoli, 1932)												
33. <i>Empoasca fabalis</i> DeLong, 1930		+										
34. <i>Eupteryx capreola</i> Lindberg, 1954		#										2
35. <i>Eupteryx filicum</i> (Newman, 1853)		+										1
36. <i>Euscelidius variegatus</i> (Kirschbaum, 1858)		+										4
37. <i>Euscelis incisus</i> (Kirschbaum, 1858)		#			#							
38. <i>Euscelis ormaiderensis</i> Remane, 1968		+			+							1
39. <i>Exitianus capicola</i> (Stål, 1855)		+										
40. <i>Exitianus fasciolatus</i> (Melichar, 1911)		+										1
41. <i>Macrosteles ossiannilssonii</i> Lindberg, 1954		+										
42. <i>Macrosteles ramosus</i> Ribaut, 1952		+										
43. <i>Macrosteles sexnotatus</i> (Fallén, 1806)		+										
44. <i>Mocuellus collinus</i> (Boheman, 1850)		+										
45. <i>Nesoclutha erythrocephala</i> (Ferrari, 1882)		*										
46. <i>Orosius orientalis</i> (Matsumura, 1914)		#										
47. <i>Opsius lethierryi</i> Wagner, 1942		+										1
48. <i>Recilia angustisectus</i> (Linnavuori, 1962)		+										
49. <i>Penthimia irrorata</i> Horváth, 1909		*										3
50. <i>Psammotettix striatus</i> (Linnaeus, 1758)		+										
51. <i>Sophonia orientalis</i> (Matsumura, 1912)		+										25
52. <i>Tamaricella cf. fasciolata</i> (Lethierry, 1876)		+										
53. <i>Typhlocyba maderae</i> Lindberg, 1961		*										1
54. <i>Zyginidia lineata</i> (Lindberg, 1954)		+										

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TABLE 2 (continued).

Species	Madeira										Number of Food Plants	
	Ps	Ma	Ic	Dg	Bu	Sg	Sp	Pp				
<b>Cixiidae Spinola, 1839</b>			+									
55. <i>Cixius chaoensis</i> China, 1938		+										
56. <i>Cixius madeirensis</i> China, 1938		+										
57. <i>Cixius verticalis</i> Noualhier, 1897		+										3
58. <i>Hyaletides madeires</i> Remane & Hoch, 1986		+										2
59. <i>Hyaletides portonoves</i> Remane & Hoch, 1986		+										
<b>Delphacidae Leach, 1815</b>												
60. <i>Flastena fumipennis</i> (Fieber, 1866)		+										
61. <i>Florodelphax leptosoma</i> (Flor, 1861)		+										
62. <i>Javesella dubia</i> (Kirschbaum, 1868)		+										
63. <i>Kelisia ribauti</i> Wagner, 1938		+										
64. <i>Laodelphax striatellus</i> (Fallén, 1826)		+										
65. <i>Liburnia anthracina</i> Horváth, 1909		+										
66. <i>Makarorysa madalta</i> Remane & Asche, 1986		+										2
67. <i>Makarorysa madeo</i> Remane & Asche, 1986		+										
68. <i>Megamelodes quadrimaculatus</i> (Signoret, 1865)		+										
69. <i>Muellerianella fairmairei</i> (Perris, 1857)		+										
70. <i>Pseudaraeopus lehierryi</i> (Mulsant & Rey, 1879)		+										
71. <i>Sogatella nigeriensis</i> (Muir, 1920)		+										
72. <i>Toya hispidula</i> (Lindberg, 1954)		+										
73. <i>Toya propinqua</i> (Fieber, 1866)		+										
<b>Dietyopharidae Spinola, 1839</b>												
74. <i>Almana longipes</i> (Dufour, 1849)		+										
<b>Flatidae Spinola, 1839</b>												
75. <i>Cyphopterum fauveli</i> (Noualhier, 1897)		+										
76. <i>Cyphopterum quartau</i> Linnavuori, 1974		+										2
77. <i>Cyphopterum retusum</i> (Walker, 1851)		+										2
78. <i>Cyphopterum salvagensis</i> Lindberg, 1959		+										
<b>Issidae Spinola, 1839</b>												
79. <i>Issus madeirensis</i> Lindberg, 1956		+										1



**TABLE 3.** Food plant species of Cicadomorpha and Fulgoromorpha reported for the archipelagos of Madeira and Salvages indicating the source of information. The insect species are represented by numbers as in Table 2.

Families	Food Plants	Insect species	Information on food plants	
<b>Aizoaceae</b>	1. <i>Tetragonia tetragonoides</i>	<b>18</b>	This work	
<b>Anacardiaceae</b>	2. <i>Schinus molle</i>	<b>17,51</b>	Freitas & Aguin-Pombo 2004; Aguin-Pombo <i>et al.</i> 2006	
<b>Asteraceae</b>	3. <i>Artemisia arborescens</i>	<b>9</b>	Quartau & Remane 1996	
	4. <i>Argyranthemum haematomma</i>	<b>51</b>	Aguin-Pombo <i>et al.</i> 2006	
	5. <i>Artemisia argentea</i>	<b>9,38</b>	Lindberg, 1961; Remane 1968	
	6. <i>Artemisia canariensis</i>	<b>9</b>	Quartau & Remane 1996	
	7. <i>Argyranthemum pinnatifidum</i>	<b>9,11</b>	Lindberg 1961; Quartau & Remane 1996	
	8. <i>Dahlia</i> sp.	<b>17</b>	Freitas & Aguin-Pombo 2004	
	9. <i>Osteospermum barberae</i>	<b>51</b>	Aguin-Pombo <i>et al.</i> 2006	
	10. <i>Taigetetes minuta</i>	<b>12,51</b>	Freitas & Aguin-Pombo 2004; Aguin-Pombo <i>et al.</i> 2006	
	<b>Caricaceae</b>	11. <i>Carica papaya</i>	<b>51</b>	Aguin-Pombo <i>et al.</i> 2006
	<b>Chenopodiaceae</b>	12. <i>Suaeda vera</i>	<b>25, 30, 76,78</b>	Leise 1992; Linnavuori 1974; Quartau 1975; Quartau 1981
<b>Convolvulaceae</b>	13. <i>Ipomoea batatas</i>	<b>51</b>	Aguin-Pombo <i>et al.</i> 2006	
	14. <i>Ipomoea</i> spp	<b>51</b>	Aguin-Pombo <i>et al.</i> 2006	
<b>Dennstaedtiaceae</b>	15. <i>Pteridium aquilinum</i>	<b>34,35</b>	Lindberg 1961; Quartau & Façonny 1988	
<b>Ericaceae</b>	16. <i>Erica</i> spp.	<b>53,51,66,79</b>	Aguin-Pombo <i>et al.</i> 2006; Lindberg 1961; Remane & Asche 1986	
	17. <i>Vaccinium</i> spp.	<b>66</b>	Lindberg 1961; Remane 1968	
<b>Euphorbiaceae</b>	18. <i>Acalypha wilkesiana</i>	<b>51</b>	Aguin-Pombo <i>et al.</i> 2006	
	19. <i>Euphorbia mellifera</i>	<b>58,59</b>	Hoch & Remane 1985; Remane & Hoch 1986	
	20. <i>Euphorbia</i> spp.	<b>15</b>	Quartau & Remane 1996	
	21. <i>Ricinus communis</i>	<b>17, 51</b>	Freitas & Aguin-Pombo 2004; Aguin-Pombo <i>et al.</i> 2006	
<b>Fabaceae</b>	22. <i>Arachnis hypogea</i>	<b>51</b>	Aguin-Pombo <i>et al.</i> ,2006	
<b>Fagaceae</b>	23. <i>Quercus robur</i>	<b>3</b>	Aguin-Pombo 2002	
	24. <i>Castanea sativa</i>	<b>2,3</b>	Lindberg 1961; Aguin-Pombo 2002	
<b>Geraniaceae</b>	25. <i>Erodium moschatum</i>	<b>51</b>	Aguin-Pombo <i>et al.</i> 2006	
<b>Globulariaceae</b>	26. <i>Globularia salicina</i>	<b>51</b>	Hoch & Remane 1985; Remane & Hoch 1986; Aguin-Pombo <i>et al.</i> 2006	
<b>Labiatae</b>	27. Labiatae spp.	<b>11</b>	Lindberg 1961	
<b>Lauraceae</b>	28. <i>Persea americana</i>	<b>51</b>	Aguin-Pombo <i>et al.</i> 2006	
<b>Leguminosae</b>	29. <i>Agropyron junceiforme</i>	<b>24, 30, 40, 75,78</b>	Leise 1992; Quartau 1975, 1984	
	30. <i>Lotus salvagensis</i>	<b>24</b>	Leise, 1992	
	31. <i>Trifolium repens</i>	<b>36</b>	Freitas & Aguin-Pombo 2003	
<b>Malvaceae</b>	32. <i>Hibiscus rosa-sinensis</i>	<b>51</b>	Aguin-Pombo <i>et al.</i> 2006	
	33. <i>Lavatera cretica</i>	<b>17, 51</b>	Freitas & Aguin-Pombo 2004; Aguin-Pombo <i>et al.</i> 2006	
<b>Myrtaceae</b>	34. <i>Psidium guajava</i>	<b>51</b>	Aguin-Pombo <i>et al.</i> 2006	
	35. <i>Eugenia uniflora</i>	<b>51</b>	Aguin-Pombo <i>et al.</i> 2006	
<b>Passifloraceae</b>	36. <i>Passiflora edulis</i>	<b>17,49</b>	Freitas & Aguin-Pombo 2004; Aguin-Pombo <i>et al.</i> 2006	
	37. <i>Passiflora laurifolia</i>	<b>49</b>	Aguin-Pombo <i>et al.</i> 2006	

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TABLE 3 (continued).

Families	Food Plants	Insect species	Information on food plants
Poaceae	38. <i>Brachiaria mutica</i>	1	Quartau & André 1986
	39. <i>Brachypodium sylvaticum</i>	36	Freitas & Aguin-Pombo 2004
	40. Poaceae spp.	36	Freitas & Aguin-Pombo 2004
Polygonaceae	41. <i>Rumex maderensis</i>	51	Aguin-Pombo <i>et al.</i> 2006
	42. <i>Rumex</i> spp.	49	Aguin-Pombo <i>et al.</i> 2006
Pteridaceae	43. <i>Pteridium aquilinum</i>	34	Quartau & Façonny 1988
Rosaceae	44. <i>Rubus</i> spp.	58	Hoch & Remane 1985; Remane & Hoch 1986
Rutaceae	45. <i>Casimiroa edulis</i>	52	Aguin-Pombo <i>et al.</i> 2006
	46. <i>Citrus sinensis</i>	52	Aguin-Pombo <i>et al.</i> 2006
Scrophulariaceae	47. <i>Isoplexis sceptrum</i>	10	Quartau <i>et al.</i> 2004
Solanaceae	48. <i>Cyphomandra betacea</i>	52	Aguin-Pombo <i>et al.</i> 2006
	49. <i>Datura stramonium</i>	52	Aguin-Pombo <i>et al.</i> 2006
	50. <i>Lycopersicon esculentum</i>	18, 24	Quartau 1981; Quartau & André 1990; this work
Tamaricaceae	51. <i>Tamarix</i> spp.	47, 52	Lindberg 1961; Leise 1992; this work
Umbeliferae	52. <i>Apium nodiflorum</i>	36	Freitas & Aguin-Pombo 2004
Verbenaceae	53. <i>Echium</i> spp.	58, 59	Remane & Hoch 1986; Hoch & Remane 1985
	54. <i>Enterolobium cyclocarpium</i>	17	Freitas & Aguin-Pombo 2004
Vitaceae	55. <i>Vitis vinifera</i>	51	Aguin-Pombo <i>et al.</i> 2006
Zingiberaceae	56. <i>Hedychium gardnerianum</i>	51	Aguin-Pombo <i>et al.</i> 2006

## CHECKLIST OF CICADOMORPHA AND FULGOROMORPHA

## Suborder Cicadomorpha Evans, 1946

## Family Aphrophoridae Amyot &amp; Serville, 1843

*Neophilaenus angustipennis* (Horváth, 1909)*Philaenus angustipennis* Horváth, 1909: 298*Neophilaenus angustipennis*; Quartau and André, 1988: 244

*Distribution.* Endemic to Canary Islands and Madeira archipelago but not listed in recent checklists (Hoch, 2004). DESERTA GRANDE: on plateau (Quartau and André 1988). MADEIRA: recorded mainly from southern, driest part of island (Ponta de São Lourenço), several localities along southern shore, and up to 900 m altitude (Ribeira da Janela) on northern coast (Quartau and André 1988). PORTO SANTO: recorded from Portela in north (Quartau and André 1988).

*Food plants.* Found on *Gramineae* (Quartau and André, 1988).

*Remarks.* Quartau and André (1988) suggested that this species probably arrived in Madeira between 1971 and 1980.

## Family Cicadellidae Latreille, 1825

### Subfamily Agalliinae Kirkaldy, 1901

#### \**Austroagallia caboverdensis* (Lindberg, 1958)

*Peragallia caboverdensis* Lindberg, 1958: 195; Quartau and André, 1990: 69

*Distribution.* Afrotropical region, Cape Verde and Salvages Archipelagos but not listed from latter in recent checklists (Hoch, 2004). MADEIRA: recorded from southern coast (this work). SELVAGEM GRANDE: locality unknown (Quartau and André, 1990).

*Food plants.* *Lycopersicon esculentum* (Quartau and André, 1990) and *Tetragonia tetragonoides* (this work).

MATERIAL EXAMINED: 1 ♂ São Vicente, Madeira, 10m, 1.x.2000, on *Tetragonia tetragonoides*, Leg. N. Freitas.

#### *Austroagallia hilaris* (Horváth, 1909)

*Agallia hilaris* Horváth, 1909: 297; China, 1938: 44

*Distribution.* Canary Islands, Madeira and North Africa. MADEIRA: locality unknown (China, 1938).

*Habitat and food plants.* Unknown.

#### \* *Austroagallia sinuata* (Mulsant & Rey, 1855)

*Bythoscopus sinuatus* Mulsant & Rey, 1855: 222

*Distribution.* Widely distributed in Palaearctic including Canary Islands and Afrotropical region. MADEIRA: recorded from high altitudes on Pico Areeiro.

*Habitat and food plants.* Unknown.

MATERIAL EXAMINED: 1 ♂ Pousada do Pico do Arieiro, Fontal, Madeira, 1810 m, 21.iii.2001, leg. D. Aguin-Pombo.

### Subfamily Aphrodinae Blöte, 1927

#### *Anoscopus assimilis* (Signoret, 1879)

*Acocephalus assimilis* Signoret, 1879: 75; Noualhier, 1897: 77; China, 1938: 44

*Aphrodes assimilis*; Lindberg, 1961: 67

*Distribution.* Europe and North Africa. BUGIO: locality unknown (China, 1938). DESERTA GRANDE: locality unknown (China, 1938). MADEIRA: locality unknown (China, 1938; Noualhier, 1897). PORTO SANTO: locality unknown (Lindberg, 1961).

*Remarks.* Information on this species is based on material sampled by Lindberg, Wollaston and Fauvel who did not report exact localities.

*Habitat and food plants.* Grasses.

#### *Anoscopus albifrons* (Linnaeus, 1758)

*Cicada albifrons* Linnaeus, 1758: 437

*Acocephalus albifrons*; China, 1938: 44

*Aphrodes albifrons*; Lindberg, 1961: 67

*Distribution.* Holoarctic region. MADEIRA: recorded from many localities from northern and southern slopes mainly above 800 m (China, 1938; Lindberg, 1961).

*Habitat and/or food plants.* Sampled on herbaceous plants and under roots (Lindberg, 1961).

? ***Aphrodes bicinctus* (Schrank, 1776)**

*Cicada bicincta* Schrank, 1776: 75

*Acocephalus nervosus*; China, 1938: 44

*Acocephalus striatus*; Noualhier, 1897: 77

*Aphrodes bicinctus*; Lindberg, 1961: 67

*Distribution*. Europe and Madeira. MADEIRA: recorded from five localities on northern and southern slopes (China, 1938; Lindberg, 1961; Noualhier, 1897).

*Habitat and food plants*. Unknown.

*Remarks*. Several species have been recognized within the *Aphrodes bicinctus* complex (Le Quesne, 1988) but the interpretation followed by China, Lindberg or Noualhier is unknown, therefore, this record should be further confirmed.

***Aphrodes brachypterus* (China, 1938)**

*Acocephalus brachypterus* China, 1938: 45

*Distribution*. Endemic to Madeira. MADEIRA: locality unknown (China, 1938).

*Remarks*. Described from a single female specimen in Wollaston's collection.

*Habitat and food plants*. Unknown.

### Subfamily Cicadellinae Latreille, 1825

\****Cicadella viridis* (Linnaeus, 1758)**

*Cicada viridis* Linnaeus, 1758: 438

*Distribution*. Holarctic and Oriental regions but not previously recorded from Macaronesia. MADEIRA: Recorded from eastern part of Island at 650m.

*Habitat and food plants*. Unknown.

MATERIAL EXAMINED: 2♀♀ Couvinhas, Santo da Serra at 650m, Madeira, 14.xii.2001 leg., Fábio Reis.

### Subfamily Deltocephalinae Dallas, 1870

***Aconurella prolixa* (Lethierry, 1885)**

*Thamnotettix prolixa* Lethierry, 1885: 102

*Aconurella prolixa*; Lindberg, 1961: 64

*Distribution*. Palaearctic and Afrotropical regions. MADEIRA: reported from northern and southern slopes at different altitudes (Lindberg, 1961). PORTO SANTO: from southern seashore up to Serra de Dentro mountain (Lindberg, 1961).

*Habitat*. Moist or dry grass vegetation, often occurs in large numbers (Lindberg, 1961).

***Balclutha frontalis* (Ferrari, 1882)**

*Gnathodus frontalis* Ferrari, 1882: 117

*Balclutha rosea*; Lindberg, 1961: 64

*Distribution*. Worldwide except Australian region. MADEIRA: sampled on seashore localities of southern slope (Lindberg, 1961).

*Habitat*. Found in dry areas on grasses (Lindberg, 1961).

\****Balclutha hebe* (Kirkaldy, 1906)**

*Nesosteles hebe* Kirkaldy, 1906: 343

*Distribution*. Cosmopolitan. MADEIRA: recorded only from west coastal.

*Habitat*. Low grass vegetation.

MATERIAL EXAMINED: 2♂♂, 1♀, Paul do Mar, Madeira, 14.viii.2005 on Poaceae, leg. E. Nunes.

***Balclutha pellucens* Horváth, 1909**

*Balclutha pellucens* Horváth, 1909: 296; China, 1938: 47; Lindberg, 1961: 64

*Dicraneura viridella* Lindberg, 1941: 23

*Distribution.* Endemic to Macaronesian archipelagos except Cape Verde. MADEIRA: common all over the island (China, 1938; Lindberg, 1941; Lindberg, 1961).

*Habitat.* Low grass vegetation (Lindberg, 1961).

**\* *Balclutha rufofasciata* (Merino, 1936)**

*Agellus rufofasciatus* Merino, 1936a: 381

*Distribution.* North Africa, Neotropical and Oriental regions. MADEIRA: recorded from Funchal on southern coast.

*Habitat.* Low grass vegetation.

MATERIAL EXAMINED: 1♂, 4♀♀, Santo Antonio, Funchal, 300 m, Madeira, 16.ii. 2002 on herbaceous plants, leg. Fábio Reis.

***Brachyterona vieirai* Quartau, 1981**

*Brachyterona vieirai* Quartau, 1981: 127

*Distribution.* Endemic to Selvagens archipelago but not listed in recent checklists (Hoch, 2004). SELVAGEM GRANDE: Pico da Atalaia (Quartau, 1981). SELVAGEM PEQUENA: reported from various localities (Quartau, 1981).

*Habitat and/or food plants.* On *Lycopersicon esculentum* in Selvagen Grande (Quartau, 1981) and in Selvagen Pequena on *Agropyron junceiforme* but present also in areas with *Limonium papillatum*, *Suaeda vera*, *Frankenia laevis* and *Lotus salvagensis* (Quartau, 1981).

***Cicadulina bipunctata* (Melichar, 1904)**

*Gnathodus bipunctata* Melichar, 1904: 47

*Cicadulina zaeae*; Lindberg, 1961: 63

*Distribution.* Worldwide except America. MADEIRA: recorded only from several localities of southern coast (Lindberg 1961).

*Habitat and food plants.* Unknown.

*Remarks.* An important pathogen vector in India, Africa and Philippines (Webb, 1987)

***Circulifer haematoceps* (Mulsant & Rey, 1855)**

*Jassus haematoceps* Mulsant & Rey, 1855: 229

*Circulifer haematoceps* var. *vittiventris*; Lindberg, 1961: 65

*Distribution.* Palaearctic region including Macaronesia but here known only from Madeira. PORTO SANTO: locality unknown (Lindberg, 1961).

*Habitat and food plants.* Unknown.

*Remarks.* *Circulifer haematoceps* and *C. opacipennis* have been variously regarded as different species or the second as a synonym of the first. Here the interpretation of Young & Frazier (1954) is followed and both species are considered valid. *Circulifer haematoceps* is an important vector in Mediterranean Basin and Near East (Kersting and Baspinar, 1995).

***Circulifer opacipennis* (Lethierry, 1786)**

*Cicadula opacipennis* Lethierry, 1786: 12

*Circulifer opacipennis*; Quartau, 1984: 4

*Distribution.* Europe, North Africa and Near East. SELVAGEM PEQUENA: reported from several

localities (Quartau, 1984).

*Habitat and/or food plants.* Areas with mixed vegetation including *Agropyron junceiforme*, *Suaeda vera* and *Limonium papillatum* (Quartau, 1984).

*Remarks.* An important vector of *Spiroplasma citri* (Kersting *et al.*, 1992). See *Circulifer haematocaps* for other comments.

***Euscelidius variegatus* (Kirschbaum, 1858)**

*Athysanus variegatus* Kirschbaum, 1858a: 9

*Euscelidius variegatus*; Reis and Aguin-Pombo, 2003: 28

*Distribution.* Palaearctic. MADEIRA: reported from coastal areas up to 1175m on both slopes of Island (Reis and Aguin-Pombo, 2003).

*Food plants.* *Brachypodium sylvaticum*, *Brachiaria mutica* (Gramineae), *Trifolium repens* (Leguminosae) and *Apium nodiflorum* (Umbelliferae) (Reis and Aguin-Pombo, 2003).

*Remarks.* An important vector of phytoplasmas and other microorganisms (Palermo *et al.*, 2001).

**? *Euscelis incisus* (Kirschbaum, 1858)**

*Athysanus incisus* Kirschbaum, 1858: 10

*Athysanus plebejus*; China, 1938: 46

*Euscelis plebejus*?; Lindberg, 1961: 66

*Distribution.* Palaearctic region including Macaronesia but here known only from Madeira. DESERTA GRANDE: locality unknown (China, 1938). ISLET CHÃO: locality unknown (China, 1938). PORTO SANTO: reported from few localities (China, 1938; Lindberg, 1961).

*Remarks.* This species shows seasonal variation in the morphology of genital structures (Muller, 1983). Lindberg (1961) examined China's material of *E. incisus* from Porto Santo and Desertas and identified it tentatively as *E. plebejus* but considered that could belong also to *E. lineolatus* Brullé. However, part of this material could belong also to *E. ormaderensis* Remane 1968 (*see* Remane, 1968) or to a different species. *Euscelis incisus* is a vector of several plant diseases (Della Giustina, 1989) and its presence on Madeira should be confirmed.

*Habitat and food plants.* Unknown.

***Euscelis ormaderensis* Remane, 1968**

*Euscelis ormaderensis* Remane, 1968: 7

*Distribution.* Endemic to Madeira archipelago. DESERTA GRANDE: locality unknown (Remane, 1968). ISLET CHÃO: locality unknown (Remane, 1968). PORTO SANTO: reported from few localities (Remane, 1968).

*Food plants.* Herbs of several plant families but often associated to *Artemisia argentea* (Remane, 1968).

*Remarks.* The specific status of the specimens from Porto Santo was confirmed after being studied the seasonal variation in genital structures and acoustic behaviour. Some additional morphologically very variable specimens of *Euscelis* were found also by Remane in Madeira at Prazeres but their specific identity was not determined (Remane, 1968).

***Exitianus capicola* (Stål, 1855)**

*Athysanus capicola* Stål, 1855: 9; China, 1938: 46

*Athysanus taeniaticeps*; Lindberg, 1941: 31

*Exitianus capicola*; Lindberg, 1961: 65; Quartau, 1984: 6

*Distribution.* Palaearctic and Afrotropical. MADEIRA: reported from several localities on both slopes of Island mainly at low and medium altitudes (China, 1938; Lindberg, 1941; Lindberg, 1961; Quartau, 1984).

*Habitat.* Agricultural areas invaded by grasses (Lindberg, 1961). A vector of phytoplasmas and/or

spiroplasmas (Boukhris-Bouhachem *et al.*, 2007).

***Exitianus fasciolatus* (Melichar, 1911)**

*Athysanus fasciolatus* Melichar, 1911: 107

*Exitianus vulnerans*; Lindberg, 1961: 65

*Exitianus fasciolatus*; Quartau, 1984: 5

*Distribution.* West Palaearctic and Afrotropical. PORTO SANTO: locality unknown (Lindberg, 1961). SELVAGEM PEQUENA: Eastern part (Quartau, 1984).

*Food plants.* *Agropyron junceiforme* (Quartau, 1984).

***Macrosteles ossiannilssoni* Lindberg, 1954**

*Macrosteles ossiannilssoni* Lindberg, 1954: 237; Lindberg, 1961: 63

*Macrosteles sexnotatus*; Lindberg, 1941: 31 [identification error]

*Cicadula fasciifrons*; China, 1938: 46 [Identification error]

*Distribution.* Europe. MADEIRA: reported from many localities from the coast up to mountain slopes (Lindberg, 1941). PORTO SANTO: reported only from Serra de Dentro-Pico Juliana (Lindberg, 1961).

*Habitat.* Wet shores of streams with rich vegetation (Lindberg, 1961).

*Remarks.* Lindberg (1941) examined 15 specimens of *Cicadula fasciifrons* Stål from Wollaston's collection, studied also by China (1938, p.46), and misidentified them as *Macrosteles sexnotatus* Fall. 1806. Later, Lindberg (1961) stated that this material could belong either to *M. ossiannilssoni*, to *M. fasciifrons* or to *M. ramosus* (= *quadricornis*). Because *M. ossiannilssoni* was very common in Madeira, Lindberg considered this material as probably *M. ossiannilssoni*. *M. fasciifrons* is known from Scandinavia and Siberia; therefore, its presence in Madeira is unlikely. This record should be further confirmed.

***Macrosteles ramosus* Ribaut, 1952**

*Macrosteles ramosus* Ribaut, 1952: 51

*Macrosteles quadricornis* Lindberg, 1954: 235; Lindberg, 1961: 63

*Distribution.* Southern Europe and Eastern Palaearctic. MADEIRA: recorded from two seashore localities in north and southern parts of island (Lindberg, 1961). PORTO SANTO: recorded only from Vila Baleira (Lindberg, 1961).

*Habitat and food plants.* Unknown.

**\* *Macrosteles sexnotatus* (Fallén, 1806)**

*Cicada sexnotata* Fallén, 1806: 34

*Distribution.* Palaearctic including Azores and Canary Islands. MADEIRA: Western part of Madeira.

*Habitat and food plants.* Unknown.

*Remarks.* This species was erroneously reported to Madeira as *M. ossiannilssoni* by Lindberg in 1941 (see Lindberg, 1961 and remarks for *M. ossiannilssoni* above).

MATERIAL EXAMINED: 1♂, 2♀♀, Caniçal, Ponta de São Lourenço, Madeira, 01.i.1998, leg. D. Aguin-Pombo.

**? *Mocuellus collinus* (Boheman, 1850)**

*Deltocephalus collinus* Boheman, 1850a: 261; China, 1938: 46 [?]

*Mocuellus collinus*?; Lindberg 1961: 67

*Distribution.* Palaearctic except North Africa. MADEIRA: locality unknown (China, 1938 as *Deltocephalus collinus* Boh.?).

*Remarks.* This record is based on a single female from Wollaston's collection examined by China

(1938) who stated that this specimen superficially resembled *M. collinus*. Later, Lindberg (1961) identified these specimens tentatively as *Mocuellus collinus* Boh. This record needs further confirmation.

*Habitat and food plants.* Unknown.

***Nesoclutha erythrocephala* (Ferrari, 1882)**

*Cicadula erythrocephala* Ferrari, 1882: 118

*Irinula erythrocephala*; Lindberg, 1961: 64

*Distribution.* Palaearctic except North Africa. MADEIRA: reported only from Funchal (Lindberg, 1961).

*Remarks.* This rare species may have been introduced (Lindberg, 1961).

*Habitat and food plants.* Unknown.

***Opsius lethierryi* Wagner, 1942**

*Opsius lethierryi* Wagner, 1942: 121; Lindberg, 1961: 65

*Distribution.* Western Palaearctic region including Canary Islands and North Africa. MADEIRA: reported only from Funchal (Lindberg, 1961).

*Food plants.* *Tamarix* (Lindberg, 1961).

***Orosius orientalis* (Matsumura, 1914)**

*Eutettix orientalis* Matsumura, 1914: 192

*Nesophrosyne cellulosa*; Lindberg, 1961: 65

*Distribution.* Occurs in Afrotropical, Oriental and Palaearctic regions including Canary Islands and Madeira but not listed in recent checklist (Hoch, 2004). MADEIRA: known from one specimen from Serra de Agua in southern part of island (Lindberg, 1961).

*Remarks.* This is one of the best known vectors of plant diseases caused by phytoplasmas and also vector of viruses diseases (Horn *et al.*, 1994).

*Habitat and food plants.* Unknown.

***Psammotettix striatus* (Linnaeus, 1758)**

*Thamnotettix striatus* Linnaeus, 1758: 437

*Psammotettix alienus*; Lindberg, 1961: 66

*Deltocephalus striatus*; China, 1938: 46 [identification error]

*Psammotettix striatus*; Lindberg, 1941: 31 [identification error]

*Distribution.* Holarctic. DESERTA GRANDE: locality unknown (Lindberg, 1961). MADEIRA: Reported from many localities from coastal areas up to mountain tops on northern and southern slopes (Lindberg, 1961; China, 1938; Lindberg, 1941). PORTO SANTO: reported from three localities from coastal areas up to high altitudes in northern slopes (Lindberg, 1961).

*Habitat and/or food plants.* Herbaceous vegetation and in the outside of cultivated terrains (Lindberg, 1961).

*Remarks.* China (1938) identified the material of Wollaston's collection as *Deltocephalus striatus* (= *Psammotettix striatus*) and Lindberg (1941) identified it as *Psammotettix striatus*. Later, Lindberg (1961) reexamined this material and considered it to be *P. alienus*. Presently *Psammotettix alienus* is considered a synonym of *Psammotettix striatus* (Razvyazkina & Pridantseva, 1968). This species is a vector of viruses and phytoplasmas which cause plant diseases (Della Giustina, 1989).

**\**Recilia angustisectus* (Linnavuori, 1962)**

*Deltocephalus angustisectus* Linnavuori, 1962: 55

*Distribution.* Previously known only from Israel (Linnavuori, 1962). MADEIRA: reported from eastern and driest part of Madeira (Ponta de São Lourenço).



*Habitat.* Herbaceous vegetation.

MATERIAL EXAMINED: 2 ♂♂, Ponta de São Lourenço, Madeira, 1.iv.2001, leg. D. Aguin-Pombo.

### Subfamily Eupelicinae Shalberg, 1871

#### ***Chloropelix canariensis* Lindberg, 1936**

*Chloropelix canariensis* Lindberg, 1936: 4; Lindberg, 1961: 67

*Distribution.* Macaronesia, North Africa and Israel not listed for Madeira in recent checklists (Nast, 1972; Hoch, 2007). MADEIRA: reported only from Funchal (Lindberg, 1961).

*Habitat and food plants.* Unknown.

### Subfamily Typhlocybinae Kirschbaum, 1868

#### ***Alebra viridis* Rey, 1897**

*Alebra albostriella* var. *viridis* Rey, 1897: 46

*Alebra viridis*; Aguin-Pombo, 2002: 68

*Distribution.* A European species not listed for Madeira archipelago in recent checklists (Hoch, 2004). MADEIRA: found in naturalized chestnut forests above 300 m altitude on southern slopes (Aguin-Pombo, 2002).

*Food plants.* *Quercus robur* and *Castanea sativa* (Aguin-Pombo, 2002).

*Remarks.* Some females recorded by Lindberg from Madeira as *Alebra albostriella* (Fallén, 1826) were deposited at the Municipal Museum of Funchal, but these resemble *A. viridis* (Aguin-Pombo, 2002). This last species was considered a variety of *A. albostriella* at the time that Lindberg published his work. The occurrence of *A. albostriella* on Madeira is unlikely.

#### ***Asianidia albula* (Lindberg, 1961)**

*Erythroneura albula* Lindberg, 1961: 73

*Distribution.* Endemic to Madeira. MADEIRA: reported from one locality on southern slope (Lindberg, 1961).

*Habitat and food plants.* Unknown.

#### ***Asianidia atlantica* (China, 1938)**

*Erythroneura atlantica* China, 1938: 50; China, 1938: 50; Lindberg, 1961: 73

*Asianidia atlantica*; Quartau and Remane, 1996: 2

*Distribution.* Endemic to Madeira archipelago. ISLET CHÃO: locality unknown (China, 1938). MADEIRA: reported from coastal areas up to medium altitude on southern slopes (Lindberg, 1961). PORTO SANTO: Serra de Dentro-Juliana (Lindberg, 1961)

*Food plants.* *Artemisia argentea* and *Artemisia arborescens* (Lindberg, 1961; Quartau and Remane, 1996).

#### ***Asianidia chinai* (Lindberg, 1961)**

*Erythroneura chinai* Lindberg, 1961: 72.

*Asianidia chinai*; Quartau *et al.*, 2004: 161

*Distribution.* Endemic to Madeira archipelago. MADEIRA: reported from two localities at high altitudes (Lindberg, 1961; Quartau *et al.*, 2004).

*Habitat and/or food plants.* *Isoplexis sceptrum*, an endemic species of the native laurel forest (Quartau *et al.*, 2004).

***Asianidia chrysanthemi* (Lindberg, 1954)**

*Erythroneura chinai* Lindberg, 1954: 252; Lindberg, 1961: 252

*Asianidia chrysanthemi*; Quartau and Remane, 1996: 2

*Distribution*. Endemic to Madeira archipelago and Canary Islands. MADEIRA: reported from five localities of southern slope (Lindberg, 1961, Quartau and Remane, 1996). PORTO SANTO: locality unknown (Lindberg, 1961).

*Food plants*. *Argyranthemum pinnatifidum*, an endemic species (reported by Lindberg, 1961 and Quartau and Remane, 1996 as *Chrysanthemum pinnatifidum*).

***Asianidia decolor* (Lindberg, 1936)**

*Erythroneura decolor* Lindberg, 1936: 15; China, 1938: 49; Lindberg, 1961: 72

*Distribution*. Endemic to Madeira archipelago and Canary Islands. MADEIRA: reported from localities above 300m on southern slopes (China, 1938; Lindberg, 1961).

*Food plants*. Labiatae spp. (Lindberg, 1961).

***Asianidia insulana* (Lindberg, 1961)**

*Erythroneura insulana* Lindberg, 1961: 71

*Distribution*. Endemic to Madeira Island. MADEIRA: on seashore on southern slopes (Lindberg, 1961).

*Habitat*. Native laurel forest (Lindberg, 1961).

***Asianidia madeirensis* (China, 1938)**

*Erythroneura madeirensis* China, 1938: 48; Lindberg, 1941: 31; Lindberg, 1961: 69

*Distribution*. Endemic to Madeira archipelago. MADEIRA: reported from many localities all over island, mainly above 500m (China, 1938; Lindberg, 1941; Lindberg, 1961).

*Habitat*. Shady places in forests (Lindberg, 1961).

***Asianidia melliferae* Quartau & Remane, 1996**

*Asianidia melliferae* Quartau & Remane, 1996: 2

*Distribution*. Endemic to Madeira Island but not included in recent checklists (Hoch, 2004). MADEIRA: known from a single locality (Ribeiro Bonito) on northern slope (Quartau and Remane, 1996).

*Food plants*. Probably monophagous on *Euphorbia mellifera*, a rare endemic plant of Macaronesian laurel forest growing in moist shady places (Quartau and Remane, 1996).

***Asianidia vallicola* (Lindberg, 1954)**

*Erythroneura vallicola* Lindberg, 1954: 252; Lindberg, 1961: 73

*Distribution*. Endemic to Canary Islands and Madeira archipelago. MADEIRA: Islet Fora: a small islet located at eastern part of Madeira Island (Lindberg, 1961).

*Habitat*. Halophyte plants (Lindberg, 1961).

***Asymmetrasca decedens* (Paoli, 1932)**

*Empoasca decedens* Paoli, 1932: 117

*Asymmetrasca decedens*; Freitas and Aguin-Pombo, 2004: 103

*Distribution*. Palaearctic and Oriental regions (Freitas and Aguin-Pombo, 2005), not listed for Madeira in recent checklists (Hoch, 2004). MADEIRA: all over island (Freitas and Aguin-Pombo, 2004).

*Food plants*. Exotic ornamental plants such as *Ricinus communis*, *Lavatera cretica*, *Passiflora edulis*, *Tagetes minuta*, *Schinus molle*, *Enterolobium cyclocarpium* and *Dahlia* sp. (Freitas and Aguin-Pombo, 2004).

*Remarks.* Probably recently introduced to Madeira Island (Freitas and Aguin-Pombo, 2004).

***Empoasca alsiosa* Ribaut, 1936**

*Empoasca alsiosa* Ribaut, 1936: 155.

*Empoasca unicolor*; Lindberg, 1961: 75

*Distribution.* Southern Europe and Macaronesia. MADEIRA: known from central parts (Lindberg, 1961).

*Habitat.* Native forest (Lindberg, 1961).

***Empoasca fabalis* DeLong, 1930**

*Empoasca fabalis* DeLong, 1930: 92; Aguin-Pombo *et al.*, 2006: 172

*Distribution.* An American species not recorded from Europe (Nast, 1972; Hoch, 2007). MADEIRA: locality unknown (Aguin Pombo *et al.*, 2006).

*Remarks.* Chromosomes of *E. fabalis* were studied in material from Madeira but this record has not been published (Aguin Pombo *et al.*, 2006).

*Habitat and food plants.* Unknown.

***Empoasca distinguenda* Paoli, 1932**

*Empoasca distinguenda* Paoli, 1932a: 114

*Distribution.* An African species not recorded from Europe (Nast, 1972; Hoch, 2007). MADEIRA: locality unknown (Aguin Pombo *et al.*, 2006).

*Remarks.* Identified based on 5 males. Parthenogenetic females probably of *E. distinguenda* were studied cytogenetically but this record has not been published (Aguin Pombo *et al.*, 2006).

*Habitat and food plants.* Unknown.

**? *Eupteryx capreola* Lindberg, 1954**

*Eupteryx capreola* Lindberg, 1954: 240; Quartau and Fañçony, 1988: 98; Aveiro and Aguin-Pombo, 2003a, 2003b

*Distribution.* Endemic to Canary Islands and Madeira archipelago. MADEIRA: reported from many localities of southern and northern slopes (Lindberg, 1961; Quartau and Fañçony, 1988). PORTO SANTO: one locality (Quartau and Fañçony, 1988).

*Food plants.* *Pteridium aquilinum* and herbaceous plants (Quartau and Fañçony, 1988).

*Remarks.* Quartau and Fañçony (1988) suggested that *Eupteryx capreola* Lindberg, 1954 is probably an extreme form of *Eupteryx filicum* (Newman, 1853). More recent morphological studies and population dynamics analysis of populations on *P. aquilinum* also failed to separate this species from *E. filicum* (Aveiro and Aguin-Pombo, 2003a, 2003b). The status of this species needs to be confirmed.

***Eupteryx filicum* (Newman, 1853)**

*Typhlocyba filicum* Newman, 1853: 132

*Eupteryx laureti*; China, 1938: 47; Lindberg, 1941: 31

*Eupteryx filicum*; Lindberg, 1961: 74

*Distribution.* Europe and Macaronesia. MADEIRA: reported from many localities at medium and high altitudes of northern and southern slopes (Lindberg, 1941; Lindberg, 1961). PORTO SANTO: sampled by Wollaston (China, 1938 as *E. laureti* Lind.) and Lindberg in Pico Castelo-Pico do Facho mountains (Lindberg, 1961).

*Habitat.* Native forest areas and above this forest on *Pteridium aquilinum* (Lindberg, 1961 as *Eupteris aquilina*).

*Remarks.* See remarks for *E. capreola* Lindberg, 1954.

**\**Tamaricella* cf. *fasciolata* (Lethierry, 1876)**

*Typhlocyba fasciolata* Lethierry, 1876: 449

*Distribution.* Palaearctic, including Canary Islands and North Africa, and Afrotropical regions. MADEIRA: reported from southern coast on western part of island.

*Food plants.* *Tamarix* sp.

MATERIAL EXAMINED: 2 ♂♂, 4 ♀♀, Paul do Mar, Madeira, 14-viii-2005, on *Tamarix* sp, leg. E. Nunes.

***Typhlocyba maderae* Lindberg, 1961**

*Typhlocyba maderae* Lindberg, 1961: 74

*Distribution.* Endemic to Madeira Island. MADEIRA: at high altitudes in native forest (Lindberg, 1961).

*Food plants.* *Erica* spp. (Lindberg, 1961).

**\**Zyginidia lineata* (Lindberg, 1954)**

*Erythroneura lineata* Lindberg, 1954: 245

*Distribution.* A Mediterranean species present in Canary Islands (Lindberg, 1954, Nast, 1972). MADEIRA: reported from laurel forest at high altitudes.

*Food plants.* Grasses.

MATERIAL EXAMINED: 1 ♂, 1 ♀, Ribeiro Frio-Poiso, Madeira, 1000m, 05.ix.1996, on Poaceae, leg. D. Aguin-Pombo.

**Subfamily Evacanthinae Metcalf, 1939**

***Sophonia orientalis* (Matsumura, 1912)**

*Nirvana orientalis* Matsumura, 1912: 282

*Sophonia orientalis*; Li and Chen, 1999: 51; Aguin-Pombo *et al.*, 2006: 21-22

*Distribution.* Oriental species recently introduced to Madeira archipelago and Canary Islands where is becoming an invasive species (Aguin-Pombo *et al.*, 2006; Webb and Viraktamath. 2004). MADEIRA: reported from many localities of southern part (Aguin-Pombo *et al.*, 2006).

*Food plants.* A polyphagous species feeding on many plant species of Anacardiaceae, Passifloraceae, Asteraceae, Euphorbiaceae, Lauraceae, Myrtaceae, Malvaceae, Convolvulaceae, Geraniaceae, Zingiberaceae, Polygonaceae, Solanaceae, Fabaceae, Globulariaceae and Caricaceae (Aguin-Pombo *et al.*, 2006).

**Subfamily Penthimiinae Kirschbaum, 1868**

***Penthimia irrorata* Horváth, 1909**

*Penthimia irrorata* Horváth, 1909: 297; Lindberg, 1961: 68

*Distribution.* Endemic to Canary Islands and Madeira archipelago but not listed in recent checklists (Hoch, 2004). MADEIRA: reported only from Serra de Água (Lindberg, 1961).

*Habitat and food plants.* Unknown.

## Suborder Fulgoromorpha Evans, 1946

### Family Cixiidae Spinola, 1839

#### Subfamily Cixiinae Spinola, 1839

##### ***Cixius chaoensis* China, 1938**

*Cixius chaoensis* China, 1938: 52; Lindberg, 1961: 55

*Distribution.* Endemic to Madeira archipelago. ISLET CHÃO: locality unknown (China, 1938; Lindberg, 1961).

*Habitat and food plants.* Unknown.

##### ***Cixius madeirensis* China, 1938**

*Cixius madeirensis* China, 1938: 51; Lindberg, 1961: 55

*Distribution.* Endemic to Madeira archipelago. MADEIRA: reported from several mountain localities on northern and southern slopes (China, 1938; Lindberg, 1961).

*Habitat.* Native vegetation (Lindberg, 1961).

##### ***Cixius verticalis* Noualhier, 1897**

*Cixius verticalis* Noualhier, 1897: 79; China, 1938: 50; Lindberg, 1941: 31; Lindberg, 1961: 55

*Distribution.* Endemic to Madeira archipelago. MADEIRA: occurs at medium and high altitudes mainly on northern slopes (China, 1938; Lindberg, 1941; Lindberg, 1961; Noualhier, 1897).

*Habitat.* Hedges and trees in native forest (Lindberg, 1961).

##### ***Hyalesthes madeires* Remane & Hoch, 1986**

*Hyalesthes madeires* Remane & Hoch, 1986: 132; Hoch and Remane, 1985: 132

*Hyalesthes flavipennis*; Lindberg, 1961: 54-55 [identification error]

*Distribution.* Endemic to Madeira Island. MADEIRA: reported from several localities on northern and southern slopes up to 600 m (Hoch and Remane, 1985; Lindberg, 1961; Remane and Hoch, 1986).

*Habitat and/or food plants.* *Globularia* spp., *Echium* spp., *Rubus* spp., *Euphorbia* spp. and other xerophyte vegetation (Hoch and Remane, 1985; Remane and Hoch, 1986).

*Remarks.* Lindberg (1961) identified 83 specimens from Serra de Agua as *Hyalesthes flavipennis* but Hoch & Remane (1985) studied part of this material (74 specimens) and identified them as a new species, *H. madeires*.

##### ***Hyalesthes portonoves* Remane & Hoch, 1986**

*Hyalesthes portonoves* Remane & Hoch, 1986: 134; Hoch and Remane, 1985: 134

*Distribution.* Endemic to Madeira Island. MADEIRA: reported from a single southern coastal locality (Porto Novo) (Hoch and Remane, 1985; Remane and Hoch, 1986).

*Habitat and/or food plants.* Xerophyte vegetation with *Echium* spp. and *Euphorbia* spp. (Hoch and Remane, 1985; Remane and Hoch, 1986).

*Remarks.* Lindberg (1941) identified two specimens from Portonovo as *Hyalesthes angustulus* Horv. 1908 but later (1961) he identified them as *Hyalesthes flavipennis*. Remane and Hoch (1985) described *H. portonoves* from the same locality; therefore, it is very likely that Lindberg's material corresponds to this species.

## Family Delphacidae Leach, 1815

### Subfamily Delphacinae Leach, 1815

#### ***Flastena fumipennis* (Fieber, 1866)**

*Delphax fumipennis* Fieber, 1866: 527

*Calligypona bifurcata*; Lindberg, 1961: 62.

*Distribution.* Palaearctic. MADEIRA: known only from a coastal locality (São Vicente) in northern part (Lindberg, 1961).

*Habitat.* Grasses and other vegetation growing on the margin of a stream (Lindberg, 1961).

#### ***Florodelphax leptosoma* (Flor, 1861)**

*Delphax leptosoma* Flor, 1861: 76

*Calligypona leptosoma*; Lindberg, 1961: 60

*Distribution.* Europe and Near East. MADEIRA: reported from two coastal localities on northern and southern parts (Lindberg, 1961).

*Habitat and food plants.* Unknown.

#### ***Javesella dubia* (Kirschbaum, 1868)**

*Delphax dubia* Kirschbaum, 1868: 26

*Delphacodes pellucida*; Lindberg, 1941: 32

*Calligypona dubia*; Lindberg, 1961: 60

*Javesella dubia*; Remane, 1975: 1

*Distribution.* Widely distributed in Palaearctic region except North Africa. MADEIRA: reported from coast to mountains in northern and southern slopes (Lindberg, 1941; Lindberg, 1961).

*Remarks.* The presence of this species in Madeira was further confirmed by Remane (1975).

*Habitat and food plants.* Unknown.

#### ***Laodelphax striatellus* (Fallén, 1826)**

*Delphax striatellus* Fallén, 1826: 129

*Delphacodes striatella*; China 1938: 54

*Delphacodes striatellus*; Lindberg, 1941: 32

*Calligypona marginata*; Lindberg, 1961: 60 [erroneous synonym]

*Distribution.* Palaearctic except North Africa, and Oriental and Afrotropical regions. MADEIRA: reported from several localities from different altitudes in northern and southern slopes (China 1938; Lindberg, 1941; Lindberg, 1961).

*Remarks.* China (1938) recorded this species as *Delphacodes striatella* Fall. Later, Lindberg (1961) identified his own material published in 1941 and China's material as *Delphacodes striatella* Fall. but erroneously misplaced this species as a synonym of *Calligypona marginata* (Fabr.). This latter species is a synonym of *Javesella pellucida* Fabricius, 1794.

*Habitat and food plants.* Unknown.

*Remarks.* A vector of the rice stripe virus (Lin *et al.*, 1996)

#### ***Liburnia anthracina* Horváth, 1909**

*Liburnia anthracina* Horváth, 1909: 301

*Calligypona anthracina*; Lindberg, 1961: 61

*Distribution.* An Afrotropical species present in Macaronesia. MADEIRA: known only from Funchal and Ribeira Brava, on southern and northern coast, respectively (Lindberg, 1961).

*Habitat and food plants.* Unknown.

***Makarorysa madalta* Remane & Asche, 1986**

*Makarorysa madalta* Remane & Asche, 1986: 228

*Distribution.* Endemic to Madeira. MADEIRA: reported from a single locality at 1450m in eastern part of Pico do Areeiro Mountain (Remane and Asche, 1986).

*Habitat and/or food plants.* Meadowlike clearing feeding probably on grasses (Remane and Asche, 1986).

*Remarks.* The specimens identified by Lindberg as *Eurysa ribauti* (Lindberg, 1936) probably correspond to *M. madalta* and/or to *M. madeco* (see Remane and Asche, 1986).

***Makarorysa madeco* Remane & Asche, 1986**

*Makarorysa madeco* Remane & Asche, 1986: 227

*Distribution.* Endemic to Madeira Island. MADEIRA: reported from coastal areas up to 1800 m (Pico Ruivo) (Remane and Asche, 1986).

*Food plants.* Grasses (Remane and Asche, 1986).

***Megamelodes quadrimaculatus* (Signoret, 1865)**

*Delphax quadrimaculatus* Signoret, 1865: 5

*Megamelus fieberi*; Lindberg, 1961: 59

*Distribution.* Europe, North Africa and Macaronesia. MADEIRA: reported from coast up to high altitudes in northern and southern slopes (Lindberg, 1961).

*Habitat.* Shady and moist places of native forest areas (Lindberg, 1961).

***Muellerianella fairmairei* (Perris, 1857)**

*Delphax fairmairei* Perris, 1857: 170

*Calligypona fairmairei*; Lindberg, 1961: 62

*Distribution.* Palaearctic including Azores and Madeira archipelagoes. MADEIRA: common at various altitudes on northern and southern slopes (Lindberg, 1961).

*Habitat and food plants.* Unknown.

***Pseudaraeopus lethierryi* (Mulsant & Rey, 1879)**

*Araeopus lethierryi* Mulsant & Rey, 1879: 319

*Pseudaraeopus lethierryi*; Lindberg, 1961: 59

*Distribution.* Widely distributed in Mediterranean Basin, Near East and Macaronesia. MADEIRA: known only from Funchal (Lindberg, 1961).

*Habitat and food plants.* Unknown.

***Sogatella nigeriensis* (Muir, 1920)**

*Megamelus nigeriensis* Muir, 1920: 140; Asche and Wilson, 1990: 13

*Distribution.* Occurs in Palaearctic and Afrotropical regions. MADEIRA: locality unknown (Asche and Wilson, 1990). The material of *Sogatella vibix* and *S. furcifera* studied by Lindberg (1961) and deposited in the British Museum, was identified by Asche and Wilson (1990) as *S. nigeriensis*.

*Remarks.* All material of *Sogatella furcifera* (Horváth, 1889) from Madeira reported by China (1938) and Lindberg (1961) and that of *Sogatella vibix* (Haupt, 1927) reported by Lindberg (1961) could correspond either to *S. nigeriensis* or *S. kolophon* Kirkaldy, 1906 (see Asche and Wilson, 1990). The presence of *S. kolophon* should be further confirmed.

*Habitat and food plants.* Unknown.

***Toya hispidula* (Lindberg, 1954)**

*Calligypona hispidula* Lindberg, 1954: 187; Lindberg, 1961: 61

*Toya hispidula*; Asche, 1980: 8

*Distribution.* African and Macaronesia. MADEIRA: known from a single locality, Porto da Cruz, in northern coast (Lindberg, 1961). PORTO SANTO: locality unknown (Asche, 1980).  
*Habitat.* Culture zone (Lindberg, 1961).

***Toya propinqua* (Fieber, 1866)**

*Delphacodes propinqua* Fieber, 1866: 525; China, 1938: 54

*Calligypona propinqua*; Lindberg, 1961: 60

*Delphacodes albicollis*; Lindberg, 1941: 32 [identification error]

*Distribution.* Worldwide except Australian region. MADEIRA: reported from many localities at different altitudes (China, 1938, no localities indicated; Lindberg, 1941; Lindberg, 1961). PORTO SANTO: sampled from southern coast up to high altitudes (Lindberg, 1961).

*Habitat.* In grass places and cultivated areas (Lindberg, 1961).

*Remarks.* This species was misidentified by Lindberg (1941) as *Delphacodes albicollis* (Motschulsky, 1863) but subsequently corrected by him (Lindberg, 1961).

### Subfamily Kelisiinae Wagner, 1963

***Kelisia ribauti* Wagner, 1938**

*Kelisia ribauti* Wagner, 1938: 12; Lindberg, 1941: 25; Lindberg, 1961: 59

*Distribution.* Palaearctic region including Macaronesia. MADEIRA: sampled in two southern localities (Lindberg, 1941; Lindberg, 1961).

*Habitat and food plants.* Unknown.

### Family Dictyopharidae Spinola, 1839

#### Subfamily Orgeriinae Fieber, 1872

***Almana longipes* (Dufour, 1849)**

*Dictyophara longipes* Dufour, 1849: 98

*Almana longipes*; Schmidt, 1915: 358

*Distribution.* Iberian Peninsula, North Africa and Madeira. MADEIRA: locality unknown (Schmidt, 1915).

*Habitat and food plants.* Unknown.

### Family Flatidae Spinola, 1839

#### Subfamily Flatinae Melichar, 1903

***Cyphopterum fauveli* (Noualhier, 1897)**

*Hysteropterum fauveli* Noualhier, 1897: 79.

*Cyphopterum fauveli*; Melichar, 1905: 476; China, 1938: 53; Lindberg, 1961: 58; Leise, 1992: 259

*Distribution.* Endemic to Madeira archipelago. DESERTA GRANDE: locality unknown (Leise, 1992; Lindberg, 1961). MADEIRA: sampled on southern coast in Funchal and Ponta de São Lourenço, the driest part of the Island (Noualhier, 1897; Melichar, 1905; Lindberg, 1961). Islet de Fora: locality unknown (Lindberg, 1961). ISLET CHÃO: locality unknown (China, 1938; Leise, 1992; Lindberg, 1961). PORTO SANTO: Serra de Dentro and Pico Juliana (Lindberg, 1961; Leise, 1992). Ilhéu da



Cevada: locality unknown (Lindberg, 1961).

*Food plants.* On halophyte plants (Lindberg, 1961).

*Remarks.* Leise (1992) indicates that Horváth's (1909) records of this species from La Palma (Canary Islands) correspond to *C. grossum* Lindberg, 1954 and Lallemand (1929) and Seabra's (1930a, 1930b, 1939a, 1939b, 1941) records from Portugal of the same species correspond to *C. adscendens* Herrich-Schäffer, 1835.

#### ***Cyphopterus quartau* Linnavuori, 1974**

*Cyphopterus quartau* Linnavuori, 1974: 2; Quartau, 1975: 2; Leise, 1992: 269

*Distribution.* Endemic to Salvagens archipelago. SELVAGEM PEQUENA: Pico do Veado (Linnavuori, 1974; Quartau, 1975; Leise, 1992)

*Food plants.* *Suaeda vera* and *Agropyron junceiforme* (Quartau, 1975).

#### ***Cyphopterus retusum* (Walker, 1851)**

*Issus retusus* Walker, 1851: 371

*Cyphopterus retusum*; Melichar, 1905: 477; China, 1938: 54; Leise, 1992: 260; Lindberg, 1961: 57

*Cyphopterus obtusatum*; Leise, 1992: 9

*Distribution.* Endemic to Madeira archipelago. MADEIRA: reported from several localities in northern and southern slopes at different altitudes (China, 1938; Leise, 1992; Lindberg, 1961; Walker, 1851 as *Issus retusus*; Melichar, 1905).

*Habitat and/or host plant.* Apparently polyphagous and common in hedges, in many cases on *Rubus* (Lindberg, 1961) but present also in many types of habitats and vegetation including pine forest with *Faya*, *Acacia*, coastal vegetation *Rubus* and *Artemisia*, herbaceous vegetation with *Pterys* and *Rubus*, moist hillsides with *Salix*, *Ulex* and *Rubus* (Leise, 1992).

*Remarks.* This species was misidentified by several authors and erroneously reported from several localities. From mainland Portugal (Leiria) it was erroneously reported by Lallemand (1929a and 1929b) and Seabra (1930a, 1930b, 1939a, 1939b, 1941) based on an incorrect identification of *C. adscendens* (H.-S.) (see Leise, 1992). Another erroneous record seems to be "Port Philip", the type locality of *C. curvipenne* Walker 1958. Distant (1910) considered this species a synonym of *C. retusum* although he apparently did not examine the type material. The locality Port Philip is unknown to Madeira but known to Australia (Victoria) where this genus is absent. The Australian locality may have been wrongly assigned by Captain Parry, the donor of the specimen, who may have travelled from Madeira to Australia. This species seems also to have been misidentified as *C. obtusatum* Melichar, 1923; the description of this last species was based on a single female specimen from Cape Verde (Melichar, 1923), the only material of this species known. Leise (1992) after examining *C. obtusatum* could not find any differences in head or body shape from *C. retusum* (Leise, 1992). For Cape Verde seven endemic species of *Cyphopterus* were reported and all except *C. obtusatum* belong to a different subgenus, *Phocypterum*. Therefore, Leise (1992) suggested that this specimen was mislabelled and that this was the same species recorded from Madeira because it seems unlikely that a species of *Cyphopterus s. str.* occurs in Cape Verde. Additional support for this is the fact that this species has never been collected in further sampling by Lindberg who collected intensively on this archipelago.

#### ***Cyphopterus salvagensis* Lindberg, 1959**

*Cyphopterus salvagensis* Lindberg, 1959: 20; Leise 1992: 263; Quartau 1975: 2

*Distribution.* Endemic to Salvage archipelago. SELVAGEM PEQUENA: Pico do Veado (Lindberg, 1959; Quartau, 1975; Leise, 1992).

*Food plants.* *Suaeda vera* and *Agropyron junceiforme* (Leise 1992; Quartau 1975).

## Family Issidae Spinola, 1839

### Subfamily Issinae Spinola, 1839

#### *Issus maderensis* Lindberg, 1956

*Issus maderensis* Lindberg, 1956: 58; Lindberg, 1961: 55; Remane, 1985: 94, 116, 120, 128, 130

*Issus canariensis*; China, 1938: 53 [identification error]; Lindberg, 1941: 32 [identification error].

*Distribution.* Endemic to Madeira Island. MADEIRA: reported from both slopes mainly at medium and high altitudes (China, 1938; Lindberg, 1941, 1956, 1961; Remane, 1985).

*Food plants.* Mainly on trees being very common on *Erica* (Lindberg, 1961).

*Remarks.* All material identified as *I. canariensis* by China (1938) corresponded to *I. maderensis* (Lindberg 1956, 1961).

### Doubtful records

- CICADELLIDAE    *Aphrodes bicinctus* (Schrank, 1776)  
                    *Mocuellus collinus* (Boheman, 1850)  
                    *Euscelis incisus* (Kirschbaum, 1858)  
                    *Eupteryx capreola* Lindberg, 1954

### Excluded species

- CICADELLIDAE    *Alebra albostriella* (Fallén, 1826)  
                    *Macrosteles fasciifrons* (Stål, 1858)
- DELPHACIDAE    *Sogatella furcifera* (Horváth, 1889)  
                    *Makarorysa ribauti* (Lindberg, 1936)  
                    *Sogatella vibix* (Haupt, 1927)  
                    *Javesella pellucida* (Fabricius 1794)

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