

ADDITIONS TO THE APHID FAUNA OF THE AZORES (HOMOPTERA: APHIDOIDEA) *

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With 1 table

ABSTRACT. The following seven aphid species are new records for the Azores, increasing the number of known species to 125: *Aphis sarothamni* FRANSSEN, *Aphis tirucallis* HILLE RIS LAMBERS, *Brachyunguis tamaricis* (LICHTENSTEIN) and *Schizaphis rotundiventris* (SIGNORET) from the island of Santa Maria; *Dysaphis crithmi* (BUCKTON), *Pentatrachopus fragaefolii* (COCKERELL) and *Rhopalosiphum nymphaeae* (LINNÉ) from the island of Flores. *D. crithmi* is also a new record for Continental Portugal.

Faunistic and specific biological comments on the seven species are made about and their geographical distribution is analysed. An updated list of the aphids of the islands of São Miguel, Santa Maria, Terceira, Faial, Pico, Flores and Corvo in the Azores, is included. As they have no published records of species the islands of São Jorge and Graciosa are omitted.

KEY WORDS: Aphidoidea, Continental Portugal, Azores.

RESUMO. As seguintes sete espécies de afídeos são citadas pela primeira vez para o Arquipélago dos Açores, elevando para 125 o total de espécies conhecidas: *Aphis sarothamni* FRANSSEN, *Aphis tirucallis* HILLE RIS LAMBERS, *Brachyunguis tamaricis* (LICHTENSTEIN) e *Schizaphis rotundiventris* (SIGNORET) para a ilha de Santa Maria; *Dysaphis crithmi* (BUCKTON), *Pentatrachopus fragaefolii* (COCKERELL) e *Rhopalosiphum nymphaeae* (LINNÉ) para a ilha das Flores. *D. crithmi* é também assinalado pela primeira vez para Portugal Continental.

São feitos comentários de natureza faunística e biológica acerca das sete espécies e analisa-se a sua distribuição geográfica. É apresentada a lista actualizada dos afídeos dos Açores (ilhas de São Miguel, Santa Maria, Terceira, Faial, Pico, Flores e Corvo). Por não terem espécies assinaladas são omitidas as ilhas de São Jorge e Graciosa.

PALAVRAS-CHAVE: Aphidoidea, Portugal Continental, Açores.

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INTRODUCTION

The aphid fauna of the Azorean Archipelago have been studied since the 70's by ILHARCO (1976, 1980, 1982, 1987), and by other authors (MÜLLER, 1965; NIETO NAFRIA, MIER DURANTE & CARNERO HERNANDEZ, 1977; CARNEIRO, 1979; CARVALHO, 1984; STOETZEL, 1985) and recently by CRUZ DE BOELPAEPE & TEIXEIRA (1990), SILVA & TAVARES (1995), SOUSA-SILVA & ILHARCO (1995) and PITA & ILHARCO (submitted). The species presented in this article were collected on the respective host plant, in two islands of the Azores (Santa Maria and Flores) and in Continental Portugal. The Azorean material refers to the second Aphid Expedition to that Archipelago, led by F.A. ILHARCO, A. VAN HARTEN and J. PINTO, between 15 September and 8 October 1979. All the samples, preserved in ethanol and on slide mounts, are now in the Aphid Collection of Estação Agronómica Nacional (CAEAN), and are referenced by a number (e.g. CAEAN 3103).

From the known literature, this paper presents an Azorean aphid list (Table 1), where species and subspecies are alphabetically listed within each family, according to ILHARCO (1992). With these seven new additions, the number of aphid species and subspecies for the Azores now amounts to 125 and the aphid fauna of this Archipelago is thus represented: São Miguel 106, Santa Maria 9, Terceira 63, Faial 39, Pico 6, Flores 9 and Corvo 2.

LIST OF SPECIES

Family Aphididae

Aphis sarothamni FRANSSEN, 1928

Aphis sarothamni is well known in Europe: Portugal, Spain, France, Italy, Great Britain, The Netherlands, Germany, Denmark and Sweden (STROYAN, 1984; HEIE, 1986; ROBERTI, 1991). It is also recorded from Peru, South America (ROBERTI, 1991).

It was first recorded in Continental Portugal by ILHARCO (1968c). In Macaronesia, it has been known since 1966 from Madeira Island. It might be the same species recorded as *Aphis cytisorum* HARTIG by GOMEZ-MENOR on *Genista* in the Canary Islands (ILHARCO, 1974). Now for the first time it has been recorded in the Azorean Archipelago.

Aphis sarothamni belongs to the *craccivora*-group and is closely related to *A. cytisorum* and *A. ulicis*. It lives on leguminous plants such as broom, mainly on young shoots and seed pods, where is attended by ants (HEIE, 1986). It has been found on plants of the genera *Sarothamnus* (= *Cytisus*) and *Spartium* (ILHARCO, 1973; HEIE, 1986; ROBERTI, 1991).

Material studied - Santa Maria, Ginjal (15 Sep. 79, CAEAN 3103, broom, col. F. A. ILHARCO, A. VAN HARTEN & J. PINTO).

Aphis tirucallis HILLE RIS LAMBERS, 1954

Aphis euphorbiae KALTENBACH, 1843 ssp. *tirucallis* HILLE RIS LAMBERS, 1954

Aphis tirucallis was described from Ethiopia, as a subspecies of *Aphis euphorbiae*, to which it is morphologically similar and with which it is sometimes associated. It is recorded from Central and Southern Europe, Great Britain, Sweden, Cape Verde Islands, Angola, South Africa, Ethiopia, Yemen and Southwest Asia (ILHARCO, 1973; BARBAGALLO & STROYAN, 1980; MILLAR, 1990; VAN HARTEN, ILHARCO & PRINSEN, 1994).

According to ILHARCO (1968c) and NIETO NAFRIA (1975) it is also known in Continental Portugal and Spain. Concerning Macaronesia, *A. tirucallis* has already been referred for Madeira (ILHARCO, 1974) and the Canary Islands (NIETO NAFRIA, CARNERO HERNANDEZ & MIER DURANTE, 1977). This paper makes its first record for the Azores.

It is commonly found on species of *Euphorbia* (ROBERTI, 1991). Its biology is unknown and only viviparae have been described (MILLAR, 1990).

Material studied - Santa Maria, São Lourenço (18 Sep. 79, CAEAN 3168, *Euphorbia azorica*, col. F.A. ILHARCO, A. VAN HARTEN & J. PINTO).

Brachyunguis tamaricis (LICHTENSTEIN, 1885)

Aphis tamaricis LICHTENSTEIN, 1885

Brachyunguis tamaricifoliae (HALL, 1926)

Brachyunguis tamaricis, a species from the Mediterranean area, is recorded from Southern and Central Europe, North Africa, the Middle East, and Southwest and Central Asia (ROBERTI, 1991; BLACKMAN & EASTOP, 1994; VAN HARTEN, ILHARCO & PRINSEN, 1994).

This species was recorded in Continental Portugal in 1977 (ILHARCO, 1996). It was reported for the first time for Macaronesia by NIETO NAFRIA, CARNERO HERNANDEZ & MIER DURANTE (1977), from the Canary Islands. Now it has been added to the Azorean fauna.

The colour of the apterae varies from green to greyish with wax secretion. The colonies of this species may be attended by ants. It lives on *Tamarix* spp. and its life cycle

is unknown (BLACKMAN & EASTOP, 1994).

Material studied - Santa Maria, Ginjal (15 Sep. 79, CAEAN 3098, *Tamarix gallica*, col. F.A. ILHARCO, A. VAN HARTEN & J. PINTO), São Lourenço (18 Sep. 79, CAEAN 3164, *Tamarix gallica*, col. F.A. ILHARCO, A. VAN HARTEN & J. PINTO).

Dysaphis crithmi (BUCKTON, 1886)

Aphis crithmi BUCKTON, 1886

Anuraphis crithmi (BUCKTON, 1886)

Dysaphis crithmi is a Palearctic species that exists in coastal areas of some European regions: Southern England, Southern Eire, Channel Islands, Spain, Southern France and Sicily (STROYAN, 1963; BARBAGALLO & STROYAN, 1980; REMAUDIÈRE, NIETO NAFRIA & MIER DURANTE, 1986; ROBERTI, 1991).

This species was first recorded in Continental Portugal in 1978 but is being reported only now.

In Macaronesia, it was reported in Madeira by ILHARCO (1974) and now, for the first time, it is recorded for the Azores.

It is an anholocyclic greenish grey species, that lives on *Crithmum maritimum* (ILHARCO, 1986; REMAUDIÈRE, NIETO NAFRIA & MIER DURANTE, 1986).

Material studied - Flores, Santa Cruz (21 Sep. 79, CAEAN 3203a, *Crithmum maritimum*, col. F.A. ILHARCO, A. VAN HARTEN & J. PINTO), Fajã Grande (26 Sep. 79, CAEAN 3335a, *Crithmum maritimum*, col. F.A. ILHARCO, A. VAN HARTEN & J. PINTO);

Continental Portugal, Cascais (20 Jun. 78, CAEAN 2615a, *Crithmum maritimum*, col. A.R. PINTO da SILVA & M. PINA), Mafra, Ericeira (04 Apr. 85, CAEAN 4252, *Crithmum maritimum*, col. J. PINTO).

Pentatrichopus fragaefolii (COCKERELL, 1901)

Chaetosiphon fragaefolii (COCKERELL, 1901)

Capitophorus fragariae (THEOBALD, 1912)

Pentatrichopus fragaefolii, the strawberry aphid, has a wide geographical distribution: Europe, North America, Argentina, Brazil, Eritrea, Morocco, Kenya, Zimbabwe, South Africa, Mauritius, Angola; the Middle East, Southwest Asia, Australia and New Zealand (HILLE RIS LAMBERS, 1953; VAN HARTEN & ILHARCO, 1971;

ILHARCO, 1973; NIETO NAFRIA, 1975; BARBAGALLO & STROYAN, 1980; ROBERTI, 1991; SOUSA-SILVA & ILHARCO, 1995). It is presumably of North America origin (MILLAR, 1990).

Now it has spread to all parts of the world where strawberries are cultivated (ILHARCO, 1973; MILLAR, 1990; ROBERTI, 1991), and is found on the undersides of young leaves. The colour of the apterae varies from yellowish white to pale greenish yellow. This species may be a noxious phytophagous to strawberry plants as it is a vector of some persistent and non-persistent viruses (BLACKMAN & EASTOP, 1984). It is not visited by ants (HILLE RIS LAMBERS, 1953; ROBERTI, 1991).

As the nomenclature of this species has become slightly complicated, HILLE RIS LAMBERS (1953) had suggested the use of the name *P. fragaefolii* for the European species and *P. thomasi* for the American form.

Pentatrichopus fragaefolii is already known from Portugal since 1939 (ILHARCO, 1968b).

It is known from the island of Madeira in 1952 (ILHARCO, 1974); NIETO NAFRIA, CARNERO HERNANDEZ & MIER DURANTE (1977) have reported it from the Canary Islands. This is the first record for the Azores.

Material studied - Flores, Santa Cruz (22 Sep. 79, CAEAN 3251, *Fragaria* sp., col. F.A. ILHARCO, A. VAN HARTEN & J. PINTO).

Rhopalosiphum nymphaeae (LINNÉ, 1761)

Aphis nymphaeae LINNÉ, 1761

Rhopalosiphum nymphaeae, commonly known as the water lily aphid, has a wide geographical distribution: Portugal, Spain, Italy, Yugoslavia, Poland, Great Britain, Denmark, Sweden, Norway, Finland and Russia (HEIE, 1986; ROBERTI, 1991); has also been recorded from Morocco, Egypt, Nigeria, Zimbabwe, Kenya, Malawi, South Africa, Angola, Mozambique, New Zealand (COTTIER, 1953; ILHARCO, 1972; VAN HARTEN & ILHARCO, 1972) and also from Canada, United States of America, Mexico, Bermudas, Cuba, Puerto Rico, Brazil, Argentina, Chile, Peru, and Yemen (VAN HARTEN, ILHARCO & PRINSEN, 1994; NIETO NAFRIA, DELFINO & MIER DURANTE, 1994; SOUSA-SILVA & ILHARCO, 1995).

This species was first recorded in Continental Portugal in 1960 (ILHARCO, 1968a). In Macaronesia, it was first recorded from Madeira in 1955 (ILHARCO, 1974); it has also been reported from the Canary Islands by NIETO NAFRIA, CARNERO HERNANDEZ & MIER DURANTE (1977). This is the first record for the Azores.

Rhopalosiphum nymphaeae alternates between *Prunus* spp. and a wide variety of

aquatic or subaquatic and marsh plants. However in temperate regions it is anholocyclic on secondary hosts.

Material studied - Flores, Santa Cruz (22 Sep. 79, CAEAN 3235, *Nymphaea* sp., col. F.A. ILHARCO, A. VAN HARTEN & J. PINTO).

Schizaphis rotundiventris (SIGNORET, 1860)

Toxoptera cyperi VAN DER GOOT, 1917

Schizaphis cyperi (VAN DER GOOT, 1917)

Schizaphis rotundiventris, originally described from Java, is widely distributed in tropical and warm temperate Old World regions: Southern Europe, Africa, the Orient, the Far East, Southeast Asia, Australia, New Zealand (HILLE RIS LAMBERS, 1967; ROBERTI, 1991).

This small dark green to almost black aphid has frequently been referred to under the name *S. cyperi* (VAN DER GOOT), a synonym. Their more normal hosts are *Cyperus* species, sometimes palms (VAN HARTEN & ILHARCO, 1971; MILLAR, 1990). This species alternates between *Pyrus* and *Cyperaceae* but in tropical and warm temperate regions it is an anholocyclic species on secondary hosts (VAN HARTEN & ILHARCO, 1971; BLACKMAN & EASTOP, 1984).

In Europe it was first recorded in France but has since been reported from Continental Portugal, Spain and Italy, including Sicily (HILLE RIS LAMBERS, 1967; VAN HARTEN, 1975; BARBAGALLO & STROYAN, 1980; MELIÁ MASIÁ, 1995) and Madeira (ILHARCO, 1984). It is now added to the Azorean aphid fauna.

Material studied - Santa Maria, Ginjal (15 Sep. 79, CAEAN 3094, *Cyperus badius*, col. F.A. ILHARCO, A. VAN HARTEN & J. PINTO), Ginjal (16 Sep. 79, CAEAN 3112a, *Cyperus esculentus*, col. F.A. ILHARCO, A. VAN HARTEN & J. PINTO).

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TABLE 1

List of the aphids of the Archipelago of the Azores

SMi - São Miguel; SMa - Santa Maria; Ter - Terceira; Fai - Faial; Pic - Pico; Flo - Flores; Cor - Corvo.

+ - Present

Species and subspecies	SMi	SMa	Ter	Fai	Pic	Flo	Cor
Phylloxeridae							
<i>Viteus vitifolii</i> (Fitch)	+		+	+	+		
Pemphigidae							
<i>Eriosoma lanigerum</i> (Hausmann)	+		+				
<i>Eriosoma lanuginosum</i> (Hartig) *	+						
<i>Geoica utricularia</i> (Passerini)	+						
<i>Pemphigus populitransversus</i> Riley	+						
<i>Prociphilus</i> sp. *	+						
<i>Tetraneura ulmi</i> (Linné)	+						
<i>Thecabius affinis</i> (Kaltenbach)	+		+				
Drepanosiphidae							
<i>Anoecia corni</i> (Fabricius)	+						
<i>Calaphis flava</i> Mordwilko	+						
<i>Chaitophorus leucomelas</i> Koch	+		+	+			
<i>Chromaphis juglandicola</i> (Kaltenbach)	+						
<i>Drepanosiphum oregonensis</i> Granovsky			+	+			
<i>Drepanosiphum platanoidis</i> (Schrank)	+		+	+			
<i>Eucallipterus tiliae</i> (Linné)	+						
<i>Hoplocallis pictus</i> (Ferrari)	+						
<i>Myzocallis boernerii</i> Stroyan	+						
<i>Myzocallis castanicola</i> Baker	+		+	+			
<i>Phloeomyzus passerinii</i> (Signoret)	+						
<i>Pterocallis alni</i> (De Geer)	+						
<i>Saltusaphis scirpus</i> Theobald	+						
<i>Sipha flava</i> (Forbes)	+	+				+	
<i>Thelaxes suberi</i> (Del Guercio)	+						
<i>Therioaphis trifolii</i> (Monell)	+						
<i>Tuberculoides annulatus</i> (Hartig)	+			+			
Aphididae							
<i>Acyrthosiphon loti</i> (Theobald)	+		+				
<i>Acyrthosiphon malvae malvae</i> (Mosley)	+		+				
<i>Acyrthosiphon malvae</i> (Mosley) <i>rogersii</i> (Theobald)	+						
<i>Acyrthosiphon pisum</i> (Harris)	+		+	+			
<i>Amphorophora idaei</i> (Bömer)			+				
<i>Aphis affinis</i> Del Guercio	+		+			+	
<i>Aphis craccivora</i> Koch	+		+	+			
<i>Aphis fabae</i> Scopoli	+		+	+			
<i>Aphis farinosa</i> Gmelin	+		+	+			

(cont. TABLE 1)

Species and subspecies	SMi	SMa	Ter	Fai	Pic	Flo	Cor
<i>Aphis gossypii</i> Glover	+		+	+	+		
<i>Aphis hederæ</i> Kaltenbach	+			+			
<i>Aphis nasturtii</i> Kaltenbach	+		+	+			
<i>Aphis origani</i> Passerini	+						
<i>Aphis parietariae</i> Theobald	+						
<i>Aphis pomi</i> De Geer	+		+	+	+		
<i>Aphis ruborum</i> (Bömer)	+		+	+			
<i>Aphis sarothamni</i> Franssen **		+					
<i>Aphis sedi</i> Kaltenbach	+						
<i>Aphis solanella</i> Theobald	+		+	+			
<i>Aphis spiraeicola</i> Patch	+		+		+		
<i>Aphis tirucallis</i> Hille Ris Lambers **		+					
<i>Aphis umbrella</i> (Bömer)	+						
<i>Aphis urticata</i> Fabricius	+						
<i>Aulacorthum solani</i> (Kaltenbach)	+		+				
<i>Brachycaudus cardui</i> (Linné)	+		+	+			
<i>Brachycaudus helichrysi</i> (Kaltenbach)	+	+	+				
<i>Brachycaudus lateralis</i> (Walker)	+		+				
<i>Brachycaudus persicae</i> (Passerini)						+	
<i>Brachycaudus prunicola</i> (Kaltenbach)	+		+	+			
<i>Brachyunguis tamaricis</i> (Lichtenstein) **		+					
<i>Brevicoryne brassicae</i> (Linné)	+		+	+			
<i>Capitophorus elaeagni</i> (Del Guercio)	+						
<i>Capitophorus hippophaes</i> (Walker) <i>dubius</i> Ilharco	+						
<i>Cavariella aegopodii</i> (Scopoli)	+		+				
<i>Cavariella theobaldi</i> (Gillette & Bragg) *	+						
<i>Coloradoa rufomaculata</i> (Wilson)	+		+				
<i>Cryptomyzus</i> sp. *	+						
<i>Dysaphis aptifolia</i> (Theobald)	+		+	+			
<i>Dysaphis aucupariae</i> (Buckton)	+						
<i>Dysaphis crataegi crataegi</i> (Kaltenbach)	+						
<i>Dysaphis crithmi</i> (Buckton) **						+	
<i>Dysaphis foeniculus</i> (Theobald)	+		+				
<i>Dysaphis maritima</i> (Hille Ris Lambers)	+						
<i>Dysaphis plantaginea</i> (Passerini)			+	+			
<i>Dysaphis pyri</i> (Boyer de Fonscolombe)	+						
<i>Dysaphis radicola</i> (Mordwilko)	+						
<i>Dysaphis tulipae</i> (Boyer de Fonscolombe)			+				
<i>Eucarazzia elegans</i> (Ferrari) ***							
<i>Holcaphis</i> sp.	+						
<i>Hyperomyzus lactucae</i> (Linné)	+		+	+			
<i>Illinoia azaleae azaleae</i> (Mason)	+						
<i>Jacksonia papillata</i> Theobald	+				+		
<i>Lipaphis erysimi</i> (Kaltenbach)	+		+				
<i>Longiunguis pyrarius</i> (Passerini)	+						
<i>Macrosiphoniella artemisiae</i> (Boyer de Fonscolombe)			+				
<i>Macrosiphoniella sanborni</i> (Gillette)			+				
<i>Macrosiphoniella tanacetaria</i> (Kaltenbach) <i>italica</i> Hille Ris Lambers						+	
<i>Macrosiphum euphorbiae</i> (Thomas)	+		+	+			
<i>Macrosiphum rosae</i> (Linné)	+		+	+			

(cont. TABLE 1)

Species and subspecies	SMi	SMA	Ter	Fai	Pic	Flo	Cor
<i>Melanaphis donacis</i> (Passerini)	+	+		+		+	+
<i>Metopolophium dirhodum</i> (Walker)	+		+	+			
<i>Metopolophium festucae</i> (Theobald)	+						
<i>Metopolophium frasicum</i> Hille Ris Lambers	+						
<i>Myzaphis bucktoni</i> Jacob	+						
<i>Myzaphis rosarum</i> (Kaltenbach)	+		+				
<i>Myzus ascalonicus</i> Doncaster *	+						
<i>Myzus cerasi</i> (Fabricius)			+				
<i>Myzus cymbalariae</i> Stroyan			+				
<i>Myzus ornatus</i> Laing	+		+	+			
<i>Myzus persicae</i> (Sulzer)	+		+	+			
<i>Nasonovia ribisnigri</i> (Mosley)	+						
<i>Nearctaphis bakeri</i> (Cowen)	+						
<i>Neomyzus circumflexus</i> (Buckton)	+		+				
<i>Ovatus crataegarius</i> (Walker)	+		+	+			
<i>Ovatus insitus</i> (Walker)			+				
<i>Pentalonia nigronervosa</i> Coquerel	+		+	+			
<i>Pentatrachopus fragaefolii</i> (Cockerell) **						+	
<i>Pentatrachopus tetrarhodus</i> (Walker)	+		+	+			
<i>Pterocomma populeum</i> (Kaltenbach)	+		+	+			
<i>Rhopalosiphoninus latysiphon</i> (Davidson)	+						
<i>Rhopalosiphoninus staphyleae</i> (Koch)	+						
<i>Rhopalosiphum insertum</i> (Walker)	+		+	+		+	
<i>Rhopalosiphum maidis</i> (Fitch)	+		+	+			
<i>Rhopalosiphum nymphaeae</i> (Linné) **						+	
<i>Rhopalosiphum padi</i> (Linné)	+	+	+				
<i>Rhopalosiphum rufiabdominalis</i> (Sasaki)	+						+
<i>Schizaphis graminum</i> (Rondani)	+		+	+			
<i>Schizaphis pyri</i> Shaposhnikov	+						
<i>Schizaphis rotundiventris</i> (Signoret) **		+					
<i>Sitobion avenae</i> (Fabricius)	+		+				
<i>Sitobion fragariae</i> (Walker)	+		+				
<i>Toxoptera aurantii</i> (Boyer de Fonscolombe)	+		+	+			
<i>Uroleucon sonchi</i> (Linné)	+	+	+	+			
Lachnidae							
<i>Cinara juniperi</i> (De Geer)	+		+		+		
<i>Cinara maritimae</i> (Dufour)	+		+	+			
<i>Cinara tujafilina</i> (Del Guercio)	+		+				
<i>Eulachnus rileyi</i> (Williams)	+						
<i>Lachnus roboris</i> Linné *	+						
<i>Neotrampa maritima</i> Eastop	+						
<i>Tuberolachnus salignus</i> (Gmelin)	+		+	+			
Total number of species and subspecies	106	9	63	39	6	9	2
Total for the Archipelago of the Azores	125						

* According to Cruz de Boelpaep & Teixeira (1990).

** The species treated in this paper, new to the Archipelago of the Azores.

*** Without indication of the island (Stoetzel, 1985).

Note: As they have no published records of species, the islands of São Jorge and Graciosa were not included in this table.