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NEW RECORDS FOR THE AZOREAN ARTHROPOD FAUNA

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ABSTRACT

The pasture arthropod fauna of three Azorean islands (S. Maria, Terceira and Pico) was surveyed through several sampling methods (pitfall traps, VORTIS suction machine, direct searching). Sucking (63 species) and chewing (65 species) arthropod herbivores and 117 species of predatory arthropods were sampled during five sampling periods covering three seasons in 1994 (Spring, Summer and Autumn) and two in 1995 (Spring and Summer). In the present contribution, 85 species of arthropods are listed as new records: 22 species were not previously known from any of the Azorean islands, five of which are considered endemic (four from S. Maria and one from Terceira) and will be described elsewhere; 63 species are recorded for the first time for S. Maria, 21 for Terceira and 28 for Pico. For each species some comments are made on their distribution and ecology.

RESUMO

A fauna de artrópodes das pastagens de três ilhas dos Açores (S. Maria, Terceira e Pico) foi alvo de uma amostragem detalhada usando várias técnicas de amostragem (armadilhas *pitfall*, aspirador entomológico VORTIS e colheitas directas). Um total de 63 espécies de insectos herbívoros sugadores, 65 espécies de insectos herbívoros mastigadores e 117 espécies de artrópodes predadores foram amostrados durante cinco períodos de amostragem cobrindo três estações do ano em 1994 (Primavera, Verão e Outono) e duas em 1995 (Primavera e Verão). A presente contribuição serve para listar 85 novidades: 22 espécies são novas para o arquipélago, sendo cinco delas (quatro de S. Maria e uma da Terceira) endémicas; 63 espécies constituem novidade para S. Maria, 21 são novas para a Terceira e 28 são novas para o Pico. Para cada espécie apresenta-se alguns comentários sobre a sua distribuição e ecologia.

KEY WORDS: pasture arthropods, Azores, Pico, S. Maria, Terceira, new records

INTRODUCTION

Standardized trapping (pitfall traps), suction (VORTIS machine) and direct searching were used to sample the arthropod fauna of recently sown pastures of four years old and semi-natural pastures with more than 35 years in the following three Azorean islands:S. Maria, Terceira and Pico (see Borges, 1997, 1999a, b; Borges & Brown, 1999, submitted a, b).

Pasture is currently the dominant habitat in the Azores, more than half of the land being pasture of some kind (Garcia & Furtado, 1991). A detailed description of the plant and arthropod communities from the recently sown pastures and old semi-natural pastures is presented in Borges (1997, 1999a).

This is the second time that the Azorean arthropod fauna has been systematically sampled in a particular habitat. In fact, Ashmole *et al.* (1996) recently published a detailed description of the invertebrate survey of early successional and volcanic habitats of the Azores. As a consequence of the sampling carried out in the Azorean pastures by the first author (P. A. V. Borges) a total of 237 species were collected and recently listed elsewhere (see Borges, 1999b). Here we deal only with the species that are new records for the Azores or each of the studied islands.

MATERIAL AND METHODS

Experimental design and sites description

For the present study three islands from the Azorean archipelago were selected, S. Maria, Pico and Terceira. Cattle-grazed upland pastures of two different types were sampled: i) recent sown pastures (of three to four years old); and ii) wet semi-natural old pastures (more than 35 years old). Two replicates of each type were selected in each island at a high-altitude level, and in all the 12 pastures, an area of at least 900 m^2 was fenced with posts and barbed wire during January and February 1994.

A total of three complete samples occurred during the first year of field work (1994) in the following months: i) May - June (Spring); ii) July – August (Summer); and iii) September – October (Autumn); in 1995, two major sampling periods occurred: iv) May – June (Spring), and v) end of July – August – early September (Summer).

Details on the characteristics of the 12 main field sites are presented on Table 1. In Terceira and S. Maria, the sown pastures are located at a lower altitude than the semi-natural sites. This was because of constraints in the location of sown pastures in these islands.

TABLE 1. Characteristics of the twelve field sites of S. Maria, Terceira and Pico. The soil data between brackets refer to the second year (1995).

	S. MARIA			
	Sown		Semi-natural	
	1.1	1.2	2.1	2.2
Location within the island	S. Espírito	S. Bárbara	Fontinhas	Casas Velhas
Altitude	300	290	430	360
Soil type	Insaturated Argilaceous	Thin Argilaceous	Litholic Andic	Litholic Andic + clay
Total area of the main pasture (m2)	3.800	4.720	4.928	3.400
Shape of the field site	Quadrat	Quadrat	Quadrat	Quadrat
Slope (%)	0	2	5	0
Exposure (North side)	180 (South)	90 (East)	0	0
Micro-topographical index	2.38	2.37	2.78	2.07
Historical management	Cereal field	Cereal field	Natural forest	Natural forest
Sowed	1990	1990	1958	1958
Ecological classification	Sown	Sown	Semi-Natural	Semi-Natural
Grazed by	Bull or dairy-cow	Bull	Dairy-cows	Dairy-cows
Type of traditional grazing management	Intensive	Intensive	Low grazing	Low grazing
Number of traditional grazing periods per year	7(1;3;2;1)	7(1;3;2;1)	5(1;2;1;1)	5(1;2;1;1)
Grazing regime	stake, closed	stake, closed	random, closed	random, closed
Number of animals	1	1	2	4
Fertilizer	P2O5 18%; S 12%	P2O5 18%; S 12%	P2O5 18%; S 12%	P2O5 18%; S 12%
quantity	20kg/1000m2	20kg/1000m2	30kg/1000m2	20kg/1000m2
no. applications per year	2(Oct, Febr.)	2(Oct., Febr.)	1 (Febr.)	1 (Febr.)
pH	6.2 (6.0)	6.6 (6.9)	5.3 (5.2)	6.6 (5,7)
P (average 20 ppm)	26 (0.51)	26 (0.50)	13 (0.52)	18 (2.0)
K (average 100 ppm)	200 (180)	130 (95)	40 (40)	190 (115)
%N	0.8 (0.56)	0.7 (0.34)	1 (0.86)	1 (0.74)
Organic matter	17.3 (6.3)	10.2 (6.3)	20.5 (8.0)	19 (6.7)
C/N	22	15	21	19

	TERCEIRA			
	Sown		Semi-natural	
	3.1	3.2	4.1	4.2
Location within the island	Altares	Altares	Pico Gaspar	Pico Gaspar
Altitude	350	330	550	530
Soil type	Typical Andisol	Typical Andisol	Litholic soil	Litholic soil
Total area of the main pasture (m2)	6397	10.800	Very large	31.710
Shape of the field site	Quadrat	Quadrat	Rectangle	Quadrat
Slope (%)	2	0	0	5
Exposure (North side)	0	0	0	0
Micro-topographical index	3.07	2.66	3.95	2.9
Historical management	Cereal field	Cereal field	Natural forest	Natural forest
Sowed	1990	1990	1950?	1950?
Ecological classification	Sown	Sown	Semi-Natural	Semi-Natural
Grazed by	Beef-cattle	Beef-Cattle	Dairy-cows and one horse	Dairy-cows
Type of traditional grazing management	Intensive	Intensive	Low grazing	Low grazing
Number of traditional grazing periods per year	Several	Several	Several	Several
Grazing regime	random, closed	random, closed	random, open	random, open
Number of animals	14	14	8	20
Fertilizer	P and K	P and K	(10/25/13)	(10/25/13)
quantity	25kg/1000m2	25kg/1000m2	25kg/1000m2	25kg/1000m2
no. applications per year	1	1	1 (Febr.)	1 (Febr.)
pH	5.7 (4.8)	5 (4.8)	5 (4.8)	5.3 (4.7)
P (average 20 ppm)	34 (50)	26 (40)	17 (18)	25 (60)
K (average 100 ppm)	160 (330)	135 (430)	285 (150)	205 (245)
%N	1.5 (1.3)	1.4 (1.3)	1.8 (1.8)	1.5 (1.4)
Organic matter	17.2 (16)	15.9 (16.8)	16.8 (22.5)	17.5 (20.4)
C/N	11	11	9	11

TABLE 1. Continued.

	PICO			
	Sown		Semi-natural	
	5.1	5.2	6.1	6.2
Location within the island	Fogueiras do Paul	Achada	Fogueiras do Paul	Achada
Altitude	790	730	800	710
Soil type	Unsat. thin Andic	Unsat. thin Andic	Unsat. thin Andic	Unsat. thin Andic
Total area of the main pasture (m2)	65.000	65.000	40.000	40.000
Shape of the field site	Rectangle	Rectangle	Rectangle	Rectangle
Slope (%)	0	Undulated	Highly Undulated	Undulated
Exposure (North side)	310	320	310	330
Micro-topographical index	3.14	4.33	8.21	3.43
Historical management	Natural forest	Natural forest	Natural forest	Natural forest
Sowed	1990	1990	1950?	1950?
Ecological classification	Sown	Sown	Natural	Natural
Grazed by	Dairy-cows	Dairy-cows	Dairy-cows	Dairy-cows and beef-cattle
Type of traditional grazing management	Intensive	Intensive	Low grazing	Low grazing
Number of traditional grazing periods per year	Several	Several	Several	Several
Grazing regime	random, open	random, open	random, open	random, open
Number of animals	12 to 18	15	10	10 to 12
Fertilizer	P2O5K2O(15/24/16)	P2O5K2O(15/24/16)	P2O5K2O(15/24/16)	P2O5K2O(15/24/16)
quantity	25kg/1000m2	25kg/1000m2	25kg/1000m2	25kg/1000m2
no. applications per year	2(Oct., April)	2(Oct., April)	1 (March)	1 (March)
pH	5.7 (5.6)	5.6 (5.6)	5.3 (5.2)	5.4 (4.9)
P (average 20 ppm)	42 (56)	23 (20)	13 (14)	10 (16)
K (average 100 ppm)	150 (265)	195 (180)	105 (85)	260 (435)
%N	0.9 (0.7)	1.2 (1.0)	1.4 (1.6)	1.9 (1.9)
Organic matter	15.3 (15.1)	24.8 (14.0)	33 (19.3)	17.2 (24.9)
C/N	17	21	23	9

Sampling methods

Pitfall traps and suction machines (VORTIS) were used for sampling arthropods during four main sampling periods (Spring, Summer and Autumn, 1994; Summer, 1995), together with standardized visual searching (Spring and Summer, 1995) (for a discussion of the importance of using both pitfall and suction methods see Borges & Brown, submitted b).

The pitfall sampling consisted of seven consecutive nights of sampling. A set of twenty pitfall traps was used, and positioned according to the grid structure described in Borges (1997). The pitfall trap consisted in a plastic cup with a trap diameter of 110 mm and a depth of 70 mm. The killing-preserving agent used was ethylene glycol (anti-freeze), with a little detergent (Teepol) added to lower the surface tension of the solution. Each trap was also protected against the rain with a white plastic dish cover fixed to the ground by three pieces of wire.

The suction apparatus used was a "Vortis" (Burkhard Scientific - Sales - Ltd., Rickmansworth, Hertfordshire, England). The sampling on each occasion was carried out between 11.00 and 18.00, and only when the vegetation was completely dry and the wind conditions acceptable. In each of the 20 plots of each field site, four random subsamples were taken, one in each corner of the 3x3 m square plots (covering a total of 0.8 m^2). The collection

nozzle was held in position for 30 seconds on each occasion. To simplify the sorting process, the four subsamples were taken successively without changing the collection vial. The samples were stored in tubes with 70% ethylene with some drops of glycerol prior to sorting.

Codes for the sites, sampling methods and dates

Sites

SMA (S. Maria)

1.1 (S. Espírito, sown pasture, 300 m altitude).
1.2 (S. Bárbara, sown pasture, 290 m altitude).
2.1 (Fontinhas, semi-natural pasture, 430 m altitude).
2.2 (Casas Velhas, semi-natural pasture, 360 m altitude).

TER (Terceira)

3.1 (Altares, sown pasture, 350 m altitude).
3.2 (Altares, sown pasture, 330 m altitude).
4.1 (Pico Gaspar, semi-natural pasture, 550 m altitude).
4.2 (Pico Gaspar, semi-natural pasture, 530 m altitude).

PIC (Pico)

5.1 (Fogueiras do Paúl, sown pasture, 790 m altitude).
5.2 (Achada, sown pasture, 730 m altitude).
6.1 (Fogueiras do Paúl, semi-natural pasture, 800 m altitude).
6.2 (Achada, semi-natural pasture, 710 m altitude).

Sampling methods and dates

P (Pitfall) (abundance for decomposers and herbivores is given as number of specimens; abundance for predators is given as number of specimens per trap per day in which 0.007 is equivalent to one specimen).

Sp94 - Spring 1994 (SMA = 3-10.V.94; TER = 15-22.V.94; PIC = 2-9.VI.94).
S94 - Summer 1994 (SMA = 7-14.VII.94; TER = 19-26.VII.94; PIC = 30VII-6VIII.94).
A94 - Autumn 1994 (SMA = 19-26.X.94; TER = 6-13.X.94; PIC = 23-30.IX.94).
S95 - Summer 1995 (SMA = 20-27.VII.95; TER = 7-14.VIII.95; PIC = 22-29.VIII.95).

S (Suction) (abundance is given as number of specimens per square meter, in which $0.063m^2$ is equivalent to one specimen).

Sp94 - Spring 1994 (1.1= 8.V.94; 1.2= 9.V.94; 2.1= 4.V.94; 2.2= 7.V.94; 3.1= 27.V.94; 3.2= 24.V.94; 4.1= 24.V.94; 4.2= 23.V.94; 5.1= 1.VI.94; 5.2= 3.VI.94; 6.1= 1.VI.94; 6.2= 3.VI.94).
S94 - Summer 1994 (1.1= 10.VII.94; 1.2= 12.VII.94; 2.1= 8.VII.94; 2.2= 12.VII.94; 3.1= 27.VII.94; 3.2= 27.VII.94; 4.1= 24.VII.94; 4.2= 24.VII.94; 5.1= 7.VIII.94; 5.2= 7.VIII.94; 6.1= 31.VII.94; 6.2= 3.VIII.94).
A94 - Autumn 1994 (1.1 = 17.X.94; 1.2 = 18.X.94; 2.1= 26.X.94; 2.2= 24.X.94; 3.1= 7.X.94; 3.2 = 7.X.94; 4.1= 12.X.94; 4.2= 12.X.94; 5.1= 3.X.94; 5.2= 4.X.94; 6.1= 27.IX.94; 6.2= 24.IX.94).
S95 - Summer 1994 (1.1= 24.VII.95; 1.2 = 25.VII.95; 2.1= 26.VII.95; 2.2= 29.VII.95; 3.1=19.VIII.95; 3.2=16.VIII.95; 4.1=11.VIII.95; 4.2= 11.VIII.95; 5.1= 27.VIII.95; 5.2= 29.VIII.95; 6.1= 27.VIII.95; 6.2 = 29.VIII.95).

Species sorting and identification

A total of 960 pitfall samples (20 pitfall traps x 12 sites x 4 sampling periods) and 960 suction samples (20 suction samples x 12 sites x 4 sampling periods) were taken during the course of the study by the first author (P. A. V. Borges). Before starting the sorting process, a decision was taken concerning the arthropod groups to be studied. The ecological groups (or "guilds") chosen included the following taxonomic groups: sap-feeders (for simplicity, referred to subsequently as suckers) – Heteroptera (Tingidae, Miridae, Lygaeidae, Rhopalidae, Cydnidae and Pentatomidae), Homoptera (Cicadellidae, Delphacidae, Coccidae, Pseudococcidae, Aphididae), Thysanoptera; chewers – Diplopoda, Lepidoptera and Coleoptera (Carabidae, Dryopidae, Elateridae, Nitidulidae, Anaspidae, Chrysomelidae, Rhynchoporidae and Curculionidae); predators – Chilopoda, Pseudoscorpiones, Opiliones, Araneae, Heteroptera (Nabidae, Miridae and Anthocoridae), Thysanoptera (Aelothripidae), Neuroptera and Coleoptera (Carabidae, Staphylinidae, Melyridae, Cucujidae and Coccinellidae).

The sorting process was a major project and divided into several parts. i) Spring and Summer 1994 suction samples were sorted into the major groups (a total of 480 samples); ii) the morphospecies were defined. The Summer 1994 sample was chosen as more appropriate because a great proportion of the specimens were adults and therefore easier to identify. iii) The morphospecies were sent to several taxonomists for species identification (see below). The first author (P. A. V. Borges) identified most of the Coleoptera; iv) The Spring and Summer 1994 pitfall samples (480) were sorted into the major predatory arthropod groups and assigned to morphospecies. All the herbivores were stored together in a common vial for subsequent sorting into morphospecies. The number of specimens of each morphospecies was recorded, reporting whenever possible the developmental stage (nymphs, larvae, juveniles, adults - brachypterous, alatae) and sex (males, females). v) With the experience gained, morphospecies-abundance sorting of all the 960 suction samples, the remaining 480 pitfall samples and the 960 pitfall herbivore vials was undertaken; vi) Finally, all the new morphospecies were studied by taxonomists for identification, the authors included: Diplopoda (H. Enghoff), Heteroptera (J. Hollier and J. Ribes), Homoptera-Auchenorrhyncha (J. Hollier and J. A. Quartau), Coccoidea (G. Watson), Aphididae (F. Ilharco and R. Blackman), Thysanoptera (G. J. du Heaume and R. zur Strassen), Lepidoptera (V. Vieira), Chrysomelidae (D. Erber and P. A. V. Borges), Curculionidae (R. Booth, A. Serrano and P. A. V. Borges), other Coleoptera (P. A. V. Borges), Chilopoda (P. A. V. Borges), Araneae (J. Wunderlich) and Neuroptera (V. J. Monserrat). The Opiliones and Pseudoscopiones still need identification.

Several published lists of species were used as reference in terms of the nomenclature of the species and their distribution on the islands: Aspöck *et al.* (1980) (Neuroptera); Borges (1990) (Coleoptera); Eason (1985) and Eason & Ashmole (1992) (Chilopoda); Ilharco (1982) (Aphidoidea); Quartau (1982) (Cicadellidae); Vieira & Pintureau (1993) (Lepidoptera); Wunderlich (1991, 1994) (Araneae); Zur Strassen (1973) (Thysanoptera).

RESULTS

New Records

DECOMPOSERS
DIPLOPODA

Blaniulidae

1. ? ***Choneiulus palmatus*** **(Nemec, 1895)** (det. H. Enghoff)

TERCEIRA: P -A94-3.2- (1 ex.).

W. European. Introduced in many other temperate areas including Canaries, Madeira and Azores.

AZORES: S. Miguel and now Terceira (?) (identification uncertain in the absence of males).

Paradoxosomatidae

2. ***Oxidus gracilis*** **(C. L. Koch, 1847)** (det. H. Enghoff)

S. MARIA: P -Sp94-1.2- (2 ex.); 2.1-(2ex.); P -S94-1.2- (1 ex.); 2.1- (1 ex.); 2.2- (1 ex.); P -A94-1.1- (13 ex.); 1.2- (2 ex.); 2.1- (2 ex.); 2.2- (5 ex.); P -S95-1.1- (2 ex.); 1.2- (1 ex.); 2.1- (1 ex.).

Cosmopolitan (in cooler areas only in greenhouses). Known from Madeira and the Canary Islands. Introduced in the Azores.

AZORES: S. Miguel (Tronqueira, 4-11.VIII.1989, collected by P. Borges & F. Pereira by means of pitfall with vinegar in natural vegetation; St António, 5-12.VIII.97, collected by P. Borges & F. Pereira by means of pitfall with turquin in natural vegetation; Moinhos-Nordeste, 4-10.VIII.89, collected by P. Borges & F. Pereira by means of pitfall with turquin; Pico da Vara, 5-12.VIII.1989, collected by P. Borges & F. Pereira by means of pitfall with turquin in natural vegetation); and now also in S. Maria.

This species is also very common in forest habitats at S. Maria, both in *Cryptomeria japonica* and also native forests (Borges, unpublished data).

Polydesmidae

3. ***Polydesmus coriaceus*** **Porat, 1871** (det. H. Enghoff)

PICO: S-S94-5.1-(0.063m^2).

W. European. Native from the Azores and also found in Madeira and the Canary Islands.

AZORES: S. Maria, S. Miguel, Terceira, Faial and now also in Pico. This is a very common species in forest habitats from the archipelago.

HERBIVORES
HETEROPTERA

Miridae

4. ***Closterotomus norwegicus*** **(Gmelin, 1790)** (det. J. Hollier & J. Ribes)

TERCEIRA: S94-4.2- (1 ex.) (Direct search).

Holopalaearctic species. Generalist feeder on herbs (mainly Compositae).

AZORES: Terceira (see also new catalogue of Miridae from Kerzhner & Josifov, 1999).

5. ***Pithanus maerkelii*** **(Herrich-Schaeffer, 1838)** (det. J. Ribes)

NEW AZORES

TERCEIRA: S-Sp94-4.2-(1.25 m^2); S-S94-4.1-(0.563 m^2); 4.2-(0.938 m^2); S-S95-4.1-(0.063 m^2); 4.2-(0.063 m^2); P-S94-4.2-(0.021 m^2);

PICO: S-Sp94-5.2-(0.125 m^2); 6.1- (0.063 m^2); 6.2-(0.563 m^2); S-S94-5.2-(0.063 m^2); 6.1-(0.188 m^2); 6.2- (0.188 m^2); S-S95-5.1- (0.063 m^2); 6.1-(0.063 m^2); P-S94-6.1-(0.007 m^2).

Euromediterranean. Partial predator and generalist on grasses and rushes. Probably a native species.
AZORES: Terceira and Pico.

6. *Trigonotylus caelestialium* (Kirkaldy, 1902) (det. J. Ribes)
(=*T. ruficornis* Geoffroy, misidentifications from previous authors)
S. MARIA: S-Sp94-2.1- (0.063 m^2); S-S94-1.2- (0.125 m^2); 2.1- (0.063 m^2); S-A94-1.1- (0.063 m^2); 1.2- (0.375 m^2); S-S95-1.1- (0.125 m^2); 1.2- (0.375 m^2); P-A94-1.2-(3 ex.).
TERCEIRA: S-S94-3.2- (0.125 m^2); S-A94-3.1- (0.063 m^2); 3.2- (0.125 m^2); S-S95-3.1- (0.125 mm2); 3.2- (0.063 m^2).
Holarctic. Generalist grass-feeder. *T. caelestialium* has the first article of antennae with alternate red and clear longitudinal bands. In *T. ruficornis* the first article of antennae is red. Only with the works of Kelton (1971) and Bozdechová (1973) this characteristic was formulated. Therefore, all the previous records of *T. ruficornis* are doubtful.
AZORES: Pico (Leston & Carthy, 1957) and Flores (Ribes *et al.*, 1997) and now S. Maria and Terceira.

Tingidae

7. *Acalypta parvula* (Fallén, 1807) (det. J. Hollier & J. Ribes)
TERCEIRA: S-Sp94-4.1- (0.375 m^2); S-S94-4.1- (3.125 m^2); 4.2- (0.250 m^2); S-A94-4.1-(0.563m^2); 4.2- (0.125 m^2); S-S95-4.1- (0.688 m^2).
Euromediterranean and North America. Generalist feeder on mosses, but also in some herbs (e.g. *Thymus*) (Péricart, 1983).
AZORES: Pico (Leston & Carthy, 1957) and now in Terceira.

8. *Agramma laetum* (Fallén, 1807) (det. J. Hollier & J. Ribes)
NEW AZORES
S. MARIA: S-S94-1.1- (0.063 m^2); S-A94-1.1- (0.063m^2); S-S95-1.1- (0.125 m^2).
European, excl. Mediterranean area. Polyphagous on rushes and sedges. Golub (1990) created a *A. laetum* complex of species. Based on the biometry of the Azorean specimens we considered that they belong to *A. laetum* (*sensu* Golub, 1990).
AZORES: S. Maria.

9. *Tingis (Tingis) cardui* (Linnaeus, 1758) (det. J. Ribes)
NEW AZORES
S. MARIA: S95-2.2- (6 ex.) (Direct search).
Holopalaearctic. Herbivore on several thistles (collected on *Carduus tenuiflorus* Curt.). Species of high fertility and quite common (Péricart, 1983).
AZORES: S. Maria (see also Sousa, 1979).

Cydnidae

10. *Geotomus punctulatus* (Costa, 1847) (det. J. Ribes)
NEW AZORES
S. MARIA: S-S94-2.2- (0.063 m^2); S-S95-2.2- (0.125 m^2); P -Sp94-2.2- (1 ex.); P - 2.2- (1 ex.); P -A94-1.1- (1 ex.); 2.2- (2 ex.); P -S95- 1.2- (3 ex.); 2.1- (3 ex.); 2.2- (5 ex.).
Atlanto-Mediterranean with Transcaucasian dispersion. Probably introduced in the Azores. Herbivore on roots.
AZORES: S. Maria (this work) but also Terceira (the first author also collected recently some specimens of this species in Terceira: Lagoa do Negro- Pico Gaspar, in semi-natural pasture, Summer 1997).

Lygaeidae (*sensu lato*, Péricart, 1999)

11. *Plinthisus (Isioscytus) minutissimus* Fieber, 1864 (det. J. Ribes)
NEW AZORES
TERCEIRA: S-S95-4.2- (0.063 m^2).
Western Mediterranean. Oligophagous on mosses, usually together with *Acalypta parvula* (Heteroptera: Tingidae).
AZORES: Terceira.

12. *Beosus maritimus* (Scopoli, 1763) (det. J. Hollier & J. Ribes)
NEW AZORES
S. MARIA: S-A94-1.1- (0.063 m^2).

Western Palaearctic. In the Iberian region is common in very different habitats, mainly in dry substrates.
AZORES: S. Maria.

HOMOPTERA

Auchenorrhyncha

Cicadellidae

13. *Eupteryx filicum* (Newman, 1853) (det. J. Hollier)

S. MARIA: S-Sp94-2.1- (0.063 m^2); S94-2.1- (0.125 m^2); Spring 95 – 1.1 (1 ex. (direct collection); S95-2.1- (1 ex.; direct collection).
Central and southern Europe, Turkestan (ex. USSR), Azores and Madeira. Native species associated with ferns (e.g. *Polypodium vulgare*; moderately specialist).
AZORES: Flores, Pico, S. Jorge, Graciosa, Terceira, S. Miguel and now S. Maria.

14. *Euscelidius variegatus* (Kirschbaum, 1858) (det. J. Hollier)

S. MARIA: S-Sp94-1.1- (3.813 m^2); 1.2 - (0.75 m^2); 2.2- (7.5 m^2); S-S94-1.1- (10.38 m^2); 1.2- (6.0 m^2); 2.1- (0.063 m^2); 2.2- (17.19 m^2); S-A94- 1.1- (6.63 m^2); 1.2- (1.06 m^2); 2.1- (0.25 m^2); 2.2- (5.56 m^2); S-S95-1.1- (21.56 m^2); 1.2- (11.31 m^2); 2.1- (0.75 m^2); 2.2- (7.5 m^2); P- Sp94-1.1- (19 ex.); 1.2 - (10 ex.); 2.2- (21 ex.); P-S94- 1.1- (47 ex.); 1.2 - (26 ex.); 2.2- (44 ex.); P-A94- 1.1- (11 ex.); 1.2 - (3 ex.); 2.2- (40 ex.); P-S95- 1.1- (41 ex.); 1.2 - (34 ex.); 2.1 (11 ex.); 2.2- (48 exx).
TERCEIRA: S-Sp94-3.1- (3.938 m^2); 3.2 - (26.06 m^2); S-S94- 3.1- (14.13m^2); 3.2 - (31.88 m^2); S-A94- 3.1- (11.06 m^2); 3.2 - (8.56 m^2); S-S95-3.1- (3.06m^2); 3.2 - (0.56 m^2); P- Sp94- 3.1 (11 ex.); 3.2 (19 ex.); P-S94-3.1 (45 ex.); 3.2 (247 ex.); P-A94- 3.1 (26 ex.); 3.2 (28 ex.); P-S95- 3.1 (28 ex.); 3.2 (1 ex.).
Europe, Siberia, ex-USSR, North Africa, Azores and the Canary Islands. An introduced species apparently associated with either grasses or clovers (moderately specialist).
AZORES: Faial, Pico, S. Jorge, Graciosa, S. Miguel and now Terceira and S. Maria.

15. *Macrosteles (Macrosteles) sexnotatus* (Fallén, 1806) (det. J. Hollier)

S. MARIA: S-Sp94-1.1- (0.063 m^2); 2.1- (0.063 m^2); S-S94- 2.1- (2.063 m^2); S-A94- 2.1- (8.625 m^2); S-S95-1.1- (1.813 m^2); 2.1- (9.69 m^2); 2.2- (0.32 m^2); P-Sp94- 2.1 (1 ex.); P-S94- 2.1 (9 ex.); P-A94- 2.1 (10 ex.); 2.2 (39 ex.); P-S95- 1.1 (7 ex.); 2.1 (6 ex.).
Europe, North Africa, China, Israel, Japan, ex-USSR, Mongolia, Cyprus, Azores and the Canary Islands. Probably a native species associated with grasses (moderately specialist ?).
AZORES: Flores, Faial, Pico, S. Jorge, Graciosa, Terceira, S. Miguel and now S. Maria.

Delphacidae

16. *Kelisia ribauti* Wagner, 1938 (det. J. A. Quartau)

S. MARIA: S-Sp94-1.1- (0.063 m^2); 2.2- (0.063 m^2); S-S94-1.1- (0.313 m^2); S-A94-1.1- (1.0 m^2); 1.2- (0.188 m^2); 2.1- (0.063 m^2); 2.2- (0.25m^2); S-S95-1.1- (0.38 m^2); 1.2- (0.88 m^2); 2.2- (0.88 m^2); P-Sp94- 1.1 (1 ex.); P-A94- 1.1 (1 ex.); 2.2 (1 ex.).
TERCEIRA: S-S94-4.1- (0.063m^2).
PICO: S-Sp94-5.2- (0.938 m^2); S-S94-5.2- (1.0 m^2); S-A94-5.2- (1.75 m^2); S-S95-5.2- (0.063 m^2); 6.2- (0.063 m^2); P-A94- 5.2 (1 ex.).
Europe, North Africa, Iraq, Turkey, ex-USSR, Azores, Madeira and the Canary Islands. Probably a native species associated with sedges (moderately specialist ?).
AZORES: S. Jorge, S. Miguel and now S. Maria, Terceira and Pico.

17. *Megamelodes quadrimaculatus* (Signoret, 1865) (det.J. Hollier and J. A. Quartau)

NEW AZORES

S. MARIA: S-Sp94- 2.1- (55.19m^2); S-S94- 1.2- (0.063 m^2); 2.1- (64.19 m^2); 2.2- (0.13 m^2); S-A94- 1.2- (1.19 m^2); 2.1- (1.31 m^2); 2.2- (0.31 m^2); S-S95- 1.1- (2.19 m^2); 1.2- (0.063 m^2); 2.1- (5.31 m^2);

2.2- (1.56 m^2); P-Sp94- 2.1 (82 ex.); P-S94- 2.1 (309 ex.); 2.2 (2 ex.); P-A94- 2.1 (14 ex.); P-S95- 2.1 (11 ex.); 2.2 (1 ex.);
TERCEIRA: S-Sp94-4.1- (0.5 m^2); S-S94-3.1- (0.063 m^2); 3.2- (0.063 m^2); 4.1- (4.44 m^2); 4.2- (0.5 m^2); S-A94-4.1- (0.56m^2); 4.2- (0.63 m^2); S-S95-3.1- (0.063m^2); 4.1- (5.0m^2); 4.2- (0.69 m^2); P-Sp94- 4.2 (1 ex.); P-A94- 4.1 (11 ex.); 4.2 (3 ex.); P-S95- 4.1 (7 ex.); 4.2 (1 ex.);
PICO: S-Sp94-5.2- (0.63 m^2); 6.1- (0.38 m^2); 6.2- (2.25 m^2); S-S94-5.1- (0.063 m^2); 5.2- (2.06 m^2); 6.1- (1.25 m^2); 6.2- (2.56 m^2); S-A94- 5.2- (0.25 m^2); 6.1- (0.25 m^2); 6.2- (0.81 m^2); S-S95- 5.2- (0.81 m^2); 6.1- (0.38 m^2); 6.2- (2.06 m^2); P-Sp94- 6.1 (2 ex.); 6.2 (7 ex.); P-S94- 5.2 (2 ex.); 6.1 (3 ex.); 6.2 (3 ex.); P-A94- 5.2 (3 ex.); 6.1 (2 ex.); 6.2 (10 ex.); P-S95- 6.2 (1 ex.).
Europe, Madeira and new to the Azores. Probably a native species associated with rushes.
AZORES: S. Maria, Terceira and Pico.

Sternorrhyncha
Aphididae

18. *Acyrthosiphon pisum* (Harris, 1776) (det. R. Blackman)
S. MARIA: S-Sp94-1.1- (0.188 m^2); 1.2- (4.56 m^2); 2.1- (2.0 m^2); 2.2- (2.31 m^2); S-S94-1.1- (7.75 m^2); 1.2- (2.56 m^2); 2.1- (8.94 m^2); 2.2- (3.31 m^2); S-A94-1.1- (10.38 m^2); 1.2- (0.063 m^2); 2.1- (7.5 m^2); 2.2- (0.625 m^2); S-S95-1.1- (1.125 m^2); 1.2- (0.44 m^2); 2.1- (1.0 m^2); 2.2- (1.25 m^2); P-Sp94-1.1- (2 ex.); 1.2- (7 ex.); 2.1- (45 ex.); 2.2- (6 ex.); P-S94-1.1- (18 ex.); 1.2- (29 ex.); 2.1- (19 ex.); 2.2- (2 ex.); P-A94- 1.2- (1 ex.); 2.2- (6 ex.); P-S95-1.1- (4 ex.); 1.2- (4 ex.); 2.2- (8 ex.).
PICO: S-Sp94-5.1- (5.56 m^2); 5.2- (1.31 m^2); 6.1- (1.69 m^2); 6.2- (1.5 m^2); S-S94-5.1- (1.063 m^2); 5.2- (1.13 m^2); 6.1- (0.94 m^2); 6.2- (0.56m^2); S-A94-5.1- (2.44 m^2); 5.2- (5.94 m^2); 6.1- (0.81 m^2); 6.2- (0.38 m^2); S-S95-5.1- (7.25m^2); 5.2- (0.44 m^2); 6.1- (0.69 m^2); 6.2- (0.125 m^2); P-Sp94-5.1- (14 ex.); 5.2- (6 ex.); 6.1- (4 ex.); 6.2- (3 ex.); P-S94- 5.2- (2 ex.); 6.1- (1 ex.); P-A94-6.1- (1 ex.); P-S95-5.1- (25 ex.); 5.2- (1 ex.); 6.1- (8 ex.).
Cosmopolitan. Native species associated with Leguminosae.
AZORES: Faial, Terceira, S. Miguel and now in Pico and S. Maria.

19. *Anoecia corni* (Fabricius, 1775) (det. R. Blackman)
S. MARIA: S-Sp94-1.1- (0.313 m^2); 2.1- (0.25 m^2); 2.2- (0.125m^2); S-S94-2.2- (0.125 m^2); S-A94-2.2- (0.438 m^2);); P-Sp94-1.1- (1 ex.); 2.1- (1 ex.); 2.2- (3 ex.); P-S94-1.1- (4 ex.); 2.1- (1 ex.); 2.2- (1 ex.); P-A94-1.1- (1 ex.); 2.1- (2 ex.); P-S95-1.1- (1 ex.); 2.2- (1 ex.).
TERCEIRA: S-Sp94-3.1- (0.063m^2); 3.2- (0.063 m^2); S-S94-4.2- (0.063 m^2); S94-3.2- (1 ex.).
PICO: S-A94-6.2- (0.063 m^2); S-S95-5.1- (0.063 m^2); P-S95-5.1- (1 ex.).
Palaearctic. Introduced in the North and South America in South Africa and in the Azores. Species associated with roots of grasses.
AZORES: S. Miguel and now in Pico, Terceira and S. Maria.

20. *Aphis craccivora* Koch, 1854 (det. R. Blackman & F. A. Ilharco)
S. MARIA: S-Sp94-1.1- (0.375 m^2); 2.2- (0.063 m^2); S-S94-2.1- (0.375 m^2); 2.2- (0.063 m^2); S-A94- 2.2- (0.063 m^2); P-S94- 2.2 (3 ex.).
PICO: S-Sp94-6.1- (0.188 m^2).
Cosmopolitan. Common in Portugal and in all Macaronesia. Native species polyphagous but mainly associated with Leguminosae.
AZORES: Faial, Terceira, S. Miguel and now in Pico and S. Maria.

21. *Aphis fabae* Scopoli, 1763 (det. F. A. Ilharco)
S. MARIA: Spring 1995 - 1.1 - several specimens.
Cosmopolitan. Common in Portugal and in all Macaronesia. Introduced species, with *Evonymus* being the primary host, but polyphagous in several secundary hosts.
AZORES: Faial, Terceira, S. Miguel and now in S. Maria.

22. ***Aphis gossypii*** **Glover, 1877** (det. R. Blackman & F. A. Ilharco)

S. MARIA: Spring 1995 - 1.1 - several specimens; S-S94- 2.2 (0.063 m^2); S-A94- 2.2 (0.063 m^2).

Cosmopolitan. Common in Portugal and in all Macaronesia. Native species, polyphagous forb feeder.

AZORES: Faial, Pico, Terceira, S. Miguel and now in S. Maria.

23. ***Dysaphis (Pomaphis) aucupariae*** **(Buckton, 1879)** (det. R. Blackman & F. A. Ilharco)

S. MARIA: S-Sp94-1.1- (0.125 m^2); 2.1- (0.063 m^2); S-S94-1.1- (0.125 m^2); 2.1- (0.188 m^2); 2.2- (0.125 m^2); S-A94-1.1- (0.188 m^2); 2.1- (0.063 m^2); 2.2- (0.063 m^2); P-Sp94- 2.1 (1 ex.); P-S94- 1.1 (1 ex.); 2.2 (1 ex.).

TERCEIRA: S-Sp94-4.2- (0.063 m^2); S-A94-4.1- (0.063 m^2); S-S95-3.2- (0.063 m^2); P-S94- 3.1 (1 ex.); P-A94- 4.2 (2 ex.).

PICO: S-Sp94-6.1- (0.063 mm^2); P-Sp94- 6.1 (1 ex.).

Palaearctic. Absent in other macaronesian islands. Introduced in the Azores. The primary host is *Sorbus torminalis* and the secondary is the common pasture herb *Plantago lanceolata*.

AZORES: S. Miguel and now in S. Maria, Terceira and Pico.

24. ***Nasonovia ribisnigri*** **(Mosley, 1841)** (det. R. Blackman & F. A. Ilharco)

S. MARIA: S-Sp94-1.1- (3.5 m^2); 1.2- (0.313 m^2); S-S94-1.1- (0.063 m^2); 1.2- (0.188 m^2); 2.1- (0.063 m^2); S-S95-1.1- (0.063 m^2); 2.1- (0.188 m^2); 2.2- (0.125 m^2); P-S95- 2.2 (1 ex.).

PICO: S-Sp94-1.1- (0.125 m^2).

Holarctic. Europe, Western Asia, North and South America, Central and South Africa, but probably native from Europe. Known from Portugal, Madeira and the Canary Islands. Introduced in the Azores. The primary host is *Ribes* and the secondary are mainly Compositae species, but also Scrophulariaceae and Solanaeceae.

AZORES: S. Miguel and now in S. Maria and Pico.

25. ***Neotrama maritima*** **(Eastop), 1953** (det. F. A. Ilharco)

S. MARIA: P-A94- 2.2 (2 ex.).

Palaearctic. Native from the Azores, in roots of Compositae.

AZORES: S. Miguel and now in S. Maria.

26. ***Pseudacaudella rubida*** **(Börner, 1939)** (det. F. A. Ilharco)

NEW AZORES

S. MARIA: P-A94- 2.1- (3 ex.).

TERCEIRA: S-Sp94-4.1- (0.125 m^2); 4.2- (0.25 m^2); S-S94-4.1- (0.125 m^2); S-A94-4.2- (0.188 m^2); P-A94- 4.2 –(13 ex.); P-S95- 4.2 –(1 ex.).

PICO: S-Sp94-5.1- (0.063 m^2); 5.2- (0.125 m^2); S-A94-6.2- (0.063 m^2); S-S95-5.1- (0.375 m^2); 5.2- (0.063 m^2); 6.1- (0.063 m^2); P-Sp94- 5.1 –(1 ex.); P-S94- 6.2 –(1 ex.); P-A94- 5.1 –(2 ex.); 5.2 –(2 ex.); 6.1 –(1 ex.).

Holarctic (Europe and Oriental part of U.S.A.). Native from the Azores and new to Macaronesia and Azores. Unknown in Portugal. In mosses.

AZORES: S. Maria, Terceira and Pico.

27. ***Rhopalosiphoninus tulipaellus*** **(Theobald, 1916)** (det. F. A. Ilharco)

NEW AZORES

S. MARIA: S-S95-2.1- (0.063m^2); P-A94- 2.1 –(3 ex.).

Western Palaearctic. Known from Portugal and in the Macaronesian region from Madeira and the Canary Islands. Polyphagous in roots and other subterranean plant parts. Introduced in the Azores.

AZORES: S. Maria.

28. ***Rhopalosiphum insertum*** **(Walker, 1849)** (det. R. Blackman & F. A. Ilharco)

S. MARIA: S-Sp94-1.1- (0.125 m^2); 1.2- (0.625 m^2); 2.1- (0.75 m^2); S-S94-1.1- (0.125 m^2); 1.2- (0.063 m^2); 2.1- (0.625 m^2); 2.2- (0.063 m^2); S-

A94-1.1- (0.063 m^2); 2.1- (1.063 m^2); S-S95- 2.1- (0.063 m^2); P-Sp94-2.1 (4 ex.); P-S94-1.1 (1 ex.); P-A94-2.1 (2 ex.).
PICO: S-Sp94-5.1- (1.875 m^2); 5.2- (0.438 m^2); 6.1- (1.438 m^2); 6.2- (0.313 m^2); S-S94- 5.2- (0.063 m^2); 6.1- (0.25 m^2); 6.2- (0.625 m^2); S-A94- 5.1- (0.063 m^2); 5.2- (0.313 m^2); 6.2- (0.188 m^2); S-S95- 6.1- (0.063 m^2); 6.2- (0.063 m^2); P-Sp94-5.1 (1 ex.); 5.2 (1 ex.); 6.1 (7 ex.); 6.2 (7 ex.).
Holarctic. Introduced in the Azores and known from Portugal, Madeira and the Canary islands. Pomoidea as primary host and roots of grasses as secondary host.
AZORES: Flores, Faial, Terceira, S. Miguel and now in S. Maria and Pico.

29. *Rhopalosiphum padi* (Linnaeus, 1758) (det. F. A. Ilharco)
PICO: S-Sp94-5.2- (0.063 m^2).
Cosmopolitan. Common in all Macaronesia. Introduced in the Azores. The primary host is *Prunus padus* and the secondary are mainly grasses.
AZORES: Terceira, S. Miguel, S. Maria and now in Pico.

30. *Saltusaphis scirpus* Theobald, 1915 (det. R. Blackman & F. A. Ilharco)
S. MARIA: S-S94-1.2- (0.063 m^2); S-A94-1.2- (0.438 m^2); 2.1- (6.625 m^2); 2.2- (0.750 m^2).
PICO: S-A94-5.1- (0.063 m^2).
Palaearctic, Afrotropical and Oriental regions. Probably native from the Azores and known from Portugal but absent in Madeira and the Canary Islands. Polyphagous in rushes and sedges.
AZORES: S. Miguel and now S. Maria and Pico.

31. *Schizaphis graminum* (Rondani, 1852) (det. F. A. Ilharco)
S. MARIA: S-A94-1.1- (0.313 m^2).
Cosmopolitan. Common in all Macaronesia (Madeira and Canary Islands). Native from the Azores. Mainly in grasses.
AZORES: Faial, Terceira, S. Miguel and now in S. Maria.

32. *Therioaphis trifolii* (Monell, 1882) (det. R. Blackman)
S. MARIA: S-Sp94-1.2- (0.625 m^2); 2.1- (0.063 m^2); S-S94-1.1- (2.688 m^2); 1.2- (33.94 m^2); 2.1- (0.188 m^2); 2.2- (1.063 m^2); S-A94-1.1- (1.00 m^2); 1.2- (0.063 m^2); S-S95-1.1- (0.063 m^2); 1.2- (2.125 m^2); P-S94-1.1 (1 ex.); 1.2 (44 ex.); P-A94-1.1 (1 ex.); P-S95-1.2 (2 ex.).
Almost Cosmopolitan, with Palaearctic origin. Native from the Azores. Common in Leguminosae.
AZORES: S. Miguel and now in S. Maria.

THYSANOPTERA

Phlaeothripidae

33. *Apterygothrips* sp. (n. sp. ?) (det. R. zur Strassen)
NEW AZORES
S. MARIA: S-Sp94-2.1- (0.188 m^2); S-A94-1.2- (0.313 m^2); S-S95-1.2- (1.625 m^2); P-S95- 2.1- (1 ex.).
Probably an endemic species, but further data cannot be given at present as long as it is not possible to identify the species with certainty.
AZORES: S. Maria, but also known from other six islands.

34. *Haplothrips ? niger* (Osborn, 1883) (det. G. J. du Heaume and R. zur Strassen)
NEW AZORES
S. MARIA: S-Sp94-2.1- (0.063 m^2); 2.2- (0.063 m^2); S-S95-1.2- (0.375 m^2); 2.1- (0.125 m^2); 2.2- (0.25 m^2); P-Sp94-2.1- (1 ex.); P-S94-2.2- (1 ex.); P-A94-1.2- (1 ex.); 2.1- (1 ex.).
PICO: P-S94-6.2- (1 ex.).
Holarctic and introduced in other countries. Probably native from the Azores. Mainly in Leguminosae.
This is a species usually difficult to determine, particularly when the specimens are not well preserved as was the case. Therefore a number of records in the literature is doubtful.
AZORES: S. Maria and Pico.

35. ***Hoplothrips semicaecus*** **(Uzel, 1895)** (det. R. zur Strassen)
NEW AZORES
S. MARIA: P-Sp94-1.2- (1 ex.).
Holarctic. Probably native from the Azores. Associated with fungus hyphae, living on dead wood of deciduous trees, often under bark.
AZORES: S. Maria.

Thripidae

36. ***Plesiothrips perplexus*** **(Beach, 1896)**
S. MARIA: S-A94-2.1- (0.063 m^2); S-S95-2.1- (0.063 m^2); 2.2- (0.063 m^2).
Subtropical and Tropical countries, particularly of the New World. Introduced in the Azores. Polyphagous in grasses.
AZORES: S. Maria.

LEPIDOPTERA

Coleophoridae

37. ***Coleophora versurella*** **Zeller, 1849** (det. V. Vieira)
S. MARIA: S-Sp94-1.1- (0.125 m^2); 1.2- (0.313 m^2); S-S94-1.1- (0.438 m^2); 1.2- (0.188 m^2); S-A94-1.1- (0.25 m^2); 1.2- (0.313 m^2); S-S95-1.1- (0.063 m^2); 1.2- (0.063 m^2); 2.2- (0.063 m^2); P-Sp94-1.1- (1 ex.); 1.2- (24 ex.); 2.1- (1 ex.); 2.2- (4 ex.); P-S94-1.1- (18 ex.); 1.2- (86 ex.); 2.2- (5 ex.); P-A94-1.1- (4 ex.); 1.2- (24 ex.); 2.2- (14 ex.).
Palaearctic. Europe (France, Belgium, Corse), Asia, Egypt. Madeira, Porto Santo, Canary Islands and introduced in the Azores. Oligophagous forb-feeder.
AZORES: Terceira, Graciosa and now in S. Maria.

Gelechiidae

38. ***Aproaerema anthyllidella*** **(Hübner, 1813)** (det. V. Vieira)
S. MARIA: S-Sp94-1.1- (0.063 m^2); 1.2- (0.063 m^2); S-S95-2.2- (0.125 m^2); P-Sp94-1.1- (1 ex.); 2.2- (15 ex.); S95-1.1- 2.2- (3 ex.).
Mediterranean. Europe, Russia, Egypt, Saudi Arabia. Madeira, Porto Santo, Canary Islands and probably introduced in the Azores. A legume-feeder (*Lotus glaucus*, *Glycine max*, *Medicago sativa*)
AZORES: Pico, Terceira, Graciosa and now in S. Maria.

Geometridae

39. ***Xanthorhoe inaequata*** **Warren, 1905** (det. V. Vieira)
S. MARIA: S-A94-2.1- (0.125 m^2).
Endemic from the Azores. Forb-feeder.
AZORES: Flores, Faial, Pico, S. Jorge, Terceira, S. Miguel and now in S. Maria.

COLEOPTERA

Nitidulidae

40. ***Meligethes aeneus*** **(Fabricius, 1755)** (det. P. Borges)
S. MARIA: P-A94-1.2- (1 ex.).
TERCEIRA: P-Sp94-6.1- (1 ex.).
Holarctic. Canary Islands. Flower-dwelling species. Introduced.
AZORES: Flores, Faial, Pico, S. Jorge, S. Miguel and now in S. Maria and Terceira.

41. *Meligethes planiusculus* (Heer, 1841) (det. P. Borges)
TERCEIRA: S-S94-4.2- (0.063 m^2).
Mediterranean. Madeira and Canary Islands. Flower-dwelling species. Native.
AZORES: S. Maria and now in Terceira.

Chrysomelidae

42. ***Longitarsus kutscherae paludivagus*** **Peyerimhoff, 1915** (det. Manfred Döberl)
NEW AZORES
TERCEIRA: S-Sp94-3.2- (0.063 m^2); S-S94-3.1- (0.125 m^2); 3.2- (0.438 m^2); 4.1- (0.125 m^2); 4.2- (0.063 m^2); S-A94-4.2- (0.063 m^2); S-S95-3.1- (0.125 m^2); 3.2- (0.125 m^2); 4.1- (0.063 m^2); P-S94-3.1- (1 ex.); 4.1- (1 ex.); P-S95-3.2- (1 ex.); 4.1- (1 ex.).
Mediterranean. Described from Algeria and also known from Mallorca. New to the Azores and probably introduced. Oligophagous forb-feeder.

AZORES: Terceira.
(Note: *Longitarsus azoricus* Israelson, 1990 is a synonym of *L. lateripunctatus* Rosh, 1856, distributed in Central Europe and Mediterranean Region, but neither in Madeira nor in the Canaries).

Rhynchophoridae

43. ***Sitophilus zeamais*** **Motschoulsky, 1855** (det. P. Borges)
S. MARIA: P-Sp94-1.1- (1 ex.); P-S94-1.2- (1 ex.); P-A94-1.2- (4 ex.); P-S95-1.2- (5 ex.); 2.2- (1 ex.).
Cosmopolitan. Common in all the Macaronesian archipelagoes. Introduced in the Azores and usually associated with stored products.
AZORES: Flores, Faial, Pico, S. Jorge, Graciosa, Terceira, S. Miguel and now in S. Maria.

44. ***Sphenophorus abbreviatus*** **(Fabricius, 1787)** (det. P. Borges)
S. MARIA: P-S95-2.2- (2 ex.).
Western Palaearctic. In roots of grasses. Introduced.
AZORES: Faial, Graciosa, Terceira, S. Miguel and now in S. Maria.

Curculionidae

45. ***Donus*** **sp. (n.sp. ?)** (det. A. Serrano)
NEW AZORES
S. MARIA: P-Sp94-2.1- (1 ex.); P-A94-2.2- (2 ex.).
Probably an endemic species, but further data cannot be given at present as long as it is not possible to identify the species with certainty.
AZORES: S. Maria.

46. ***Sitona flavescens*** **(Marshall, 1802)** (det. R. Booth)
PICO: S-S94-5.1- (0.563 m^2); 5.2- (0.125 m^2); 6.2- (0.063 m^2); S-A94-5.1- (0.063 m^2); S-S95-5.1- (0.125 m^2); 5.2- (0.063 m^2); P-Sp94-5.1- (6 ex.); 5.2- (4 ex.); P-S94-5.1- (6 ex.); P-A94-5.1- (9 ex.); 5.2- (1 ex.); P-S95-5.1- (7 ex.); 5.2- (1 ex.).
Holarctic. Madeira. Introduced in the Azores. Legume-feeder.
AZORES: Flores, Faial, S. Jorge, Terceira, S. Miguel, S. Maria and now in Pico.

47. ***Sitona puberulus*** **Reitter, 1903** (det. R. Booth)
PICO: S-S94-5.2- (0.063 m^2); 6.1- (0.625 m^2); 6.2- (0.063 m^2); S-A94-5.2- (0.125 m^2); 6.1- (0.25 m^2); 6.2- (0.25 m^2); S-S95-5.2- (0.188 m^2); 6.1- (0.563 m^2); 6.2- (0.25 m^2); P-Sp94-6.1- (1 ex.).
Mediterranean. Madeira, Selvagens and Canary Islands. Introduced in the Azores. Legume-feeder.
AZORES: Flores, Faial, S. Jorge, Graciosa, Terceira, S. Miguel S. Maria and now in Pico.

PREDATORS

CHILOPODA

Lithobiomorpha

48. ***Lithobius lusitanus*** **Verhoeff, ?** (det. P. Borges)
S. MARIA: S-A94-1.1- (0.25 m^2); 1.2- (0.063 m^2); P-Sp94-1.1- (0.021); P-S94-1.2- (0.014); P-A94-1.1- (0.014); 1.2- (0.043); 2.2- (0.007); P-S95-1.1- (0.021).
A Palaearctic species common in Iberian Peninsula (Eason & Ashmole, 1992).
AZORES: Terceira and now in S. Maria.

ARANEAE

Araneidae

49. ***Mangora acalypha*** **(Walckenaer, 1802)** (det. J. Wunderlich)
S. MARIA: S-A94-1.1- (0.125 m^2); 2.1- (0.188 m^2); 2.2- (0.063 m^2);
Western-Palaearctic. In low vegetation. Probably introduced in the Azores.
AZORES: Flores, Faial, Pico, Graciosa, Terceira, S. Miguel and now in S. Maria.

50. ***Neoscona crucifera*** **(Lucas, 1838)** (det. J. Wunderlich)
S. MARIA: S-Sp94- 2.1- (0.063 m^2); S-S94- 1.1- (0.063 m^2).
Holarctic. In higher strata. Probably introduced in the Azores.
AZORES: Faial, Terceira and now in S. Maria.

Linyphiidae
Linyphiinae

51. ***Lepthyphantes schmitzi*** **Kulczynski, 1899** (det. J. Wunderlich)

PICO: S-Sp94- 5.1- (0.125 m^2); 5.2- (0.125 m^2); 6.1- (0.063 m^2); 6.2- (0.063 m^2); S-S94- 5.1- (0.438 m^2); 5.2- (0.125 m^2); 6.2- (0.063 m^2); S-A94- 6.2- (0.063 m^2); S-S95- 5.1- (0.125 m^2); 5.2- (0.125 m^2); 6.1- (0.063 m^2); P-Sp94- 5.2- (0.007); 6.1- (0.007); P-S94- 6.2- (0.014); P-A94- 5.2- (0.014); 6.1- (0.014); 6.2- (0.007); P-S95- 5.1- (0.014); 6.1- (0.021).

Madeira and Azores. Probably native from the Azores. Epigeic, under stones, etc. Common in natural and semi-natural pastures.

AZORES: Flores, Graciosa, Faial, Terceira, S. Miguel and now in Pico.

Erigoninae

52. ***Erigone autumnalis*** **Emerton, 1882** (det. J. Wunderlich)

S. MARIA: S-Sp94- 1.1- (1.875 m^2); 1.2- (2.063 m^2); 2.2- (0.75 m^2); S-S94- 1.1- (1.875 m^2); 1.2- (2.00 m^2); 2.2- (1.125 m^2); S-A94- 1.1- (6.563 m^2); 1.2- (2.063 m^2); 2.1- (0.063 m^2); 2.2- (3.00 m^2); S-S95- 1.1- (2.75 m^2); 1.2- (2.563 m^2); 2.1- (1.063 m^2); 2.2- (5.063 m^2); P-Sp94- 1.1- (0.664); 1.2- (0.886); 2.1- (0.014); 2.2- (0.45); P-S94- 1.1- (0.393); 1.2- (0.814); 2.1- (0.043); 2.2- (0.671); P-A94- 1.1- (0.779); 1.2- (0.593); 2.1- (0.007); 2.2- (0.443); P-S95- 1.1- (0.707); 1.2- (0.457); 2.1- (0.50); 2.2- (1.357).

Central and North America, Switzerland, Canaries and Azores. Probably introduced in the Azores.

AZORES: Pico, Faial, Terceira, S. Miguel and now in S. Maria. Most probably in all islands, since is very common in the pastures.

53. ***Erigone dentipalpis*** **(Wider, 1834)** (det. P. Borges)

PICO: S-Sp94- 5.1- (1.688 m^2); 5.2- (0.438 m^2); 6.1- (1.438 m^2); 6.2- (0.938 m^2); S-S94- 5.1- (0.563 m^2); 6.1- (1.563 m^2); 6.2- (0.563 m^2); S-S94- 5.1- (0.875m^2); 5.2- (1.125 m^2); 6.1- (1.375 m^2); 6.2- (0.625 m^2); S-S95- 5.1- (0.75 m^2); 5.2- (0.438 m^2); 6.1- (0.313 m^2); 6.2- (0.188 m^2); P-Sp94- 5.1- (2.4); 5.2- (0.457); 6.1- (0.786); 6.2- (0.364); P-S94- 5.1- (2.229); 5.2- (0.529); 6.1- (1.429); 6.2- (0.636); P-A94- 5.1- (2.84); 5.2- (0.586); 6.1- (1.114); 6.2- (0.564); P-S95- 5.1- (0.221); 5.2- (0.029); 6.1- (0.043); 6.2- (0.057).

Mediterranean. Canaries. Probably introduced in the Azores. Epigeic.

AZORES: Graciosa, S. Jorge, Faial, Terceira, S. Miguel, S. Maria and now in Pico. Most probably in all islands, since is very common in managed pastures.

54. ***Erigone vagans*** **Savigny & Audouin, 1825** (det. P. Borges)

PICO: S-S95- 5.1- (0.125 m^2); P-Sp94- 5.1- (0.007); P-S94- 5.1- (0.021); 6.1- (0.007); P-A94- 5.1- (0.021); P-S95- 5.1- (0.007).

Western-Palaearctic, South Africa, Malaysia, Hawaii, Madeira, Canaries. Introduced in the Azores. Epigeic.

AZORES: Flores, Terceira, S. Miguel, S. Maria and now in Pico. Probably in all islands.

55. ***Minicia*** **n. sp.(= *Minicia* sp. 2 in Wunderlich, 1991)** (det. J. Wunderlich)

NEW AZORES

TERCEIRA: S-S94- 4.1- (0.125 m^2).

Endemic to the Azores and probably to Terceira. Material collected by P. A. V. Borges at Laurisilva Forests (Serra de Santa Bárbara) includes only subadults. Recently some more material was collected by BALA project and will be described soon.

56. ***Oedothorax fuscus*** **(Blackwall, 1834)** (det. J. Wunderlich)

NEW AZORES

S. MARIA: S-S94- 1.1- (0.063 m^2); P-S95- 1.2- (0.029).

TERCEIRA: S-Sp94- 3.1- (3.938 m^2); .3.2- (2.813 m^2); 4.1- (3.063 m^2); 4.2- (3.563 m^2); S-S94- 3.1- (4.813 m^2); .3.2- (8.563 m^2); 4.1- (2.813 m^2); 4.2- (5.25 m^2); S-A94- 3.1- (13.688 m^2); .3.2- (12.438

m^2); 4.1- (2.00 m^2); 4.2- (3.25 m^2); S-S95- 3.1- (13.188 m^2); .3.2- (11.5 m^2); 4.1- (4.00 m^2); 4.2- (7.31 m^2); P-Sp94- 3.1- (6.843); .3.2- (4.079); 4.1- (3.543); 4.2- (3.814); P-S94- 3.1- (9.371); .3.2- (7.35); 4.1- (5.836); 4.2- (6.157); P-A94- 3.1- (7.829); .3.2- (5.039); 4.1- (1.35); 4.2- (1.793); P-S95- 3.1- (15.407); .3.2- (12.443); 4.1- (9.286); 4.2- (8.986).
PICO: S-S95- 5.1- (0.188 m^2); 6.2- (0.125 m^2); P-S95- 5.1- (0.364); .5.2- (0.093); 6.1- (0.05); 6.2- (0.521).
Europe, North-Africa. Introduced in the Azores and new record for the Macaronesia (see Wunderlich, 1994). Epigeic.
AZORES: Now in Terceira, S. Maria and Pico. Probably in all islands, since is very common in managed pastures.

Mimetidae

57. *Ero furcata* (Villers, 1789) (det. J. Wunderlich)
S. MARIA: P-Sp94- 1.1- (0.007).
Palaearctic, Europa, North- America, Canaries and Azores. Mostly in low vegetation.
AZORES: Pico, Terceira and now in S. Maria.

Theridiidae

58. *Achaearanea acoreensis* (Berland, 1932) (det. J. Wunderlich)
S. MARIA: S-Sp94- 1.1- (0.25 m^2); 1.2- (0.063 m^2); 2.1- (0.938 m^2); 2.2- (1.00 m^2); S-S94- 1.1- (0.188 m^2); 1.2- (0.25 m^2); 2.1- (0.313 m^2); 2.2- (0.5 m^2); S-A94- 1.1- (16.688 m^2); 1.2- (4.25 m^2); 2.1- (2.313 m^2); 2.2- (6.5 m^2); S-S95- 1.1- (1.625 m^2); 1.2- (4.375 m^2); 2.1- (0.438 m^2); P-Sp94- 1.2- (0.007); 2.2- (0.007); P-S94- 1.1- (0.021); 1.2- (0.014); 2.1- (0.007); 2.2- (0.021); P-A94- 1.1- (0.157); 2.1- (0.014);); P-S95- 1.1- (0.021); 1.2- (0.036); 2.2- (0.007).
PICO: S-Sp94- 5.2- (0.063 m^2); 6.1- (0.063 m^2); 6.2- (0.25 m^2); S-S94- 5.1- (0.75 m^2); 5.2- (0.125 m^2); 6.1- (0.563 m^2); 6.2- (0.938 m^2); S-A94- 5.1- (0.563 m^2); 6.1- (0.5 m^2); 6.2- (0.563 m^2); S-S95- 5.1- (0.188 m^2); 5.2- (0.313 m^2); 6.1- (0.313 m^2); 6.2- (0.125 m^2); P-Sp94- 6.1- (0.021); 6.2- (0.007); P-S94- 6.1- (0.021); 6.2- (0.029); P-A94- 6.1- (0.007); 6.2- (0.007); P-S95- 5.2- (0.029); 6.1- (0.007); 6.2- (0.014).
California, New Zealand, Portugal, Madeira and Azores. Introduced. In low vegetation.
AZORES: Flores, Graciosa, Terceira, Faial, S. Migiel and now in S. Maria and Pico.

59. *Lasaeola oceanica* Simon, 1883 (det. J. Wunderlich)
S. MARIA: S-Sp94- 2.1- (0.125 m^2); 2.2- (0.063 m^2); S-S94- 2.1- (0.125 m^2); S-A94- 2.1- (0.188 m^2).
Endemic. In higher strata, mainly on native and endemic trees.
AZORES: Flores, Graciosa, Terceira, S. Miguel and now in S. Maria.

60. *Neottiura bimaculata* (Linnaeus, 1767) (det. J. Wunderlich)
PICO: Sp95- 5.2 – (1 ex.) (Direct collection).
Europa, Azores. In higher strata.
AZORES: Graciosa, Terceira, S. Miguel, S. Maria and now in Pico.

61. *Nesticodes rufipes* (Lucas, 1846) (det. J. Wunderlich)
S. MARIA: P-S95- 1.2- (0.007).
Nearly Cosmopolitan. Azores.
AZORES: S. Miguel and now in S. Maria.

62. *Theridion hannoniae* Denis, 1944 (det. J. Wunderlich)
NEW AZORES
S. MARIA: P-S95- 2.1- (0.007).
Europe, Azores. In higher strata.
AZORES: Only S. Maria.

63. *Theridion musivivum* Schmidt, 1956 (det. J. Wunderlich)
S. MARIA: S-Sp94- 1.1- (0.063 m^2); 2.2- (0.25m^2); S-A94- 1.1- (0.813 m^2); 1.2- (0.25 m^2); 2.2- (0.438 m^2); S-S95- 1.1- (0.063 m^2); 1.2- (0.188 m^2).
Macaronesian islands (Canaries, Madeira ?, and Azores). In higher strata.
AZORES: Graciosa, Terceira, Faial, S. Miguel and now in S. Maria.

Gnaphosidae

64. *Drassodes lapidosus* (Walckenaer, 1802) (det. J. Wunderlich)
NEW AZORES
TERCEIRA: P-Sp94- 3.1-(0.014).
Palaearctic. Azores. Probably introduced. Epigeic.
AZORES: Probably in Faial (Wunderlich, 1991) and now in Terceira.

65. *Haplodrassus signifer* (C. L. Koch, 1839) (det. J. Wunderlich)
TERCEIRA: P-S94- 4.1-(0.029); 4.2-(0.029); P-A94- 4.2-(0.007).
Holarctic. Azores. Probably introduced. Epigeic.
AZORES: Flores and now in Terceira.

66. ? *Leptodrassus albidus* Simon, 1914 (det. J. Wunderlich)
NEW AZORES
S. MARIA: S-A94- 1.2- (0.063 m^2); P-Sp94- 1.2-(0.007); P-S94- 1.2- (0.007).
Spain, Azores. Probably introduced. Epigeic.
AZORES: Only in S. Maria.

67. *Trachyzelotes lyonneti* (Audouin, 1827) (det. J. Wunderlich)
S. MARIA: P-S95- 1.2- (0.021).
Americas, Mediterranean, Azores. Probably introduced. Epigeic.
AZORES: Graciosa?, S. Miguel and now in S. Maria.

68. *Trachyzelotes* n. sp. (det. J. Wunderlich)
NEW AZORES
S. MARIA: S-A94- 2.1- (0.063 m^2); 2.2- (0.063 m^2); P-Sp94- 2.1- (0.007); P-S94- 1.1- (0.021); 2.2- (0.029).
Endemic from the Azores. Epigeic.
AZORES: Only in S. Maria.

69. *Zelotes aeneus* (Simon, 1878) (det. J. Wunderlich)
NEW AZORES
S. MARIA: P-A94- 1.2- (0.021); 2.2- (0.007).
Europe, Azores. Probably introduced. Epigeic.
AZORES: Only in S. Maria.

Salticidae

70. *Neon* n. sp. (det. J. Wunderlich)
NEW AZORES
S. MARIA: S-S94- 1.2- (0.063 m^2); P-Sp94- 1.2-(0.007).
Endemic from the Azores. Epigeic.
AZORES: Only in S. Maria.

HETEROPTERA

Nabidae

71. *Nabis* (*Tropiconabis*) *capsiformis* Germar, 1838 (det. J. Ribes)
S. MARIA: S-S95- 1.2- (0.875 m^2).
Cosmopolitan in subtropical areas. Introduced in the Azores. Not so common in the Azorean pastures as the native predator *Nabis* (*s. str.*) *pseudoferus ibericus* Remane.
AZORES: Flores, Faial and now in S. Maria.

NEUROPTERA

Chrysopidae

72. *Chrysoperla carnea* (Stephens, 1836) (det. V. J. Monserrat)
S. MARIA: P-A94- 2.2- (0.007).
Palaearctic. Madeira and Canary Islands. Native from the Azores. The larvae are very good predators of aphids and coccids. It is the most eurioic known Neuroptera, recorded on many different ecosystems and many different substrates.
AZORES: Flores, Faial, Pico, S. Jorge, Terceira, S. Miguel and now in S. Maria.

COLEOPTERA

Carabidae

73. *Agonum mulleri* (Herbst, 1784) (det. P. Borges)
S. MARIA: P-S95- 1.2- (0.1).
Holarctic. Introduced in the Azores. Rare in the pastures studied.
AZORES: Faial, Graciosa, Terceira, S. Miguel and now in S. Maria.

74. *Anisodactylus binotatus* (Fabricius, 1787) (det. P. Borges)
S. MARIA: P-Sp94- 1.1- (0.007); 2.1- (0.05); 2.2-(0.043); P-S94- 1.1- (0.071); 2.1- (0.079); 2.2-

(0.029); P-A94- 2.1- (0.007); P-S95- 1.1- (0.014); 1.2- (0.007); 2.1- (0.057); 2.2- (0.036).
Holarctic. Madeira. Introduced in the Azores. Very common in most sites.
AZORES: In all the Azorean islands and now also in S. Maria.

75. *Lagarus vernalis* **(Panzer, 1796)** (det. P. Borges)
PICO: S-Sp94- 5.2- (0.313 m^2); 6.1- (0.188 m^2); S-S94- 5.1- (0.25 m^2); 5.2- (0.375 m^2); S-A94- 5.1- (0.063 m^2); 5.2- (0.063 m^2); S-S95- 5.1- (0.063 m^2); 5.2- (0.063 m^2); 6.1- (0.063m^2); 6.2- (0.063 m^2); P-Sp94- 5.1- (0.264); 5.2- (2.268); 6.1- (0.007); 6.2- (0.071); P-S94- 5.1- (1.893); 5.2- (3.286); 6.1- (0.157); 6.2- (0.614); P-A94- 5.1- (0.114); 5.2- (0.236); 6.1- (0.014); 6.2- (0.086); P-S95- 5.1- (0.257); 5.2- (1.293); 6.1- (0.086); 6.2- (0.15).
Palaearctic. Introduced in the Azores. Probably one of the most important predators in semi-natural pastures from the Azores. In moist sites.
AZORES: Faial, S. Jorge, Terceira, S. Miguel and now in Pico.

76. *Notiophilus quadripunctatus* **Dejean, 1826** (det. P. Borges)
S. MARIA: S-Sp94- 1.1- (0.625 m^2); 1.2- (0.063 m^2); S-A94- 1.1- (0.125 m^2); P-Sp94- 1.1- (0.271); 1.2- (0.1); 2.2- (0.029); P-S95- 1.1- (0.007).
Western-Palaearctic. Madeira. Introduced in the Azores.
AZORES: Terceira and S. Miguel and now in S. Maria.

Staphylinidae

77. *Astenus longelytrata* **Palm, 1936** (det. P. Borges)
PICO: S-Sp94- 6.1- (0.188 m^2); S-S94- 6.1- (0.563 m^2); S-A94- 6.1- (0.125 m^2); 6.2- (0.125 m^2); S-S95- 6.1- (0.5 m^2); 6.2- (0.188 m^2); P-Sp94- 5.2- (0.007); 6.2- (0.014); P-S94- 6.1- (0.057); 6.2- (0.007); P-A94- 6.1- (0.021); 6.2- (0.007); P-S95- 6.1- (0.007).
Western-Palaearctic. Madeira and Porto Santo. Native from the Azores. Very common in both types of pasture in the three islands studied.
AZORES: Faial, Terceira, S. Miguel, S. Maria and now in Pico.

78. *Atheta (Atheta) acuicollis* **(Sharp, 1876)** (det. P. Borges)
PICO: S-Sp94- 6.1- (0.063 m^2).
Palaearctic. Canary Islands. Introduced in the Azores.
AZORES: Flores, Faial, Graciosa, S. Jorge, S. Miguel, S. Maria and now in Pico.

79. ? *Brundinia meridionalis* **(Mulsant & Rey, 1853)** (det. P. Borges)
NEW AZORES
S. MARIA: P-Sp94- 2.2- (0.007).
TERCEIRA: P-Sp94- 3.2- (0.014).
Palaearctic. Probably introduced in the Azores.
AZORES: Terceira and S. Maria.

80. *Cilea silphoides* **(Linnaeus, 1767)** (det. P. Borges)
S. MARIA: S-Sp94- 1.1- (3.0 m^2); 1.2- (1.625 m^2); 2.1- (0.75 m^2); 2.2- (1.563 m^2); S-S94- 1.1- (1.75 m^2); 1.2- (0.25 m^2); 2.1- (0.313 m^2); 2.2- (0.5 m^2); P-Sp94- 1.1- (0.3); 1.2- (0.007); 2.1- (0.379); 2.2- (0.064); P-S94- 2.1- (0.014).
Holarctic. Madeira, Cape Verde Islands. Introduced in the Azores. Common in vegetable refuse.
AZORES: Flores, Faial, Pico, Terceira and now also in S. Maria.

81. *Oligota parva* **Kraatz, 1862** (det. P. Borges)
PICO: P-S94- 5.2- (0.007).
Cosmopolitan. All the Macaronesian archipelagoes. Introduced in the Azores. Common in vegetable refuse.
AZORES: Flores, Faial, Terceira, S. Miguel, S. Maria and now also in Pico

82. *Philonthus ventralis proximus* **Wollaston, 1857** (det. P. Borges)
S. MARIA: P-A94- 2.1- (0.007).

Macaronesian. All the Macaronesian archipelagoes. Native from the Azores.
AZORES: Faial, Graciosa, S. Jorge and now also in S. Maria.

83. ***Quedius simplicifrons*** **(Fairmaire, 1861)** (det. P. Borges)
S. MARIA: P-A94- 2.2- (0.071).
Western-Palaearctic. Madeira and Canary Islands. Native from the Azores. Very common in the pastures from the Azores.
AZORES: Faial, Pico, Graciosa, S. Jorge, Terceira and now in S. Maria.

84. ***Tachyporus chrysomelinus*** **(Linnaeus, 1758)** (det. P. Borges)
S. MARIA: S-Sp94- 2.1- (0.063 m^2); 2.2- (0.125 m^2); S-S94- 2.1- (0.063 m^2); 2.2- (0.063 m^2); S-A94- 2.2- (0.125 m^2); S-S95- 2.2- (0.063 m^2); P-Sp94- 2.2- (0.014).
TERCEIRA: S-Sp94- 4.2- (0.063 m^2).
PICO: S-Sp94- 6.1- (0.125 m^2); 2.2- (0.063 m^2); P-Sp94- 6.1- (0.007).
Holarctic. Madeira and Canary Islands. Introduced in the Azores. Common in vegetable refuse.
AZORES: Flores, Graciosa and now in S. Maria, Terceira and Pico

85. ***Xantholinus longiventris*** **Heer, 1839** (det. P. Borges)
S. MARIA: S-S94- 1.1- (0.063 m^2); 2.2- (0.125 m^2); S-A94- 2.2- (0.25 m^2); S-S95- 2.2- (0.063 m^2); P-Sp94- 1.1- (0.014); 2.2- (0.036); P-S94- 2.2- (0.014); P-A94- 1.1- (0.014); 2.2- (0.043); P-S95- 2.2- (0.043).
PICO: S-A94- 5.2- (0.125 m^2); S-S95- 5.2- (0.188 m^2); 6.2- (0.063 m^2); P-Sp94- 5.2- (0.071); P-S94- 5.2- (0.036); P-A94- 5.2- (0.007); P-S95- 5.2- (0.029); 6.2- (0.014).
Western-Palaearctic. Madeira. Native from the Azores. Very common in the pastures from the Azores.
AZORES: Faial, Graciosa, S. Jorge, Terceira and now in S. Maria and Pico.

DISCUSSION

The present study was carried out in three different oceanic islands and at high altitude pasture. In a previous publication published in this Journal (Borges, 1999b) a detailed list of the arthropods occurring in the twelve studied sites was presented. In the present publication, we showed that the results obtained in terms of new records for the islands and the archipelago clearly demonstrate the importance of standardized insect sampling. In fact, a great portion of the sampled species (36 %) is either a new record for the Azores and or the studied islands.

In summary, 85 species of arthropods are listed being 22 not previously known from the islands, five of which are considered endemic (four from S. Maria and one from Terceira) and will be described elsewhere; 63 species are new records for S. Maria, 21 for Terceira and 28 for Pico. S. Maria and Pico are islands that have been surveyed less intensively than Terceira, so their high numbers of new records are not surprising.

Concerning the Homoptera, Auchenorrhyncha, all species are of a relatively recent West Palaearctic origin and most are probably native (Quartau, 1982). Within the Cicadellidae, *Empteryx filicum*, a leafhopper always associated with ferns in its distributional range, appears to be a native species, and to a lesser extent also *Macrosteles sexnotatus*, which is typically associated with grasses. On the other hand, within the

Delphacidae, both *Kelisia ribauti* and *Megamelodes quadrimaclulatus* are also probably native.

In the aphids, it is remarkable the absence of endemic species in the Azores. In fact, in the Macaronesia there is only one endemic species, *Acyrthosiphon supranubius* Carnero & Nieto Nafria, 1995, occurring only in the Canary islands and specialist feeder on the endemic plant *Spartocytius supranubius* (L. fil.) Santos (see Carnero & Nieto Nafria, 1995). Presently, the fauna of aphids from the Azores is composed by 132 species distributed as follows: S. Maria (23 spp.), S. Miguel (109 spp.), Terceira (66 spp.), Faial (39 spp.), Pico (14 spp.), Flores (10 spp.) and Corvo (2 spp.).

The Heteroptera are particularly badly studied in the Azores, since 25% of the listed new records for the Azores belong to this group and most of the sampled Heteroptera species are new records for at least one island. A detailed revision of this taxon is in preparation by Ribes (pers. comm.).

The Araneae is another taxon where the knowledge is not equilibrated between islands. With this study, and based only on the estimates presented in Wunderlich (1991), a total of 116 spider species are known in the archipelago, distributed as follows: S. Maria (59 spp.), S. Miguel (81 spp.), Terceira (72 spp.), S. Jorge (10), Graciosa (35), Faial (43 spp.), Pico (45 spp.), Flores (38 spp.) and Corvo (6 spp.). Recent studies on native forests from most of the islands (Borges *et al.*, in prep.) are showing that these figures need urgent updating.

Concerning the Lepidoptera and Coleoptera, the knowledge is improved, but still some islands are better sampled than others and this is particularly true for the beetles. Based on the list of Borges (1990), the Azorean beetle fauna is now know to consist in 525 species distributed as follows: S. Maria (262 spp.), S. Miguel (336 spp.), Terceira (250 spp.), S. Jorge (121), Graciosa (101), Faial (212 spp.), Pico (163 spp.), Flores (182 spp.) and Corvo (21 spp.). A total of 150 species of Lepidoptera are know in the Azores distributed as follows (Vieira, 1997): S. Maria (54 spp.), S. Miguel (94 spp.), Terceira (106 spp.), S. Jorge (52), Graciosa (50), Faial (68 spp.), Pico (67 spp.), Flores (61 spp.) and Corvo (28 spp.).

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