

# NEW RECORDS OF COCCINELLIDAE (COLEOPTERA) TO THE AZORES ISLANDS

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## ABSTRACT

In order to record new Coccinellidae species to the Azores, forty one samplings were made in S. Miguel, Graciosa and Pico islands. Graciosa and Pico islands surveys were performed during the scientific expeditions organised by the Department of Biology from the University of the Azores, between the 7<sup>th</sup> and 15<sup>th</sup> of June, 2004 and the 6<sup>th</sup> and 15<sup>th</sup> of June, 2005, respectively. A total of eleven species were collected. The presence of two new species was noticed: one Scymnini species to Pico island, *Clitosthetus arcuatus* (Rossi) and one Coccinellini species to S. Miguel island, *Myrrha octodecimguttata* (Linnaeus).

## INTRODUCTION

The knowledge of Coccinellidae faunal composition in the ecosystems, including agro-ecosystems, is very important because species richness is one of the parameters used to measure the biodiversity (Magurran, 1991) and this family includes many predators used as natural enemies on biological control (Dixon, 2000). Of the predatory species most feed on either aphids or coccids, with few feeding on both types of prey. Some species feed on others species as mites, aleyrodids, ants, chrysomelid larvae, cicadellids, pentatomids, fungi and psyllids (Dixon, 2000; Hodek & Honek, 1996). Thus the food of ladybirds in a particular region is likely to reflect the faunal composition of the potential prey in that area (Dixon, 2000). The aim of this work is to contribute to the knowledge of the biological control agents of the Coccinellidae family, in the Azores archipelago.

## MATERIAL AND METHODS

Thirty sampling sites in S. Miguel, Graciosa and Pico islands were selected. A total of forty one samplings were made [S. MIGUEL: Ponta Delgada (1); GRACIOSA: Terreiros (1), Negro (1), Porto Afonso (1), João Gomes (1), Serra Branca (2), Folga (1), Alto do Sul (2), Fenais (1), Pinheiro (1), Lagoa (2), Facho (1), Caldeira do Enxofre (1), Pico Timão (1), Guadalupe (1), Luz (1) and Pico Machado (1); PICO: Terras (2), Manhenha (2), Sta. Luzia (3), Cabrito (1), Madalena (2), Candelária (1), S. Mateus (2), S. João (1), Lajes (1), Prainha (1), Piedade (1), S. Roque do Pico (2) and Cais do Mourato (1)].

Depending on the type of vegetal cover, we used direct observation, beating and sweeping methods, cromotropic and Malaise traps, collecting ladybeetle adults or larvae

with a suction tube aspirator or a forceps, respectively. We never took more than one hour in each sampling site. Larvae were reared until adult emergence. The collected specimens were preserved in 70% alcohol and afterwards mounted and classified. The specimens collected were deposited on the Ecology Section of the Department of Biology from the University of the Azores.

The names of species provided on Table I. are according to the accepted names of the Fauna Europaea database (Canepari, 2004).

## RESULTS AND DISCUSSION

On overall samples a total of 11 species of ladybird beetles were collected. In S. Miguel island, we collected the following species: *Chilocorus bipustulatus* (Linnaeus), *Scymnus subvillosus* (Goeze), *Adalia decempunctata* (Linnaeus), *Myrrha octodecimguttata* (Linnaeus), *Rhyzobius lophanthae* (Blaisdell) and *R. chrysomeloides* (Herbst.). In Graciosa island, the collected species were *R. lophanthae* and *R. litura* (Herbst.). Finally, in Pico island we collected 3 species: *Clitosthetus arcuatus* (Rossi), *S. interruptus* (Goeze) and *S. nubilus* Mulsant. *M. octodecimguttata* and *C. arcuatus*, were, for the first time recorded to S. Miguel and Pico islands, respectively. Species richness for the Azorean island is now updated to 18 species for S. Miguel, 18 species for Sta. Maria, 12 species for Terceira, 9 species for Graciosa, 11 species for S. Jorge, 6 species for Pico, 8 species for Faial, 7 species for Flores and 6 species for Corvo (Table I).

The following species *S. mimulus*, *P. decemplagiatus* (Borges *et al.*, 2005a), *H. variegata* and *H. undecimnotata* need further taxonomic work for confirmation of their presence in the Azores.

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## BIBLIOGRAPHY

- BORGES, P.A.V., 1990a. A checklist of Coleoptera from the Azores with some systematic and biogeographic comments. *Boletim do Museu Municipal do Funchal*, 42 (220): 87-136.
- BORGES, P.A.V., 1990b. Estudo preliminar dos coleópteros (Insecta, Coleóptera) da ilha das Flores. *Relatórios e Comunicações do Departamento de Biologia*, 18: 47-61.
- BORGES, P.A.V. & A.R.M. SERRANO, 1989. New records of the Coleopterous fauna (Insecta) from the Azores. *Boletim do Museu Municipal do Funchal*, 41 (209): 5-24.
- BORGES P.A.V., R. CUNHA, R. GABRIEL, A.F. MARTINS, L. SILVA & V. VIEIRA, 2005a. *A list of the terrestrial fauna (Mollusc and Arthropoda) and flora (Bryophyta, Pteridophyta and Spermatophyta) from the Azores*. Direcção Regional do Ambiente and Universidade dos Açores, Horta, Angra do Heroísmo and Ponta Delgada, 317 pp.

- BORGES P.A.V., P. OROMÍ, F. DINIS & S. JARROCA, 2005b. Coleoptera. In: Borges, P. A. V., R. Cunha, R. Gabriel, A. F. Martins, L. Silva and V. Vieira, (eds.): *A list of the terrestrial fauna (Mollusc and Arthropoda) and flora (Bryophyta, Pteridophyta and Spermatophyta) from the Azores*. pp. 197-207, Direção Regional do Ambiente and Universidade dos Açores, Horta, Angra do Heroísmo and Ponta Delgada.
- CANEPARI, C., 2004. Fauna Europaea: Coccinellidae. In: Audisio, P. (ed.) (2004) Fauna Europaea: Coleoptera 2. Fauna Europaea version 1.5, <http://www.faunaeur.org>. (accessed on the 2<sup>nd</sup> of March of 2006).
- CROTCH, G.R., 1867. On the coleoptera of the Azores. *Proceedings of the Zoological Society of London*, 359-391.
- DIXON, A.F.G., 2000. *Insect Predator-Prey Dynamics: Ladybirds Beetles & Biological Control*. Cambridge University Press, Cambridge, 257 pp.
- DROUET, H., 1859. Coléoptères Açoréenes. *Rev. Mag. Zool.*, 7: 5-22.
- DROUET, H., 1861. *Éléments de la faune açoréenne*. J. B. Baillière & Fils, Libraires de l'Académie de Médecine, Paris, 245 pp.
- FÜRSCH, H., 1966. Die coccinelliden der Azoren. *Boletim do Museu Municipal do Funchal*, 20: 29-33.
- FÜRSCH, H., 1987. Die Scymninae der Kanaren, Azoren und Madeiras. *Acta Coleopterologica*, 3: 1-14.
- GILLERFORS, G., 1986. Contribution to the coleopterous fauna of the Azores. *Boletim do Museu Municipal do Funchal*, 38 (172): 16-27.
- HODEK, I. & A. HONEK, 1996. *Ecology of Coccinellidae*. Kluwer Academic Publishers, Dordrecht, 464 pp.
- ISRAELSON, G., 1984. Coleoptera from the Azores. *Boletim do Museu Municipal do Funchal*, 36 (161): 142-161.
- ISRAELSON, G., 1985. Notes on the coleopterous fauna of Azores, with description of new species of *Atheta* Thomson (Coleoptera). *Boletim do Museu Municipal do Funchal*, 37 (165): 5-19.
- MAGURRAN, A.E., 1991. *Ecological diversity and its measurement*. Chapman and Hall, Cambridge, 179 pp.
- MEQUIGNON, A., 1942. Catalogue des Coléoptères Açoréens. *Annales de la Société Entomologique de France CXI* Paris.
- RAIMUNDO, A.A.C. & M.L.G. ALVES, 1986. *Revisão dos coccinélídeos de Portugal*. Universidade de Évora, Évora. 103pp.
- SERRANO, A.R.M., 1982. Contribuição para o conhecimento do povoamento, distribuição e origem dos Coleópteros do arquipélago dos Açores (Insecta, Coleóptera). *Boletim do Museu Municipal do Funchal*, 36 (147): 67-104.
- SERRANO, A.R.M. & P.A.V. BORGES, 1987. A further contribution to the knowledge of the Coleoptera (Insecta) from Azores. *Boletim do Museu Municipal do Funchal*, 39 (187): 51-69.
- SOARES, A.O., R.B. ELIAS & H. SCHANDERL, 1999. Population dynamics of *Icerya purchasi* Maskell (Homoptera: Margarodidae) and *Rodolia cardinalis* Mulsant (Coleoptera: Coccinellidae) in two citrus orchards of São Miguel island (Azores). *Boletim de Sanidad Vegetal de Plagas*, 25: 459-467.
- SOARES, A.O., R.B. ELIAS, R. RESENDES & H. FIGUEIREDO, 2003. Contribution to the knowledge of the Coccinellidae (Coleoptera) fauna from the Azores islands. Arquipélago. *Life and Marine Sciences*, 20A: 47-53.

- TARNIER, M.F., 1860. Insect Coleóptère. *In: A. Morelet Iles Açores. Notice sur l'Histoire Naturelle des Açores*, suivie d'une descriptions des Molusques terrestres de cet archipel, 87-96
- UYTTENBOOGAART, D.L., 1930. *Contributions to the knowledge of the fauna of the Canary-Islands*. Tijdschr. Ent. Amsterdam.
- UYTTENBOOGAART, D.L., 1947. Coleoptera (excl. Staphylinidae et Hydrophilidae) von Azoren und Madeira. *Soc. Sci. Fenn. Comm. Biol.*, VIII: 12. Helsingfors.

Table I. List of Coccinellid species collected to the Azores islands. Legend: **1** Drouet (1859); **2** Tarnier (1860); **3** Drouet (1861); **4** Crotch (1867); **5** Uyttenboogaart (1930 in Frsch 1966); **6** Mquignon (1942); **7** Uyttenboogaart (1947 in Frsch 1966); **8** Frsch (1966); **9** Serrano (1982); **10** Israelson (1984); **11** Israelson (1985); **12** Raimundo & Alves (1986); **13** Gillerfors (1986); **14** Frsch (1987); **15** Serrano & Borges (1987); **16** Borges & Serrano (1989); **17** Borges (1990b); **18** Soares et al. (1999); **19** Borges (1990a; pers. comm.); **20** Soares et al. (2003); **21** Borges et al. (2005b); **22** Present survey. Legend: # Synonymy of *Stethorus wollastoni* Kapur, \* Synonymy of *Scymnus levallanti* Mulsant, \* Synonymy of *Lindorus lophanthæ* Blaisdell.

Subfamilies	Tribes	Genus	Species	S. Miguel	S. Maia	Tenria	Oesteira	S. Jorge	Pico	Faial	Flores	Corvo	Açores			
Chrysomelae Byrrheninae	Chrysomelini Stethorini Coccinellini Scymnini	Chalcovius Stethorus Cibadistivus Scymnus	<i>C. lapidivellus</i> (Linnaeus)	6, 7, 12, 20, 21, 22	4, 21								8			
			<i>S. javalicum</i> Weise *	8, 8, 9, 14, 20, 21	4, 8, 19, 21	21		8, 20, 21		4, 8, 19, 21				8		
			<i>C. aculeatus</i> (Rocs)	14, 20, 21		21	20, 21	20, 21	22						8	
			<i>S. interopterus</i> (Cesare)	8, 12, 20	8, 9, 14, 20	16, 20	20	16, 20	11, 20, 22	13, 20	11	19				
			<i>S. laeviventris</i> Heisterl.		16											
			<i>S. abnormicollis</i> (Cesare)												7, 8, 14	
			<i>S. subvovus</i> (Cesare)	6, 21, 22	9, 21	4, 16, 21	6, 21				4, 8, 21				8	
			<i>S. adamsi</i> (Thurston)		13, 14, 21											
			<i>S. nobilis</i> Mulsant *	12, 13, 20	13, 20	16, 20	16, 20	16, 20	13, 20, 22	13, 20	13, 20	20				14
			<i>S. annulatus</i> Cajani & Frsch			13, 14, 21										14
Meligethinae	Meligethini	<i>M. asperatus</i> (Boheman)	<i>M. flavipictus</i> (Wollaston)	7, 9, 20, 21		19, 21		6, 9, 21			21		5, 6, 14			
			<i>M. hebraeus</i> Frsch													
			<i>M. flavus</i> Frsch	20, 21		13, 14, 21	20, 21	20, 21					20, 21			
Coccinellinae	Coccinellini	Phenacoccus Adalia	<i>P. decempunctatus</i> (Wollaston)							8, 21			8			
			<i>A. bipunctata</i> Linnaeus	12, 21												
			<i>A. decempunctata</i> (Linnaeus)	3, 12, 20, 21, 22	3, 21	3, 21	3, 21	1, 3, 21	3, 21	1, 3, 21	3, 21				1, 4, 6, 8, 2	
			<i>C. septempunctata</i> (Linnæus)		4, 21	16, 21									8, 9	
			<i>C. undecimpunctata undecimpunctata</i> L.	1, 3, 4, 12, 20, 21	1, 3, 9, 12, 20, 21	4, 20, 21	8, 21	9, 21	19, 21	8, 21	4, 8, 21	8, 17, 20, 21			7, 8, 2	
			<i>E. connexa</i> (Germar)	19, 21	21											
			<i>M. veluticornis</i> (Linnaeus)	22	16,											
			<i>M. octodecimmaculata</i> formosa (Cesare)		13, 21											
			<i>H. variegata</i> (Cesare)													6, 10
			<i>H. undecimnotata</i> (Schnheider)	12												
Coccidulinae	Coccidulini	<i>Rhycolus</i>	<i>R. lophanthæ</i> (Blaisdell) *	10, 12, 20, 22	10	21	20, 22	21			19					
			<i>R. flavus</i> Heisterl.	1, 3, 4, 6, 9, 20	19	1, 3, 4, 6, 9, 16, 22				1, 3, 4, 6, 9				2		
			<i>R. chrysomeloides</i> (Heisterl.)	10, 20, 22												
Novitii	Rudolphi	<i>R. carinatus</i> Mulsant	8, 12, 18, 20	8, 20	8, 20	20	8, 20	20	8, 20	20	17	19	8			
			19	19	12	9	11	6	8	7	6					

Species richness