

New records of Agromyzidae (Diptera) from Portugal, with an updated checklist

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Abstract: New records of 110 species of the acalyprate Diptera family Agromyzidae are given from Portugal, including Madeira, Porto Santo and the Azores. A quarantine plant pest, *Nemorimyza maculosa* (Malloch, 1913), was detected in the Old World for the first time. Details on *Phytobia* xyleminers and a parthenogenetic *Phytomyza* species are recorded together with new distribution data. For certain species morphological and taxonomic notes and discussions on known or new host plants are added. A complete checklist of Agromyzidae of Portugal is presented.

Key words: Diptera, Agromyzidae, new records, new host plants, distribution, biology, parthenogenesis, quarantine species, checklist, Argentina, Azores, Canary Islands, Chile, Italy, Madeira, Portuguese mainland, Sahara, Turkey.

Introduction

The Agromyzidae belong to families of Diptera Acalyptratae hitherto insufficiently studied on the Iberian Peninsula and Balearic Islands. The first concrete records on leaf miner flies from Portugal were published by Tavares (1901) including the description of the new species *Agromyza kiefferi* Tavares, 1901 from the locality "Castello Branco ate a Covilhan". The first records on the fauna of Agromyzidae from Madeira are by Buhr (1908). Our knowledge of the Agromyzidae of the Portuguese mainland has in the past firstly been based on brief articles by Buhr (1941), Godinho *et al.* (1994), Griffiths (1967), Hendel (1931–36, 1957), Nowakowski (1973), Spencer (1954, 1965a, b, 1990, 1992). *Phytomyza smyrnii* Spencer, 1954 was described from the continental territory of Portugal but only based on one female. Records of Agromyzidae from the Azores and Madeira have been summarised by Frey (1945, 1949). Also from the Azores are described two new species, namely *Cerodontha bistrigata* Frey, 1945 from localities on Terceira (Angra do Heroísmo, Bagacina), São Jorge (Ribeira do Salto), Pico (Silveira, Lagoa do Caiado), Faial (Caldeira), Corvo (Caldeirão) and *Liriomyza subartemisicola* Frey, 1945 from localities on São Miguel, Terceira, São Jorge, Pico, Faial, and Flores. The latter one was synonymized by Spencer (1965b) with *L. umbilici* Hering, 1927 known from the Canary Islands. These works have been used by Martinez & Báez (2002), who record 46 species for Portugal (namely 16 for the Portuguese mainland, 19 for the Azores and 24 for Madeira) in the „Catálogo de los Diptera de España, Portugal y Andorra“. Subsequently Bella (2013), Černý (2005, 2009, 2013), Černý & Merz (2006), Gil-Ortiz *et al.* 2011 and Zlobin (2003, 2005) updated the number of species of the agromyzid fauna of Portugal.

This study is mainly aimed at the presentation of new data on the species of the family Agromyzidae based on material acquired between the years 2009 and 2017 in which fieldwork in various parts of continental Portugal mainland and on Madeira has been done. Some older data were taken from the Michael von Tschirnhaus Insect Collection diaries and re-identified by him if necessary.

Material and methods

The majority of the material examined from the continental territory of Portugal was collected by Rui Andrade and Ana Rita Gonçalves during their study in 2009–2017 (512 specimens). Material examined from the Azores and Madeira (1164 specimens) were determined by M. von Tschirnhaus and belong to his collection. As far as not otherwise noted above, material examined was identified by the first author and specimens are deposited in the private collection of the first author.

Macrophotographs of living adults were taken by digital cameras Fujifilm FinePix S5500 and Fujifilm FinePix HS10 HS11 both with macro lens Raynox DCR-250 (R. Andrade). Also habitats of some species in their Portuguese localities were documented by photography during the fieldwork. Specimens were mostly collected by sweeping over vegetation in various habitats. When necessary male terminalia were studied after detachment, softening and mazerating the terminalia in hot 10% KOH, washing in water and dissecting the whole abdomen in a droplet of glycerine under a binocular microscope MBS 10-100 (M. Černý). After examination all dissected parts were placed into a droplet of the medium „glycerin plus gum resin“ on a card which was pinned below the relevant specimen. M. von Tschirnhaus fundamentally used the same method but with washing in 10% acetic acid and transferring the genitalia into glycerin in open micro-craters on 9mm x 36mm glass slides, those stored in small vials (von Tschirnhaus 1981: 27).

The material examined is deposited in the following collections: CMBP – collection of Miroslav Barták, Praha, Czech Republic; CMCH – collection of Miloš Černý, Halenkovice, Czech Republic; CMTB – collection of Michael von Tschirnhaus, Bielefeld, Germany, later to be stored in the „Zoologische Staatssammlung München“.

Genera and species are arranged alphabetically in the two subfamilies Agromyzinae and Phytomyzinae. The distribution of species in Europe is well documented in the database Fauna Europaea which is available online (Martinez 2011). Therefore records which are not listed in that database are accompanied by citing the papers in which they were published.

Localities

- [1a] Azores, Island São Miguel: From João Bom, path in SSE direction to crater edge of "Caldeira das Sete Cidades", also path along crater edge, way down to Remédios, 37°53'N, 25°46' to 25°47'W, M. von Tschirnhaus leg. et det. (CMTB).
- [1b] Azores, Island São Miguel: João Bom, private vegetable and flower garden, M. von Tschirnhaus leg. et det. (CMTB).
- [1c] Azores, Island São Miguel: Village João Bom at western end of island, repeatedly swept on young leaves of *Arundo donax*, M. von Tschirnhaus leg. et det. (CMTB).
- [1d] Azores, Island São Miguel: Lagoa Verde, crater lake in Caldeira das Sete Cidades, M. von Tschirnhaus leg. et det. (CMTB).
- [1e] Azores, Island São Miguel: Atlantic coast north of Mosteiros, 25°49'N, 37°54'W, M. von Tschirnhaus leg. et det. (CMTB).
- [1f] Azores, Island São Miguel: 25°49'N, 37°54'W, western lower mountain slope of Pico dos Gatos, M. von Tschirnhaus leg. et det. (CMTB).
- [1g] Azores, Island São Miguel: Miradouro de Santa Iria above steep coast, E Ribeira Grande, 3km ESE Ribeirinha, 37°49'N, 25°28'W, M. von Tschirnhaus leg. et det. (CMTB).
- [1h] Azores, Island São Miguel: Lagoa do Carvão (W of crater lake), 37°49'N, 25°45'W, M. von Tschirnhaus leg. et det. (CMTB).
- [1i] Azores, Island São Miguel: Near road 1.5km W Covoada, 37°47'N, 25°45'W, M. von Tschirnhaus leg. et det. (CMTB).
- [1j] Azores, Island São Miguel: Lagoa do Canário, SE Caldeira das Sete Cidades, 37°50'N, 25°46'W, M. von Tschirnhaus leg. et det. (CMTB).
- [1k] Azores, Island São Miguel: Village Caldeiras, 3.5km N Lagoa do Fogo, 37°48'N, 25°29'W, M. von Tschirnhaus leg. et det. (CMTB). 25°29'W, pasture at lake bank, between hot springs and church, M. von Tschirnhaus leg. et det. (CMTB).
- [1l] Azores, Island São Miguel: „Lombadas“ locality above waterfall, 45°38'30"N, 25°28'W, M. von Tschirnhaus leg. et det. (CMTB).
- [1m] Azores, Island São Miguel: Mountain road and irrigation channel at 37°47'N, 25°29'W, M. von Tschirnhaus leg. et det. (CMTB).
- [1n] Azores, Island São Miguel: Western part of Island São Miguel, country lane between Pico de Mafra and João Bom, 37°53'N, 25°48'W, path between cattle pastures, M. von Tschirnhaus leg. et det. (CMTB).
- [1o] Azores, Island São Miguel: Village João Bom at western end of island, cattle pasture, swept on flowering *Coleostephus myconis* (Asteraceae), M. von Tschirnhaus leg. et det. (CMTB).

- [1p] Azores, Island São Miguel: 37°43'N, 25°28'W, southern coast, beach 3km W Vila Franca do Campo, M. von Tschirnhaus leg. et det. (CMTB).
- [1r] Azores, Island São Miguel: Ponta Delgada, city park and botanical garden „Jardim António Borges“, M. von Tschirnhaus leg. et det. (CMTB).
- [1s] Azores, Island São Miguel: 37°52'N, 25°51'W, most western point of the island, black lava above breakwater coast at base of Pico das Camarinhas, swept on tussocks of *Festuca petraea*, M. von Tschirnhaus leg. et det. (CMTB).
- [1t] Azores: Island São Miguel: N' Pico das Camarinhas, 37°52'N, 25°51'W, cattle pastures, forest edge, M. von Tschirnhaus leg. et det. (CMTB).
- [2a] Madeira: Caniço, 32°39'N, 16°50'W, M. Lehnert leg., M. von Tschirnhaus det. (CMTB).
- [2b] Madeira: Camacha, 32°40'50"N, 16°51'00"W, M. Lehnert leg., M. von Tschirnhaus det. (CMTB).
- [2c] Madeira: Coastal road W of Seixal, P. Ohm leg., M. von Tschirnhaus det. (CMTB).
- [2d] Madeira: Garajau, 32°38'41"N, 16°51'02"W, Hans Meyer leg., M. von Tschirnhaus det. (CMTB).
- [2e] Madeira: Monte, 32°40'18"N, 16°54'27"W, M. Lehnert leg., M. von Tschirnhaus det. (CMTB).
- [2f] Madeira: Paul da Serra, Campo Grande near „Cristo Rei“, 5.5km N Canhas, 1350m a.s.l., edge of aqueduct, W. Barkemeyer leg., M. von Tschirnhaus det. (CMTB).
- [2g] Madeira: 1km SW Poiso, 6.5km N Funchal, 1350m a.s.l., conifer forest, W. Barkemeyer leg., M. von Tschirnhaus det. (CMTB).
- [2h] Madeira: Porto da Cruz, salt marshes, G. Weigmann leg., M. von Tschirnhaus det. (CMTB).
- [2i] Madeira: Rabaçal, meadow, G. Weigmann leg., M. von Tschirnhaus det. (CMTB).
- [2j] Madeira: Ribeiro Frio, 850m a.s.l., about 10km N Funchal, Lauraceae forest, W. Barkemeyer leg., M. von Tschirnhaus det. (CMTB).
- [2k] Madeira: Ribeiro Frio, aqueduct Levada do Furado, 32°44'06"N, 16°53'10"W, 895m a.s.l., W. Barkemeyer leg., M. von Tschirnhaus det. (CMTB).
- [2l] Madeira: Santana, meadow along a steep, G. Weigmann leg., M. von Tschirnhaus det. (CMTB).
- [2m] Madeira: São Vicente, meadow above shore, G. Weigmann leg., M. von Tschirnhaus det. (CMTB).
- [2n] Madeira: forest 2.5km WNW Santo da Serra, 800m a.s.l., aqueduct „Levada da Serra – Lamaceiros“, W. Barkemeyer leg., M. von Tschirnhaus det. (CMTB).
- [2o] Madeira: Trail between Boca da Encumeada and Boca dos Corgos, south of Ribeiro de Poço, close to a spring, 1000m a.s.l., W. Barkemeyer leg., M. von Tschirnhaus det. (CMTB).
- [2p] Madeira: Trail between Boca da Encumeada and Boca dos Corgos, 1km W Fenda do Ferreiro, 1200–1250m a.s.l., W. Barkemeyer leg., M. von Tschirnhaus det. (CMTB).
- [2r] Madeira: Calheta Beach, 32°43'N, 17°10'W, V. Vrabec leg., M. Černý det. (CMBP, CMCH).
- [3] Madeira: Island of Porto Santo: 50km NE Madeira, 33°04'55"N, 16°20'45"W, 0.5km SW Camacha, dry stream bed, W. Barkemeyer leg., M. von Tschirnhaus det. (CMTB).
- [4] Algarve, Faro, dry grassland, close to *Puccinellia* saltmarshes, sweeping vegetation, G. Weigmann leg., M. von Tschirnhaus det. (CMTB).
- [5a] Aveiro, Estarreja, Canelas e Fermelã, 40°43'22.7"N, 8°34'20.6"W, 4m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH). (Fig. 17)
- [5b] Aveiro, Estarreja, Canelas e Fermelã, 40°42'49.6"N, 8°35'09.3"W, 1m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [5c] Aveiro, Estarreja, Salreu, 40°44'04.4"N, 8°34'51.9"W, 5m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [6a] Beja, Barrancos, Barrancos (Noudar), 38°09'46.8"N, 7°03'08.7"W, 165m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [6b] Beja, Moura, Safara e Santo Aleixo da Restauração, 38°04'40.1"N, 7°14'21.3"W, 207m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [6c] Beja, Moura, Sobral da Adiça, 38°02'34.7"N, 7°15'52.7"W, 173m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [6d] Beja, Odemira, Longueira/Almograve (Parque Natural do Sudoeste Alentejano e Costa Vicentina), 37°43'33"N, 8°46'08"W, 3m a.s.l., estuary Rio Mira, sweeping vegetation, M. Barták leg., M. Černý det. (CMBP).
- [6e] Beja, Ourique, Garvão e Santa Luzia, 37°43'50.3"N, 8°25'27.2"W, 200m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [6f] Beja, Serpa, Serpa (Salvador e Santa Maria), 37°58'46.5"N, 7°38'53.4"W, 73m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [6g] Beja, Serpa, Vila Verde de Ficalho, 37°57'46.5"N, 7°17'58.5"W, 280m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [7a] Braga, Barcelos, Gilmonde, 41°30'42.0"N, 8°38'56.1"W, 50m a.s.l., Malaise trap, R. Andrade leg., M. Černý det. (CMCH).

- [7b] Braga, Barcelos, Gilmonde, 41°30'43.0"N, 8°38'57.0"W, 25–50m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [7c] Braga, Celorico de Basto, Veade, Gagos e Molares, 41°25'07.5"N, 7°58'54.0"W, 175m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [7d] Braga, Esposende, Apúlia e Fão (Parque Natural do Litoral Norte), 41°28'16.4"N, 8°46'27.2"W, 2m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH). (Fig. 16)
- [7e] Braga, Esposende, Fonte Boa e Rio Tinto (Marachão), 41°30'16.9"N, 8°43'10.6"W, 23m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [7f] Braga, Fafe, Travassós, 41°30'06.4"N, 8°10'55.6"W, 386m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [7g] Braga, Terras de Bouro, Campo do Gerês (Parque Nacional da Peneda-Gerês), 41°48'28.5"N, 8°07'55.5"W, 500–800m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [7h] Braga, Vila Nova de Famalicão, Mouquim, 41°26'01.71"N, 8°31'32.71"W, 105m a.s.l., Pan traps, R. Andrade leg., M. Černý det. (CMCH).
- [7i] Braga, Vila Nova de Famalicão, Novais, 41°23'26.34"N, 8°26'06.06"W, 150m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [8a] Bragança, Bragança, Castrelos e Carrazedo, 41°45'56.9"N, 6°54'43.5"W, 980m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [8b] Bragança, Bragança, Castro de Avelãs, 41°48'55.7"N, 6°48'56.7"W, 737m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [8c] Bragança, Bragança, Espinhosela (Parque Natural de Montesinho), 41°53'08.2"N, 6°49'37.4"W, 793m a.s.l., sweeping vegetation, R. Andrade & A. Gonçalves leg., M. Černý det. (CMCH). (Fig. 20)
- [8d] Bragança, Bragança, França (Parque Natural de Montesinho), 41°56'33.0"N, 6°45'51.0"W, 1049m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [8e] Bragança, Bragança, Gondesende (Parque Natural de Montesinho), 41°50'47.1"N, 6°52'45.9"W, 635m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [8f] Bragança, Bragança, Parâmio (Parque Natural de Montesinho), 41°53'54.0"N, 6°51'16.3"W, 780m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [8g] Bragança, Carrazeda de Ansiães, Fonte Longa, 41°14'16.2"N, 7°14'57.6"W, 775m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [8h] Bragança, Miranda do Douro, Vila Chã de Braciosa (Parque Natural do Douro Internacional), 41°25'29.8"N, 6°18'29.4"W, 602m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [8i] Bragança, Vimioso, Algoso, Campo de Víboras e Uva, 41°27'17.6"N, 6°35'35.2"W, 340m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [8j] Bragança, Vinhais, Tuizelo (Parque Natural de Montesinho), 41°54'20.3"N, 7°01'47.4"W, 935m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [8k] Bragança, Vinhais, Quirás e Pinheiro Novo (Parque Natural de Montesinho), 41°57'29.7"N, 7°09'29.9"W, 588m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [9a] Castelo Branco, Castelo Branco, Monforte da Beira (Monte Barata, Parque Natural do Tejo Internacional), 39°42'33.5"N, 7°18'59.3"W, 250m a.s.l., sweeping vegetation, A. Gonçalves leg., M. Černý det. (CMCH). (Fig. 19)
- [9b] Castelo Branco, Covilhã, Cortes do Meio (Parque Natural da Serra da Estrela), 40°18'38.83"N, 7°34'35.14"W, 1645m a.s.l., sweeping vegetation, A. Gonçalves leg., M. Černý det. (CMCH).
- [9c] Castelo Branco, Vila Velha de Ródão, Vila Velha de Ródão, 39°38'51.3"N, 7°40'41.6"W, 110m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [10] Coimbra, Coimbra, Taveiro, Ameal e Arzila (Reserva Natural do Paul de Arzila), 40°10'45.0"N, 8°33'18.7"W, 25 m a.s.l., sweeping vegetation, A. Gonçalves leg., M. Černý det. (CMCH).
- [11] Évora, Évora, São Manços e São Vicente do Pigeiro, 38°27'32.0"N, 7°40'44.9"W, 170m a.s.l., sweeping vegetation, R. Andrade & A. Gonçalves leg., M. Černý det. (CMCH).
- [12a] Faro, Loulé, Querença, Tôr e Benafim (Paisagem Protegida Local da Fonte Benémola), 37°12'29.2"N, 8°00'29.7"W, 153m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [12b] Faro, Silves, São Marcos da Serra, 37°20'01.16"N, 8°24'20.63"W, 100m a.s.l., Pan traps, Pedro Andrade leg., M. Černý det. (CMCH).
- [12c] Faro, Vila do Bispo, Budens (Parque Natural do Sudoeste Alentejano e Costa Vicentina), 37°04'28.7"N, 8°48'10.7"W, 6m a.s.l., sweeping vegetation, R. Andrade leg. (CMCH).
- [12d] Faro, 10km W Lagos, Luz env., pasture, 4–5.vi.1997, B. Mocek leg., M. Černý det. (CMCH).
- [13a] Guarda, Estrela Mts., Manteigas env., valey of Mondego river, 1000m a.s.l., B. Mocek leg., M. Černý det. (CMCH).
- [13b] Guarda, Figueira de Castelo Rodrigo, Algodres, Vale de Afonsinho e Vilar de Amargo, 40°57'36.5"N, 7°02'09.6"W, 525m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).

- [13c] Guarda, Gouveia, Aldeias e Mangualde da Serra (Parque Natural da Serra da Estrela), 40°24'13"N, 7°35'10"W, 1450m a.s.l., forest, sweeping vegetation, M. Barták leg., M. Černý det. (CMBP).
- [13d] Guarda, Gouveia, Folgosinho (Parque Natural da Serra da Estrela), 40°30'32.92"N, 7°31'56.48"W, 784m a.s.l., sweeping vegetation, A. Gonçalves leg., M. Černý det. (CMCH).
- [13e] Guarda, Gouveia, Melo e Nabais (Parque Natural da Serra da Estrela), 40°30'21.70"N, 7°32'17.82"W, 735m a.s.l., sweeping vegetation, A. Gonçalves leg., M. Černý det. (CMCH).
- [13f] Guarda, Guarda, Fernão Joanes (Parque Natural da Serra da Estrela), 40°28'31"N, 7°21'32"W, 930m a.s.l., *Castanea* wood, sweeping vegetation, M. Barták leg., M. Černý det. (CMBP).
- [13g] Guarda, Guarda, Valhelhas (Parque Natural da Serra da Estrela), 40°24'10"N, 7°24'16"W, 500m a.s.l., near river, sweeping vegetation and Pan traps, M. Barták leg., M. Černý det. (CMBP).
- [13h] Guarda, Manteigas, Sameiro (Parque Natural da Serra da Estrela), 40°24'42"N, 7°28'04"W, 580m a.s.l., near river, sweeping vegetation, M. Barták leg., M. Černý det. (CMBP).
- [13i] Guarda, Manteigas, São Pedro (Poço do Inferno, Parque Natural da Serra da Estrela), 40°22'21.7"N, 7°31'00.1"W, 1100m a.s.l., sweeping vegetation, A. Gonçalves leg., M. Černý det. (CMCH).
- [13j] Guarda, Seia, Alvoco da Serra (Parque Natural da Serra da Estrela), 40°17'59.60"N, 7°41'17.45"W, 855m a.s.l., sweeping vegetation, A. Gonçalves leg., M. Černý det. (CMCH).
- [13k] Guarda, Seia, Loriga (Parque Natural da Serra da Estrela), 40°19'41.26"N, 7°40'36.71"W, 901m a.s.l., sweeping vegetation, A. Gonçalves leg., M. Černý det. (CMCH).
- [13l] Guarda, Seia, Loriga (Parque Natural da Serra da Estrela), 40°19'43.71"N, 7°42'53.22"W, 832m a.s.l., sweeping vegetation, A. Gonçalves leg., M. Černý det. (CMCH).
- [13m] Guarda, Seia, Seia, São Romão e Lapa dos Dinheiros (Parque Natural da Serra da Estrela), 40°23'04.19"N, 7°42'18.40"W, 587m a.s.l., sweeping vegetation, A. Gonçalves leg., M. Černý det. (CMCH).
- [14a] Leiria, Alcobaça, Cela, 39°30'21.3"N, 9°01'37.2"W, 70m a.s.l., Pan traps, R. Andrade leg., M. Černý det. (CMCH).
- [14b] Leiria, Alvaiázere, Almôster, 39°50'49.8"N, 8°25'53.3"W, 280m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [14c] Leiria, Caldas da Rainha, Tornada e Salir do Porto (Reserva Natural Local do Paul de Tornada), 39°26'53.1"N, 9°08'04.3"W, 25m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [14d] Leiria, Caldas da Rainha, Tornada e Salir do Porto, 39°28'28.06"N, 9°09'25.76"W, 25m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [15a] Lisboa, Torres Vedras, A dos Cunhados (Casal da Serra), 39°09'56.20"N, 9°20'31.53"W, sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [15b] Lisboa, Sintra, Almargem do Bispo, Pero Pinheiro e Montelavar, 38°50'31.43"N, 9°15'36.34"W, 275m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [15c] Lisboa, Torres Vedras, A dos Cunhados e Maceira, 39°08'41.82"N, 9°16'16.62"W, 23m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [16] Portalegre, Portalegre, Ribeira de Nisa e Carreiras, 39°19'53.5"N, 7°25'23.4"W, 590m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [17a] Porto, Porto, Lordelo do Ouro e Massarelos (Jardim Botânico do Porto), 41°09'10.0"N, 8°38'35.1"W, 66m a.s.l., collected with a vial, R. Andrade leg., M. Černý det. (CMCH).
- [17b] Porto, Póvoa de Varzim, Estela, 41°27'52.73"N, 8°45'54.18"W, 12m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [17c] Porto, Póvoa de Varzim, Estela, 41°27'52.73"N, 8°45'54.18"W, 12m a.s.l., Pan traps, R. Andrade leg., M. Černý det. (CMCH).
- [17d] Porto, Valongo, Campo e Sobrado, 41°10'31.9"N, 8°28'48.5"W, 86m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [17e] Porto, Valongo, Valongo, 41°09'33.4"N, 8°29'05.6"W, 50–100m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH). (Fig. 21)
- [17f] Porto, Vila do Conde, Malta e Canidelo, 41°18'17.25"N, 8°39'38.10"W, 65m a.s.l., collected with a vial, R. Andrade leg., M. Černý det. (CMCH).
- [17g] Porto, Vila do Conde, Mindelo (Paisagem Protegida Regional do Litoral de Vila do Conde e Reserva Ornitológica de Mindelo), 41°19'13.9"N, 8°44'07.5"W, 5–20m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH). (Fig. 18)
- [17h] Porto, Vila Nova de Gaia, Arcozelo (Parque de Dunas da Aguda), 41°03'12.3"N, 8°39'18.0"W, 10m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [17i] Porto, Vila Nova de Gaia, Avintes (Parque Biológico de Gaia), 41°06'00.0"N, 8°33'35.3"W, 50m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [17j] Porto, Vila Nova de Gaia, Canidelo (Reserva Natural Local do Estuário do Douro), 41°08'20.7"N, 8°39'55.2"W, 10m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).

- [17k] Porto, Vila Nova de Gaia, Mafamude e Vilar do Paraíso, 41°07'22.99"N, 8°36'42.78"W, 125m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [18] Santarém, Abrantes, Mouriscas, 39°28'02.0"N, 8°04'41.0"W, 50m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [19] Setúbal, Grândola, Carvalhal, 38°23'38.1"N, 8°48'13.6"W, 0m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [20] Viana do Castelo, Melgaço, Castro Laboreiro e Lamas de Mouro (Parque Nacional da Peneda-Gerês), 41°59'39.4"N, 8°10'03.7"W, 805m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [21] Viana do Castelo, Viana do Castelo, Vila Nova de Anha, 41°40'08.9"N, 8°49'25.7"W, 10m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [22a] Vila Real, Mondim de Basto, Bilhó, 41°25'15.5"N, 7°51'53.6"W, 610m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [22b] Vila Real, Mondim de Basto, Ermelo e Pardelhas (Varzigueto, Parque Natural do Alvão), 41°22'44.0"N, 7°51'14.4"W, 750m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [22c] Vila Real, Mondim de Basto, Ermelo e Pardelhas (Fisgas de Ermelo, Parque Natural do Alvão), 41°22'48.9"N, 7°52'38.6"W, 525m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [22d] Vila Real, Montalegre, Paradela, Contim e Fiães, 41°47'51.1"N, 7°52'33.2"W, 905m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [22e] Vila Real, Vila Real, Borbela e Lamas de Olo (Parque Natural do Alvão), 41°22'27.6"N, 7°48'23.7"W, 975m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).
- [23a] Viseu, Moimenta da Beira, Leomil, 41°00'16.1"N, 7°40'13.4"W, 830m a.s.l., Pan traps, R. Andrade leg., M. Černý det. (CMCH).
- [23b] Viseu, Tabuaço, Granja do Tedo, 41°03'50.9"N, 7°36'53.0"W, 344m a.s.l., sweeping vegetation, R. Andrade leg., M. Černý det. (CMCH).

Results

List of species

SUBFAMILY AGROMYZINAE

Agromyza abiens Zetterstedt, 1848 (Fig. 1)

Material examined: Portugal: [8j] 1♀, 21.vi.2015; [17d] 1♂, 9.iv.2012.

Distribution: Widespread in the Holarctic Region. In Europe known from the following countries: Andorra (Černý 2007a), Austria, Bulgaria (Beiger 1979), Czech Republic, Denmark, Finland, France, Germany, Great Britain, Greece incl. Crete (Černý 2011a), Hungary, Lithuania, Ireland, Italy incl. Sicily (Černý 2006), Maltese Islands, Montenegro (Spasić 1996), Netherlands, Norway, Poland, Portugal (Černý & Merz 2006), Romania, Russia (Nartshuk & von Tschirnhaus 2017), Slovakia, Spain, Sweden, Switzerland and Ukraine (Guglya 2016). Also known from Azerbaijan, Cyprus, Japan, Morocco, Turkey and Turkmenistan (Çıkman & Civelek 2005, Černý & Vála, 2006, Nartshuk & von Tschirnhaus 2017),

Biology: The larva forms leaf mine on host plants *Anchusa*, *Asperugo*, *Cerinthe*, *Cynoglossum*, *Echium*, *Lappula*, *Lycopsis*, *Myosotis*, *Nonea*, *Omphalodes*, *Podonosma*, *Pulmonaria* and *Symphytum*.

Agromyza albipennis Meigen, 1830

Material examined: Portugal: [5b] 1♂, 9.iii.2017; [10] 1♂, 10.vii.2013.

Distribution: Widespread in the Holarctic Region. In Europe known from the following countries: Austria, Belarus, Belgium, Czech Republic, Denmark, Estonia, Finland, France incl. Corsica, Germany, Great Britain, Greece (Černý 2011a), Hungary, Latvia, Lithuania, Ireland, Italy, Montenegro (Spasić 1996), Netherlands, Norway, Poland, Russia (Nartshuk & von Tschirnhaus 2017), Slovakia, Spain, Sweden, Switzerland and Ukraine (Guglya 2012). Also known from China, Iraq, Japan, Kamchatka, Kazakhstan, Mongolia, South Korea, Tajikistan, Turkey, Yakutia, Canada and United States (Nartshuk & Bagachanova 2010, Nartshuk & von Tschirnhaus 2017, Spencer 1981, Suh & Kwon 1998). First record from Portugal.



Figs 1–2: Agromyzidae species. 1 – *Agromyza abiens* Zetterstedt, male, laterally; 2 – *Agromyza nana* Meigen, female, laterally. Photo by R. Andrade.

Biology: The larva forms an upper surface leaf mine on host plants *Agrostis stolonifera*, *Arrhenatherum elatius*, *Brachypodium sylvaticum*, *Bromus*, *Calamagrostis arundinacea*, *Dactylis*, *Deschampsia cespitosa*, *Festuca*, *Glyceria*, *Hordeum murinum*, *H. vulgare*, *Milium*, *Phalaris arundinacea*, *Phleum pratense*, *Poa trivialis*, *Secale cereale*, *Setaria viridis* and *Triticum*.

***Agromyza conjuncta* Spencer, 1966**

Material examined: Portugal: [9a] 2♂ 4♀, 12.iv.2014; [10] 1♂, 10.vii.2013; [16] 1♀, 14.iii.2015.

Distribution: This European species is recorded from Belgium, Czech Republic, France, Germany, Great Britain, Greece incl. Crete, Hungary (Papp & Černý 2015), Italy incl. Sicily, Poland, Serbia (Spasić 1991), Slovakia, Spain and Sweden (Zlobin 2005). First record from Portugal.

Biology: Host and early stages unknown.

***Agromyza hiemalis* Becker, 1908**

Material examined: Portugal: [17d] 1♀, 26.i.2015; [17i] 1♂, 29.iii.2014.

Distribution: Species firstly described from Canary Islands – Tenerife, is known mainly from the Mediterranean, hitherto recorded from France, Greece, Italy incl. Sicily (Süss 1999), Spain incl. Balearic and Canary Islands (Gil-Ortiz *et al.* 2011), Maltese Islands, Morocco, Israel and Turkey. First record from Portugal.

Biology: Host plants are *Urtica membranacea* and *U. urens*.

***Agromyza idaeiana* Hardy, 1853**

Material examined: Portugal: [18] 1♂, 29.iii.2011.

Distribution: Widespread species in Europe known from Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Hungary, Ireland, Latvia (Karpa 2008), Lithuania, Montenegro (Spasić 1996), Netherlands, Norway, Poland, Romania, Russia, Sardinia, Slovakia, Spain, Sweden, Switzerland (Černý & Merz 2006). Also known from China, Turkey (Civelek *et al.* 2007), Kuril Islands (Iwasaki 2000), Uzbekistan, Japan, Canada and United States. First record from Portugal.

Biology: The larva forms a linear mine which later widens to a conspicuous blotch on host plants *Acaena*, *Agrimonia*, *Alchemilla*, *Artemisia*, *Filipendula*, *Fragaria*, *Geum*, *Potentilla*, *Ribes*, *Rosa*, *Rubus*, *Sanguisorba* and *Sibbaldia*.

***Agromyza luteifrons* Strobl, 1906**

Material examined: Portugal: [6g] 2♂, 16.xi.2014.

Distribution: European species recorded from southern France, Hungary, Sicily, Slovenia, Spain incl. Canary Islands. First record from Portugal.

Biology: The larva forms leaf mine on host plant *Spartium junceum*.

***Agromyza mobilis* Meigen, 1830**

Material examined: Portugal: [5a] 1♂, 29.iii.2012; [5b] 1♂, 7.v.2017; [7b] 1♂, 17.iv.2015; [7e] 1♂, 2.vi.2015.

Distribution: Palaearctic species known in Europe from Andorra, Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal (Černý 2013), Russia (Nartshuk & von Tscharnhaus 2017), Slovakia, Spain, Sweden, Switzerland, Ukraine (Guglyá 2011) and former Yugoslavia. Also known from China, Japan and Turkey (Dursun *et al.* 2015).

Biology: The larva form leaf mine on *Agropyron*, *Brachypodium*, *Bromus*, *Echinochloa*, *Holcus*, *Hordeum*, *Secale* and *Triticum*.

Agromyza nana Meigen, 1830 (Fig. 2)

Material examined: Portugal: [5a] 1♀, 25.ii.2011, 1♂, 13.iii.2016; [5b] 1♀, 9.iii.2017, 1♂, 7.v.2017; [6a] 1♀, 15.iii.2015; [6b] 3♂, 15.xi.2014; [6c] 1♂, 15.xi.2014; [6f] 1♂, 15.xi.2014; [6g] 4♂, 16.xi.2014; [8e] 1♂, 10.v.2015; [9a] 1♂, 13.iv.2014; [13c] 1♂, 16–17.vii.2009; [17d] 1♂, 26.xi.2010.

Distribution: Generally common in the Palaearctic region including North Africa and eastern Siberia, also recorded in northern India. Spencer (1954) recorded it from mines on *Trifolium* sp. near the Parque Florestal, 10 miles west of Lisbon. Hitherto no adult specimens have been collected in Portugal. First record from Portugal.

Biology: The larva form leaf mine on *Anthyllis*, *Medicago*, *Melilotus*, *Onobrychis*, *Oxalis*, *Trifolium*, *Trigonella* and *Vicia*.

Agromyza nigrociliata Hendel, 1931

Material examined: Portugal: [7e] 1♂, 2.vi.2015.

Distribution: This Palaearctic species is known in Europe from Austria, Belarus, Czech Republic, Denmark, Estonia, Faroe Isl., Finland (Kahanpää 2014), France, Germany, Great Britain, Hungary, Italy (Černý 2006), Lithuania, Poland, Russia (Černý & Merz 2006), Slovakia, Spain, Sweden (Zlobin 2005), Switzerland, Kuril Islands (Iwasaki 2000) and Yakutia (Nartshuk & Bagachanova 2010). First record from Portugal.

Biology: The larva forming upper surface greenish leaf mine on host plants *Apera spica-venti*, *Arrhenatherum elatius*, *Avena*, *Avenula vesicolor*, *Dactylis glomerata*, *Elymus repens*, *E. caninus*, *Hordeum murinum*, *Phalaris arundinacea*, *Secale cereale* and *Triticum aestivum*.

Agromyza pseudoreptans Nowakowski, 1967

Material examined: Portugal: [17g] 1♂, 30.x.2016.

Distribution: Holarctic species known in Europe from Austria, Belgium, Canary Islands, Czech Republic, Denmark, Estonia, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal (Černý 2009), Russia, Slovakia, Sweden, Switzerland and Ukraine (Guglya 2016). Also known from Georgia, Kazakhstan, North Korea, Uzbekistan (Černý 2007b, Černý & Merz 2006, Nartshuk & von Tschirnhaus 2017), in North America known from Canada and United States.

Biology: The larva form leaf mine on *Humulus*, *Laportea*, *Loasa*, *Parietaria* and *Urtica*.

Agromyza rondensis Strobl, 1900

Material examined: Portugal: [14d] 6♂2♀, 1.xi.2013.

Distribution: Palaearctic species in Europe known from Austria, Belgium, Czech Republic, Estonia, France, Germany, Great Britain, Greece incl. Crete, Croatia, Hungary, Italy incl. Sicily, Lithuania, Norway, Poland, Romania, Russia (Nartshuk & von Tschirnhaus 2017), Slovakia, Spain incl. Balearic and Canary Islands, Sweden, Switzerland (Černý 2005), Ukraine (Guglya 2011) and former Yugoslavia. Also recorded from Cyprus (Černý & Vála 2006), Egypt (Černý & Merz 2006), Iran, Israel, Saudi Arabia (Deeming 2006), South Korea, Tunisia, Turkey, Yakutia (Narthusk & Bagachanova 2010). First record from Portugal.

Biology: The larva form leaf mine on *Arrhenatherum*, *Avena*, *Brachypodium*, *Bromus*, *Calamagrostis*, *Dactylis*, *Hordeum*, *Oryzopsis*, *Poa*, *Secale*, *Sorghum* and *Triticum*.

Agromyza spenceri Griffiths, 1963

Material examined: Portugal: [12c] 1♂, 2.x.2016.

Distribution: West Palaearctic species, recorded in Europe from Bulgaria (Beiger 1979), Czech Republic, France, Hungary (Papp & Černý 2015), Italy (Černý 2006), Maltese Islands (Černý 2005a), Lithuania, Poland, Spain and known from Morocco (Černý & Merz 2006), Turkey (Černý 2013) and Uzbekistan (Černý & Merz 2006). First record from Portugal.

Biology: This is one of the species which develops in leaves of reed (*Phragmites australis*). Its mines are not differentiated from those of its congeners.

***Hexomyza cecidogena* (Hering, 1927)**

Material examined: Portugal: [9a] 1♂, 13.iv.2014.

Distribution: Palaearctic species known in Europe from Austria, Belgium, Czech Republic, Denmark, France, Germany, Hungary (Papp & Černý 2015) Italy, Lithuania, Slovakia and also recorded from China. First record from Portugal.

Biology: The larva forms a small, cylindrical twig-gall on *Salix aurita* and *S. repens*.

***Hexomyza sarothamni* (Hendel, 1923)**

Material examined: Portugal: [8c] 1♂, 16.v.2015.

Distribution: West Palaearctic species in Europe known from Austria, Czech Republic, France, Germany, Great Britain, Greece, Hungary (Papp & Černý 2015), Netherlands, Portugal (Černý & Merz 2006), Sicily, Spain, but also recorded from Cyprus and Israel. M. v. Tschirnhaus collected it also on the island of Rhodes (Greece), 4.6km SW Laerma, 36°07'58"N, 27°53'35"E, 1♂ 1♀, 1.iv.1997).

Biology: The larva forms oval stem galls on *Cytisus scoparius*.

***Melanagromyza aenea* (Meigen, 1830)**

Material examined: Portugal: [8i] 1♂, 16.vi.2015.

Distribution: Widespread species in Europe, recorded from Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece (Černý 2011a), Hungary, Italy, Latvia (Karpa 2008), Poland, Slovakia, Spain, Sweden, Switzerland and Ukraine (Guglyá 2011). First record from Portugal.

Biology: The larvae bore in stems of *Urtica* spp., only a single generation.

***Melanagromyza aeneoventris* (Fallén, 1823)**

Material examined: Portugal: [5b] 1♀, 31.v.2017.

Distribution: Species known from Palaearctic region and it has been found also in Taiwan (Sasakawa 2008). In Europe recorded from Austria, Belgium, Bulgaria (Černý & Merz 2006), Czech Republic, Dalmatia (Spasić & Spencer 1992), Denmark, Estonia, Finland, France, Germany, Great Britain, Greece (Černý 2011a), Hungary, Ireland, Italy, Lithuania, Netherlands, Poland, Slovakia, Spain, Sweden, Switzerland, Ukraine (Guglyá 2011) and former Yugoslavia. Also known from Iran (Ranji *et al.* 2015), Turkey (Çıkman & Sasakawa 2006), Pakistan, Asian Russia and Japan. First record from Portugal.

Biology: The larva is oligophagous, feeding as an internal stem-borer on *Cirsium arvense*, *C. palustre*, *C. vulgare*, more rarely recorded on *Carduus acanthoides*, *C. crispus*, *Inula* sp. and *Senecio jacobaea*.

***Melanagromyza cunctans* (Meigen, 1830)**

Material examined: Portugal: [5b] 2♂, 1.x.2017; [13e] 1♀, 28.vii.2014.

Distribution: A species known from the Palaearctic, Afrotropical and Oriental Regions. Indeed, it is widespread throughout Europe, hitherto recorded from Albania, Andorra, Austria, Belgium, Bulgaria, Croatia, Czech Republic, Dalmatia, Denmark, France incl. Corsica, Germany, Great Britain, Greece incl. Crete, Hungary, Italy incl. Sicily, Lithuania, Maltese Islands, Netherlands, Poland, Romania, Slovakia, Spain, Sweden, Switzerland, Ukraine and former Yugoslavia. First record from Portugal.

Biology: Host plants are *Lotus corniculatus*, *L. ornithopodioides* and *L. rectus*. The larva feeds in the upper part of the stem, forms a slender, cylindrical gall immediately below inflorescence.

***Melanagromyza pubescens* Hendel, 1923**

Material examined: Portugal: [9a] 1♀, 12.iv.2014; [10] 1♂, 10.vii.2013; [12c] 1♂, 2.x.2016.

Distribution: A Palaearctic species in Europe known from Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, Germany, Great Britain, Greece (Černý 2011a), Hungary, Italy, Lithuania, Poland, Romania, Russia, Spain (Černý & Merz 2007), Sweden and Ukraine (Guglya 2011), as well as from China, Japan, Mongolia, Nepal, North Korea, Kuril Islands, Asian Russia and Turkey. First record from Portugal.

Biology: The larva feeds in the lower part of *Artemisia vulgaris*.

***Melanagromyza siciliensis* Spencer, 1966**

Material examined: Portugal: [6a] 1♂, 4.iv.2015.

Distribution: West Palaearctic species described from Sicily and later recorded from Czech Republic, Israel, Slovakia and Spain (Papp & Černý 2015). First record for Portugal.

Biology: Host and early stages unknown.

***Ophiomyia alliariae* Hering, 1954**

Material examined: Portugal: [7b] 1♂, 16.iv.2015.

Distribution: European species described from Germany and recorded from Andorra, Austria, Czech Republic, France, Great Britain, Greece, Hungary, Italy incl. Sardinia, Latvia, Lithuania, Maltese Islands, Slovakia, Spain and Ukraine (Guglya 2012). First record from Portugal.

Biology: The larva forms external stem mine on host plants *Alliaria officinalis*, *Bertorea*, *Brassica napus*, *Capsella bursa-pastoris*, *Cardamine bulbifera*, *Erysimum cheiranthoides*, *Raphanus raphanistrum*, *R. sativum*, *Sinapis alba*, *S. arvensis*, *Sisymbrium altissimum* and *S. officinale*.

***Ophiomyia beckeri* (Hendel, 1923)**

Material examined: Portugal: [7d] 1♀, 16.vi.2017.

Distribution: Palaearctic species in Europe known from Albania (Černý & Merz 2006), Andorra (Černý 2007a), Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Greece incl. Crete, Ireland, Lithuania, Hungary (Papp & Černý 2015), Maltese Islands, Poland, Portugal incl. Madeira (Černý & Merz 2006), Sicily, Slovakia, Spain incl. Balearic and Canary Islands, Sweden (Zlobin 2005), Switzerland (Černý & Merz 2005), Ukraine (Guglya 2011). Also recorded from Egypt, Israel, Iran, Morocco, Oman, Saudi Arabia, South Africa, Tanzania, Tunisia, Turkey, Yemen, Zimbabwe and India (Çıkman & Sasakawa 2005, Černý & von Tschirnhaus 2014, Deeming 2006, Ranji *et al.* 2015).

Biology: Host plants are *Coreopsis*, *Crepis*, *Hypochoeris*, *Launaea*, *Leontodon*, *Picris*, *Sonchus* and *Taraxacum*.

***Ophiomyia curvipalpis* (Zetterstedt, 1848)**

Material examined: Portugal: [7b] 1♂, 12.x.2012; [7d] 1♂, 16.vi.2017; [12d] 1♂, 4–5.vi.1997; [13j] 1♂3♀, 30.vii.2014.

Distribution: Palaearctic species widespread in Europe and also recorded from Cyprus, Egypt, Iran (Ranji *et al.* 2015), Israel, Japan, Morocco and Turkey. In Europe known from the following countries: Andorra (Černý 2007a), Austria, Belgium, Bulgaria (Černý & Merz 2006), Czech Republic, Estonia, France, Germany, Great Britain, Greece (Černý & Merz 2006), Hungary, Italy incl. Sardinia and Sicily (Černý 2006), Lithuania, Macedonia, Maltese Islands (Černý 2005a), Poland, Romania (Černý & Merz 2006), Russia, Slovakia, Spain, Sweden, Switzerland, former Yugoslavia and Ukraine (Guglya 2011). First record from Portugal.

Biology: The larva forms narrow stem mine on *Achillea millefolium*, *A. ptarmica*, *Anthemis tinctoria*, *Artemisia absinthium*, *A. campestris*, *A. vulgaris*, *Centaurea cyanus*, *C. stoebe*, *Matricaria inodora*, *Medicago sativa* and *Tanacetum vulgare*.

Ophiomyia galii Hering, 1937

Material examined: Portugal: [12c] 1♂, 2.x.2016.

Distribution: Palaearctic species described from Germany and known from Andorra (Černý 2007a), Bulgaria (Černý & Merz 2006), Czech Republic, France incl. Corsica, Greece (Černý 2011), Hungary (Papp & Černý 2015), Italy (Černý 2006), Lithuania, Poland, Slovakia, Spain, Sweden (Černý & Merz 2006), Switzerland (Černý 2005b), recorded also from Turkey (Černý & Merz 2007) and North Korea (Černý 2007b). First record from Portugal.

Biology: The larva forms an external stem mine, with frass in large, widely-spaced grains on *Asperula*, *Galium mollugo* and *G. verum*.

Ophiomyia heringi Starý, 1930

Material examined: Portugal: [7b] 1♂, 17.iv.2015.

Distribution: European species described from Czech Republic and known from Austria, Finland, France, Germany, Great Britain, Hungary, Italy (Süss 1999), Latvia (Karpa 2008), Lithuania, Poland, Slovakia, Sweden and Switzerland (Černý & Merz 2007). First record from Portugal.

Biology: The larva forms an external stem mine with frass in two rows of disconnected strips on host plants *Campanula patella*, *C. persicifolia*, *Crepis paludosa*, *Hieracium sylvaticum*, *Hypochaeris radicata*, *Jasione montana*, *Lapsana communis*, *Leontodon autumnalis*, *L. hispidus*, *Matricaria*, *Mycelis muralis*, *Phyteuma*, *Prenanthes*, *Reichardia*, *Scorzonera humilis*, *Sonchus* and *Tragopogon*.

Ophiomyia labiatarum Hering, 1937

Material examined: Portugal: [5a] 1♂1♀, 29.iii.2012; [7b] 1♂, 27.viii.2014; [7e] 1♂, 2.vi.2015; [8i] 1♂, 16.vi.2015.

Distribution: Holarctic species, described from Germany, in Europe recorded from Andorra (Černý 2007a), Austria, Belgium, Bulgaria, Croatia (Černý 2009), Czech Republic, Finland, France, Germany, Great Britain, Greece (Černý 2011a), Hungary, Latvia (Karpa 2008), Lithuania, Norway, Slovakia, Spain (Gil-Ortiz *et al* 2010a), Sweden (Černý & Merz 2006), Switzerland (Černý 2009), Ukraine (Guglya 2016). Also recorded from Cyprus (Černý 2013), Israel and Turkey (Černý & Merz 2016), in North America recorded from Canada and United States. First record from Portugal.

Biology: The larva forms an external stem mine on *Clinopodium vulgare*, *Galeopsis*, *Lamium album*, *L. galeobdolon*, *L. maculatum*, *Leonurus*, *Nepeta*, *Prunella*, *Salvia*, *Satureja*, *Scutellaria galericulata*, *Stachys officinalis*, *S. palustris*, *S. recta* and *S. sylvatica*.

Ophiomyia melandryi de Meijere, 1924

Material examined: Portugal: [7a] 1♂, 21.v.–4.vi.2012; [7e] 1♂, 2.vi.2015; [8c] 1♂, 16.v.2015.

Distribution: Palaearctic species in Europe known from Andorra, Austria, Czech Republic, France, Germany, Great Britain, Greece, Italy, Lithuania, Netherlands, Poland, Slovakia, Sweden, Switzerland, Ukraine (Guglya 2011) and also recorded from Cyprus and Japan. First record from Portugal.

Biology: The larva forms a shallow mine inside the hollow stem on *Lychnis* and *Silene*.

Ophiomyia moravica Černý, 1994

Material examined: Portugal: [17d] 1♂, 27.viii.2011.

Distribution: This species described from Czech Republic and hitherto only recorded from Hungary (Papp & Černý 2015), Slovakia, Switzerland and Ukraine (Guglya 2016). First record from Portugal.

Biology: Host and early stages unknown.

Ophiomyia orbiculata (Hendel, 1931)

Material examined: Portugal: [6f] 1♂, 16.xi.2014; [7b] 1♂1♀, 17.iv.2015; [10] 3♀, 10.vii.2013.

Distribution: Palaearctic species widespread in Europe known from Austria, Belarus, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Italy incl. Sicily, Latvia, Lithuania, Norway, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Ukraine, former Yugoslavia, and also recorded from Cyprus, Iran, Turkey and Uzbekistan (Papp & Černý 2015, Ranji *et al.* 2015).

Biology: Host plants are *Lathyrus*, *Pisum* and probably *Vicia*.

Ophiomyia pulicaria (Meigen, 1830)

Material examined: Portugal: [10] 1♀, 10.vii.2013.

Distribution: Palaearctic and Afrotropical species in Europe known from Andorra, Austria, Belarus, Belgium, Bulgaria, Croatia, Czech Republic, Dalmatia, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Italy, Latvia, Lithuania, Netherlands, Norway, Portugal, Russia, Slovakia, Spain incl. Canary Islands, Sweden, Switzerland, Ukraine, former Yugoslavia and also recorded from China, Turkey, Japan and Kenya (Černý & von Tscharnhaus 2014, Papp & Černý 2015).

Biology: The larva forms leaf mine on *Andryala*, *Chondrilla*, *Crepis*, *Hieracium*, *Hypochoeris*, *Lapsana*, *Leontodon*, *Picris*, *Reichardia*, *Sonchus* and *Taraxacum*.

Ophiomyia vimperi Černý, 1994

Material examined: Portugal: [7b] 1♂, 12.x.2012, 1♂, 17.iv.2015.

Distribution: West Palaearctic species, described from Czech Republic and Slovakia, also recorded from Andorra (Černý 2007a), France, Greece, Hungary (Papp & Černý 2015), Italy, Morocco, Spain, Switzerland and Ukraine (Guglya 2011). First record from Portugal.

Biology: Host and early stages unknown.

SUBFAMILY PHYTOMYZINAE

Amauromyza (Cephalomyza) flavifrons (Meigen, 1830)

Material examined: Portugal: [7i] 1♂, 16.viii.2013.

Distribution: It is a Holarctic species, widespread in Europe known from Albania, Belgium, Czech Republic, Denmark, Finland, France incl. Corsica, Germany, Great Britain, Hungary, Italy, Lithuania, Montenegro (Spasić 1996), Netherlands, Norway, Poland, Romania, Spain, Sweden and Switzerland, also recorded from Kyrgyzstan, North Korea (Černý 2007b) and Turkey. From North America recorded in Canada and United States (Boucher 2012). First record from Portugal.

Biology: It is a polyphagous miner, the larva forms a white blotch mine on many genera of Amaranthaceae and Caryophyllaceae, namely on *Agrostemma*, *Beta*, *Cerastium*, *Dianthus*, *Gypsophila*, *Moehringia*, *Saponaria*, *Silene*, *Spinacia*, *Stellaria* and *Vaccaria* (Benavent-Corai *et al.* 2005, Spencer 1990).

Amauromyza (Cephalomyza) luteiceps (Hendel, 1920)

Material examined: Portugal: [10] 3♂, 10.vii.2013; [21] 1♀, 28.viii.2010.

Distribution: It is an uncommon Holarctic species, in Europe known from the following countries: Czech Republic, Great Britain, Greece (Černý & Merz 2006), Denmark, Finland, France, Germany, Hungary (Papp & Černý 2016), Lithuania (Ostrauskas *et al.* 2005), Maltese Islands (Černý 2005b), Netherlands, Norway, Poland, Spain (Černý & Merz 2006) and Sweden, also known from Iran (Ranji *et al.* 2015) and Turkey. Later recorded in North America from Eastern Canada (Boucher 2012). First record from Portugal.

Biology: The larvae develop as stem borer in *Atriplex* (von Tscharnhaus 1981; Spencer 1990).

Aulagromyza discrepans (van der Wulp, 1871)

Material examined: Portugal: [6c] 1♂2♀, 15.xi.2014.

Distribution: European species known from Belgium, Czech Republic, Finland (Thuneberg 1960), France, Germany, Great Britain, Greece incl. Crete (Černý 2011a) and Kos (von Tschirnhaus 1994), Hungary (Papp 2004), Netherlands, Poland, Portugal (Černý 2009), Slovakia, Spain incl. Balearic Islands and Switzerland (Černý & Merz 2007).

Biology: Flies emerged from puparia obtained together with *Aulagromyza orphana* from stems of *Galium aparine*, the belonging larva was described and figured by Dempewolf (2001). A record of reared flies from *Artemisia vulgaris* by Bland (1983) was corrected by von Tschirnhaus (1992: 520).

Aulagromyza orphana (Hendel, 1920)

Material examined: Portugal: [5c] 1♂1♀, 22.iii.2011; [8b] 1♀, 10.v.2015.

Distribution: West Palaearctic species recorded from Andorra (Černý 2007a), Austria, Belgium, Bulgaria (Černý & Merz 2006), Czech Republic, Denmark, France, Germany, Great Britain, Greece (Černý & Merz 2006), Hungary, Ireland, Netherlands, Poland, Slovakia, Spain, Sweden (Zlobin 2005) and Switzerland (Černý 2005b), it has been reported also from Turkey. First record from Portugal.

Biology: The larva forming an external stem mine on *Galium aparine* and *G. palustre*.

Cerodontha (Butomomyza) angulata (Loew, 1869)

Material examined: Portugal: [17d] 1♂, 26.iv.2016.

Distribution: A Holarctic species widespread and locally common over the better part of Europe. Recorded from Andorra (Černý 2007a), Austria, Belgium, Czech Republic, Denmark, Estonia, France, Great Britain, Germany, Greece (Černý 2011a), Hungary, Ireland, Italy, Latvia (Karpa 2008), Lithuania, Netherlands, Norway, Poland, Romania, Slovakia, Sweden, Switzerland (Černý 2005b). Also recorded in Israel (Černý 2011b), Japan, Turkey, North and South Korea (Černý 2007b), Kuril Islands and Yakutia, Canada, United States and Guiana (Spencer 1990). First record from Portugal.

Biology: The larva forms a long greenish mine in its host plants *Carex* spp. and rarely *Scirpus sylvaticus*.

Cerodontha (Butomomyza) mellita Spencer, 1971

Material examined: Portugal: [8c] 5♂, 16.v.2015.

Distribution: A rare European species recorded from Belgium, Czech Republic (Černý & Heřman 2015), Great Britain, Poland and Slovakia (Vála & Černý 2009). First record from Portugal.

Biology: The larva mines on the middle part of leaf in host plants of *Carex* spp.

Cerodontha (Cerodontha) ? bistrigata Frey, 1945

Material examined: Azores: [1s] 1♂1♀, 9.iv.1994.

Note. Between and above the coastal black lava rocks and within permanent salt influence these predominantly yellow specimens have been captured on scattered tussocks of the endemic coastal grass “Bracel-da-rocha, Bracéu”, *Festuca petraea* Guthn. ex Seub. The only other plants on the rocky shore, interrupted by black sand below a steep lava cliff belonged to the genus *Limonium* (Plumbaginaceae) which is not yet known to be host genus of any world agromyzid and not being a monocot to which all *Cerodontha* hosts belong worldwide. The natural colouration of these specimens was protocolled short time after collecting and does not fit exactly to the description of Frey (1945), the phallus is very similar to the figure of Spencer (1965b). In the São Miguel material, the slightly elongate third antennal segment with a long

pubescence is only light brown on its outer side, arista black with first two segments yellow, the long black phallapodeme is reaching back until the mid of the first tergite, the ejaculatory apodeme is hyaline, the tips of the male cerci are blackish, the slender oviscape is laterally compressed at its end and bicoloured, black dorsally, reddish ventrally, all bristles and hairs of the fly are black. For a final determination it is necessary to compare the type series of *C. bistrigata* which was collected on other islands of the archipel. May be that this endemic species already developed slight differences on the nine volcanic islands with different geological age.

***Cerodontha (Cerodontha) denticornis* (Panzer, 1806)**

Material examined: Azores: [1a] 4♀, 28.iii.1994; [1b] 5♂9♀, 29.iii.1994; [1c] 2♂1♀, 30.iii.–9.iv.1994; [1d] 2♂1♀, 1.iv.1994; [1e] 1♀, 1.iv.1994; [1f] 3♂, 1.iv.1994; [1g] 8♂9♀, 2.iv.1994; [1i] 1♀, 3.iv.1994; [1n] 6♂7♀, 4–5.iv.1994; [1o] 1♂2♀, 7.iv.1994; [1p] 3♂6♀, 8.iv.1994; [1r] 1♀, 8.iv.1994; [1t] 1♂9♀, 9.iv.1994. Madeira: [2c] 1♂3♀, 27.vii.1970; [2f] 4♂2♀, 2.vi. 1987; [2g] 5♂4♀, 6.vi.1987; [2i] 4♂5♀, 30.vii.1970; [2j] 2♂2♀, 1.vi.1987; [2l] 2♂3♀, 31.vii.1970; [2m] 8♂4♀, 26.vii.1970; [2n] 1♀, 8.vi.1987; [2o] 1♂1♀, 30.v.1987; [2p] 1♀, 30.v.1987. Madeira, Porto Santo Island: [3a] 10♂3♀, 9.vi.1987. Portugal: [5b] 1♀, 31.v.2017; [5c] 1♂, 11.iv.2010, 1♂, 29.v.2010, 1♂, 3.vi.2013; [7b] 1♂, 16.iv.2015, 2♂, 17.iv.2015, 1♂, 2.vi.2015, 1♀, 28.iv.2017; [7d] 1♂1♀, 16.vi.2017; [8c] 1♂, 16.v.2015; [13a] 2♂3♀, 12.vi.1997; [13h] 1♂, 23.v.2008; [13i] 1♂, 29.vi.2013; [17j] 2♀, 22.ix.2009; [22e] 1♂, 30.iv.2017.

Distribution: In Europe known from Albania, Andorra, Austria, Belgium, Bulgaria, Czech Republic, Dalmatia, Denmark, Estonia, Finland, France incl. Corsica, Germany, Great Britain, Greece, Hungary, Ireland, Italy incl. Sicily, Latvia, Lithuania, Maltese Islands, Montenegro, Netherlands, Norway, Poland, Portugal incl. Azores and Madeira, Romania, Slovakia, Spain incl. Canary Islands, Sweden, Switzerland and Ukraine, also known from North Africa, Central and East Asia.

Biology: Host plants are *Agropyron*, *Alopecurus*, *Avena*, *Calamagrostis*, *Dactylis*, *Festuca*, *Holcus*, *Hordeum*, *Phalaris*, *Phleum*, *Poa* and *Triticum*.

***Cerodontha (Cerodontha) fulvipes* (Meigen, 1830)**

Material examined: Portugal: [5a] 1♂, 12.viii.2010; [5b] 1♂, 7.v.2017, 2♂2♀, 31.v.2017; [17i] 1♂, 1.vii.2011; [17d] 2♂, 31.v.2012.

Distribution: Palaearctic species widespread in Europe recorded from Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece (Černý 2011a), Hungary, Ireland, Italy, Latvia, Lithuania, Montenegro (Spasić 1996), Netherlands, Norway (Andersen 2012), Poland, Romania, Russia (Zlobin 1979b), Slovakia, Spain, Sweden, Ukraine, and also recorded from China, Japan, Tajikistan, Turkey and Yakutia (Nartshuk & Bagachanova 2010). First record from Portugal.

Biology: The larva forms leaf mine in *Poa trivialis* but probably feeding on other grasses (Nowakowski 1973), too.

***Cerodontha (Cerodontha) phragmitophila* Hering, 1935 (Fig. 3)**

Material examined: Portugal: [12a] 1♀, 12.vii.2014; [14c] 2♂1♀, 15.ix.2012; [15b] 1♀, 21.viii.2013, 1♂2♀, 18.ix.2013; [17b] 1♂2♀, 14.viii.2013; [17g] 1♂, 29.vii.2016.

Distribution: A Palaearctic species known in Europe and recorded from Belgium, Bulgaria, Croatia, Czech Republic, France incl. Corsica, Great Britain (Gibbs 2006), Greece (Černý 2011a), Hungary, Italy, Poland, Spain incl. Canary Islands and former Yugoslavia, also recorded from Cyprus, Egypt, Israel, Kazakhstan, Pakistan and Uzbekistan. The potential for long dispersion and the attractivity of isolated host plants could be stated in an only 100m² small reed bed of *Phragmites australis* around a leaky water pipeline within the endless Egyptian Sahara desert, 55km SSW Bawiti and 213km W of the Nile valley, 27°54'N, 28°34'E, 16.iii.1992, R. Mannesmann leg., M. von Tschirnhaus det.). First record from Portugal.

Biology: The larva mines in the leaf sheath of *Arundo donax* L. and *Phragmites australis*.

Cerodontha (Cerodontha) vandalitiensis Spencer, 1965

Material examined: Portugal: [9a] 1♂, 12.iv.2014, 1♂, 13.iv.2014.

Distribution: A European species known from Czech Republic, France, Hungary (Papp & Černý 2016), Portugal (Černý 2009), Russia and Spain.

Biology: Host and early stages unknown.

Cerodontha (Dizygomyza) bimaculata (Meigen, 1830)

Material examined: Portugal: [8e] 1♂, 10.v.2015; [8g] 1♂, 30.v.2016.

Distribution: This Palaearctic species is widespread in Europe, known from Andorra (Černý 2007a), Austria, Belgium, Bosnia and Herzegovina, Czech Republic, Dalmatia, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece (Černý 2011a), Hungary, Italy, Latvia, Lithuania, Montenegro (Spasić 1996), Netherlands, Norway, Poland, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland (Černý 2005b), Ukraine, Vatican City, also recorded in Turkey (Civelek *et al.* 2009), Japan and the Kuril Islands. First record from Portugal.

Biology: The larva forms a narrow leaf mine in its host plants *Luzula campestris*, *L. multiflora*, *L. pilosa* and *L. sylvatica*.

Cerodontha (Dizygomyza) iraeos (Robineau-Desvoidy, 1851)

Material examined: Portugal: [5c] 1♂, 31.v.2010.

Distribution: This Palaearctic species is widespread in Europe and it has been recorded from Albania (Černý & Merz 2006), Austria, Belarus, Belgium, Czech Republic, Denmark, Estonia, Finland, France incl. Corsica, Germany, Great Britain, Hungary, Ireland, Italy, Latvia, Lithuania, Moldavia, Netherlands, Norway (Andersen & Jonassen 1994), Poland, Romania, Russia, Slovakia, Spain, Switzerland, also known from Japan (Sasakawa 2005) and South Korea. First record from Portugal.

Biology: The larva forms a short white leaf mine in its host plants *Iris pseudacorus* and *I. sibirica*.

Cerodontha (Dizygomyza) luctuosa (Meigen, 1830) (Fig. 4)

Material examined: Portugal: [5a] 1♂, 12.viii.2010, 1♂, 14.ix.2011, 1♂, 13.iii.2012, 1♂, 28.viii.2016; [5b] 1♂, 21.xi.2017; [9a] 1♂, 12.iv.2014, 1♂, 13.iv.2014; [17g] 1♂, 30.x.2016; [22d] 1♂, 23.ix.2016.

Distribution: Holarctic species known in Europe from Albania, Austria, Belgium, Belarus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy incl. Sicily, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Russia, Slovakia, Spain, Sweden, Switzerland and former Yugoslavia, but also recorded from Iraq, Israel, Tunisia, China, Japan and Uzbekistan. In North America recorded from Canada and United States incl. Alaska.

Biology: The larva form leaf mine on *Juncus effusus*.

Cerodontha (Dizygomyza) luzulae (Groschke, 1957)

Material examined: Portugal: [20] 1♂, 8.ix.2016.

Distribution: This European species was recorded from the Czech Republic, Germany, Great Britain, Greece (Černý 2011a), Hungary, Montenegro (Spasić 1996), Poland, Slovakia, Slovenia and Switzerland (Černý 2005b). First record from Portugal.

Biology: The larva forms leaf mine in its host plants *Luzula sylvatica* and *L. pilosa*.



Figs 3–4: Agromyzidae species. 3 – *Cerodontha (Cerodontha) phragmitophila* Hering, male, dorsolaterally; 4 – *Cerodontha (Dizygomyza) luctuosa* (Meigen), male, laterally. Photo by R. Andrade.

***Cerodontha (Dizygomyza) morosa* (Meigen, 1830)**

Material examined: Portugal: [22d] 1♂, 23.ix.2016.

Distribution: This Holarctic species is common in Europe: Andorra (Černý 2007a), Azores, Austria, Belarus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece (Černý 2011a), Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Madeira Islands, Netherlands, Norway, Poland, Russia, Slovakia, Spain incl. Canary Islands, Sweden, Switzerland, former Yugoslavia, and known to occur also in the East Palaearctic: China, Japan, North Korea (Černý 2007b), Yakutia (Nartshuk & Bagachanova 2010), and the Oriental region: India, Philippines. Also recorded from Canada and the United States. From Portugal hitherto only known from Azores and Madeira (Hendel 1931–36), this is first record from Portuguese mainland.

Biology: The larva forms a relatively short and broad leaf mine in its host plants *Carex* spp.

***Cerodontha (Dizygomyza) suturalis* (Hendel, 1931)**

Material examined: Madeira: [2e] 1♂, 1.viii.1959; [2i] 1♀, 30.vii.1970; [2k] 1♂1♀, 3.vi.1987; [2l] 1♂, 31.vii.1970.

Distribution: This Palaearctic species is widespread in Europe, known from Albania (Černý & Merz 2006), Austria, Belgium, Bulgaria, Czech Republic, Denmark, France (Černý & Merz 2006), Germany, Great Britain, Greece (Černý 2011a), Hungary, Latvia (Karpa 2008), Lithuania, Montenegro (Spasić 1996), Poland, Slovakia, Sweden (Zlobin 2005), Switzerland (Černý 2009) and also recorded from Cyprus (Černý & Vála 2006), Israel (Černý 2011b), China, Japan and Yakutia (Nartshuk & Bagachanova 2010). First record from Madeira.

Biology: The larva forms leaf mine in its host plant *Carex hirta*.

***Cerodontha (Icteromyza) capitata* (Zetterstedt, 1848) (Fig. 5)**

Material examined: Portugal: [5c] 1♂, 3.vi.2013; [17d] 1♂, 23.v.2013.

Distribution: It is a Holarctic species, known from nearly 20 European countries from Ireland and Great Britain to Hungary and Serbia and from Spain to Sweden. Known also from Morocco, Kyrgyzstan, Canada and the United States incl. Alaska. First record from Portugal.

Biology: Repeatedly speculations have been published about the host plant of this peculiarly large species, so often caught on stands of *Juncus effusus*. All searches for puparia in the seeds, stems and roots by M. von Tschirnhaus were unsuccessful also in localities where the flies were abundantly on the wing (von Tschirnhaus 1991: 295). Spencer (1976a) recorded this rush as host and the base of the stems as the larval substrate, but not based on any real observation. In his book 1990 he changed his mind and expressed the information of Nowakowski (1973: 34). Later authors took over this unconfirmed information (Benavent-Corai *et al.* 2005, Gil-Ortiz *et al.* 2011). But to date it was overlooked that already Fahringer (1937: 342–346) obtained *Microgaster globatus* (L.) var. *rufipes* Nees from “*Dizygomyza capitata*” and other hosts. But details on the rearing were not described. C. van Achterberg (Leiden) informed M. von Tschirnhaus that this braconid parasitoid was a misidentification of *Microgaster rufipes* Nees, 1834 (van Achterberg 2014: 207). Finally, parts of a letter of G.C.D. Griffiths (dated 3.ii.1992) to von Tschirnhaus should be cited here serving as the most informative observation: “The failure of so many workers to find the immature stages of this common species suggests that development may occur at an unusual time of the year, perhaps in winter or early spring. On 16.vii.1966 I collected two large empty *Cerodontha* puparia [at Woodwalton Fen] of presumably *capitata* from inside stem bases of *Juncus effusus* from which the flies had emerged”. Those puparia were sent by Griffiths to J.T. Nowakowski in Warsaw.

***Cerodontha (Icteromyza) geniculata* (Fallén, 1823) (Fig. 6)**

Material examined: Portugal: [5c] 1♂, 20.vii.2010; [17a] 1♂, 16.iii.2017.

Distribution: It is a widespread Palaearctic species (known also from North Africa) and it has some doubtful records also from the Oriental Region. In Europe known from the following countries: Austria, Belgium, Bulgaria, Czech Republic, Estonia, Finland, France, Germany, Great Britain, Greece (Černý 2011a), Hungary, Italy, Latvia (Karpa 2008), Netherlands, Poland, Romania, Russia, Slovakia, Spain, Sweden, Switzerland and Ukraine. First record from Portugal.

Biology: The larvae form linear mines in the leaves of *Eriophorum latifolium*.

***Cerodontha (Icteromyza) rozkosnyi* Černý, 2007**

Material examined: Portugal: [7e] 1♂, 15.vi.2013; [17e] 1♂1♀, 21.vii.2017.

Distribution: This species was described from the type series from the Czech Republic, Romania and Morocco. Rather recently, it has been confirmed from Greece (Černý 2011a), Israel (Černý 2011b) and Hungary (Papp & Černý 2016). First record from Portugal.

Biology: Host and early stages unknown.

***Cerodontha (Poemyza) melicae* Nowakowski, 1973**

Material examined: Madeira: [2m] 1♂2♀, 26.vii.1970.

Distribution: This European species has been known from the Czech Republic, Germany, Ireland, Poland and Slovakia. First record from Madeira.

Biology: The larva forms leaf mine in its host plants *Poa chaixii*, *Melica uniflora*, *M. nutans*, *Molinia caerulea* and *Calamagrostis arundinacea*.

***Cerodontha (Poemyza) muscina* (Meigen, 1830)**

Material examined: Portugal: [5c] 1♂, 20.vii.2010; [7e] 1♂, 17.vi.2017.

Distribution: This Holarctic species which is widely distributed in much of Europe also recorded in Russia (Yakutia), Canada, and the United States including Alaska. First record from Portugal.

Biology: The larva forms a long mine on the lower surface of the leaf in many genera of Poaceae, confirmed genera are *Bromus*, *Dactylis*, *Festuca*, *Hierochloe*, *Holcus*, *Lolium*, *Milium* and *Poa*.

***Cerodontha (Poemyza) pygmaea* (Meigen, 1830)**

Material examined: Madeira: [2j] 1♀, 1.vi.1987; [2k] 2♀, 3.vi.1987.

Distribution: A Holarctic species is widespread and frequently common over the greatest part of Europe, but recorded also from Iran, Japan, Turkey, Canada and the United States.

Biology: Leaf mines in a multitude of grass species, 20 genera are listed by Benavent-Corai *et al.* (2005).

***Cerodontha (Xenophytomyza) atronitens* (Hendel, 1920)**

Material examined: Portugal: [7e] 1♂, 2.vi.2015; [13a] 1♂, 12.vi.1997.

Distribution: European species known from Albania (Černý & Merz 2006), Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Hungary (Papp 2009), Ireland, Latvia (Karpa 2008), Lithuania, Netherlands, Norway, Portugal (Černý & Merz 2006), Russia, Slovakia, Spain, Sweden and Switzerland (Černý 2005b).

Biology: Larval development in the culm of *Poa nemoralis* (von Tschirnhaus 1991: 294) and possibly other grasses. *Xenophytomyza* is the only group of Agromyzidae tunneling in grass stems.

Chromatomyia aprilina (Goureau, 1851)

Material examined: Portugal: [17d] 1♂, 9.iv.2012.

Distribution: European species known from Austria (Franz 1989), France incl. Corsica, Germany, Great Britain, Italy, Norway, Poland, Portugal and Spain.

Biology: The larva forms leaf mine on *Lonicera*.

Chromatomyia farfarella (Hendel, 1935)

Material examined: Portugal: [4] 2♂1♀, 1–5.v.1971.

Distribution: This European species was described after a female holotype which was found near Bleder See (Slovenia), later recorded from Denmark, Faroe Islands, Ireland, Finland, France, Germany, Iceland, Latvia (Karpa 2008), Lithuania, Norway, Poland and Sweden. First record from Portugal.

Biology: The larva forms a narrow, whitish linear mine on *Taraxacum officinale* and *Leontodon autumnalis*.

Note. Details of the phallus, arista and morphometry were figured and compared with the two closely related global polyphagous pest species *C. horticola* (Goureau, 1851) and *C. syngenesiae* Hardy, 1849 by von Tschirnhaus (1969).

Chromatomyia horticola (Goureau, 1851)

Material examined: Azores: [1n] 1♀, 4–5.iv.1994; [1o] 4♂8♀, 7.iv.1994; [1p] 2♂1♀, 8.iv.1994. Portugal: [7b] 1♂, 14.iv.2013, 3♂, 17.iv.2015.

Distribution: This is a semi-cosmopolitan species common throughout Europe, North Africa, East and West Africa, Madagascar, India, China (incl. Taiwan) and Japan. This species appears to have dispersed naturally across temperate areas of Africa to South Africa, it is common in parts of India and by natural spreading it has reached eastern Asia. Hitherto it has not been reported from Australia, New Zealand, North and South America.

Biology: It is an exceptionally polyphagous species: it has been recorded from host plant species of 60 families and some 230 genera (Benavent-Corai *et al.* 2005, Spencer 1990).

Chromatomyia lindbergi (Spencer, 1957)

Material examined: Madeira: [2g] 1♀, 6.vi.1987; [2k] 1♀, 3.vi.1987.

Distribution: Hitherto only known from the male holotype from La Palma, Canary Islands. First record from Madeira.

Biology: Host plants are not yet known. The fly was captured in a shady and moist conifer forest with ferns, grass and the herbaceous vegetation dominated by two species of Caryophyllaceae, *Digitalis*, *Veronica* and two species of yellow flowering Asteraceae in locality [2k]. In a similar biotope of locality [2g] *Erigeron karwinskianus* and *Chrysanthemum* spec. were protocolled.

Note. The type specimen has been reinvestigated by Griffiths (1967: 5), who published figures of the male genitalia. Later he transferred it to the genus *Chromatomyia* Hardy, 1849 (Griffiths 1974: 37). The most similar species *C. farfarella*, *C. horticola* and *C. syngenesiae* were separated by minute characters of the palpi and aristae by von Tschirnhaus (1969) at that time without having seen *C. lindbergi* which belongs to the *syngenesiae*-group, too. Both descriptions, the original one and that of Griffiths (1967) agree with the first females now available. The tips of the fore coxae are yellow and only 2, 3 or 4 acrostichals are present in each of the two rows, ending short distance behind the 3rd dorsocentral seta (counted from behind). Additional features ease the future identification: All knees are bright yellow in more than the width of the diameter of the distal end of the tibiae, the scapes are ochre, the palpi are yellowish (black in the other three species), outer and inner vertical setae (*vte* and *vti*) emerge



Figs 5–6: Agromyzidae species. 5 – *Cerodontha (Icteromyza) capitata* (Zetterstedt), male, laterally; 6 – *Cerodontha (Icteromyza) geniculata* (Fallén), male, laterally. Photo by R. Andrade.

from yellow ground. The typical interruption within the arista as figured by von Tschirnhaus (1969) for *C. horticola* and *C. syngenesiae* (to date not reported for any other agromyzid) is only very weak and difficult to detect. It divides the arista in two parts of about equal lengths like in *C. syngenesiae*.

***Chromatomyia mili* (Kaltenbach, 1864)**

Material examined: Portugal: [5c] 1♂, 29.v.2010; [7b] 1♂, 17.iv.2015; [7c] 5♂1♀, 25.vi.2013; [7e] 1♂, 2.vi.2015; [7f] 2♂, 9.iv.2017; [8c] 2♂, 16.v.2015; [8j] 3♂, 21.vi.2015; [13b] 1♂, 17.vi.2013; [13c] 3♂, 16–17.vii.2009; [13i] 3♂1♀, 29.vi.2013; [17g] 1♂, 13.v.2013, 1♂, 6.iv.2016; [22a] 1♂, 26.vi.2013; [17d] 1♂, 13.vi.2012; [8b] 1♂, 10.v.2015; [22b] 1♂, 25.vi.2013; [22e] 1♂, 26.vi.2013.

Distribution: This species is known from the Holarctic and Oriental regions, in Europe recorded from Andorra, Austria, Belarus, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, France incl. Corsica, Germany, Great Britain, Greece, Ireland, Italy, Latvia, Lithuania, Poland, Portugal, Montenegro, Norway, Russia, Slovakia, Spain, Sweden and Switzerland (Černý 2007b, Černý & Merz 2007, Gil-Ortiz *et al.* 2011, Griffiths 1980). Also widespread from Canada, Morocco, India, Japan (Sasakawa 2005), Taiwan (Sasakawa 2008), Turkey and Yakutia (Nartshuk & Bagachanova 2010).

Biology: The larva forms leaf mine on *Agrostis*, *Aira*, *Brachypodium*, *Catabrosa*, *Dactylis*, *Festuca*, *Hierochloe*, *Holcus*, *Hordeum*, *Lolium*, *Milium* and *Poa*.

***Chromatomyia nigra* (Meigen, 1830)**

Material examined: Azores: [1a] 10♂27♀, 28.iii.1994; [1b] 1♂10♀, 29.iii.1994; [1c] 1♀, 30.iii.–9.iv.1994; [1d] 7♂5♀, 1.iv.1994; [1f] 2♂, 1.iv.1994; [1g] 2♂5♀, 2.iv.1994; [1h] 1♂, 3.iv.1994; [1i] 3♀, 3.iv.1994; [1j] 6♂27♀, 3.iv.1994; [1k] 3♂37♀, 4.iv.1994; [1l] 7♂8♀, 4.iv.1994; [1m] 16♂35♀, 4.iv.1994; [1n] 22♂51♀, 4–5.iv.1994; [1o] 1♀, 7.iv.1994; [1r] 5♀, 8.iv.1994; [1t] 18♂12♀, 9.iv.1994. Madeira: [2g] 1♀, 6.vi.1987; [2k] 6♂10♀, 3.vi.1987; [2l] 1♀, 31.vii.1970; [2m] 1♂2♀, 26.vii.1970; [2p] 2♀, 30.v.1987. Portugal: [8c] 1♂, 16.v.2015.

Distribution: This species known from Holarctic and Oriental regions, is widespread and common in much of Europe. From Portugal hitherto only known from Madeira (Spencer 1965b, as *Phytomyza nigra* Mg.), this is the first record from the Azores and the Portuguese mainland.

Biology: *C. nigra* has the widest range of *Chromatomyia* species on the Poaceae or other monocots with host plant records from 47 genera (Spencer 1990).

Note. All material from the Azores belongs to the species of the *C. nigra*-group possessing at least a partly yellowish frons. The two pairs of long supporting sclerites of the phallus are of uneven lengths. As in all *Chromatomyia* species a distinct distiphallus is reduced to a short, hyaline, hook-like and (in rest position of the phallus) upwards curved appendix. After the issue of the revision of the *C. nigra*-group by Griffiths (1980) it could be clarified in correspondance with Griffiths that the form with equal lengths of those four sclerites and with a dark frons deserves its own species status with the name *obscuriceps* Hendel, 1935 (see von Tschirnhaus 1981: 32). This darker and on average slightly smaller species is peculiarly abundant along coasts and not conspecific with the similar *C. puccinelliae* Griffiths, 1980 from North America and as recently recorded from the high north of Greenland (Wirta *et al.* 2016).

***Chromatomyia syngenesiae* Hardy, 1849**

Material examined: Portugal: [5c] 2♂, 2.vi.2014.

Distribution: An extremely widespread species in temperate areas, known from Europe, North America (Canada, United States), Colombia, Israel, Japan, Saudi Arabia, Yakutia, Australia, New Zealand and Sri Lanka (Černý 2009, Nartshuk & Bagachanova 2010, Spencer & Steyskal 1986). In Europe known from Czech Republic, Dalmatia (Spasić & Spencer 1992), Denmark, Finland, France, Germany, Great Britain, Greece (Černý 2011b), Ireland, Netherlands, Poland, Portugal, Spain incl. Balearic Islands, Sweden and Switzerland.

Biology: It is a polyphagous species, its host plants are mainly in the Compositae (Benavent-Corai *et al.* 2005, Griffiths 1976, Spencer 1990).

Liriomyza artemisicola de Meijere, 1924

Material examined: Azores: [1n] 1♂1♀, 4–5.iv.1994; [1r] 146♂193♀, 8.iv.1994.

Distribution: A Palaearctic species, in Europe recorded from Andorra (Černý 2007a), Austria, Belgium, Croatia (Černý 2009), Czech Republic, Denmark, Finland, France incl. Corsica, Germany, Great Britain, Greece (Černý 2011a), Hungary (Papp & Černý 2017), Ireland, Italy (Černý 2006), Lithuania, Netherlands, Norway (Andersen 2016), Poland, Slovakia, Sweden, Switzerland, also recorded from China, North Korea (Černý 2007b), Yakutia (Nartshuk & Bagachanova 2010), Japan and India. First record from the Azores.

Biology: Host plants are several species in the genus *Artemisia*. In the botanical garden of Ponta Delgada (Azores) [1r] mass occurrence of flies and leaf mines was observed on flowering *Argyranthemum* sp. (= *Chrysanthemum* s.l.). Mines and larvae were collected, and flies and Chalcidoidea parasitoids emerged later. Mymaridae were captured and preserved in numbers, too, they may be egg parasitoids of the leaf miner. First record of this host plant genus.

Liriomyza bryoniae (Kaltenbach, 1858)

Material examined: Azores: 2♀ of this species were obtained from [1b] and [1c], 29.iii.–9.iv.1994, but a reliable distinction of females from *L. strigata* is impossible. Portugal: [7h] 4♂1♀, 16.viii.2013; [13g] 1♂, 16–17.vii.2009; [14a] 1♂, 1.xi.2013; [14d] 30♂7♀, 1.xi.2013; [17c] 1♂, 18.vii.2013.

Distribution: A polyphagous species with a Palaearctic and Oriental type of distribution. It has been reported from ca. 36 European countries: known from Albania, Austria, Belgium, Great Britain, Bulgaria, Belarus, Croatia, Czech Republic, Denmark, Estonia, Finland, France incl. Corsica, Germany, Greece incl. Crete, Hungary, Italy incl. Sicily, Latvia (Karpa 2008), Lithuania, Maltese Isles, Moldavia, Netherlands, Norway, Poland, Portugal incl. Azores, Romania, Russia, Slovenia, Spain incl. Canary Isles, Sweden, Switzerland (Černý & Merz 2006), Ukraine and former Yugoslavia. Also known from China, Egypt, Georgia, India, Iran, Iraq (Spencer 1981), Japan, Morocco, Nepal (Sasakawa 1996), South Korea, Taiwan, Thailand, Turkey, Turkmenistan and Yakutia (Nartshuk & Bagachanova 2010).

Biology: A highly polyphagous species, recorded from 112 genera in 30 plant families (Benavent-Corai *et al.* 2005, Spencer 1990).

Liriomyza congesta (Becker, 1903)

Material examined: Portugal: [9c] 4♂, 11.iv.2014.

Distribution: It is very common throughout most of Europe, known also from Canary Islands, China, Cyprus (Černý & Vála 2006), Egypt, India, Iran, Iraq (Saleh *et al.* 2013), Israel, Japan, Oman (Deeming 2006), South Korea, Tunisia, Turkey, Yakutia (Nartshuk & Bagachanova 2010), Yemen (Deeming 2006) and Uzbekistan.

Biology: The larva forms leaf mine on *Anthyllis*, *Astragalus*, *Caragana*, *Cicer*, *Colutea*, *Coronilla*, *Euphorbia*, *Glycine*, *Glycyrrhiza*, *Hippocrepis*, *Hymenocarpos*, *Lathyrus*, *Lens*, *Lotus*, *Lupinus*, *Medicago*, *Melilotus*, *Onobrychis*, *Ononis*, *Ornithopus*, *Oxytropis*, *Trifolium*, *Trigonella* and *Vicia*.

Liriomyza flaveola (Fallén, 1823)

Material examined: Portugal: [22b] 1♂, 25.vi.2013.

Distribution: This Holarctic species is widespread and common in Europe, namely in Andorra (Černý 2007a), Belgium, Belarus, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece (Černý 2011a), Hungary, Ireland, Italy, Latvia (Karpa 2008), Monaco, Montenegro (Spasić 1996), Netherlands, Norway, Poland, Portugal (Černý 2013), Russia, Spain incl. Canary Islands, Slovakia, Sweden, and recorded also in Canada and United States (Lonsdale 2017). Also known from Asian Russia, India, Japan, North Korea (Černý 2007b), Kuril Islands (Iwasaki 2000), Turkey and Uzbekistan.

Biology: The larva forms leaf mine on *Avena*, *Bromus*, *Dactylis*, *Holcus*, *Hordeum*, *Milium* and *Poa*.

***Liriomyza huidobrensis* (Blanchard, 1926)**

Material examined: Portugal: [7i] 6♂3♀, 28.vi.2013, 2♂, 16.viii.2013; [17b] 2♂, 14.viii.2013; [17c] 5♂2♀, 18.vii.2013; [17f] 1♂, 6.ix.2013.

Distribution: This cosmopolitan species was described from Argentina, known from the Afro-tropical, Australian, Oriental, Neotropical regions and from the whole Holarctic region. In Europe known from Austria, Belgium, Czech Republic, Finland, France incl. Corsica, Germany, Great Britain, Greece incl. Crete, Hungary, Italy, Maltese Islands, Netherlands, Norway, Poland, Portugal incl. Madeira Islands, Russia, Spain incl. Canary Islands, Sweden and Switzerland.

Biology: A highly polyphagous species, with confirmed records on 110 genera from 33 families of host plants, especially Chenopodiaceae, Compositae, Cucurbitaceae, Leguminosae, Liliaceae, Linaceae, Solanaceae, Tropaeolaceae, Umbelliferae and Violaceae (Benavent-Corai *et al.* 2005, Spencer 1973, 1990).

***Liriomyza infuscata* Hering, 1926**

Material examined: Portugal: [5a] 2♂1♀, 13.iii.2016; [7b] 1♀, 10.ii.2011.

Distribution: A Palaearctic species, in Europe recorded from Belgium, Bulgaria (Černý 2013), Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary (Papp & Černý 2017), Latvia, Lithuania, Norway (Andersen & Jonassen 1994), Poland, Russia, Slovakia, Spain, Sweden, Ukraine, also recorded from West and East Siberia, Mongolia (Zlobin 2003). First record from Portugal.

Biology: Host and early stages unknown.

***Liriomyza latigenis* (Hendel, 1920)**

Material examined: Portugal: [7d] 3♂, 23.v.2012, 1♂, 15.vi.2013, 5♂1♀, 19.iv.2015, 2♂, 30.v.2015, 2♂1♀, 25.iv.2017, 1♀, 27.iv.2017, 2♂2♀, 16.vi.2017; [17g] 1♀, 19.x.2011; [17h] 3♂1♀, 19.v.2009, 2♂, 22.v.2009.

Distribution: Hitherto known from the Czech Republic, France, Greece (Černý 2011a), Spain and Uzbekistan (Černý & Merz 2006). First record from Portugal.

Biology: The larva forming leaf mine on *Senecio jacobaea*.

***Liriomyza orbona* (Meigen, 1830) (Fig. 7)**

Material examined: Portugal: [5a] 1♀, 28.xi.2010, 1♀, 15.xii.2010, 1♂1♀, 13.iii.2012, 1♀, 19.xii.2014, 2♂2♀, 13.iii.2016 [6a] 1♂, 15.iii.2015; [7b] 1♀, 16.iv.2015, 2♀, 17.iv.2015; [8h] 1♂, 6.x.2015; [9a] 1♀, 12.iv.2014; [10] 1♀, 24.vii.2013; [14c] 1♂, 15.ix.2012; [17d] 1♂, 21.ii.2016; [17f] 1♀, 6.ix.2013.

Distribution: Palaearctic species widespread in most parts of Europe and known from Austria, Czech Republic, Dalmatia (Spasić & Spencer 1992), Denmark, France, Finland, Germany, Great Britain, Greece incl. Crete, Hungary, Ireland, Italy incl. Sicily, Lithuania, Maltese Islands, Netherlands, Norway (Andersen & Jonassen 1994), Poland, Spain incl. Canary Islands, Sweden, Switzerland and former Yugoslavia. Also recorded from Azerbaijan, Cyprus (Černý & Vála 2006), Egypt, Iraq, Tunisia and Turkey. From Portugal hitherto only known from Madeira (Zlobin 2003), this is new record from Portuguese mainland.

Biology: Host plants are certainly Poaceae mainly *Avena*, *Deschampsia*, *Hordeum murinum* and *Poa*.

Liriomyza pedestris Hendel, 1931 (Fig. 8)

Material examined: Portugal: [5a] 1♂, 13.iii.2016; [5b] 1♀, 1.x.2017; [7f] 2♂1♀, 9.iv.2017; [9a] 2♂, 12.iv.2014; [17d] 1♂1♀, 26.iv.2016; [17g] 1♂1♀, 6.iv.2016.

Distribution: This West Palaearctic species was described by Hendel (1931-36) and based on the type series from Hungary, Finland, Germany and Russia (Kamchatka). It is also known from Austria, Corsica (Černý & Merz 2006), Czech Republic, Denmark, Great Britain, Greece (Zlobin 2003), Italy (Černý 2006) incl. Sicily, Maltese Islands, Norway, Russia (Zlobin 2003), Slovakia (Vála & Černý 2009), Spain, Sweden, Switzerland (Černý & Merz 2007) and Ukraine (Zlobin 2003). Also recorded from Cyprus (Černý & Vála 2006), Iran (Zlobin 2003), Israel (Zlobin 2003), Morocco, Saudi Arabia (Deeming 2006), Turkey (Černý & Merz 2006) and Uzbekistan (Černý & Merz 2006). First record from Portugal.

Biology: The larva forming mine on *Deschampsia flexuosa*, and almost certainly other Poaceae.

Liriomyza ptarmicae de Meijere, 1925

Material examined: Portugal: [6d] 1♂, 19.vii.2009.

Distribution: This Holarctic species is known in Europe from Andorra (Černý 2007a), Belarus, Czech Republic, Estonia, Denmark, Finland, France, Germany, Great Britain, Hungary, Italy (Černý 2006) incl. Sicily, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal (Gil-Ortiz *et al.* 2011), Slovakia, Sweden, Switzerland (Černý 2009), also recorded from China (Sasakawa 2006), Japan, Yakutia (Nartshuk & Bagachanova 2010). In North America known from Canada and the United States.

Biology: The larva forms a narrow linear leaf mine on *Achillea distans*, *A. millefolium*, *A. pannonica*, *A. ptarmica*, *Anthemis arvensis* and *Chrysanthemum coronarium*.

Liriomyza taraxaci Hering, 1927

Material examined: Portugal: [17k] 1♂, 14.vii.2011.

Distribution: This Holarctic species is known in Europe from Austria, Belarus, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland (Kahapää 2014), France, Germany, Great Britain, Greece (Černý 2011a), Hungary (Papp & Černý 2017), Ireland, Italy (Süss 2003), Latvia (Karpa 2008), Lithuania, Netherlands, Norway (Andersen & Jonassen 1994), Poland, Portugal (Černý 2009), Romania, Russia (Strakhova *et al.* 2013), Slovakia, Slovenia, Spain, Sweden, Switzerland (Černý 2005b), also recorded from Canada and United States.

Biology: The larva forms leaf mine on *Aposeris*, *Arnoseris*, *Leontodon*, *Sonchus* and *Taraxacum*.

Liriomyza umbilici Hering, 1927

Material examined: Azores: [1a] 1♀, 28.iii.1994; [1n] 1♀, 4-5.iv.1994.

Distribution: European species known from Canary Islands, Portugal incl. Azores, Slovenia.

Biology: The larva forms a long, shallow and narrow leaf mine on *Umbilicus rupestris*.

Liriomyza undescribed species, flaveola Fallén-group

Material examined: Madeira: [2b] 2♂, 25.vii.1995; [2d] 4♀, 3.i.1986; [2f] 1♂1♀, 2.vi.1987; [2g] 4♂4♀, 6.vi.1987; [2i] 1♂, 30.vii.1970; [2j] 2♂, 1.vi.1987; [2k] 5♂2♀, 3.vi.1987; [2l] 1♀, 31.vii.1970; [2m] 3♂4♀, 26.vii.1970; [2n] 1♂1♀, 8.vi.1987; [2o] 1♂, 30.v.1987.

After the publications of Zlobin (2002), Lonsdale (2017) and Papp & Černý (2017) all former determinations of the grass miners belonging to the *L. flaveola*-group have to be re-identified. Since 48 years M. von Tschirnhaus separated this undescribed species which occurs on Madeira and which he also collected on La Palma (Canary Islands), 28°29'49"N, 17°50'26"W, Los Canarios NE, 1♂, 14.i.2011, and 28°48'28"N, 17°48'18"W, Laguna de Barlovento, 6♂10♀, 17.i.2011. In Zlobin's *Liriomyza* key it runs to couplet 12, in the key of Papp & Černý to couplet

34. Its male genitalia are very similar to *L. phryne* Hendel, 1931, but the ejaculatory apodeme is exceptional small, not deeper as the length of the phallus, the epandrium bears not any „short process“ or „long projection“ (Zlobin 2003), called „bar“ and „elaboration“ (Lonsdale 2017) or „additional laths“ or additional „processes“ (Papp & Černý 2017). The so-called surstyli of *Liriomyza* species (attached to the anterior edge of the epandrium and bent horizontally inwards, are present only as tiny narrow hyaline remnants with a terminal seta, though „considered lost“ in the *flaveola*-group (Lonsdale 2017: 7). The outer vertical seta (*vte*) is emerging on dark ground, the anepisternum is black in its lower three quarters, the distal third of the fore-femur is yellow dorsally, posterior acrostichals are mostly slightly bent inwards, 1+3 dorsocentrals, scutum shining, wings slightly brownish. The oviscape is not laterally compressed compared with *L. taurica* Zlobin, 2003 (this character of *taurica* first mentioned here).

***Metopomyza scutellata* (Fallén, 1823) (Fig. 9)**

Material examined: Portugal: [5b] 1♂, 7.v.2017; [7e] 1♂, 17.vi.2017; [8h] 1♂, 6.x.2015; [10] 1♂, 24.vii.2013; [12c] 1♂, 2.x.2016; [15c] 1♂, 19.ix.2013; [17g] 1♂, 13.v.2013, 1♂, 23.iii.2016.

Distribution: Palaearctic species known in Europe from Albania (Černý & Merz 2006), Andorra (Černý 2007a), Croatia (Černý 2009), Belarus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece (Černý 2011a), Hungary, Italy (Černý 2006), Latvia (Karpa 2008), Lithuania, Maltese Islands (Černý 2005a), Norway (Andersen 2012), Poland, Russia (Zlobin 1993), Slovakia, Spain (Černý & Merz 2006), Sweden and Switzerland (Černý 2005b). First record from Portugal.

Biology: The larva mining on host plants *Carex* spp.

***Napomyza bellidis* Griffiths, 1967**

Material examined: Portugal: [6e] 1♂, 17.iv.2011; [23a] 1♂, 9.x.2013.

Distribution: Palaearctic species known from Europe and recorded from Israel, Japan, Kyrgyzstan, Tajikistan, Turkey and Uzbekistan. In Europe known from the following countries: Andorra, Austria, Belgium, Bulgaria, Czech Republic, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Italy, Latvia, Lithuania, Maltese Islands, Russia, Slovakia, Sweden, Switzerland and Ukraine. In Portugal hitherto only known from the Azores (Zlobin 1994a: 62), this is the first record from the Portuguese mainland.

Biology: The larvae are mining in the basal rosette of small plants of *Bellis perennis*.

***Napomyza lateralis* (Fallén, 1823)**

Material examined: Portugal: [13f] 3♂, 23.v.2008; [13h] 2♂, 23.v.2008.

Distribution: Holarctic species, common throughout much of Europe and recorded from Afghanistan (Spencer 1976c), China (Sasakawa 1986), Iraq (Spencer 1981), Israel, Morocco (Černý & Merz 2006), Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, also known from Canada (Spencer 1990).

Biology: The larva mining on host plants *Anthemis*, *Bellis*, *Bidens*, *Calendula*, *Carduus*, *Centaurea*, *Cirsium*, *Crepis*, *Helichrysum*, *Hypochaeris*, *Inula*, *Lactuca*, *Linum*, *Lupinus*, *Matricaria* and *Senecio*.

***Napomyza merita* Zlobin, 1993**

Material examined: Portugal: [5a] 1♂, 13.iii.2012; [7f] 2♂1♀, 9.iv.2017.

Distribution: This European species is described after a type series from Russia, Finland and Hungary, later the species was recorded from Czech Republic (Černý 2009), France (Černý 2013), Greece (Zlobin 2001), Sweden and Switzerland (Černý & Merz 2007). First record from Portugal.

Biology: Host and early stages unknown.



Figs 7–8: Agromyzidae species. **7** – *Liriomyza orbona* (Meigen) male, dorsolaterally; **8** – *Liriomyza pedestris* Hendel, male, laterally: Note the distinct stridulation file on the ventral edge of syntergite 1+2. Photo by R. Andrade.

***Napomyza scrophulariae* Spencer, 1966**

Material examined: Azores: [1a] 1♂, 28.iii.1994; [1n] 1♂, 4–5.iv.1994.

Distribution: Palaearctic species known in Europe from Andorra (2007a), Czech Republic, Denmark, France incl. Corsica, Germany, Great Britain, Greece (Černý & Merz 2006), Ireland, Lithuania, Norway (Andersen & Jonassen 1994), Slovakia, Spain, Sweden and Switzerland (Černý & Merz 2007). Also recorded from Israel, Morocco (Černý & Merz 2006), Tajikistan and Turkey (Dursun *et al.* 2015). In Portugal hitherto only known from the Portuguese mainland (Černý 2013: 286), this is the first record from the Azores.

Biology: When the species was described several genera now included in the Plantaginaceae or Orobanchaceae still belonged in the Scrophulariaceae. In German forests, e.g. the Harz mountains, M. von Tscherhnhaus repeatedly detected mass occurrence of larvae in the seed capsules and upper stem parts of *Digitalis purpurea* (Plantaginaceae). Reared specimens can become exceptionally large compared with other *Napomyza* species. Before Spencer's description the species was already recorded as *N. lateralis* in seeds of *Digitalis* (Woodroffe & Southgate 1952, Erfurth & Plescher 1983) or as *N. annulipes* by Necyopor (1962). Zlobin (1994a) in addition to *Digitalis* also lists *Verbascum* (Scrophulariaceae) and *Mentha* (Lamiaceae) as host genera. In Croatia the interior of young stems of *Lamium* spp. were attacked in spring time, but M. von Tscherhnhaus was not successful to rear the flies.

***Nemorimyza maculosa* (Malloch, 1913), the “burdock leafminer”.**

Material examined: Madeira: [2r] 14♂, 4–11.iv.2016.

Distribution: Species described from United States and known from South America, confirmed from Argentina, Bahamas, Barbados, Bermuda, Bolivia, Brazil, Chile, Costa Rica, Cuba, Dominican Republic, Easter Island, Grand Cayman, Hawaii, Jamaica, Peru, Trinidad, Uruguay and Venezuela. An incomplete overview of countries and references is put together by CABI/EPPO (1999). In 177 papers (in the collection of M. von Tscherhnhaus) dealing with this pest species under the generic names *Agromyza*, *Amauromyza*, *Annimyzella*, *Dizygomyza*, *Nemorimyza* and *Phytobia*, [as well under the synonym *Agromyza guaranatica* Brèthes, 1920] not any record for the Old World could be found. But several articles with specific quarantine laws and regulations for the export countries of vegetables and flowers and for imports of those into the European Union and especially to England, Poland, Lithuania, and Finland include this taxon. Here, in addition to Madeira for the first time we report the successful establishment of this neozoon to a further island of the Old World: From 14–17.i.2011 M. von Tscherhnhaus collected 2♂ 5♀ in three different areas of the Canary Island La Palma (28°48'28"N, 17°48'18"W; 28°35'50"N, 17°55'32"W; 28°29'49"N, 17°55'32"W). During many weeks of collecting by M. von Tscherhnhaus in earlier years on Gomera, Tenerife, Fuerteventura and Gran Canaria the species could not yet be obtained! The species became a quarantine pest during the last years, e.g. documented by Commission of the European Communities (2002) and Bell *et al.* (2014), and it was treated in 99 further publications since the year 1980. Concerning the massive tourism from the Atlantic islands to continental Europe it will be only a question of time until larvae or puparia become transferred; see discussion. First records from Portugal (Madeira) and the Canary Islands.

Biology: An oligophagous species, the larvae form a large blotch leaf mine on host plants, namely *Acanthospermum*, *Ageratum*, *Artemisia*, *Aster*, *Baccharis*, *Bellis*, *Bidens*, *Chrysanthemum*, *Conyza*, *Cynara*, *Dahlia*, *Emilia*, *Erechtites*, *Eupatorium*, *Gaillardia*, *Gnaphalium*, *Helenium*, *Helianthus*, *Lactuca*, *Melanthera*, *Senecio*, *Solanum* (Sanabria de Arevalo 1994: 72), *Solidago*, *Sonchus*, *Synedrella*, *Tagetes*, *Taraxacum* and *Zinnia* (Benavent-Corai *et al.* 2005, Spencer 1990).



9



10

Figs 9–10: Agromyzidae species. **9** – *Metopomyza scutellata* (Fallén) male, dorsolaterally; **10** – *Phytobia cambii* (Hendel), male, dorsally: Note the silvery lunule, typically for many tropical *Phytobia* spp. Photo by R. Andrade.



11

Fig. 11: *Phytobia cambii* (Hendel), larval pith flecks or medullary spots in a basal cross section of a young willow tree (*Salix* spec., Bielefeld, Germany). Diameter of trunk 73mm. During the first three years the tree is still too young to serve for larval development. Note the osmotic effect of some flecks on the central year rings. Photo by M. von Tschirnhaus.

***Phytobia cambii* (Hendel, 1931) (Figs 10, 11)**

Material examined: Portugal: [5b] 1♂, 9.iii.2017.

Distribution: Species widespread in Europe and recorded from Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Ireland, Latvia, Lithuania, Netherlands, Poland, Romania (Pașcovică 1975), Russia (North and Central European Territories, East Siberia), Slovakia (PAPP 2009) and Sweden, also recorded from Japan. First record from Portugal.

Biology: Host plants are *Populus deltoides*, *P. euramericana*, *P. nigra*, *P. tremula*, *P. trichocarpa* and *Salix alba*, *S. caprea*, *S. cordata*, *S. fragilis*, *S. purpurea*, *S. triandra*, *S. viminalis* (MARTINEZ *et al.* 1986).

Note. Specimens reared from *Alnus glutinosa* and *Betula* spp. (Betulaceae) by M. Martinez and M. von Tschirnhaus are in all details identical with reared material from Salicaceae with the result that *Dendromyza betulae* Kangas, 1935 became a junior synonym of *P. cambii* (Hen-

del) (von Tschirnhaus 1992: 480, plate 13). Two further genera with larval attack and belonging in the Betulaceae, *Carpinus* and *Corylus*, surely also belong to the host genera of *P. cambii*. Mines found 21.vi.2008 by M. von Tschirnhaus in the young xylem of *Alnus* trees in the „Hatila Vadisi Mili Park“ mountain forests at 1300m a.s.l. near Artvin, East Turkey, add this country to the distribution list above. The earliest description of the larval tracks in living wood (pith flecks, medullary spots, Fig. 11), of any agromyzid and especially of *P. cambii* in poplar and willow trees interprets them as the possible work of a *Cerambyx* species (Coleoptera) (Rennie & Wood 1830: 239, re-issued 1838 with identical pagination by Charles Knight, London 1838). It was never cited in 291 books and articles dealing since the year 1840 with the damage of the enigmatic „cambium miners“, firstly clarified as agromyzid larvae by Nielsen (1905).

Phytoliriomyza arctica (Lundbeck, 1901)

Material examined: Azores: [1a] 2♂, 28.iii.1994; [1c] 1♀, 30.iii.–9.iv.1994. Madeira: [2f] 1♂1♀, 2.vi.1987. Portugal: [7b] 1♂, 15.iv.2012; [14a] 1♂, 12.ix.2013.

Distribution: An almost cosmopolitan species. It has been reported not only from numerous European countries from the Canary Islands to Greenland (as far north as 74°28'N, 20°34'W, see Wirta *et al.* 2016) but also from North America, Brazil and Chile. From Portugal hitherto only known from the Azores and Madeira (Spencer 1965a, b), this is a new record from the Portuguese mainland.

Biology: Its host plants are *Sonchus* spp., probably also other species of Asteraceae.

Note. This species has previously been recorded in both the Azores and Madeira as *Phytoliriomyza perpusilla* (Meigen, 1830), see Spencer (1963).

Phytoliriomyza dorsata (Siebke, 1863) (Fig. 12)

Material examined: Portugal: [6f] 1♂, 15.xi.2014; [17i] 1♂, 12.iv.2011.

Distribution: Holarctic species known in Europe from Austria, Czech Republik, Denmark, Estonia, Finland, Great Britain, Lithuania, Norway, Poland, Romania, Russia, Slovakia and Sweden (Zlobin 2005). Also recorded from Iran (Shahreki *et al.* 2012), Japan (Iwasaki 2000), Kuril Islands (Iwasaki 2000), Turkey (Çikman & Civelek 2005) and Yakutia (Nartshuk & Bagachanova 2010). In North America known from United States (Spencer & Steyskal 1989). First record from Portugal.

Biology: Host and early stages unknown.

Phytoliriomyza immoderata Spencer, 1963

Material examined: Portugal: [6g] 5♂, 16.xi.2014; [22c] 1♂, 25.vi.2013.

Distribution: This species was described from South Africa (Natal) and later recorded in further countries in the Palaearctic Region from Israel (Černý 2009) and Morocco (Černý & Merz 2006). In Europe recorded from Andorra (Černý 2007a), Greece (Černý 2011a), Sardinia (Černý 2006), Serbia (Černý & Merz 2006) and Spain (Černý & Merz 2006). In addition, M. von Tschirnhaus collected it in Italy (Apulia, Spiaggiabella, 25km SE Brindisi, coastal dunes, 40°28'45"N, 19°10'17"E, 1♂, 14.iv.2000), on Gomera (Canary Islands), 64♂43♀, top plateau of the volcano Fortaleza, peak 1241m a.s.l., 28.iii.1985 and 4♂4♀ on the top plateau of the volcano Garajonay, peak 1487m a.s.l., 25.iii.1985. Further findings by M. von Tschirnhaus in Spain and Morocco confirm that this species is well established in the Mediterranean realm. First record from the Canary Islands, Peninsular Italy and Portugal.

Biology: Host and early stages unknown. In the Fortaleza example (Gomera) the flies visited the flowering plants of *Asphodelus* sp. The two mentioned volcanoes should be visited again to find out the host plant among the easily identifiable floral elements of those mountain peaks.

Phytoliriomyza mikii (Strobl, 1898)

Material examined: Azores: [1a] 1♀, 28.iii.1994.

Distribution: Species described from Austria and known in Denmark, Finland, Lithuania, Poland, Sweden, also recorded from Yemen (Deeming 2006) and Kuril Islands (Iwasaki 2000). First record from the Azores.

Biology: Host and early stages unknown.

Phytoliriomyza oasis (Becker, 1907)

Material examined: Portugal: [6f] 2♂3♀, 15.xi.2014; [8h] 1♂, 6.x.2015; [9a] 1♂, 12.iv.2014; [14b] 1♂, 9.viii.2016; [17g] 2♂, 23.iii.2016.

Distribution: This species was described after a female type from Algeria and later recorded from Greece, Iraq (Spencer 1981), Kyrgyzstan (Černý & Merz 2006), Lithuania, Morocco, Poland, Spain incl. Canary Islands, Sweden, Turkey (Černý & Merz 2006) and Uzbekistan (Černý & Merz 2006). First record from Portugal.

Biology: Host and early stages unknown.

Phytoliriomyza perpusilla (Meigen, 1830)

Material examined: Portugal: [8a] 1♂, 19.vi.2015; [9a] 2♂1♀, 12.iv.2014, 1♂, 13.iv.2014; [9b] 1♂, 2.ix.2014; [13d] 2♂1♀, 28.vii.2014; [13l] 5♂1♀, 30.vii.2014; [15c] 1♂, 22.viii.2013.

Distribution: This species is known from Palaearctic and Afrotropical regions, in Europe recorded from Austria, Belgium, Bulgaria, Czech Republic, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Italy incl. Sardinia (Černý 2006), Lithuania, Netherlands, Poland, Portugal (Černý 2013), Romania (Papp & Černý 2017), Serbia (Papp & Černý 2017), Spain incl. Canary Islands, Sweden and Switzerland (Černý 2005b). This species is also known from Tunisia, Turkey, Russia – Yakutia, Cabo Verde Islands, Lesotho, Oman, South Africa and Yemen (Černý & von Tscharnhaus 2014, Deeming 2006, Nartshuk & Bagachanova 2010).

Biology: Host plants unconfirmed but are probably species of Compositae, concretely *Aster tripolium* (Spencer 1976a). The early stages are unknown.

Phytoliriomyza pteridii Spencer, 1973

Material examined: Portugal: [7b] 1♂, 4.vii.2014; [13g] 1♂, 16–17.vii.2009; [13k] 4♂2♀, 3.ix.2014; [17d] 1♂, 1.vii.2013.

Distribution: It is a rare European species. It was described from England, Scotland, Germany, Montenegro, Slovenia, since that time it has been reported from Andorra (Černý 2007a), Croatia (Černý 2009), France (Černý 2009), Hungary (Papp & Černý 2017), Ireland, Italy (Černý 2006), Poland, Portugal and Slovakia. M. von Tscharnhaus collected it in large numbers on the small island of Nisiros (Greece) on *Pteridium aquilinum* and as well on Corfu (Greece) and Mallorca (Spain).

Biology: The larva forms a linear mine at the edge of the frond of *Pteridium aquilinum*.

Phytoliriomyza scotica Spencer, 1962

Material examined: Madeira: [2f] 1♀, 2.vi.1987; [2g] 1♀, 6.vi.1987; [2m] 1♂1♀, 8.vi.1987; [2o] 2♀, 30.v.1987; Portugal: [5a] 2♂1♀, 29.iii.2012; [5c] 2♂, 3.vi.2013; [6a] 1♂, 4.iv.2015; [7b] 2♂, 16.iv.2015; [7g] 1♂2♀, 24.vii.2010; [8b] 2♂, 10.v.2015; [8d] 1♂, 15.vii.2010; [11] 1♂, 4.iv.2015; [13c] 3♂, 16–17.vii.2009; [13d] 1♂, 28.vii.2014; [13f] 1♂, 23.v.2008; [13i] 2♂, 29.vi.2013; [13m] 1♂, 4.ix.2014; [16] 1♂, 14.iii.2015; [17d] 5♂3♀, 30.viii.2010, 1♂, 12.v.2011.

Distribution: It was described from Scotland, later recorded from Canary Islands, Czech Republic, France, Germany, Great Britain, Hungary (Papp & Černý 2017), Portugal incl. Madeira.



Figs 12–13: Agromyzidae species. **12** – *Phytoliriomyza dorsata* (Siebke), male, laterally; **13** – *Phytomyza albipennis* Fallén, male, dorsolaterally. Photo by R. Andrade.

Biology: On the Canary Islands, certainly feeding on *Cotula australis* (Spencer 1990; compare von Tschirnhaus 1992). Spencer based his information on unpublished findings of M. von Tschirnhaus: Gomera, 8 samples in the W, NW, N and centrum of the island, 369♂436♀, 21.iii..–31.iii.1985, swept and aspirated from *Cotula australis* (Sieb.) Hook, a plant identified later by the British Museum (Natural History). It occurs also in Portugal, on Madeira and the Canary Islands being a neophyte from Australia. But Spencer (1990) on page 261 erroneously named *P. scotica* „*P. pilosella*“. This failure has the reason that M. von Tschirnhaus proposed him to synonymize *Phytoliriomyza pilosella* Spencer, 1973 from Florida, Costa Rica and Puerto Rico with *P. scotica*. But on p. 301 he postponed the formal synonymization.

Phytomyza albipennis Fallén, 1823 (Fig. 13)

Material examined: Portugal: [17e] 1♂2♀, 3.v.2017.

Distribution: Palaearctic species known from Andorra (Černý 2007a), Austria, Belgium, Bulgaria (Černý & Merz 2006), Denmark, Croatia, Czech Republic, Estonia, Finland, France, Germany, Great Britain, Greece (Černý 2011a), Hungary, Italy, Lithuania, Netherlands, Norway (Andersen & Jonassen 1994), Poland, Russia, Slovakia, Spain incl. Canary Islands, Sweden, Switzerland (Černý 2005b), former Yugoslavia, Turkey (Civelek *et al.* 2007), North Korea (Černý 2007b). First record from Portugal.

Biology: Unknown but larva almost certainly an internal feeder in Ranunculaceae (Spencer 1976a).

Phytomyza cineracea Hendel, 1920

Material examined: Portugal: [5a] 2♂1♀, 13.iii.2016.

Distribution: Palaearctic species recorded from the Czech Republic, France (Černý 2013), Germany, Great Britain, Hungary, Iceland, Slovakia (Vála & Černý 2009), Japan and recently recorded from Wrangel Island (Nartshuk & Khruleva 2011). First record from Portugal.

Biology: Host and early stages unknown.

Phytomyza clematidis Kaltenbach, 1859

Material examined: Portugal: [6a] 1♂, 4.iv.2015; [12c] 1♂, 2.x.2016; [17d] 1♂, 26.iv.2016.

Distribution: West Palaearctic species known from Andorra (Černý 2007a), Austria, Czech Republic, Cyprus (Černý & Vála 2006), France incl. Corsica, Germany, Great Britain, Greece (Černý & Merz 2006), Hungary, Israel, Italy (Černý 2006), Lithuania, Maltese Islands, Netherlands, Slovakia, Spain incl. Balearic and Canary Islands, Switzerland and Turkey. First record from Portugal.

Biology: The larva forms a short linear leaf mine on host plants *Clematis cirrhosa*, *C. vitalba*, *Ranunculus acris*, *R. auricomus*, *R. lanuginosus* and *R. lingua*.

Phytomyza conyzae Hendel, 1920

Material examined: Portugal: [12b] 3♂, 29–30.ix.2010.

Distribution: This species is widespread in West Palaearctic and India, in Europe recorded from Albania, Austria, Bulgaria, Czech Republic, Dalmatia (Spasić & Spencer 1992), Denmark, France incl. Corsica, Germany, Great Britain, Greece, Ireland, Italy incl. Sardinia and Sicily, Lithuania, Maltese Islands, Montenegro (Spasić 1996), Netherlands, Poland, Portugal, Romania, Spain incl. Balearic Islands, Sweden, also recorded from Cyprus (Černý & Vála 2006), Egypt (Černý 2009), Israel, Morocco and Turkey (Civelek 2002).

Biology: The larva forms leaf mine on host plants namely *Anaphalis*, *Arnica*, *Asteriscus*, *Bupthalmum*, *Dittrichia*, *Inula*, *Pallenis*, *Pulicaria* and *Telekia*.

Phytomyza evanescens Hendel, 1920

Material examined: Portugal: [5a] 1♂, 29.iii.2012.

Distribution: Holarctic species known in Europe from Andorra (Černý 2007a), Austria, Belarus, Belgium (Scheirs *et al.* 1995), Czech Republic, Denmark, Estonia, Faroe Isl., Finland, France, Germany, Hungary, Iceland, Italy incl. Sicily, Lithuania, Netherlands, Norway (Andersen & Jonassen 1994), Poland, Russia, Slovakia, Spain, Sweden, Switzerland (Černý 2005b) and former Yugoslavia. Also recorded from Kuril Islands, Asian Russia (Zlobin 1994b), Tajikistan, from North America known in Canada and United States. First record from Portugal.
Biology: The larva is feeding as an internal stem-borer of *Ranunculus acris* and *R. lanuginosus*.

Phytomyza fallaciosa Brischke, 1880

Material examined: Portugal: [8c] 2♂1♀, 10.v.2015.

Distribution: Holarctic species known in Europe from Albania (Černý & Merz 2006), Andorra (Černý 2007a), Austria, Czech Republic, Denmark, Estonia, Faroe Isl., Finland, France, Germany, Great Britain, Greece (Černý 2011a), Iceland, Ireland, Italy, Lithuania, Montenegro (Spasić 1996), Norway, Poland, Romania, Russia, Slovakia, Switzerland (Černý 2005b) and recorded also from North Korea (Černý 2007b) and Turkey (Mart *et al.* 2005). First record from Portugal.

Biology: The larva forms a linear leaf mine on *Ranunculus acris*, *R. auricomus*, *R. breyninus*, *R. lingua* and *R. repens*.

Phytomyza gymnostoma Loew, 1858

Material examined: Portugal: [9a] 1♂, 12.iv.2014.

Distribution: West Palaearctic species known from Austria, Bosnia and Herzegovina (Đurić & Hrnčić 2015), Czech Republic, Croatia, Denmark, Finland, France, Germany, Great Britain (Smith *et al.* 2007), Greece (Simoglou *et al.* 2008), Hungary, Italy incl. Sicily, Lithuania, Morocco (Mouna 1998), Netherlands, Poland, Romania (Coman & Roșca 2011), Serbia (Spasić 1994), Slovakia, Slovenia, Spain, Sweden, Switzerland (Černý 2005b), Turkey, Turkmenistan and Ukraine. First record from Portugal.

Biology: The larva forms a mine on its host plants *Allium cepa* and *A. porrum*, often hidden inside the bulb of the onion or the compressed porrum leaves.

Note. Already von Tschirnhaus (1994: 523) pointed out in detail that in southern France an undescribed very similar species occurs sympatrically with *P. gymnostoma* (Châine des Alpilles, NNE Mourières, 43°42'N, 4°54'E, 8♂6♀, 30.iii.1980; olive orchard N Pelissane, 4km E Salon-de-Provence, 5♂, 1.iv.1980). It was collected in natural dry biotopes with wild *Allium* species. It has thicker yellowish palpi and different male genitalia. The type material of the two junior synonyms of *P. gymnostoma* (*Phytomyza algecirasensis* Strobl, 1906, a justified emendation of *algecirasensis* Strobl, 1906 by Arias Encobet (1912: 69, 238) and reconditioned by Morge (1978: 168), and *Agromyza phytomyzina* Hering, 1933) has not yet been investigated. The correct determinations of *P. gymnostoma* in the rapidly increasing number of publications on the dispersing *Allium* pest (140 papers are in the collection of M. von Tschirnhaus, the vast number of internet articles not considered) one day all will become doubtful after the taxonomy of the two sibling species will be clarified.

Phytomyza pastinacae Hendel, 1923

Material examined: Portugal: [17g] 1♂, 25.v.2013.

Distribution: Holarctic species, in Europe known from Austria, Belgium, Bulgaria, Czech Republic, France, Germany, Great Britain, Greece (Černý 2011a), Ireland, Latvia, Lithuania, Montenegro (Spasić 1996), Netherlands, Poland, Portugal, Russia, Slovakia, also known from United States.

Biology: The larva forms leaf mine on *Angelica*, *Cicuta*, *Conium*, *Heracleum*, *Levisticum* and *Pastinaca*.

***Phytomyza plantaginis* Robineau-Desvoidy, 1851 (Fig. 14)**

Material examined: Azores: [1b] 3♀, 29.i.1994; [1n] 2♂, 4–5.iv.1994; [1s] 1♀, 9.iv.1994; [1t] 1♀, 9.iv.1994. Madeira: [2h] 1♂, 31.vii.1970; [2i] 7♂1♀, 30.vii.1970; [2l] 1♂, 31.vii.1970; [2o] 1♂, 30.v.1987. Portugal: [4] 1♂, 5.v.1971, 1♀, 1–5.v.1971; [13a] 1♂, 12.vi.1997; [13f] 1♂, 23.v.2008; [13g] 1♂, 16–17.vii.2009; [13h] 8♂, 23.v.2008.

Distribution: Species known from Holarctic, Neotropical, Oriental and Australian regions. In Europe recorded from Portugal to Russia and from Italy to Finland (Černý & Merz 2006, Černý & Vála 2006, Černý 2007a). In Portugal hitherto only known from the Azores (Spencer 1965: 109) and Portuguese mainland (Černý 2013: 286), this is the first record from Madeira.

Biology: The larva forms a narrow, white linear mine on *Plantago* spp., particularly *P. lanceolata* and *P. major* (while the very similar *P. griffithsi* Spencer, 1963 hitherto has only been reared from *P. media*).

Note. It is of interest that in New Zealand and Australia never males have been collected (Spencer 1976b, 1977). As well, von Tschirnhaus collected only females in Australia and in South America. From the South American continent, the species is not yet reported (Martinez & Étienne 2002). But von Tschirnhaus collected many samples, all exclusively containing high numbers of females in Chile and Argentina. Two selected examples as first records for those countries: Chile, 38°38'26"S, 72°07'06"W, 2km N San Patrício, 1139♀, 23.xii.2005; Argentina, 42°09'42"S, 71°24'17"W, 8km NNW Epuyén, 77♀, 28.i.2008. *P. plantaginis* follows the globally invasive “waybread” or “food steps of the white man” (*Plantago major*) until the passes of the high Andes and the far south of the continents. Parthenogenesis of this species and of *Phytomyza crassiseta* Zetterstedt, 1860 were reported first by Hering (1926) and Frick (1951) and was confirmed on the base of chromosome studies for *P. crassiseta* by Block (1969). Thus, the dispersion of males to the Azores and Madeira surely has taken place from Europe or the African continent. Collecting *P. plantaginis* on five further Macaronesian islands by von Tschirnhaus revealed both, males and females.

***Phytomyza ranunculi* (Schrank, 1803)**

Material examined: Madeira: [2k] 2♀, 3.vi.1987. Portugal: [5a] 1♂, 12.viii.2010, 3♂1♀, 13.iii.2016; [5b] 1♀, 31.v.2017; [6a] 1♂, 4.iv.2015; [6g] 1♂, 16.xi.2014; [7b] 1♀, 17.iv.2015; [7e] 1♂, 2.vi.2015; [8c] 2♀, 16.v.2015; [8g] 1♂, 30.v.2016; [8j] 2♂, 21.vi.2015; [9a] 1♂1♀, 13.iv.2014; [17d] 1♀, 20.x.2010, 1♀, 8.vi.2011, 1♀, 9.iv.2012, 1♂, 13.vi.2012, 1♀, 26.iv.2016; [17i] 1♂, 1.iv.2009, 1♀, 6.ix.2009; [23b] 1♂, 27.iv.2014.

Distribution: Species known from Holarctic Afrotropic (Tanzania: Kilimanjaro) and Oriental regions, widespread throughout Europe.

Biology: The larva form leaf mines on *Ficaria*, *Myosurus* and *Ranunculus*.

***Phytomyza ranunculivora* Hering, 1932**

Material examined: Portugal: [5a] 1♂, 12.viii.2010.

Distribution: European species recorded from Austria, Balearic Islands, Belarus, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Hungary (Papp 2004), Italy, Lithuania, Poland, Montenegro (Spasić 1996), Norway, Slovakia, Sweden and Switzerland (Černý & Merz 2006). First record from Portugal.

Biology: The larva forms leaf mine on *Ranunculus*.

Note. Pakalniškis (1997) retained *P. linguae* Lundqvist, 1947 as a separate species. M. von Tschirnhaus thoroughly compared material (partly reared from *Ranunculus lingua*) from Denmark, Germany and the Austrian Alps. He did not find differences in the male genitalia or puparia. May be that the puparium of *P. ranunculivora* figured by Pakalniškis belongs to one of the further species developing on *Ranunculus*. In as far *P. linguae* is retained here as a junior synonym.

Phytomyza rufipes Meigen, 1830 (Fig. 15)

Material examined: Azores: 1♀, 4–5.iv.1994. Madeira: [2d] 1♀, 3.i.1986. Portugal: [5a] 1♂, 13.iii.2016.

Distribution: Species known from the Holarctic and Neotropical (Argentina) regions. In Europe it is known from more than thirty countries, from Great Britain to Russia and from Spain (Canary Islands) to Finland and Norway. Also recorded in Canada and United States. From Portugal hitherto only known from Madeira (Becker 1908: 203), this is the first record from the Azores and the Portuguese mainland.

Biology: The larvae forming leaf mines exclusively on Brassicaceae, common on *Brassica* spp., less frequently on other genera namely *Alliaria*, *Conringia*, *Diplotaxis*, *Sinapis*, *Moricandia*, *Peltaria*, *Raphanus*, *Rorippa* and *Sisymbrium*.

Phytomyza sedi Kaltenbach, 1869

Material examined: Portugal: [19] 1♂, 15.iv.2011.

Distribution: A European species described from Germany and hitherto recorded from Andorra (Černý 2007a), Czech Republic (Černý & Heřman 2015), France, Great Britain (Gibbs 2007), Spain, Sweden (Zlobin 2005), Switzerland (Černý 2005b) and former Yugoslavia. First record from Portugal.

Biology: The larva forms brownish lower surface blotch mine on *Sedum album* and *S. rupestre*.

Note. The types of *P. catalaunica* Spencer, 1960 had been studied by von Tschirnhaus (1994: 526) with the result that the latter name became a junior synonym of *P. sedi*.

Phytomyza spondylii Robineau-Desvoidy, 1851

Material examined: Portugal: [17f] 1♂, 14.vi.2013.

Distribution: This is a Holarctic species, widespread and common in Europe namely recorded from Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, also known from Canada and United States incl. Alaska.

Biology: The larva forms leaf mine on *Heracleum*, *Levisticum* and *Pastinaca*.

Phytomyza tetrasticha Hendel 1927

Material examined: Portugal: [5a] 2♂, 28.xi.2010, 1♂, 15.xii.2010; [13g] 3♂, 16–17.vii.2009.

Distribution: Palaearctic species in Europe recorded from Belgium, Bulgaria, Czech Republic, Denmark, France incl. Corsica, Germany, Great Britain, Greece (Černý 2011a), Ireland, Italy, Lithuania, Poland, Portugal (Černý 2009) incl. Azores, Slovakia, Spain incl. Canary Islands, Sweden, Switzerland (Černý & Merz 2007). Also known from Iraq (Spencer 1981), Japan (Iwasaki 1997) and Turkey (Civelek 2003).

Biology: The larva form leaf mine on *Mentha*.

Phytomyza wahlgreni Rydén, 1944

Material examined: Portugal: [8c] 3♂, 10.v.2015, 1♂, 16.v.2015; [8k] 1♂, 4.x.2015.

Distribution: Holarctic species described from Sweden, in Europe recorded from Austria, Belarus, Czech Republic, Denmark, Estonia, Faroe Isl., Finland, France, Germany, Great Britain, Ireland, Italy, Latvia (Karpa 2008), Montenegro (Spasić 1996), Norway, Poland, Russia, Slovakia and Sweden. Species known also from China, Kuril Islands (Iwasaki 2000), Morocco (Černý & Merz 2006), Turkey (Çıkman & Sasakawa 2010), Uzbekistan (Černý & Merz 2006) and in North America known from the United States. First record from Portugal.

Biology: The larva feeds in the midrib of *Taraxacum officinale*.

Note. Females of *P. wahlgreni* are very difficult to distinguish from *P. rhabdophora* Griffiths, 1964 with which it occurs together on *Taraxacum* and *Leontodon* (von Tschirnhaus 1969). Constant helpful differentiation features may be mentioned here: Orbita without black edges

along eye margin and outside the two upper orbital setae; along the yellow hind edges of the tergites there is not a sharp exact border against the anterior black part of the tergite as in *rhabdophora*, black and yellow are flowing together; the upper yellow edge of the anepisternum is wider in *wahlgreni*, half-moon shaped with the convex side ventrally and the straight side touching the notopleuron.

Pseudonapomyza atra (Meigen, 1830)

Material examined: Portugal: [6g] 1♀, 16.xi.2014; [8f] 1♀, 21.vi.2015.

Distribution: Holarctic species known in Europe from Andorra (Černý 2007a), Austria, Belarus, Belgium, Bulgaria, Croatia (Černý 2009), Czech Republic, Denmark, Estonia, Finland, France incl. Corsica (Černý & Merz 2006), Germany, Great Britain, Greece (Černý & Merz 2006), Croatia (Černý 2009), Dalmatia (Spasić & Spencer 1992), Hungary, Italy incl. Sardinia (Černý 2006), Latvia, Lithuania, Maltese Islands (Černý 2005a), Netherlands, Norway (Andersen & Jonassen 1994), Poland, Portugal incl. Azores and Madeira Islands (Černý & Merz 2006), Romania, Russia, Slovakia, Spain incl. Canary Islands, Sweden, Switzerland (Černý 2005b), Ukraine and former Yugoslavia. Recorded also from Cape Verde Islands, Cyprus (Černý & Vála 2006), Egypt, India, Iran, Israel (Černý 2009), Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Tunisia (Černý 2009), Turkey, Turkmenistan, Uzbekistan, Yakutia (Nartshuk & Bagachanova 2010), and known in Canada, United States (Boucher 2004).

Biology: The larva forms leaf mine in leaves of many Poaceae, especially in *Agropyron*, *Apera*, *Avena*, *Hordeum*, *Lolium*, *Phalaris*, *Poa*, *Secale* and *Triticum*.

Pseudonapomyza europaea Spencer, 1973

Material examined: Portugal: [7b] 1♂, 28.iv.2017.

Distribution: Species originally known only from European locations and later recorded also from Iran (Ranji *et al.* 2015), Japan (Černý 2005c), Canada and the United States (Boucher 2004), Turkey (Černý 2005c). In Europe known from Andorra (Černý 2007a), Austria, Belgium, Bulgaria (Černý & Merz 2006), Czech Republic, Denmark (Petersen & von Tschirnhaus 2001), Estonia, Finland (Černý & Merz 2006), France, Germany, Great Britain, Greece (Černý 2011a), Hungary, Italy, Lithuania, Macedonia, Norway (Andersen & Jonassen 1994), Poland, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden (Zlobin 2005), Switzerland and Ukraine. First record from Portugal.

Biology: Host plants are certainly Poaceae, Greiler (1994) reported *Dactylis glomerata* as a host plant for *P. europaea*. In Canada (Quebec) specimens of *P. europaea* were collected in the same series as specimens of *P. atra* (Boucher 2004).

Pseudonapomyza hispanica Spencer, 1973

Material examined: Madeira: [2a] 6♂4♀, 22.vii.1995.

Distribution: Species described from Spain, later confirmed from Cyprus, Egypt, Gambia, Greece, Israel, Nigeria, Sierra Leone, Tanzania, Turkey, Yemen and Zambia (Černý & von Tschirnhaus 2014). M. von Tschirnhaus collected it in Spain, too, and on the islands of Crete and Corfu (Greece). Gil-Ortiz *et al.* (2010b) added Austria, France, Italy and Madeira but all without documented collecting data. First record with collecting data for Madeira.

Biology: Confirmed host plants are the Poaceae *Echinochloa crus-galli* (Deeming 2006) and *Sorghum halepense*.



14



15

Figs 14–15: Agromyzidae species. 14 – *Phytomyza plantaginis* Robineau-Desvoidy, male, dorsolaterally; 15 – *Phytomyza rufipes* Meigen, male, dorsolaterally. Photo by R. Andrade.

Pseudonapomyza insularis Zlobin, 1993

Material examined: Madeira: [2a] 1♂, 22.vii.1995.

Distribution: Described from Tenerife (Canary Islands) and the Afrotropical Cape Verde Islands, later recorded from Botswana, Gambia, Kenya, Sierra Leone and Zambia (Černý & Zlobin 2008). No further findings. First record for Madeira.

Biology: Host plants surely are Poaceae, as in all species of the *P. atra*-group.

Pseudonapomyza pallidinervis Zlobin, 2003

Material examined: Portugal: [7d] 1♂, 11.vi.2011, 1♂, 23.v.2012, 1♀, 19.iv.2015, 1♂, 16.vi.2017; [17j] 1♀, 12.iv.2009.

Distribution: Species known from Russia (European part), East Siberia, Kazakhstan and Mongolia. First records from Portugal and Western Europe.

Biology: Host and early stages unknown.

Pseudonapomyza spinosa Spencer, 1973

Material examined: Madeira, Porto Santo Island: [3a] 2♂, 9.vi.1987; [3b] 10♂12♀, 10.vi.1987. Portugal: [7d] 1♂, 16.vi.2017; [7i] 1♂, 16.viii.2013; [14b] 1♂, 9.viii.2016.

Distribution: This species is recorded from Afrotropical, Palaearctic and Oriental Regions (Černý & von Tscharnhaus 2014). In Europe it is known from Greece, Spain incl. Canary Islands and in Portugal to date it is known only from Vila Nova de Milfontes (Černý 2013). First record for Porto Santo and the Madeira archipelago.

Biology: Confirmed host plant genera are the Poaceae *Brachiaria*, *Eleusine*, *Hordeum*, *Triticum* and *Zea mays*.

Discussion

The new enlarged catalogue of the Portuguese Agromyzidae presented here indicates that the local fauna of this family on the Azores, Madeira and the Portuguese mainland is much richer than formerly known. A total of 142 species of Agromyzidae are recorded from Portugal, 64 species are new to the Portuguese mainland, 8 species represent the first records for Madeira and Porto Santo, and 5 species represent the first records for the Azores.

Altogether 76 species of Agromyzidae were previously known to occur in Portugal (Bella *et al.* 2013, Černý 2009, 2013, Černý & Merz 2006, Gil-Ortiz *et al.* 2011, Martinez & Báez 2002). Our records increase the number of Agromyzidae of Portugal to 142 by adding 66 hitherto unrecorded species. Compared with other European countries (e.g. Andorra 92 species, Spain 280 species, France 385 species, Great Britain 398 species) numerous additional species are expected to be discovered during field work in unstudied areas using appropriate collecting methods: Malaise traps, pan traps, sweeping and aspirating or rearing flies from infested plants.

A short comparison of March/April sweep net samples may throw some light on the confirmed poor agromyzid fauna of the Azores: Collecting 20 samples from 28.iii.–9.iv.1994 on the largest Azores island São Miguel (747 km²), M. von Tscharnhaus focused on obtaining Agromyzidae and Chloropidae with the result of eleven agromyzid (and six chloropid) species only. Collecting 24 samples during 18–29.iii.1985 on Gomera (Canary Islands) resulted in 30 species, in 15 samples from 30.iii.–3.iv.1985 on Tenerife 15 species were identified, 18 samples from 26.iii.–3.iv.1986 on Mallorca produced 35 species, and in 22 samples collected 15–27.iii.1987 on Crete (Greece) 36 agromyzid species were found. Compared with the Atlantic islands the low diversity may have three reasons: São Miguel is dominated by cattle pastures and agriculture with a low plant diversity, winter and spring bring much more precipitation, far off in the ocean and under permanent wind exposure the arrival of founder species and their population establishment is less probable.



Figs 16–21: Habitats of Agromyzidae. **16** – habitat of *Pseudonapomyza pallidinervis* Zlobin and *P. spinosa* Spencer, Apúlia e Fão (Espirito Santo); **17** – habitat of *Cerodontha (Cerodontha) fulvipes* (Meigen), *C. (Dizygomyza) luctuosa* (Meigen) and *Liriomyza orbona* (Meigen), Canelas e Fermelã (Estarreja); **18** – habitat of *Liriomyza latigenis* (Hendel) and *Metopomyza scutellata* (Fallén), Mindelo (Vila do Conde); **19** – habitat of *Agromyza hiemalis* Becker, *Hexomyza sarothonni* (Hendel), *Melanagromyza pubescens* Hendel, *Phytoliriomyza oasis* (Becker), Monforte da Beira (Castelo Branco); **20** – habitat of *Cerodontha (Butomomyza) mellita* Spencer, *Hexomyza sarothonni* (Hendel), *Phytomyza wahlgreni* Rydén, Espinhosela (Bragança); **21** – habitat of *Cerodontha (Icteromyza) rozkosnyi* Černý, *Phytomyza albipennis* Fallén, Valongo (Valongo). Photo by R. Andrade.

For the applied entomology and as a serious warning for staffs employed for fulfilling the European quarantine laws here we document the first transatlantic arrival of *Nemoromyza maculosa* as a neozoon in the Old World. In both Americas it attacks many vegetable plants and cut flowers belonging in plant genera of the Asteraceae and also in the Solanaceae. The papers of Ota & Nishida (1966) or Stegmaier (1967) are helpful as startpoints to study this species. Several further articles already deal with the parasitoids, competitors and other antagonistic organisms of this leaf miner.

We include new or additional information on several host plant genera of the treated Agromyzidae: *Allium* (Alliaceae), *Alnus* and *Betula* (Betulaceae), *Argyranthemum* and *Cotula* (Asteraceae), *Digitalis* and *Plantago* (Plantaginaceae), *Festuca* and *Phragmites* (Poaceae), *Galium* (Rubiaceae), *Juncus* (Juncaceae), *Lamium* (Lamiaceae), *Ranunculus* (Ranunculaceae), and *Salix* (Salicaceae). The unknown host plant of *Phytoliriomyza immoderata* is assumed to grow on the peaks of two extinct volcanoes on Gomera, being a worthwhile aim for a further search.

Updated checklist of the Agromyzidae of Portugal

(FE = Fauna europaea, P = Portuguese mainland 122 spp., A = Azores 23 spp., M = Madeira 33 spp., nA: new for the Azores fauna, nM: new for the Madeira fauna, nP: new for the Portuguese mainland fauna)

AGROMYZIDAE FALLEN, 1810 SUBFAMILY AGROMYZINAE

Agromyza Fallén, 1810

P	-	-	<i>abiens</i> Zetterstedt, 1848 – Černý & Merz 2006
P	-	-	<i>albipennis</i> Meigen, 1830 – nP
P	-	-	<i>conjuncta</i> Spencer, 1966 – nP
P	-	-	<i>hiemalis</i> Becker, 1908 – nP
P	-	-	<i>idaeiana</i> Hardy, 1853 – nP
P	-	-	<i>luteifrons</i> Strobl, 1906 – nP
P	-	-	<i>mobilis</i> Meigen, 1830 – Černý 2013
P	-	-	<i>nana</i> Meigen, 1830 – nP
P	-	-	<i>nigrociliata</i> Hendel, 1931 – nP
P	-	-	<i>prespana</i> Spencer, 1957 – Černý 2009
P	-	-	<i>pseudoreptans</i> Nowakowski, 1967 – Černý 2009
P	-	M	<i>reptans</i> Fallén, 1823 – Černý 2009, FE
P	-	-	<i>rondensis</i> Strobl, 1900 – nP
P	-	-	<i>spenceri</i> Griffiths, 1963 – nP

Hexomyza Enderlein, 1936

P	-	-	<i>cecidogena</i> (Hering, 1927) – nP
P	-	-	<i>kiefferi</i> (Tavares, 1901) – FE
P	-	-	<i>sarothamni</i> (Hendel, 1923) – Černý & Merz 2006

Japanagromyza Sasakawa, 1958

P	A	-	<i>salicifolii</i> (Collin, 1911) – FE
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Melanagromyza Hendel, 1920

P	-	-	<i>aenea</i> (Meigen, 1830) – nP
P	-	-	<i>aeneoventris</i> (Fallén, 1823) – nP
P	-	-	<i>albocilia</i> Hendel, 1931 – Černý 2009
P	-	-	<i>cunctans</i> (Meigen, 1830) – nP
-	A	-	<i>lappae</i> (Loew, 1850) – FE
P	-	-	<i>pubescens</i> Hendel, 1923 – nP
P	-	-	<i>siciliensis</i> Spencer, 1966 – nP

Ophiomyia Braschnikov, 1897

P	-	-	<i>alliariae</i> Hering, 1954 – nP
P	-	M	<i>beckeri</i> (Hendel, 1923) – Černý & Merz 2006, FE
P	-	-	<i>curvipalpis</i> (Zetterstedt, 1848) – nP
P	-	-	<i>galii</i> Hering, 1937 – nP

P	-	-	<i>heracleivora</i> Spencer, 1957 – Černý 2013
P	-	-	<i>heringi</i> Starý, 1930 – nP
P	-	-	<i>labiatarum</i> Hering, 1937 – nP
P	-	-	<i>melandryi</i> de Meijere, 1924 – nP
P	-	-	<i>moravica</i> Černý, 1994 – nP
P	-	-	<i>orbiculata</i> (Hendel, 1931) – Černý 2013
P	-	-	<i>pulicaria</i> (Meigen, 1830) – Černý 2013
P	-	-	<i>vimmeri</i> Černý, 1994 – nP

SUBFAMILY PHYTOMYZINAE

Amauromyza Hendel, 1931

subgenus ***Cephalomyza*** Hendel, 1931

P	-	-	<i>flavifrons</i> (Meigen, 1830) – nP
P	-	-	<i>luteiceps</i> (Hendel, 1920) – nP
P	-	-	<i>monfalconensis</i> (Strobl, 1909) – Černý 2009

Aulagromyza Enderlein, 1936

P	-	-	<i>discrepans</i> (van der Wulp, 1871) – Černý 2009
P	-	-	<i>orphana</i> (Hendel, 1920) – nP
P	-	-	<i>trivittata</i> (Loew, 1873) – Černý 2013

Cerodontha Rondani, 1861

subgenus ***Butomomyza*** Nowakowski, 1967

P	-	-	<i>angulata</i> (Loew, 1869) – nP
P	-	-	<i>mellita</i> Spencer, 1971 – nP

subgenus ***Cerodontha*** Rondani, 1861

-	A	-	<i>bistrigata</i> Frey, 1945 – FE
P	A	M	<i>denticornis</i> (Panzer, 1806) – Černý & Merz 2006, FE
P	-	-	<i>fulvipes</i> (Meigen, 1830) – nP
P	-	-	<i>phragmitophila</i> Hering, 1935 – nP
P	-	-	<i>vandalitiensis</i> Spencer, 1965 – Černý 2009

subgenus ***Dizygomyza*** Hendel, 1920

P	-	-	<i>bimaculata</i> (Meigen, 1830) – nP
P	-	-	<i>iraeos</i> (Robineau-Desvoidy, 1851) – nP
P	-	-	<i>iridis</i> (Hendel, 1927) – FE
P	-	-	<i>luctuosa</i> (Meigen, 1830) – Gil-Ortiz <i>et al.</i> 2011
P	-	-	<i>luzulae</i> (Groschke, 1957) – nP
P	A	M	<i>morosa</i> (Meigen, 1830) – nP, FE
-	-	M	<i>suturalis</i> (Hendel, 1931) – nM

subgenus ***Icteromyza*** Hendel, 1931

P	-	-	<i>capitata</i> (Zetterstedt, 1848) – nP
P	-	-	<i>geniculata</i> (Fallén, 1823) – nP
P	-	-	<i>rozkosnyi</i> Černý, 2007 – nP

subgenus ***Poemyza*** Hendel, 1931

P	-	-	<i>incisa</i> (Meigen, 1830) – Černý 2013
-	-	M	<i>melicae</i> Nowakowski, 1973 – nM
P	-	-	<i>muscina</i> (Meigen, 1830) – nP
-	-	M	<i>pygmaea</i> (Meigen, 1830) – FE

subgenus ***Xenophytomyza*** Frey, 1946

P	-	-	<i>atronitens</i> (Hendel, 1920) – Černý & Merz 2006
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Chromatomyia Hardy, 1849

P	-	-	<i>aprilina</i> (Goureau, 1851) – FE
P	-	-	<i>farfarella</i> (Hendel, 1935) – nP
P	A	M	<i>horticola</i> (Goureau, 1851) – Griffiths 1967, FE
-	-	M	<i>lindbergi</i> (Spencer, 1957) – nM
P	-	-	<i>mili</i> (Kaltenbach, 1864) – Gil-Ortiz <i>et al.</i> 2011
P	A	M	<i>nigra</i> (Meigen, 1830) – nA, nP, FE
P	-	-	<i>syngenesiae</i> Hardy, 1849 – FE

Liriomyza Mik, 1894

-	-	M	<i>amoena</i> (Meigen, 1830) – FE
-	-	M	<i>analis</i> (Rondani, 1875) – FE
-	A	-	<i>artemisicola</i> de Meijere, 1924 – nA

P	-	-	<i>brassicae</i> (Riley, 1884) – Černý & Merz 2006
P	A	-	<i>bryoniae</i> (Kaltenbach, 1858) – FE
P	-	-	<i>cicerina</i> (Rondani, 1875) – FE
P	-	-	<i>congesta</i> (Becker, 1903) – Černý 2013
-	-	M	<i>euphorbiana</i> Hendel, 1931 – FE
P	-	-	<i>flaveola</i> (Fallén, 1823) – Černý 2013
P	-	M	<i>huidobrensis</i> (Blanchard, 1926) – FE
P	-	-	<i>infuscata</i> Hering, 1926 – nP
P	-	-	<i>latigenis</i> (Hendel, 1920) – nP
-	A	-	<i>nigrifrons</i> Hendel, 1920 – FE
P	-	M	<i>orbona</i> (Meigen, 1830) – nP
P	-	-	<i>pedestris</i> Hendel, 1931 – nP
P	-	-	<i>ptarmicae</i> de Meijere, 1925 – Gil-Ortiz <i>et al.</i> 2011
P	-	-	<i>richteri</i> Hering, 1927 – Gil-Ortiz <i>et al.</i> 2011
P	-	M	<i>strigata</i> (Meigen, 1830) – P = Gil-Ortiz <i>et al.</i> 2011
P	-	-	<i>taraxaci</i> Hering, 1927 – Černý 2009
P	-	-	<i>trifolii</i> (Burgess in Comstock, 1880)
P	A	-	<i>umbilici</i> Hering, 1927 – FE
<i>Metopomyza</i> Enderlein, 1936			
P	-	-	<i>scutellata</i> (Fallén, 1823) – nP
<i>Napomyza</i> Westwood, 1840			
P	A	-	<i>bellidis</i> Griffiths, 1967 – nP, FE
P	A	M	<i>lateralis</i> (Fallén, 1823) – Černý & Merz 2006, FE
P	-	-	<i>merita</i> Zlobin, 1993 – nP
P	A	-	<i>scrophulariae</i> Spencer, 1966 – Černý 2013, nA
<i>Nemoromyza</i> Frey, 1946			
-	-	M	<i>maculosa</i> (Malloch, 1913) – nM
<i>Phytobia</i> Lioy, 1864			
P	-	-	<i>cambii</i> (Hendel, 1931) – nP
<i>Phytoliriomyza</i> Hendel, 1931			
P	A	M	<i>arctica</i> (Lundbeck, 1901) – nP, FE
P	-	-	<i>dorsata</i> (Siebke, 1863) – nP
P	-	-	<i>immoderata</i> Spencer, 1963 – nP
P	-	-	<i>jacarandae</i> Steyskal & Spencer, 1978 – Bella 2013
-	A	-	<i>mikii</i> (Strobl, 1898) – nA
P	-	-	<i>oasis</i> (Becker, 1907) – nP
P	-	M	<i>pectoralis</i> Becker, 1908 – P = Černý 2013
P	-	-	<i>perpusilla</i> (Meigen, 1830) – Černý 2013
P	-	-	<i>pteridii</i> Spencer, 1973 – FE
P	-	M	<i>scotica</i> Spencer, 1962 – FE
<i>Phytomyza</i> Fallén, 1810			
-	-	M	<i>affinis</i> Fallén, 1823 – FE
P	-	-	<i>albibennis</i> Fallén, 1823 – nP
P	-	-	<i>bellidina</i> Hendel, 1934 – FE
P	-	-	<i>cineracea</i> Hendel, 1920 – nP
P	-	-	<i>clematidis</i> Kaltenbach, 1859 – nP
P	-	-	<i>conyzae</i> Hendel, 1920 – FE
P	-	-	<i>crassiseta</i> Zetterstedt, 1860 – Černý 2009
P	-	-	<i>evanescens</i> Hendel, 1920 – nP
P	-	-	<i>fallaciosa</i> Brischke, 1880 – nP
-	-	M	<i>flavicornis</i> Fallén, 1823 – FE
P	-	-	<i>gymnostoma</i> Loew, 1858 – nP
P	-	-	<i>medicaginis</i> Hering, 1925 – Černý 2009
P	A	M	<i>obscura</i> Hendel, 1920 – Černý & Merz 2006, FE
-	-	M	<i>obscurella</i> Fallén, 1823 – FE
P	-	-	<i>pastinaceae</i> Hendel, 1923 – FE
P	A	M	<i>plantaginis</i> Robineau-Desvoidy, 1851 – Černý & Merz 2006, nM, FE
P	A	M	<i>ranunculi</i> (Schrank, 1803) – P = Černý 2013, FE
P	-	-	<i>ranunculivora</i> Hering, 1932 – nP
P	A	M	<i>rufipes</i> Meigen, 1830 – nA, nP, FE

P	-	-	<i>sedi</i> Kaltenbach, 1869 – nP
P	-	-	<i>smyrnii</i> Spencer, 1954 – FE
P	-	-	<i>spondyliae</i> Robineau-Desvoidy, 1851 – FE
-	A	M	<i>tenella</i> Meigen, 1830 – FE
P	A	-	<i>tetrasticha</i> Hendel, 1927 – Černý 2009
P	-	-	<i>wahlbergi</i> Rydén, 1944 – nP
<i>Pseudonapomyza</i> Hendel, 1920			
P	A	M	<i>atra</i> (Meigen, 1830) – Černý & Merz 2006, FE
P	-	-	<i>europaea</i> Spencer, 1973 – nP
-	-	M	<i>hispanica</i> Spencer, 1973 – nM
-	-	M	<i>insularis</i> Zlobin, 1993 – nM
P	-	-	<i>pallidinervis</i> Zlobin, 2003 – nP
P	-	M	<i>spinosa</i> Spencer, 1973 – Černý 2013, nM
P	-	-	<i>vota</i> Spencer, 1973 – Černý & Merz 2006

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