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New taxa to the flora of Madeira archipelago islands (Portugal)

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Abstract. 73 new references for 72 taxa of vascular plant are here reported for the Madeira archipelago. 55 not previously recorded for Desertas Islands, 12 to Porto Santo Island and 6 for Madeira Island. Of the 72 taxa, 28 are xenophytes, and 10 are new taxa to the flora of the archipelago (of these 9 are xenophytes). Their native status, taxonomy and distribution are briefly discussed.
Keywords: Madeira archipelago; vascular plants; new records; xenophytes.

[es] Nuevos taxones para la flora de las islas del archipiélago de Madeira (Portugal)

Resumen. Se recogen 73 nuevas referencias incluyendo 72 taxones de plantas vasculares para el archipiélago de Madeira. 55 nuevos registros para las islas Desertas, 12 para la isla de Porto Santo y 6 para la isla de Madeira. De los 72 nuevos taxa, 28 corresponden a xenófitos, y 10 a nuevos táxones para el archipiélago (de los cuales 9 son xenófitos). Se discute brevemente la naturalidad, taxonomía y distribución.
Palabras clave: Archipiélago de Madeira; plantas vasculares; nuevos registros; xenófitos.

Introduction

The Madeira archipelago is located in the NE Atlantic, about 795 km SW of mainland Portugal, between latitudes 32º 24'N and 33º 07'N and longitudes 16º 16'W and 17º 16'W. It consists of the volcanic islands of Madeira (with an area of 734 Km^2 and highest altitude of 1861m), Porto Santo (42 km^2, 517m) and its 6 islets, and the uninhabited Desertas subarchipelago (Ilhéu Chão, 0.5 km^2, 98 m high; Deserta Grande, 10.3 km^2, 479 m high and Bugio, 4 km^2, 384 m high).

Porto Santo Island, with an age of approximately 14 Ma is much older than Madeira Island (< 7 Ma) (Ramalho et al. 2015), and much lower with a smoother orography resulting from an intense erosion process. The Desertas Islands with an age of 5.07 Ma (Mata 2013), belong to the same volcanic complex of Madeira Island.

The Madeira archipelago, together with the archipelagos of Selvagens, Azores, Canary Islands and Cape Verde, form the Macaronesia region (*e.g.* Hansen & Sunding 1993; Jardim & Menezes de Sequeira 2008).

Jardim & Menezes de Sequeira (2008) listed 1204 taxa of vascular plants for Madeira and Selvagens Archipelagos, based on published data, and including 154 taxa endemic to this area, 74 Macaronesian endemics, 480 stated as native, 66 as "possible natives", 29 as "possible introduced" and 401 as "introduced" taxa.

Several additions to the above referred checklist were published since 2008. New species endemic to Madeira Archipelago have been described, *e.g. Holcus pintodasilvae* M. Seq. & Castrov., *Pericallis menezesii* R. Jardim, K.E. Jones, Carine & M. Seq., *Viola sequeirae* Capelo, R. Jardim, J.C. Costa, Lousã & Rivas Mart. (Capelo et al. 2013, Menezes de Sequeira & Castroviejo 2013, Jones et al. 2014). Other species changed its native status and former Macaronesian endemisms are now endemic to Madeira archipelago, *e.g. Andryala glandulosa* Lam., *Aichryson villosum* Webb & Berthel. (Ferreira et al. 2014, Moura et al. 2018). New records to the flora of Madeira and Porto Santo islands, mainly xenophytes and some of them with invasive character were published, *e.g. Malephora crocea* (Jacq.) Schwantes, *Melinis repens* (Willd.) Zizka, *Atriplex semibaccata* R.Br. (Jardim & Menezes de Sequeira 2014, 2015a).

Here we present new references for the islands of Madeira archipelago (Madeira, Porto Santo and the Desertas) based on field collections kept as herbarium specimens.

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Material and methods

Results are based on specimens collected in the Madeira archipelago, including Madeira Island, Porto Santo and its islets, and the Desertas islands. These specimens are kept at UMAD, MADJ and MA herbaria.

The taxonomical treatment follows Jardim and Menezes de Sequeira (2008), Flora iberica (Castroviejo 1986-2015) as well as several monographic publications, *e.g.* Paton et al. (2019).

The archipelago of Madeira is made up of 3 main geographical units. The island of Madeira, the island of Porto Santo and the group of islands of Desertas. Porto Santo is here referred to Porto Santo Island and its islets, and Desertas are referred to the islands of Deserta Grande, Bugio and Ilhéu Chão.

Results and discussion

73 new references for 72 taxa of vascular plant are reported for the first time as native or naturalized, either for one of the islands belonging to the Madeira archipelago, or for all the studied area. Their native status, taxonomy and distribution are briefly discussed.

PTERIDOPHYTA
PTERIDACEAE
Pteris vittata L.
Native to Mediterranean region (Gibby & Paul 1994), naturalized in Madeira, on rocks and walls, manly in Funchal region. Found at Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Doca, 7-IV-2006, *R. Jardim* (MADJ 11339).

SPERMATOPHYTA
MAGNOLIOPSIDA
AIZOACEAE
Tetragonia tetragonoides (Pall.) Kuntze
Native to Australia and New Zeland (Short 1994a), naturalized in Madeira and Porto Santo, was found on Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: arredores da casa-doca, 5 m, exp. NW, 25-II-2006, *L. Carvalho, M. Silva, D. Menezes, I. Silva* LC447 (UMAD 1060).

AMARANTHACEAE
Alternanthera pubiflora (Benth.) Kuntze
Native to Central and South America (Burger 1983), already has been referred as naturalized in Porto Santo (Jardim & Menezes de Sequeira 2015b). Found now naturalized in Madeira Island, W of Funchal.

PORTUGAL, MADEIRA: Funchal, promenade Praia Formosa-Câmara de Lobos, 29-IV-2016, *R. Jardim* RJ6428 (UMAD).

Amaranthus blitoides S. Watson
Native to N America (Carretero 1990), was found in Porto Santo Island, in abandoned agriculture field, and represents a new reference for the Madeira archipelago.

PORTUGAL, MADEIRA: Porto Santo: Assoprões, terrenos agrícolas, próximo ao Aeroporto, ca. 95 m, 5-I-2012, *R. Jardim* RJ1891 (UMAD).

Amaranthus retroflexus L.
Native to N America (Carretero 1990), already naturalized in Madeira, found in Porto Santo Island as a weed in roadsides and cultivated areas.

PORTUGAL, MADEIRA: Porto Santo: Campo de Cima, na berma de caminho, ca. 55 m, 6-IX-2016, *R. Jardim* RJ6591 (UMAD); Campo de Cima, Estrada das Areias, em terreno agrícola, ca. 65 m, 30-XI-2016, *R. Jardim* RJ6619 (UMAD).

Amaranthus viridis L
Nitrophilous tropical and subtropical plant of unknown origin (Carretero 1990), naturalized in Madeira, found naturalized in in roadsides of Porto Santo.

PORTUGAL, MADEIRA: Porto Santo: Tanque, na berma da estrada, próximo da ribeira, ca. 44 m,14-VII-2011, *R. Jardim* RJ1764 (UMAD); Sítio do Tanque, campos agrícolas, ca. 65 m, 9-VIII-2015, *R. Jardim* RJ6244 (UMAD).

ASTERACEAE
Argyranthemum frutescens (L.) Sch. Bip.
Canary Islands endemic plant (Bramwell & Bramwell 2001), largely cultivated in Madeira and Porto Santo as ornamental plant, has been found naturalized in the Madeira archipelago only in Porto Santo Island.

PORTUGAL, MADEIRA: Porto Santo: Rocha de Nossa Senhora, berma do caminho, ca.185 m, 19-II-2012, *R. Jardim* RJ1995 (UMAD); Rocha de Nossa Senhora, talude acima da estrada, ca. 160 m, 31-III-2016, *R. Jardim* RJ6423 (UMAD); Vale do Touro, no leito da ribeira, ca. 36 m, 1-IV-2018, *R. Jardim* RJ6869 (UMAD).

Bidens pilosa L.
Native to S America (Press 1994a) naturalized in Madeira and Porto Santo, found in Deserta Grande Island. The introduction of *Bidens pilosa* in Desertas, near the area used for disembarking, could result from achenes attached in the footwear and clothes of visitors (see Global Invasive Species Database 2021).

PORTUGAL, MADEIRA: Deserta Grande: arredores da casa-doca, 5 m, exp. NW, 25-II-2006, *L. Carvalho, M. Silva, D. Menezes, I. Silva* LC451 (UMAD 1064); Doca, 7-IV-2006, *R. Jardim* (MADJ 11342).

Conyza sumatrensis (Retz.) E.H. Walker
Native to S America (Press 1994a) and naturalized in Madeira and Porto Santo, on roadsides and as a part of other ruderal plant communities. Here referred for the first time for Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Doca, 30-III-1999, *S. Fontinha, R. Jardim* (MADJ 9149); arredores da casa-doca, 5 m, exp. NW, 25-II-2006, *L. Carvalho, M. Silva, D. Menezes, I. Silva* LC449 (UMAD 1062); Vale depois das Eiras-Topo, 26-II-2006, *L. Carvalho, M. Silva, D. Menezes, L. Oliveira* LC495 (UMAD1107); Topo, perto do Vale da Castanheira, 14-V-2006, *L. Carvalho, M. Silva, P. Gouveia* LC849 (UMAD 1570).

Helichrysum obconicum DC.
Putative Madeira Island endemic species (Jardim & Menezes de Sequeira 2008), occurring in rocky sea cliffs, in north and south cost of Madeira Island. Collected by Isamberto Silva in the Ilhéu Chão enlarging the range to the Desertas. *H. obconicum* should be considered as a Madeira archipelago endemic.

PORTUGAL, MADEIRA: Desertas: Ilhéu Chão, 15 m, 26-III-2015, *I. Silva* (MADJ 13873)

Youngia japonica (L.) DC. subsp. ***japonica***
Species native to SE Asia considered a pantropical weed (Spurr 2006), fully naturalized in Madeira, in gardens, lawns, roadsides, rapidly spreading and becoming common in pavements, mainly in Funchal area.

PORTUGAL, MADEIRA: Funchal, Imaculado Coração de Maria, na berma da estrada dos Marmeleiros, 230 m, 4-IV-2014, *R. Jardim* RJ5043 (UMAD); Funchal, São Martinho, próximo da Travessa do Moinho da Areia, na berma da Levada dos Piornais, ca.130 m, 17-V-2018, *R. Jardim* RJ6961 (UMAD); Funchal, junto à via rápida na entrada de St. Rita, 8-II-2021, *M. Sequeira, C. Bairos* MS9919 (UMAD).

BRASSICACEAE
Diplotaxis tenuifolia (L.) DC.
Native to S and E Europe, naturalized in N Europe, cultivated in N Africa, naturalized elsewhere, namely W Asia, America and Oceania (Martínez Laborde 1993, 2010), found naturalized in Madeira along roadsides, waste areas and levadas near Funchal. This species was also recently reported as naturalized in Porto Santo (Jardim & Menezes de Sequeira 2014).

PORTUGAL, MADEIRA: Funchal, São Gonçalo, 100 m, na berma da estrada, 27-IX-2017, *R. Jardin, M. Sequeira* MS8476 (UMAD).

Hymenolobus procumbens (L.) Nutt. subsp. ***procumbens***
Native to the Mediterranean region, W Asia and America (Morales 1993), found in Deserta Grande.

Porto Santo specimens identified as *Teesdalia coronopifolia* (J.P. Bergeret) Thell correspond also to *Hymenolobus procumbens* subsp. *Procumbens*. In fact, the number of seeds per locule largely exceeds the description given by Short (1994b) "Seeds usually 2 in each locule" for Porto Santo plants. Although Lowe (1851: 33) refers to *Teesdalia lepidium* DC., *i.e.* to *Teesdalia coronopifolia* his observations are based on "The few pl. observed were quite out of fl. and nearly burnt up when discovered early in May". *T. coronopifolia* should therefore be excluded from Madeira archipelago Flora and *Hymenolobus procumbens* subsp. *procumbens* be included as native to Porto Santo. This was possibly an overlooked plant in the Desertas and therefore the native status could also be accepted to these islands.

PORTUGAL, MADEIRA: Deserta Grande: Risco, 8-III-1998, *R. Jardim, S. Fontinha* (MADJ 8816); Porto Santo: Porto dos Frades, III-1940,J. *Costa* (MADS 106); Marinhas, na vereda junto à captação de água, 100 m, exp. NE, 14-II-2013, *R. Jardim* RJ3509 (UMAD); Morenos, ponta da Cana Vieira, 2-III-2007, *S. Castroviejo, M. Velayos, C, Aedo, R. Jardim, M. Sequeira L. Medina* LM3884 (MA-01-00757346); Fonte de Areia, 19-III-2007, *S. Castroviejo, M. Velayos, C, Aedo, R. Jardim, M. Sequeira & L. Medina* LM3794 (MA-01-00757641).

Sisymbrium erysimoides Desf.
Native to SW Europe, N and E Africa, SW Asia, and Madeira and Porto Santo, introduced in Azores and doubtful native in the Canary Islands (Pujadas 1993; Jardim & Menezes de Sequeira 2008; Marhold 2011), found in the top of Ilhéu Chão (Desertas).

PORTUGAL, MADEIRA: Desertas: Ilhéu Chão-Topo, 7-III-1998, *R. Jardim, S. Fontinha, F. Vieira, H. Fernandes* (MADJ 8815); Desertas. Ilhéu Chão-Topo, 29-III-1999, *R. Jardim, S. Fontinha* (MADJ 9166).

CALLITRICHACEAE
Callitriche stagnalis Scop.
Native to Madeira and referred for Porto Santo (Short 1994c) but not recently collected, found at Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Vale da Castanheira (lago), 8-III-1998, *R. Jardim, S. Fontinha, F. Vieira, H. Fernandes* (MADJ 8817); Deserta Grande: Cisterna do Cabeço da Doca, 27-III-1999, *R. Jardim, S. Fontinha* (MADJ 9167).

CARYOPHYLLACEAE
Stellaria media (L.) Vill.
Common native nitrophilous species in Madeira and Porto Santo (Jardim & Menezes de Sequeira 2008), reported for the first time to Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Risco, 8-III-1998, *R. Jardim, S. Fontinha* (MADJ 8826); Risco, 28-III-1999, *R. Jardim, S. Fontinha* (MADJ 9177); Vale da Castanheira, 2-III-2006, *L. Carvalho, M. Silva* LC554 (UMAD 1168).

CHENOPODIACEAE

Chenopodium ambrosioides L.

Native to Madeira and Porto Santo Islands (Jardim & Menezes de Sequeira 2008), was found for the first time at Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Pedregal, 450 m, 9-VIII-2002, *I. Silva* (MADJ 10934); Vale da Castanheira, 6-IV-2006, *R. Jardim, I. Silva* (MADJ 11311).

CONVOLVULACEAE

Convolvulus althaeoides L.

Native to Mediterranean and Macaronesian regions (Silvestre 2012a), common in Madeira and Porto Santo, here referred for first time in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: subida da Castanheira, 350 m, 2-V-2006, *I. Silva* (MADJ 11385).

Convolvulus arvensis L.

Common native species in Madeira and Porto Santo (Jardim & Menezes de Sequeira 2008), found in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Vale da Castanheira, 9-VIII-2002, *I. Silva* (MADJ 10935); Deserta Grande: Topo, 4-IV-2006, *R. Jardim, I. Silva* (MADJ 11209); Deserta Grande: Topo, perto do Vale da Castanheira, 14-V-2006, *L. Carvalho, M. Silva, P. Gouveia* LC846, (UMAD 1567); Vale da Castanheira, 3-VII-2008, *C. Nóbrega* (MADJ 11511).

Convolvulus siculus L. subsp. ***siculus***

Native to Mediterranean and Macaronesian regions (Silvestre 2012a), occurring in Madeira and Porto Santo Island, has been found in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Vale da Castanheira, 29-III-1999, *R. Jardim, S. Fontinha* (MADJ 9183).

Cuscuta approximata Bab.

Native to Porto Santo (Turland 1994) was found in Deserta Grande, growing on *Vicia parviflora* Cav., *Stachys arvensis* (L.) L. and *Lotus glaucus* Aiton subsp. *glaucus*.

PORTUGAL, MADEIRA: Deserta Grande: Pedregal, 16-V-1984, *M. Nóbrega* (MADJ 6790); Deserta Grande: Doca, 27-III-1999, *R. Jardim, S. Fontinha* ((MADJ 9184).

Dichondra micrantha Urb.

Native to Central America (Silvestre 2012b), naturalized in Madeira (Jardim & Menezes de Sequeira 2008), found naturalized in Deserta Grande and Bugio.

PORTUGAL, MADEIRA: Desertas: Deserta Grande, planalto sul, 380 m, 27-V-2007, *I. Silva* (UMAD); Bugio, 15-IV-2013, *J. Carvalho, I. Silva* (MADJ 14288); Deserta Grande-topo Sul, 19-V-2015, *F. Fernandes* (MADJ 13904).

EUPHORBIACEAE

Chamaesyce hypericifolia (L.) Millsp.

According to Sciandrello et al. (2016) this taxon is native to the tropical and subtropical New World and is regarded as an invasive weed elsewhere. Found in Funchal as ruderal plant, it is possibly an overlooked introduction due to the general similarity with *Chamaesyce nutans* (Lag.) Small (= *Euphorbia refracta* Lowe; *E. preslii* Guss.), naturalized in Madeira at least since the XIX century (Menezes 1914).

PORTUGAL, MADEIRA: Funchal, Ponta da Cruz, na berma da promenade, ca. 35 m, 26-VI-2019, *R. Jardim* RJ7023 (UMAD); Funchal, Travessa do Moinho da Areia, na berma, ca. 130 m, 5-VII-2019, *R. Jardim* RJ7024 (UMAD).

FABACEAE

Acacia saligna (Labill.) H.L.Wendl.

Species native to W Australia and Tasmania (Paiva 1999), found fully naturalized in Porto Santo, already referred by Vieira (2002) as an escape, long planted in gardens and parks in Madeira and Porto Santo.

PORTUGAL, MADEIRA: Porto Santo: Morenos, ca. 100 m, 22-II-2012, *R. Jardim* RJ2042 (UMAD).

Bituminaria bituminosa (L.) C.H. Stirt.

Native to Madeira and Porto Santo islands (Jardim & Menezes de Sequeira 2008), found in the Deserta Grande and Ilhéu Chão. Possible introduced plant taxa in the Desertas islands.

PORTUGAL, MADEIRA: Desertas: Deserta Grande, Doca, 28-V-2007, *I. Silva* (UMAD); Ilhéu Chão, 13-IV-2013, *J. Carvalho, I. Silva* (MADJ 14211); Deserta Grande, 19-IV-2013, *J. Carvalho, I. Silva* (MADJ 14287).

Cytisus striatus (Hill) Rothm.

Species native to W Iberian Peninsula and NW Morocco (Talavera 1999) found naturalized in top of Deserta Grande, near Pedregal. Troublesome invasive in Madeira, in Porto Santo only occurs in Pico do Castelo (Jardim & Menezes de Sequeira 2014).

PORTUGAL, MADEIRA: Deserta Grande: vereda Cabeço da Doca-Pedregal, 5-IV-2006, *R. Jardim* (MADJ 11276).

Scorpiurus vermiculatus L.

Native to W Mediterranean region and Macaronesia (Madeira and Canary Islands) (Talavera & Domínguez 2000), found in Deserta Grande. A further specimen of *Scorpiurus* was collected in Ilhéu Chão in 12-IV-1983 (MADJ 6806) but with no flowers or fruit, preventing therefore a positive identification of the species. It is remarkable that *Scorpiurus sulcatus* L., a common species in Madeira and Porto Santo islands, was never referred or collected in Desertas islands.

PORTUGAL, MADEIRA: Deserta Grande: Vale da Castanheira, 6-IV-2006, *R. Jardim, I. Silva* (MADJ 11318).

Trifolium striatum L. subsp. ***striatum***
Native to Madeira and Porto Santo (Jardim & Menezes de Sequeira 2008) found in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Topo, 4-IV-2006, *R. Jardim* (MADJ 11216).

Trifolium tomentosum L.
Native to Madeira and Porto Santo (Jardim & Menezes de Sequeira 2008), found in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: vale depois à vigia, 26-II-2006, *L. Carvalho, D. Menezes, L. Oliveira, M. Silva*, LC521 (UMAD 1130); Deserta Grande: Vale depois das Eiras-topo, 26-II-2006, *L. Carvalho, D. Menezes, L. Oliveira, M. Silva* LC493 (UMad 1105); Deserta Grande: Vereda vigia Sul, 4-IV-2006, *R. Jardim* (MADJ 11217).

Ulex europaeus L. subsp. ***europaeus***
Native to W Europe (Cubas 1999), naturalized in Madeira Island, where it became a troublesome invasive, and Porto Santo. Found naturalized in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Vale da Castanheira, 2-III-2006*, L. Carvalho, M. Silva* LC548 (UMAD 1162); Deserta Grande: Vale da Castanheira, 6-IV-2006, *R. Jardim, I. Silva* (MADJ 11320).

Ulex minor Roth
Native from Britain to Portugal, naturalized in Madeira and recorded for Porto Santo (Cannon & Turland 1994), found in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Vale da Castanheira, 6-IV-2006, I. Silva, R. Jardim, MADJ 11321.

Vicia benghalensis L.
Native to Madeira and Porto Santo (Jardim & Menezes de Sequeira 2008), found in Desertas in the Ilhéu Chão.

PORTUGAL, MADEIRA: Desertas: Ilhéu Chão, 9-V-2006, *L. Carvalho, P. Gouveia, M. Silva* LC783 (UMAD 1504); Desertas: Ilhéu Chão, 13-IV-2013, *J. Carvalho, I. Silva* (MADJ 14228).

Vicia disperma DC.
Native to Madeira (Jardim & Menezes de Sequeira 2008), reported for the Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande, 19-IV-2013, *J. Carvalho, I. Silva* (MADJ 14211); Deserta Grande, 19-IV-2013, *J. Carvalho, I. Silva* (MADJ 14208).

Vicia lutea L. subsp. ***lutea***
Native to Madeira and Porto Santo (Jardim & Menezes de Sequeira 2008), found in the Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Topo Sul, 19-V-2015, *F. Fernandes, I. Silva, D. Teixeira* (MADJ 13921).

Vicia pubescens (DC.) Link
Native to Madeira (Jardim & Menezes de Sequeira 2008), found in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Vale da Castanheira, 6-IV-2006, *R. Jardim* (MADJ 11323).

GERANIACEAE

Geranium dissectum L.
Native to Madeira and Porto Santo (Jardim & Menezes de Sequeira 2008), found in Deserta Grande)

PORTUGAL, MADEIRA: Deserta Grande: Vale da Castanheira, 29-III-1999, *S. Fontinha, R. Jardim* (MADJ 9200).

Geranium molle L.
Native to Madeira and Porto Santo (Jardim & Menezes de Sequeira 2008), found in the top of Bugio Island.

PORTUGAL, MADEIRA: Desertas: Bugio, 18-IV-2006, *L. Carvalho, M. Sequeira, M. Silva* MS4835 (UMAD 1344).

Geranium purpureum Vill.
Native to Madeira and Porto Santo (Jardim & Menezes de Sequeira 2008), found in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: vereda Cabeço da Doca-Pedregal, 5-IV-2006, *R. Jardim* (MADJ 11281).

LAMIACEAE
Coleus barbatus var. ***grandis*** (L.H.Cramer) A.J.Paton
Native to Central, N and E Tropical Africa (Paton et al. 2019) mainly cultivated in gardens in Madeira and Porto Santo for medicinal use, was found naturalized in several places in South coast Madeira between Caniçal and Fajã da Ovelha. The Madeiran plants are aromatic shrubs up to 4 m tall, with large leaves, corresponding to var. *grandis* (Lukhoba & Paton 2003).

PORTUGAL, MADEIRA: Fajã da Ovelha, 28-VI-2007, *L. Ramos, M. Sequeira* MS5030 (UMAD); Caniço, Rua da Olaria, na berma, ca. 348 m, 28-VI-2021, *R. Jardim* RJ7068 (UMAD).

Stachys ocymastrum (L.) Briq.
Native to Madeira and Porto Santo (Jardim & Menezes de Sequeira 2008), found in the top of Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: vereda Cabeço da Doca-Pedregal, 5-IV-2006, *R. Jardim* (MADJ 11284); Deserta Grande: Topo, 12-V-2006, *L. Carvalho, P. Gouveia, M. Silva* LC825 (UMAD 1546).

OXALIDACEAE
Oxalis pes-caprae L.
Native to Cape Province, South Africa (Sánchez Pedraja 2015), an invasive weed in Madeira and Porto

Santo (Jardim & Menezes de Sequeira 2008), found in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Vale da Castanheira, 2-III-2006, *L. Carvalho, M. Silva* LC547 (UMAD 1160); Deserta Grande: Vale da Castanheira, 6-IV-2006, *R. Jardim* (MADJ 11332); Deserta Grande: Risco, 3-VII-2008, *C. Nóbrega* (MADJ 10781).

PAPAVERACEAE

Fumaria agraria Lag.

Native to W Mediterranean (Líden 1986), found naturalized in Porto Santo in roadsides, agriculture fields, and waste areas. This is the first reference for the flora of Madeira archipelago.

PORTUGAL, MADEIRA: Porto Santo: Campo de Cima, berma de caminho, 28-III-2018, *R. Jardim* RJ6820 (UMAD); Porto Santo, Campo de Cima, 5-IV-2018, *R. Jardim* RJ6941 (UMAD)

Fumaria montana J.A. Schmidt

Endemic to Macaronesia (Madeira, Desertas, Selvagens, Canary islands and Cape Verde; Press 1994b), was found in Porto Santo.

PORTUGAL, MADEIRA: Porto Santo: Morenos, ca. 70 m, exp. NW, 27-II-2017, *R. Jardim* RJ6654 (UMAD).

Papaver somniferum L. subsp. ***setigerum*** (DC.) Arcang.

Native to Porto Santo (Jardim & Menezes de Sequeira 2008), found in Deserta Grande. Possible introduced plant taxa in the Desertas islands.

PORTUGAL, MADEIRA: Deserta Grande: Doca, 18-IV-1997, *R. Jardim, S. Fontinha* (MADJ 8607).

PLANTAGINACEAE

Plantago leiopetala Lowe

Endemic to the Madeira archipelago (Jardim & Menezes de Sequeira 2008), occurring in coastal areas of Madeira and Porto Santo, mainly in peaks. Has been found in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: 12-VII-1993, *J. Carvalho* (MADJ 8290); Deserta Grande: vereda vigia Sul, 4-IV-2006, *R. Jardim, I. Silva* (MADJ 11225); Deserta Grande: Topo - Vigia de Leste, 8-V-2006, *L. Carvalho, M. Silva, P. Gouveia* LC749 (UMAD 1471).

POLYGONACEAE

Emex spinosa (L.) Campd.

Native to the Mediterranean region and Macaronesia (Luceño 1990), common in Madeira and Porto Santo islands, in coastal areas and as ruderal. Found in Deserta Grande. Possible introduced plant taxa in the Desertas islands.

PORTUGAL, MADEIRA: Deserta Grande: Doca, 7-IV-2006, *R. Jardim* (MADJ 11376).

RHAMNACEAE

Rhamnus glandulosa Aiton

Endemic to Madeira and Canary Islands (Jardim & Menezes de Sequeira 2008), has been collected in Deserta Grande. These specimens show some peculiar characters as small size leaves (smaller than 4 cm) with pubescent petioles, sometimes a spiny crenulated margin, that resembles the structure mention by Perez de Paz et al. (1992) for the Canarian xerophytic endemic *Rhamnus crenulata* Aiton, reduced number of glands, 2, located at the base of the leaf, and pentamerous flowers. The morphological differences observed on the specimens could be due to the xeric ecology where these plants were collected. Further studies, on newly collected plants, will clarify both the taxonomical and native status of these plants in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Rocha do Barbusano, 420 m, exp. W, 27-VI-2007, *F. Viveiros, I. Silva* (MADJ 10293); Deserta Grande: Rocha do Barbuzano, 22-II-2014, *J. Gomes* (MADJ 14324).

SOLANACEAE

Nicotiana tabacum L.

Native to S America, invasive in Madeira and Porto Santo, also has been recorded from Selvagem Grande (Short 1994d). It has been collected in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Doca, 15 m, 28-VI-2002, *I. Silva* (MADJ 12345); Deserta Grande: Doca, 27-VI-2008, *C. Nóbrega* (MADJ 11493).

LILIOPSIDA

AMARYLLIDACEAE

Pancratium maritimum L.

Native to Atlantic cost of N America, S Europe, N Africa and W Asia (Aedo 2013a) has been found in Porto Santo beach dunes. Possibly resulting from a recent introduction, eventually from its ornamental value. This is the first reference for Madeira archipelago.

PORTUGAL, MADEIRA: Porto Santo: Calheta, dunas, ca. 9 m, 21-XI-2015, *R. Jardim* RJ6257 (UMAD).

ARECACEAE

Washingtonia robusta H. Wendl.

Palm tree native to Mexico (Zona 2000), widely cultivated in Madeira and Porto Santo. Has been found naturalized in several localities in Porto Santo, mainly near riverbeds as Ribeiro Salgado, Ribeira do Tanque and Ribeiro Cochino. Seedlings were found in riverbeds but also in pavement cracks, close to adult plants in urban areas. Vieira (2002) refers to both *W. robusta* and *Washingtonia filifera* (Linden ex André) H. Wendl. as escaped species without naturalized status in Madeira.

PORTUGAL, MADEIRA: Porto Santo: Campo de Baixo, no leito do Ribeiro Salgado, ca. 16 m, 13-II-2019, *R. Jardim* RJ6971 (UMAD).

CYPERACEAE

Cyperus rotundus L.

Pantropical, reaching the Atlantic region of N America, the Mediterranean region, temperate Asia and part of Australia (Castroviejo 2008) considered as a probably introduced aggressive weed of cultivated and waste areas in Madeira and Porto Santo (Jardim & Menezes de Sequeira 2008). We found it in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Doca, 26-III-1999, *S. Fontinha, R. Jardim* (MADJ 9187); Deserta Grande: arredores da casa-doca, 5 m, Exp. NW, 25-II-2006, *L. Carvalho, D. Menezes, I. Silva, M. Silva* LC452 (UMAD 1065).

IRIDACEAE

Gladiolus italicus Mill.

Native to the Mediterranean region naturalized in Madeira and Porto Santo (Press 1994c), found in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Vale da Castanheira, 6-IV-2006, *R. Jardim, I. Silva* (MADJ 11326).

JUNCACEAE

Juncus bufonius L.

Native to Madeira and Porto Santo (Jardim & Menezes de Sequeira 2008), found in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: vereda Cabeço da Doca-Pedregal, 5-IV-2006, *R. Jardim* (MADJ 11283); Deserta Grande: Topo, 330-380 m, 30-V-2006, *I. Silva* (MADJ 11400); Deserta Grande: Topo, 6-V-2006, *L. Carvalho, M. Silva, C. Viveiros* LC722 (UMAD 1444).

Juncus maritimus Lam.

Native to Central and W Europe, Mediterranean region, W Asia and N Africa (Romero Zarco 2010), has been found in Deserta Grande. This is the first reference to the flora of Madeira archipelago.

PORTUGAL, MADEIRA: Deserta Grande: vereda para a fonte do Cabeço da Doca, vertente Este, 8-III-1998, S. Fontinha, R. Jardim (MADJ 8838); Deserta Grande: vereda vigia Sul, 4-IV-2006, *R. Jardim* (MADJ 11221); Deserta Grande: Topo, 6-V-2006, *L. Carvalho, M. Silva, C. Viveiros* LC734 (UMAD 1456).

LILIACEAE

Allium roseum L.

Species native to S Europe, N Africa, Turkey, and Cyprus (Aedo 2013b) found in Deserta Grande. According to Vickery (1994) this species has been already recorded for Madeira.

PORTUGAL, MADEIRA: Deserta Grande: Vale da Castanheira, 6-IV-2006, *R. Jardim* (MADJ 11330).

POACEAE

Agrostis castellana Boiss. & Reut.

Native to Madeira Island (Jardim & Menezes de Sequeira 2008), found in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Risco, 28-III-1999, *S. Fontinha, R. Jardim* (MADJ 10212); Deserta Grande: Topo, perto do Vale da Castanheira, 15-V-2006, *L. Carvalho, M. Silva, C. Viveiros* LC861 (UMAD 1582).

Avena fatua L.

According to Jardim & Menezes de Sequeira (2008) is a possible native to Madeira and Porto Santo. Found in Deserta Grande, although Cope (1994) refers old records from Desertas as erroneous collected specimens clearly correspond to *A. fatua*.

PORTUGAL, MADEIRA: Deserta Grande: Vale da Castanheira, 6-IV-2006, *R. Jardim* (MADJ 11334); Deserta Grande: Topo, 12-V-2006, *L. Carvalho, P. Gouveia, M. Silva* LC830 (UMAD 1551).

Brachiaria mutica (Forssk.) Stapf

Native to the tropics, naturalized and invasive in Madeira lowlands, where was introduced for forage (Cope 1994), found recently naturalized in Porto Santo (Jardim & Menezes de Sequeira 2015b). Has been now collected in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Planalto sul, 380 m, 27-V-2007, *I. Silva* (UMAD).

Brachypodium sylvaticum (Huds.) P. Beauv.

Native to Madeira and Porto Santo (Jardim & Menezes de Sequeira 2008) found in Deserta Grande. It could eventually correspond to a "possible native" in the Desertas following the criteria proposed by Jardim & Menezes de Sequeira (2008). However, the fact that it was found close to the landing point amid many other clearly non-native plant species, better points to a recent introduction (as possible introduced).

PORTUGAL, MADEIRA: Deserta Grande: arredores da casa-doca, 5 m, exp. NW, 25-II-2006, *L. Carvalho, D. Menezes, I. Silva, M. Silva* LC418 (UMAD 1032).

Briza minor L.

Native to Madeira and Porto Santo islands (Jardim & Menezes de Sequeira 2008), now collected in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: 330 m, 30-V-2006, *I. Silva* (MADJ 11401); Deserta Grande: Rocha do Barbusano, 22-IV-2013, *I. Silva* (MADJ 14236).

Cenchrus ciliaris L.

A "probably introduced" plant both in Madeira and Porto Santo according to Jardim & Menezes de Sequeira (2008)). Has been found in Ilhéu Chão.

PORTUGAL, MADEIRA: Desertas: Ilhéu Chão, 9-V-2006, *L. Carvalho, P. Gouveia, M. Silva* LC792 (UMAD 1513).

Desmazeria marina (L.) Druce
Species native to W and S Europe, NW Africa, SW Asia and Macaronesia (Devesa 1987), and referred for Madeira archipelago (Hansen & Sunding 1993) although according to Cope (1994) the records of this taxon, as *Catapodium marinum* (L.) C.E. Hubb., from Madeira and Desertas are almost certainly referable to *Catapodium rigidum* C.E. Hubb. Found in Porto Santo.

PORTUGAL, MADEIRA: Porto Santo: Pico Branco, encosta W, nas proximidades da pedreira, ca. 183 m, 7-V-2015, *R. Jardim* RJ6177 (UMAD); Porto Santo, Pico Branco, encosta SW, ca. 211 m, acima da vereda, 13-IV-2017, *R. Jardim* RJ6737 (UMAD).

Echinocloa crus-galli (L.) P. Beauv.
Native to warm temperate and subtropical regions (Cope 1994), naturalized in Madeira. Has been found in Porto Santo Island.

PORTUGAL, MADEIRA: Porto Santo: Ribeira do Tanque, 25-VII-2012, *R. Jardim* RJ3069 (UMAD); Porto Santo, Lagoa do Tanque, 2-IX-2016, *R. Jardim* RJ6583 (UMAD).

Eragrostis barrelieri Daveau
Native to the Mediterranean region, tropical Africa and SW Asia, naturalized in Madeira and Porto Santo (Cope 1994), where is common in roadsides and in waste places, has been found in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Doca, 30-III-1999, *S. Fontinha, R. Jardim* ((MADJ 10213); Deserta Grande: arredores da casa-doca, 5 m, exp. NW, 25-II-2006, *L. Carvalho, D. Menezes, I. Silva, M. Silva* LC465 (UMAD 1078); Deserta Grande: perto da casa, 1-III-2006, *L. Carvalho, M. Silva* LC526 (UMAD 1138).

Hyparrhenia hirta (L.) Stapf
Paleotropical and Mediterranean species (Romero 2011), native to Madeira and Porto Santo islands (Cope 1994), main species of perennial grassland of the lower vegetation belts of these islands. It was found in 2006 in Deserta Grande at Doca and in the top of the island.

PORTUGAL, MADEIRA: Deserta Grande: arredores da casa-doca, 5 m, exp. NW, 25-II-2006, *L. Carvalho, D. Menezes, I. Silva, M. Silva* LC446 (UMAD 1059); Deserta Grande: Topo, 4-IV-2006, *R. Jardim* (MADJ 11230); 19-IV-2013, *J. Carvalho, I. Silva*, MADJ 14243.

Lolium canariense Steud.
Endemic to Macaronesia (Canary islands and Porto Santo), confined to Porto Santo peaks according to Cope (1994), has been found in Madeira Island, in Deserta Grande and in Bugio Island, spreading the range of this species to Desertas and Madeira Island.

PORTUGAL, MADEIRA: Paul do Mar, vereda dos Prazeres - Paúl do Mar, 100-150 m, 20-IV-2009, *M. Benedito, D. Henriques, M. Sequeira* MS5973 (UMAD); Deserta Grande: vereda Vigia Sul, 4-IV-2006, *R. Jardim* (MADJ 11228); Bugio, 15-IV-2013, *J. Carvalho, I. Silva* (MADJ 14239); Deserta Grande, 20-IV-2013, *J. Carvalho, I. Silva* (MADJ 14215).

Melica ciliata subsp. ***magnolii*** (Gren. & Godr.) Husn.
Taxon native to Madeira and Selvagens islands (Cope 1994), has been collected in Deserta Grande.
PORTUGAL, MADEIRA: Deserta Grande: Topo, 12-V-2006, *L. Carvalho, P. Gouveia, M. Silva* LC831 (UMAD 1552); Deserta Grande: Vale da Castanheira, 3-VII-2008, *C. Nóbrega* (MADJ 11518).

Micropyrum tenellum (L.) Link
Species native to Madeira. According to Cope (1994) the records from Desertas are thought to be erroneous.. , Found in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: subida para o topo, 26-II-2006, *L. Carvalho, D. Menezes, L. Oliveira*, *M. Silva* LC479 (UMAD 1091).

Oryzopsis miliacea (L.) Asch. & Schweinf.
Native to Madeira and Porto Santo (Jardim & Menezes de Sequeira 2008), was found in Deserta Grande. Possible as a recent introduced plant in the Desertas islands.

PORTUGAL, MADEIRA: Deserta Grande: arredores da casa-doca, 5 m, exp. NW, 25-II-2006, *L. Carvalho, D. Menezes & I. Silva, M. Silva* LC470 (UMAD 1082).

Pennisetum setaceum (Forssk.) Chiov.
Native to N and E Africa and SW Asia (Romero 2011b) recently found naturalized in Madeira (Cabral et al. 2020), has been found now in Porto Santo.

PORTUGAL, MADEIRA: Porto Santo: Campo de Baixo, terrenos agrícolas abandonados nas proximidades do Pestana Colombos hotel, ca. 8 m, 13-IV-2019, *R. Jardim* RJ6977 (UMAD).

Phalaris minor Retz.
According to Cope (1994) it is an introduced plant in Madeira and Porto Santo, however Jardim & Menezes de Sequeira (2008) state this taxon as "possible native". Has been found now in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande: Vale da Castanheira, 29-III-1999, *S. Fontinha, R. Jardim* (MADJ 9214).

Stenotaphrum secundatum (Walter) Kuntze
Native to the Atlantic shores of Africa and America (Cope 1994), is considered naturalized in Madeira and Porto Santo. Has been collected in Deserta Grande.

PORTUGAL, MADEIRA: Deserta Grande, 1-VII-2008, *C.* Nóbrega (MADJ 11502).

As a resume, 56 taxa are recorded for the first time for the Desertas Islands, 12 to Porto Santo Island and

6 to Madeira Island. These new intra-archipelago references include two Madeira archipelago endemics, 3 Macaronesian endemics, 27 native taxa, 3 "possible natives", 9 "possible introduced" and 28 introduced taxa, following the criteria proposed by Jardim & Menezes de Sequeira (2008) in what concerns native status (Table 1), as is discussion below. Of these taxa, 10 are new to the flora of Madeira archipelago, including 8 introduced, one "possible introduced" and one native.

Plant taxa with native status (including Madeira Island endemics or Macaronesian endemics) possibly correspond to neglected taxa, many have benefited from the attempts to eliminate feral goats, which resulted in a lowest population record in 2018 (IFCN 2020; Menezes de Sequeira et al. 2021). Low numbers of feral goats would lead to a recovery of plant communities possibly resulting on the spread of former neglected plant taxa. For a thorough discussion on feral goat eradication in Madeira archipelago see Menezes de Sequeira et al. (2021).

Neglected or overseen plant taxa include the Macaronesian endemics: *Rhamnus glandulosa*, found in the Deserta Grande (although a possible human introduction among other Madeiran phanerophytes seen planted in the Desertas cannot be discarded), *Lolium canariense*, found both in Madeira and Desertas (Deserta Grande and Bugio) and *Fumaria montana*, found in Porto Santo. The former Madeira Island endemic *Helichrysum obconicum*, found in Deserta Grande, and *Plantago leiopetala* (endemic from Madeira and Porto Santo) found also in Deserta Grande, are also possible neglected plant taxa.

Non-native species, many considered as invasive in other islands of the Madeira archipelago, were mainly found close to the landing point in Deserta Grande. This fact is certainly cause for concern since no measures are taken by the IFCN (Instituto das Florestas e Conservação da Natureza, IP-RAM), to avoid the introduction of alien seeds or fruits by visitors. In fact, from a total of 16 "introduced" and "possible introduced" plant taxa, 7 were found at the landing facilities ("Doca" locality), *e.g. Bidens pilosa* and *Eragrostis barrelieri*, clearly supporting the conclusion that these invasive plants are being introduced into Deserta Grande by careless visitors. More extensive actions must be taken to prevent the entry of other new species.

Native Madeiran or Porto Santo plants found in Deserta Grande (or other Desertas islands) could either be overlooked plant taxa benefiting from periodical fluctuations on feral goats or be, themselves, human introduced plants, *i.e.* native Madeiran plants could in some case be introduced plant taxa in the Desertas. From a total of 34 plant taxa, 5 were only found at the landing facilities, strongly suggesting an anthropogenic introduction, and they have been considered as "possible introduced" in this list (*e.g. Brachypodium sylvaticum* and *Emex spinosa*). By the other hand plants detected on the landing facilities but also found in distant locations have been considered as natives as have been all others.

Once more, a plant probably involuntary introduced among imported ornamental plants in nurseries has become a troublesome weed and possibly an invading plant, *i.e. Youngia japonica*.

The transport of living plants between islands of the Madeira archipelago has been so far not clearly regulated and even less surveilled (Silva et al. 2018). The absence of specific regulations concerning the involuntary transport of plant propagules is cause for deep concern as our list clearly proves demonstrates.

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Captions

Table 1. Number of references/taxa and native status per island or subarchipelago. END, Madeiran endemic; MAC, Macaronesian endemic; n, native; np, possible native; ip, possible introduced; i, introduced (naturalized).

Tables

Table 1

	Madeira	Porto Santo	Desertas	Total (taxa/references)
END			2	2
MAC	1	1	2	3*/4
n		1	26	27
np			3	3
ip		1	8	9
i	5	9	14	28
Total	6	12	55	72*/73

* Corresponds to *Lolium canariense* found both in Madeira and Desertas.