

Article

# New Chorological Data for the Italian Vascular Flora

Leonardo Rosati <sup>1,\*</sup>, Simonetta Fascetti <sup>1</sup>, Vito Antonio Romano <sup>1</sup>, Giovanna Potenza <sup>1</sup>, Maria Rita Lapenna <sup>1</sup>, Antonio Capano <sup>1</sup>, Pietro Nicoletti <sup>1</sup>, Emmanuele Farris <sup>2</sup>, Peter James de Lange <sup>3</sup>, Eva Del Vico <sup>4</sup>, Laura Facioni <sup>4</sup>, Emanuele Fanfarillo <sup>4</sup>, Edda Lattanzi <sup>4</sup>, Ana Cano-Ortiz <sup>5</sup>, Michela Marignani <sup>6</sup>, Maria Caterina Fogu <sup>6</sup>, Erika Bazzato <sup>6</sup>, Erik Lallai <sup>6</sup>, Valentina Lucia Astrid Laface <sup>7</sup>, Carmelo Maria Musarella <sup>7</sup>, Giovanni Spampinato <sup>7</sup>, Giacomo Mei <sup>8</sup>, Giuseppe Misano <sup>1</sup>, Giovanni Salerno <sup>9</sup>, Assunta Esposito <sup>10</sup> and Adriano Stinca <sup>10</sup>

<sup>1</sup> School of Agriculture, Forestry, Food and Environment, University of Basilicata, 85100 Potenza, Italy

<sup>2</sup> Department of Chemistry and Pharmacy, University of Sassari, 07100 Sassari, Italy

<sup>3</sup> School of Environmental and Animal Sciences, Unitec Institute of Technology, 1025 Auckland, New Zealand

<sup>4</sup> Department of Environmental Biology, Sapienza University of Rome, 00185 Rome, Italy

<sup>5</sup> Department of Animal and Plant Biology and Ecology, Section of Botany, University of Jaén, Campus Universitario Las Lagunillas, 23071 Jaén, Spain

<sup>6</sup> Department of Life and Environmental Sciences, University of Cagliari, 09123 Cagliari, Italy

<sup>7</sup> AGRARIA Department, Mediterranea University of Reggio Calabria, 89122 Reggio Calabria, Italy

<sup>8</sup> Department of Agricultural, Food and Environmental Sciences, Marche Polytechnic University, 60131 Ancona, Italy

<sup>9</sup> Department of Science, University of Roma Tre, 00146 Rome, Italy

<sup>10</sup> Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, University of Campania Luigi Vanvitelli, 81100 Caserta, Italy

\* Correspondence: leonardo.rosati@unibas.it

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**Abstract:** Despite the importance for scientific and conservation purposes, the knowledge of the Italian territory is far from exhaustive. New chorological data for 87 vascular taxa regarding the central-southern part of Italy and its two main islands (Sicilia and Sardegna) are presented. Among these taxa, *Epilobium nummularifolium*, *Metrosideros excelsa*, and *Salvinia minima* are recorded as casual aliens for the first time in Europe (excluding Azores and Madeira for *M. excelsa*), while *Cyclamen balearicum* and *Polygala rupestris* are reported for the first time and confirmed for Italian native flora, respectively. Furthermore, several taxa are new or confirmed at regional level. Finally, *Lathyrus cirrhosus*, *Urginea fugax*, and *Linum tenuifolium* are excluded from Italy, continental and peninsular Italy, and Sardegna, respectively.

**Keywords:** alien species; endemic plants; checklist; new floristic records; plant diversity

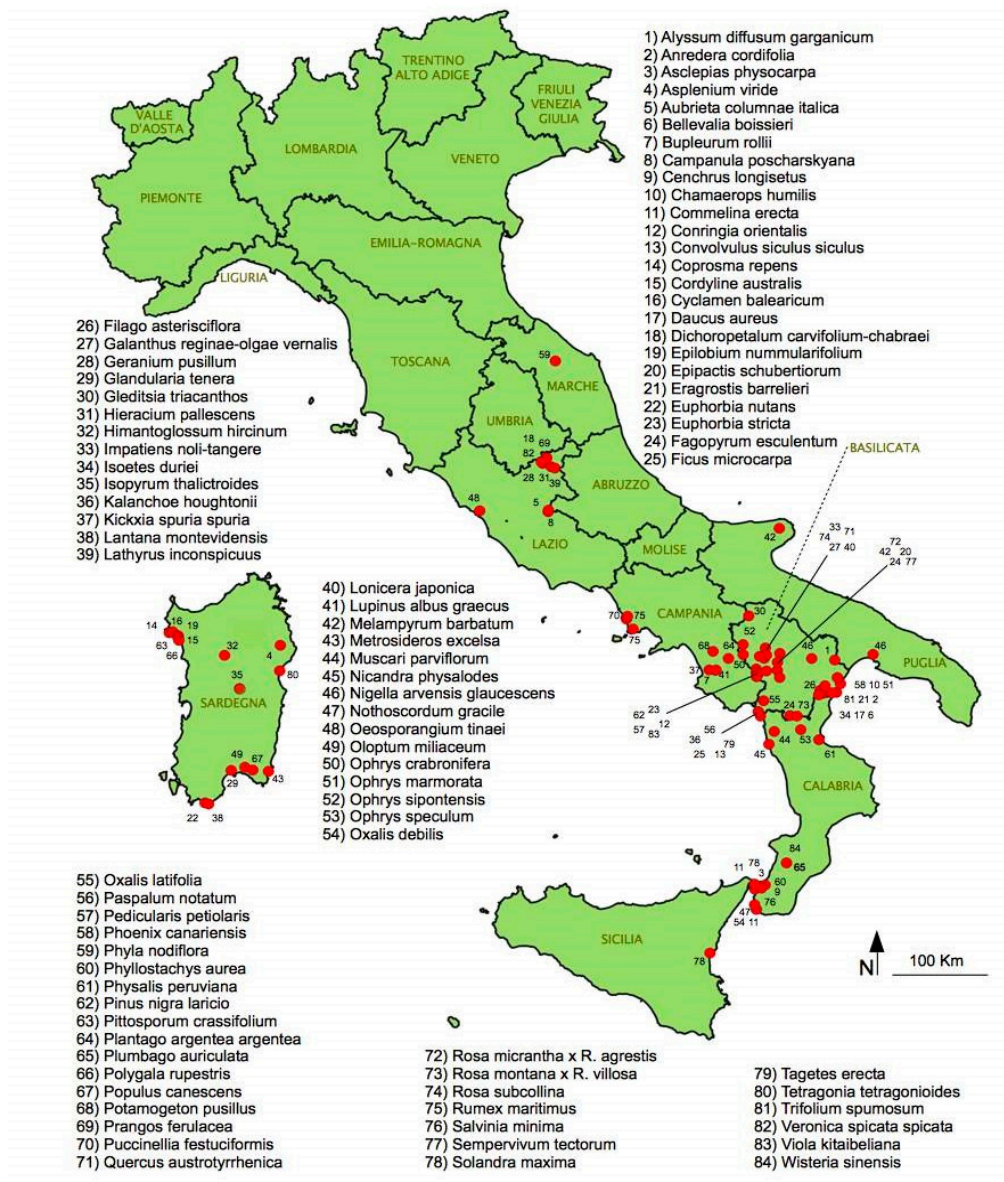
## 1. Introduction

Over the past 20 years, floristic studies of the central-southern Italian Peninsula have greatly improved our knowledge of the flora of this region [1–15] and some syntheses at the national scale [16–22] have been made available.

However, despite the importance for scientific and conservation purposes, our knowledge of the Italian territory is far from exhaustive. In particular, in some regions of Italy, knowledge about the vascular flora remains inadequate usually because the geographic distributions of many species are poorly understood resulting in gaps in our knowledge of their actual extent [23]. This is the so-called “Wallacean shortfall,” that is considered one of the crucial sources of uncertainty in biodiversity inventories, limiting both biosystematic and ecological analyses of these [24,25] and resulting in some exceptional discoveries when critical gaps are surveyed, such as finding of a new taxon of

*Gymnospermium* (Berberidaceae) in an unexplored mountain range between Basilicata and Campania [26,27]. Further biological invasions represent a major threat to biodiversity [28,29], particularly as new naturalizations of alien vascular plants are continuously happening and are usually poorly documented within regional flora treatments. This is particularly the case on Mediterranean islands [30]. As a consequence, it is important that frequent assessment of regional floras are undertaken, not only to monitor the established populations (indigenous and naturalized), but also to update the distribution data to enable early warning of declines in indigenous or endemic species, and to document new arrivals of invasive plants, as an aid to better manage the invasive ones, particularly those species included in the European list of EU concern [31].

In this paper we document new observations of plants for the central-southern Italian Peninsula and the two main insular regions (Figure 1). Our records include both native and alien non-cultivated species with a careful assessment of the status of naturalization for the latter. For each taxon, relevant information about ecology and distribution are also provided.



**Figure 1.** Research area with administrative Italian regions and locations of the new records of vascular plants reported in this study. We considered “continental Italy” the regions north to Toscana and Marche, “peninsular Italy” the other regions of Italian peninsula and “insular Italy” the Sardegna (Sardinia) and Sicilia (Sicily) regions.

## 2. Materials and Methods

The floristic data are based on field investigation carried out by the authors in the study area, as well as on herbaria and literature surveys. The collected or examined materials are preserved in public (ANC, AK, HLUC, PORUN-Herb. Stinca, REGGIO, SS; acronyms according to Thiers [32]) or private herbaria. In the floristic list (Appendix A), taxa are arranged in alphabetical order. Nomenclature, taxa delimitation, and notes on the regional distribution follow the recent checklists of the Italian vascular flora [16,17] and their updates [33–40]. Nomenclature of the species that had not been previously reported from Italy and of *Populus ×canescens* follows World Flora Online [41]. The taxa recorded in this paper were identified using Flora Europaea [42–46], Flora d'Italia [18–21,47], and some monographic works cited in the species' note listed in Appendix A.

For each species the following information is provided: basionym and most relevant synonyms; plant family; life form, attributed on the basis of field observations using the categories of Flora d'Italia [47]; native range; period of introduction (archaeophyte or neophyte); data report in the study area; current invasiveness status for each region, assessed by population monitoring over time according to the terminology of Pyšek et al. [48]; date and discovery localities with details on the location (municipality, administrative province), habitat, altitude, decimal degrees geographic coordinates (datum WGS84); collector(s) (*legit*), author(s) of the identification (*determinavit*) and, eventually, the identity confirmation (*confirmavit*); herbarium where specimen is kept; additional notes. Species not documented with a herbarium specimen are shown in Figure 2.



**Figure 2.** Species not documented by herbarium specimens in Appendix A: (A) *Ophrys crabronifera*, (B) *O. marmorata*, (C) *O. speculum*, (D) *O. sipontensis*.



### 3. Results

Two native and four alien species are recorded for the first time in Italy; among the aliens, three species deserve more attention since they are new for Europe. Overall, 87 taxa of floristic interest for the Italian flora are herein reported, 50 are native and 37 represent alien taxa. Among the native plants seven are endemic taxa of the Italian territory.

#### 3.1. Native taxa

*Cyclamen balearicum* and *Polygala rupestris* discovered in Sardegna are recorded for the first time in Italy, while *Euphorbia stricta* found in Basilicata is recorded as new for peninsular Italy (i.e., the regions south to Toscana and Marche, Sicilia and Sardegna excluded). *Lathyrus cirrhosus*, previously reported by [49], is here excluded from the Sardinian and Italian flora.

In the same way, *Linum tenuifolium* reported from Sardegna [50] and *Urginea fugax* from Basilicata [51] are not confirmed throughout this study. These species seem to have been recorded by mistake and are here excluded from the floras of these regions.

Thirty-four taxa are new for the regional floras of the study area: 6 were found in Lazio (*Dichoropetalum carvifolium-chabraei*, *Geranium pusillum*, *Hieracium pallescens* s.l., *Lathyrus inconspicuus*, *Oeosporangium tinaei*, and *Veronica spicata* subsp. *spicata*), 6 in Campania (*Bupleurum rollii*, *Kickxia spuria* subsp. *spuria*, *Lupinus albus* subsp. *graecus*, *Plantago argentea* subsp. *argentea*, *Potamogeton pusillus*, and *Rumex maritimus*), 17 in Basilicata (*Alyssum diffusum* subsp. *garganicum*, *Bellevalia boissieri*, *Convolvulus siculus* subsp. *siculus*, *Daucus aureus*, *Epipactis schubertiorum*, *Eragrostis barrelieri* subsp. *barrelieri*, *Euphorbia stricta*, *Filago asterisciflora*, *Galanthus reginae-olgae* subsp. *vernalis*, *Isoetes duriei*, *Melampyrum barbatum* subsp. *carstiense*, *Nigella arvensis* subsp. *glaucescens*, *Ophrys crabronifera*, *Ophrys marmorata*, *Ophrys sipontensis*, *Quercus petraea* subsp. *austrotyrrhenica*, *Rosa subcollina*, and *Semperivium tectorum*) and 4 in Sardegna (*Asplenium viride*, *Himantoglossum hircinum*, *Isopyrum thalictroides*, and *Oloptum miliaceum*).

In addition, two hybrids within the genus *Rosa* are reported in Basilicata for the first time (*R. × bishopii* and *R. montana × R. villosa*) and one (*Populus × canescens*) in Sardegna. We also confirm 10 taxa as present in the regions covered by this paper: *Prangos ferulacea* in Lazio; *Pedicularis petiolaris*, *Potamogeton pusillus*, *Puccinellia festuciformis* subsp. *festuciformis*, and *Viola kitaibeliana* in Campania; *Trifolium spumosum* in Basilicata; *Melampyrum barbatum* subsp. *carstiense* and *Nigella arvensis* subsp. *glaucescens* in Puglia, *Muscari parviflorum* and *Ophrys speculum* in Calabria region. Finally, for one species (*Impatiens noli-tangere*), reported for the first time in Basilicata in the recent checklist of the Italian vascular flora [16] on the basis of our unpublished data, full details about the record are provided.

#### 3.2. Alien taxa

Three alien species are recognized new for Europe (excluding Azores and Madeira for *M. excelsa*) and for Italy: *Epilobium nummularifolium*, *Metrosideros excelsa*, found in Sardegna, and *Salvinia minima*, found in Calabria. In the same regions, we found *Coprosma repens*, *Pittosporum crassifolium* (Sardegna) recorded for the first time in Italy, and *Commelina erecta*, recorded for the first time in Italy (Calabria) outside Sicilia. In addition to those species, 31 new alien vascular species are reported at regional level (two of these are present in two regions): 2 in Lazio (*Aubrieta columnae* subsp. *italica* and *Campanula poscharskyana*); 2 in Campania (*Conringia orientalis* and *Pinus nigra* subsp. *laricio*); 12 in Basilicata (*Anredera cordifolia*, *Chamaerops humilis*, *Euphorbia nutans*, *Fagopyrum esculentum*, *Ficus microcarpa*, *Gleditsia triacanthos*, *Kalanchoë × houghtonii*, *Lonicera japonica*, *Paspalum notatum*, *Phoenix canariensis*, *Pinus nigra* subsp. *laricio*, and *Tagetes erecta*); 12 in Calabria (*Asclepias physocarpa*, *Cenchrus longisetus*, *Commelina erecta*, *Nicandra physalodes*, *Nothoscordum gracile*, *Oxalis debilis*, *Oxalis latifolia*, *Phyllostachys aurea*, *Physalis peruviana*, *Plumbago auriculata*, *Solandra maxima*, and *Wisteria sinensis*); 1 in Sicilia (*Solandra maxima*); 4 in Sardegna (*Cordyline australis*, *Euphorbia nutans*, *Glandularia tenera*, and *Lantana montevidensis*). Furthermore, the presence of *Phyla nodiflora* in Marche, *Fagopyrum esculentum*

in Calabria (herein recorded as new also in Basilicata) and *Tetragonia tetragonoides* in Sardegna is confirmed.

#### 4. Discussion

We reported 50 native taxa for the regions covered in this paper, including several endemic Italian taxa that are range extensions from their previous reported limits. The discovery in Sardegna of *Cyclamen balearicum* and *Polygala rupestris*, two species that had until now not been recorded for Italy, is particularly relevant because their presence provides additional support for the biogeographical link between Sardegna and the W-Mediterranean areas [52–54].

In the same way, the numerous neophytes reported for the first time in the regional floras once again confirm that alien species are continuously invading the environment. Although the majority of the recorded species have been evaluated with respect to their naturalization degrees as “casual,” their monitoring over time is considered of primary importance in order to be able to effectively intervene if these species prove to be highly invasive. One especially noteworthy discovery is *Salvinia minima*, a species known to be invasive in most of the southern United States, where it is a significant threat to aquatic systems [55]. *Salvinia minima* is widely available for purchase for aquaria and water-gardens in Europe. Accordingly, we think that this species established in Italy from the aquatic plant trade, probably as an accidental introduction. The high number of floristic records of international and regional relevance provided, after a very short time from the publication of the latest Italian vascular flora checklist [16,17], even if not derived from a systematic sampling activity, testify of the importance to continuously implement our knowledge of plant diversity, especially for conservation purposes, studying and reviewing herbaria collections, coupled with frequent field surveys with special attention to achieve an early warning to monitor introduction and naturalization of alien taxa.

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**Conflicts of Interest:** The authors declare no conflict of interest.

#### Appendix A

##### *Alyssum diffusum* Ten. subsp. *garganicum* Španiel, Marhold, N. G. Passal. and Lihová

Brassicaceae Hemicryptophyte scapose Italian endemic

First record for Basilicata

Specimen: 8-4-2011, Difesa S. Biagio (Montescaglioso, Matera province), rocky outcrop within dry grassland, 155 m a.s.l., 40.5044° N-16.6876° E, leg. et det S. Fascetti (HLUC).

*Note:* This endemic taxon was until now recorded only for Puglia region [56]. It is noteworthy to underline the presence in Basilicata of two infraspecific taxa of *Alyssum diffusum*: the subspecies *calabricum* Španiel, Marhold, N. G. Passal. and Lihová in the Campano-Lucano Apennine, along the border with Campania and Calabria regions [16] and the subsp. *garganicum* in the eastern part, along the border in Puglia region.

##### *Anredera cordifolia* (Ten.) Steenis [= *Boussingaultia cordifolia* Ten.]

Basellaceae Phanerophyte climbing Neophyte, S-America

First record for Basilicata (casual)

Specimen: 15-6-2014, Lido di Policoro (Policoro, Matera province), roadside, 40.17361° N-16.70099° E, 3 m a.s.l., leg. G. Salerno et M.R. Lapenna, det. G. Salerno (Herb. Salerno).

*Note:* Casual or naturalized alien species in most of the peninsular and insular regions except for Umbria [17]. It is considered an invasive taxon in Toscana [17].

***Asclepias physocarpa* (E. Mey.) Schltr.** [= *Gomphocarpus physocarpus* E. Mey.]

Apocynaceae Phanerophyte caespitose Neophyte, S-Africa

*First record for Calabria* (casual)

Specimen: 1-7-2019, Campo Calabro (Reggio Calabria province), roadside, 38.20633° N-15.64897° E, leg. V.L.A. Laface, det. V.L.A. Laface et G. Spampinato (REGGIO).

*Note:* Five plants were recorded along the road, mixed with *Hyparrhenia hirta* (L.) Stapf. subsp. *hirta* and *Rubus ulmifolius* Schott. It was previously recorded as casual or naturalized alien species only in Toscana, Campania, and Sicilia regions [17].

***Asplenium viride* Huds.**

Aspleniaceae Hemicryptophyte rosulate Circumboreal

*First record for Sardegna*

Specimen: 14-5-2013, Monte Albo (Siniscola, Nuoro province), 40.54141° N-9.62394° E, sinkhole shaft in montane karstfield, 880 m a.s.l., leg. et det. P.J. de Lange (AK, SS).

*Note.* Recorded from all regions of Italy except for Puglia and doubtfully for Basilicata, but until now absent in the insular regions (Sardegna and Sicilia) [16]. However, *Asplenium viride* had been reported from Sardegna from a locality close to Fluminimaggiore (Iglesiente, South-western Sardegna) from where it has not since been seen [57]. Recently Ballero et al. [57] suggested its exclusion from the flora of Sardegna.

Image available at: <https://inaturalist.nz/observations/4046536>

***Aubrieta columnae* Guss. subsp. *italica* (Boiss.) Mattf.** [= *A. italica* Boiss.]

Brassicaceae Chamaephyte subshrubs Italian endemic

*First record for Lazio* (naturalized)

Specimen: 5-8-2019, Old town (Anticoli Corrado, Roma province), old walls, 500 m a.s.l., 42.00991° N-12.99103° E, leg. et det. L. Rosati (HLUC).

*Note:* A small population of this Italian endemic taxon, which grows in nature only in Puglia (Gargano peninsula) and doubtfully in Basilicata, was observed for over 10 years in anthropogenic habitat at Anticoli Corrado (Rosati, pers. observ.). These individuals have spread by seeds from a nearby cultivated plant in pots and urban gardens. Our specimens were identified using the key by [58].

***Bellevalia boissieri* Freyn** [= *Bellevalia dubia* (Guss.) Kunth subsp. *boissieri* (Freyn) Feinbrun]

Asparagaceae Geophyte bulbouse E-Mediterranean

*First record for Basilicata*

Specimen: 28-3-2018, Iazzo di Tucci (Rotondella, Matera province), olive groves, 40.17157° N-16.53832° E, 298 m a.s.l., leg. G. Salerno et G. Misano, det. G. Salerno (Herb. Salerno).

*Note:* Until these discoveries this species was known from Italy only from the Calabria region [16].

***Bupleurum rollii* (Montel.) Moraldo** [= *B. gracile* d'Urv. var. *rollii* Montel.]

Apiaceae Therophyte scapose Italian endemic

*First record for Campania*

Specimen: 8-9-2013, Monte Vesole (Rocccaspide, Salerno province), chestnuts, 580 m a.s.l., 40.41156° N-15.16761° E, leg. et det. G. Salerno (Herb. Salerno).

*Note.* This Italian endemic had previously been recorded from Lazio to Sicilia, but not from Campania [16].

***Campanula poscharskyana* Degen**

Campanulaceae Hemicryptophyte scap Neophyte, SE-European (Dinarides)

*First record for Lazio* (casual)

Specimen: 5-8-2019, Old town (Roviano, Roma province), calcareous rock crevices, 495 m a.s.l., 42.02565° N-12.99403° E, leg. et det. L. Rosati (HLUC).

*Note:* This alien species was reported as casual or naturalized only in Lombardia, Veneto, and Toscana [17].

***Cenchrus longisetus* M. C. Johnst.** [= *Pennisetum villosum* R. Br. ex Fresen.]

Poaceae Hemicryptophyte caespitose Neophyte, Palearctic

*First record for Calabria* (casual)

Specimen: 16-6-2019, San Roberto (Reggio Calabria province), sidewalks, 280 m a.s.l., 38.21074° N-15.736° E, *leg.* V.L.A. Laface, *det.* V.L.A. Laface, C.M. Musarella *et* G. Spampinato (REGGIO).

*Note:* Collected from the margins of sidewalks where it was probably derived from a nearby flowerbed. This species has been recorded from Italian regions as casual or naturalized [17]; only in Sardegna is it considered invasive [17].

***Chamaerops humilis* L.**

Arecaceae Nano-phanerophyte Neophyte, W-Mediterranean

*First record for Basilicata* (casual)

Specimen: 14-12-2017, S. Basilio, Marina di Pisticci (Pisticci, Matera province), clearings in mediterranean maquis, 3 m a.s.l., 40.2998° N-16.78265° E, *leg. et det.* S. Fascetti (HLUC).

*Note:* Although this palm is indigenous to the neighboring regions of Campania and Calabria [16], it has not been recorded in the previous flora of Basilicata [51]. Therefore, as for the neighboring Puglia region [16], we consider it as introduced to this region. Plants probably spread from cultivation as the species was present in the nearby gardens, and only juvenile plants and seedlings were observed.

***Commelina erecta* L.**

Commelinaceae Terophyte crawling Archeophyte, C-America

*First records for Calabria and peninsular Italy* (casual)

Specimens: 23-6-2019, Lazzaro (Motta San Giovanni, Reggio Calabria province), crevices between road and sidewalks, 16 m a.s.l., 37.97394° N-15.66507° E, *leg. et det.* C. M. Musarella (REGGIO); 25-6-2019, Catona (Reggio Calabria, Reggio Calabria province), sidewalks, 22 m a.s.l., 38.17987° N-15.64811° E, *leg.* V.L.A. Laface, *det.* V.L.A. Laface, C.M. Musarella *et* G. Spampinato (REGGIO).

*Note:* Observed growing in crevices and on the edge of the roadside. Probably escaped from plants cultivated in pots placed on sidewalks. It was recently reported for the first time in Italy in Sicilia by [38].

***Conringia orientalis* (L.) Andr. ex DC.** [= *Brassica orientalis* L.; ≡ *Gorinkia orientalis* (L.) J. Presl and C. Presl]

Brassicaceae Therophyte scapose Neophyte, W-Asia

*First record for Campania* (casual)

Specimen: 15-5-2018, Campitello, Monti della Maddalena (Padula, Salerno province), forest edges, along a track, 1270 m a.s.l., 40.3452° N-15.68886° E, *leg.* S. Fascetti, *det.* S. Fascetti *et* L. Rosati (HLUC).

*Note:* It is considered an archaeophyte associated with cereal crops, as stated for example in a previous record for Basilicata [59]. However, our finding of *C. orientalis* was in a silvo-pastoral habitat, quite far from cultivated areas.

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

Convolvulaceae Therophyte scapose S-Mediterranean

*First record for Basilicata*

Specimen: 12-3-2012, Torre Caina (Maratea, Potenza province), clearings in mediterranean maquis, 39.94319° N-15.73534° E, 880 m a.s.l., *leg. et det.* G. Salerno (Herb. Salerno).

*Note:* It was previously recorded in Liguria, Toscana, Lazio, Campania, Puglia, Sicilia, and Sardegna regions [16].

***Coprosma repens* A. Rich.**

Rubiaceae Nano-phanerophyte Neophyte, New Zealand

*First record in Italy* (casual)

Specimen: 10-03-2013, Torre Nuova, Porto Conte (Alghero, Sassari Province), occasional shrubs growing by old Spanish tower near beach, 2 m a.s.l., 40.593647° N-8.20430° E, *leg. et det.* P.J. de Lange (AK).

*Note:* Growing among *Myoporum laetum* G. Forst., *M. aff. insulare* R. Br., *M. laetum* × *M. aff. insulare*. Plants with flower buds, seedlings present. In Europe, although it has been recorded only from Great Britain [60], this species was commonly seen by PdL along the coastline of southern France (1999, 2013), and northern Spain (Catalonia) (2013). It seems surprising it has not naturalized further as under the vernacular “mirror bush” it is recorded as an aggressive invasive species throughout much of the world [61].

***Cordyline australis* (G. Forst.) Endl.** [≡ *Dracaena australis* G. Forst.]

Asparagaceae Phanerophyte scapose Neophyte, New Zealand

*First record for Sardegna* (casual)

Specimen: 12-3-2012, Via Tarragona (Alghero, Sassari province), courtyard garden 30 m a.s.l., 40.55422° N-8.32475° E, *leg. et det.* P.J. de Lange (AK, SS).

*Note:* Seedling collected from rank grassland within inner courtyard garden. Growing close to planted adult fruiting trees. Although this species is a very commonly cultivated tree in Sardegna, so far, only sparingly naturalizing. This may be because mostly only one clone is grown, and the species is self-incompatible [62]. Outside Sardegna this species has been reported as a casual alien only in Marche, Abruzzo, and Campania [17].

***Cyclamen balearicum* Willk.** [≡ *C. repandum* Sm. subsp. *balearicum* (Willk.) O. Schwarz]

Primulaceae Geophyte bulbouse NW-Mediterranean

*First record for Italy* (Sardegna)

Specimen: 20-4-2008, Monte Doglia (Alghero, Sassari province), evergreen woodlands of *Prasio majoris-Quercetum ilicis chamaeropetosum humilis*, 40.60742° N-8.24683° E, 190 m a.s.l., *leg. et det.* E. Farris (SS).

*Note:* *Cyclamen balearicum* differs from *C. repandum* in having leaves usually adaxially speckled with white and flowers that are either fully white or with a white-veined pale pink corolla [42]. Recent research [63,64] highlighted the presence of a hybrid zone between *Cyclamen repandum* and *C. balearicum* in NW Sardegna, where hybrid plants displaying bi-colored flowers prevail, and pure *C. balearicum* plants were scarce. However, based on the original observations, at Mt. Doglia plants with small white flowers and non-exserted stigma are dominant, though only occasional individuals have the diagnostic leaf ornamentation of *C. balearicum* s.s. The nearest known localities of this species according to Flora Gallica and Flora Iberica are in Corsica (France), Provence (S-France), and Balearic Islands (Spain).

***Daucus aureus* Desf.**

Apiaceae Therophyte scapose S-Mediterranean

*First record for Basilicata*

Specimen: 1-5-2019, Serra delle Grotte (Rotondella, Matera province), fallows on clay soils, 120 m a.s.l., 40.19691° N-16.49405° E, *leg.* G. Salerno *et* G. Misano, *det.* G. Salerno (Herb. Salerno).

*Note:* At present known only from Calabria and Sicilia [16]. There are historical doubtful records of this species from Liguria and Campania, respectively [16].

***Dichoropetalum carvifolium-chabraei* (Crantz) Soldano, Galasso and Banfi** [≡ *Selinum carvifolium-chabraei* Crantz; – *Holandrea carvifolia* Reduron, Charpin and Pimenov; = *Peucedanum carvifolium-chabraei* (Crantz) Soldano]

Apiaceae Hemicryptophyte scapose European-Caucasian

*First record for Lazio*



Specimen: 16-7-2015, Monte Tilia, Fondo del Laghetto (Leonessa, Rieti province), secondary grassland with *Brachypodium genuense*, marly-calcareous slopes, 1400 m a.s.l., 42.55842° N-12.95441° E, leg. et det. E. Del Vico (Herb. Del Vico).

Note: In Italy it is reported in many northern and central regions and in Sicilia [16].

***Epilobium nummularifolium* R. Cunn. ex A. Cunn.**

Onagraceae Hemicryptophyte crawling Neophyte, New Zealand

First record for Italy (casual)

Specimen: 24-04 2013, via Castelsardo (Alghero, Sassari province), damp ground on side of road adjacent pasture used for hay making, 6 m a.s.l., 40.57221° N-8.32010° E, leg. et det. P.J. de Lange (AK, SS).

Note: Image of *Epilobium nummularifolium* at this locality available at: <https://inaturalist.nz/observations/4437892>.

*Epilobium nummularifolium* is apparently not known wild elsewhere in greater Europe [65]. However, this species has a superficial similarity to *E. brunnescens* (Cockayne) Raven et Engelhorn subsp. *brunnescens*, which is abundantly naturalized in the British Isles, and reported from the Guernsey Islands, so it is possible that it has been confused with that species, and so overlooked [65]. *E. nummularifolium*, a New Zealand endemic, is well-known for its aggressive, weedy nature. Raven and Raven [65] argue that this species was once a narrow range endemic of northern New Zealand, which has spread throughout that archipelago as a garden plant pot contaminant. We suspect that this is how it has reached Sardegna, i.e., as a possible soil/garden plant contaminant, introduced alongside anyone of the many New Zealand indigenous/endemic plants seen there in cultivation. This species should be looked for elsewhere in Europe. *Epilobium nummularifolium* is distinguished from both *E. brunnescens* and *E. komarovianum* H. Lev, which is also naturalized in Europe [65] by the yellow-green, serrulate leaves, purple-blue stems, and grey-strigulose capsules [65–68] (Table A1, Figure A1). These species are keyed out as follows:

1. Adaxial leaf surface deeply rugose-impressed..... *E. komarovianum*
1. Adaxial leaf surface smooth, not rugose-impressed..... .. 2
2. Leaves yellow-green, with red margins, serrulate bearing 2-11 pairs of teeth either side of midrib; stems purple-blue, capsules grey-strigulose..... *E. nummularifolium*
2. Leaves dark green, tinged red or brown, entire or with 1-4 pairs of indistinct teeth either side of midrib, capsules glabrate, rarely very sparsely hairy..... *E. brunnescens*

**Table A1.** Distinguishing characters between three New Zealand creeping *Epilobium* species naturalized in Europe/British Isles.

	<i>E. brunnescens</i> subsp. <i>brunnescens</i>	<i>E. komarovianum</i>	<i>E. nummularifolium</i>
<b>Growth habit</b>	Densely matted, creeping herb forming patches up to 1 m diameter	Matted, creeping herb forming patches of tightly appressed stems and leaves up to 1 m diameter (usually less)	Loosely matted, creeping herb patches up to 1 m diameter
<b>Stems</b>	Light brown	Yellow-green	Purple-blue
<b>Leaves</b>	Dull green often with a red or brown-tinge, bearing 0–1(–2) obscure lateral veins either side of midrib; lamina 1.5–13.0 × 1.5–12.0 mm ovate to broadly ovate, apex rounded to obtuse, base obtuse to truncate, entire, rarely with 1–2(–4) weakly	Dull reddish-green to coppery, adaxially rugose-impressed, bearing 1–4 lateral veins on each side of the midrib; lamina 2.0–12.0 × 1.5–9.0 mm, usually orbicular, but occasionally oblong or ovate (sometimes with all forms on the same plant), apices subacute to obtuse, base attenuate to obtuse,	Yellowish-green, usually with red margins and 1–3(–4) inconspicuous lateral veins on either side of the midrib; lamina 3.0–13.0 × 3–11.0 mm, broadly ovate to oblate, obtuse or rounded at apex, rounded to truncate at base,

	developed teeth on each margin	entire or occasionally with 1–3 remote, weak teeth on each side of leaf	margins remotely and shallowly serrulate with 2–11 teeth on either side
<b>Flowers</b>	Flowers nodding, falling before full pedicel elongation is achieved	Flowers falling before full pedicel elongation is achieved	flowers falling when pedicel elongation is complete
<b>Capsules</b>	Capsule glabrate or sparsely hairy, indumentum of appressed glandular or erect glandular or glandular hairs running along lines of dehiscence, 12–60 mm long, borne on a glabrous pedicel (16–)35–80(–120) mm long	Capsule subglabrous or sparsely furnished with hairs, 4–30 mm long, borne on a pedicel 3–93(–135) mm long	Capsule densely grey-strigulose, (10–)15–40 mm long, borne on a strigulose pedicel 23–130 mm long



**Figure 1.** Comparison images of three New Zealand creeping *Epilobium* species naturalized in Europe/British Isles: (A) *Epilobium brunnescens* subsp. *brunnescens* fruiting plant showing growth habit, Mt Te Aroha, North Island, New Zealand, image: P.J. de Lange; (B) *E. komarovianum*, flowering plant with immature capsules, showing distinctive rugose-impressed leaves, Long Point, Otago, South Island, New Zealand, image: J.W. Barkla; (C) *E. nummularifolium*, vegetative material showing growth habit, note stem and leaf color and toothed leaf margins; Alghero, Sardegna, image: P. J. de Lange; (D) *E. nummularifolium* flowering and fruiting plant (note greyish color of capsules); Centre Road, Otago Peninsula, South Island, New Zealand image: D. Lyttle.

***Epipactis schubertiorum* Bartolo, Pulv. and Robatsch** [≡ *Epipactis helleborine* (L.) Crantz subsp. *schubertiorum* (Bartolo, Pulv. and Robatsch) Kreutz]  
 Orchidaceae Geophyte rhizomatous Italian endemic  
 First record for Basilicata

Observatum: 25-7-2017, Abetina di Laurenzana (Viggiano, Potenza province), *Abies alba* and *Quercus cerris* forest, 1130 m a.s.l., 40.40708° N-15.95478° E, *leg. et det.* V.A. Romano (HLUC).

*Note:* This Italian endemic species had previously been recorded only from Puglia and Calabria [16].

***Eragrostis barrelieri* Daveau subsp. *barrelieri***

Poaceae Therophyte scapose S-Mediterranean

*First record for Basilicata*

Specimen: 16-6-2014, Concio, Sinni river (Policoro, Matera province), roadside, 40.17126° N-16.64227° E, 10 m a.s.l., *leg. et det.* G. Salerno (Herb. Salerno).

*Note:* In Italy it is recorded for some northern and central regions, Sicilia and Sardegna [16].

***Euphorbia nutans* Lag. [= *Chamaesyce nutans* (Lag.) Small]**

Euphorbiaceae Therophyte scapose. Neophyte, N-America

*First record for Basilicata (casual) and Sardegna (casual)*

Specimens: 3-8-2017, Porto (Maratea, Potenza province), roadside, 15 m a.s.l., 39.98978° N-15.70888° E, *leg.* A. Stinca *et* M. Eviano, *det.* A. Stinca (PORUN-Herb. Stinca); 20-8-2017, along SS18 road, close by loc. La Torre (Maratea, Potenza province), roadside, 60 m a.s.l., 40.03127° N-15.67405° E, *leg.* A. Stinca *et* M. Ravo, *det.* A. Stinca (PORUN-Herb. Stinca); 29-9-2019, Tuerredda (Teulada, Cagliari province), pots and paths along the dune, 2 m a.s.l., 38.89686° N-8.81394° E, *leg. et det.* L. Rosati *et* M. Marignani (HLUC).

*Note:* *Euphorbia nutans* was recorded as casual or naturalized alien in most of the Italian regions [17]. It is considered invasive in Lombardia and Veneto [17].

***Euphorbia stricta* L. [= *Euphorbia serrulata* Thuill.]**

Euphorbiaceae Therophyte scapose European-Caucasian

*First record for Basilicata and confirmation for peninsular Italy*

Specimen: 12-6-2018, Vascarano, Pergola (Marsico Nuovo, Potenza province), traditional arable land, 915 m a.s.l., 40.42385° N-15.68713° E, *leg. et det.* L. Rosati (HLUC).

*Note:* Previously, and reliably reported only from the northern Italian regions [16]; this record provides the first verified evidence of its presence in peninsular Italy. Previously it was considered as doubtfully present in Lazio [16], while it has not been recently recorded from Abruzzo and Calabria [16], and was apparently recorded by mistake from Sicilia [16].

***Fagopyrum esculentum* Moench**

Polygonaceae Therophyte scapose Neophyte, Asia

*First record for Basilicata (casual) and confirmation for Calabria (casual)*

Specimens: 7-9-2011, Diga Masseria Nicodemo, Lago di Cogliandrino (Lauria, Potenza province), fallows, mesic grasslands, 670 m a.s.l., 40.08151° N-15.93680° E, *leg. et det.* S. Fascetti (HLUC); 30-8-2017, Contrada Schiena La Torre (Verbicaro, Cosenza province), vegetable garden, 575 m a.s.l., 39.76166° N-15.89780° E, *leg. et det.* S. Fascetti (HLUC).

*Note:* This species is known with certainty only from the northern Italian regions [17]; otherwise considered doubtfully present in Lazio, and not recently confirmed from Abruzzo and Calabria (after 1950) [17]. In Basilicata it was observed escaping from small cultivated fields of buckwheat. In the Calabria region it was observed for some years as a weed of vegetable gardens and along arable land edges.

***Ficus microcarpa* L. f. [- *Ficus retusa* auct. p.p., non L.]**

Moraceae Phanerophyte scapose Neophyte, E-Asia

*First record for Basilicata (casual)*

Specimen: 3-8-2017, Porto (Maratea, Potenza province), walls and crevices in the road pavements, 5 m a.s.l., 39.98949° N-15.70868° E, *leg.* A. Stinca *et* M. Eviano, *det.* A. Stinca (PORUN-Herb. Stinca).

*Note:* Treated as a casual alien in Sardegna, Campania, and Puglia; naturalized in Sicilia [17]. Recently recorded in southern Italy for Calabria [14].

***Filago asterisciflora* (Lam.) Sweet [= *Gnaphalium asterisciflorum* Lam.; = *Evax asterisciflora* (Lam.) Pers.]**

Asteraceae Therophyte crawling Steno-Mediterranean



*First record for Basilicata*

Specimen: 2-5-2019, Bosco Finocchio (Rotondella, Matera province), roadside, 40.15282° N-16.47588° E, 600 m a.s.l., leg. G. Salerno et G. Misano det. G. Salerno (Herb. Salerno).

*Note:* Previously *Filago asterisciflora* has been recorded from Toscana, Lazio, Campania, Puglia, Calabria, Sicilia, and Sardegna [16].

***Galanthus reginae-olgae* Orph. subsp. *vernalis* Kamari**

Amarylloidaceae Geophyte bulbouse European-Caucasian

*First record for Basilicata*

Specimen: 20-2-2014, Sellata (Pignola, Potenza province), beech forest, 1270 m a.s.l., 40.53127° N-15.78871° E, leg. et det. S. Fascetti (HLUC).

*Note:* Several plants observed in a large population extending for approximately 200 m<sup>2</sup>. Previously reported from the Calabria and Sicilia regions [16].

***Geranium pusillum* L.**

Geraniaceae Therophyte scapose Eurasian

*First record for Lazio*

Specimen: 4-6-2015, Colle Pietrolone (Poggio Bustone, Rieti province), secondary grassland with *Bromus hordeaceus*, *Poa trivialis* and *Poa sylvicola*, gently marly slopes, 1070 m a.s.l., 42.50015° N-12.90332° E, leg. E. Del Vico et L. Facioni, det. E. Del Vico (Herb. Del Vico).

*Note:* It was previously recorded in all Italian regions except for Lazio and Sicilia [16].

***Glandularia tenera* (Spreng.) Cabrera [≡ *Verbena tenera* Spreng.; ≡ *Shuttleworthia tenera* (Spreng.) Walp.]**

Verbenaceae Chamaephyte subshrubs Neophyte, S-America

*First record for Sardegna (casual)*

Specimen: 27-4-2019, Colle S. Michele (Cagliari, Cagliari province), grassland, 95 m a.s.l., 39.24345° N-9.11095° E, leg. et det. L. Rosati et M. Marignani (HLUC).

*Note:* It was previously recorded only for Lazio as casual [17]. Plant samples were identified using the diagnostic characters and keys of [69–71].

***Gleditsia triacanthos* L.**

Fabaceae Phanerophyte scapose, Neophyte, N-America

*First record for Basilicata (casual)*

Specimen: 25-5-2017, M. Vulture, Foggianello (Rionero in Vulture, Potenza province), forest edges and road side, 570 m a.s.l., 40.96473° N-15.59563° E, leg. et det. E. Fanfarillo et L. Rosati (HLUC)

*Note:* Previously reported from all Italian regions except for Molise and Basilicata [17].

***Hieracium pallescens* Waldst. and Kit. s.l.**

Asteraceae Hemicryptophyte scapose SE-European

*First record for Lazio*

Specimen: 29-7-2015, Rifugio Sebastiani, Monte Terminillo (Rieti province), pastured grassland dominated by *Bromopsis erecta* with *Helictochloa praetutiana*, *Brachypodium genuense*, *Carex kitaibeliana*, and *Festuca violacea* subsp. *italica*, limestone, 1870 m a.s.l., 13.01343° N-42.46902° E, leg. E. Del Vico et L. Facioni, det. G. Gottschlich (Herb. Del Vico).

*Note:* This species is present in all the northern regions of Italy except for Liguria [16]. In peninsular Italy it was recorded only from Abruzzo, Campania, Basilicata, and Calabria [16]. About twenty subspecies of *H. pallescens* are present in Italy; however, our specimen does not allow to ascertain the subspecific level. Further on filed investigations should be performed to fix this gap.

***Himantoglossum hircinum* (L.) Spreng. [≡ *Satyrium hircinum* L.]**

Orchidaceae Geophyte bulbouse Mediterranean-Atlantic

*First record for Sardegna*

Specimen: 22-5-2013, Illorai forest (Illorai, Sassari province), within a small clearing in otherwise dense *Quercus ilex* and *Q. pubescens* forest, 40.40494° N-8.92588° E, photo et det. P. J. de Lange.



*Note:* This species is present in Italy in the north-western (Piemonte, Liguria, Toscana and Emilia-Romagna) and in the southern regions with a clear gap in central Italy [16]. Although it is a very showy orchid it was never seen before in Sardegna, probably because of its rarity.

Images available at: <https://inaturalist.nz/observations/4060025>

***Impatiens noli-tangere* L.**

*Distribution clarification for Basilicata*

Balsaminaceae Therophyte scapose Eurasian

Specimen: 31-7-2015, Fossa Cupa (Sasso di Castalda, Potenza province), *Fagus sylvatica* forest, 40.50972° N-15.73002° E, *leg.* V.A. Romano, *det.* L. Rosati (HLUC).

*Note:* This species was reported first from Basilicata by Bartolucci et al. [16] based on our unpublished record above. Here we provide full details of the discovery.

***Isoëtes durieui* Bory**

Isoëtaceae Geophyte bulbouse W-Steno-Mediterranean

*First record for Basilicata*

Specimen: 2-5-2019, Bosco Finocchio (Rotondella, Matera province), ponds within *Quercus cerris* forest, 600 m a.s.l., 40.15282° N-16.47588° E, *leg.* G. Salerno et G. Misano, *det.* G. Salerno (Herb. Salerno).

*Note:* It was previously recorded for all western Italian regions though considered doubtfully in Molise [16].

***Isopyrum thalictroides* L.**

Ranunculaceae Geophyte rhizomatous Eurasian

*First record for Sardegna*

Specimen: 15-6-2014, Fontana Is Bidileddos (Desulo, Nuoro province), riparian forest of *Glechoma sardoae-Alnetum glutinosae*, 1660 m a.s.l., 40.01029° N-9.309394° E, *leg. et det.* E. Farris (SS).

*Note:* Locally common on the Fonni mountain side, exclusively in *Alnus glutinosa* forests above 1500 m a.s.l. (see <https://inaturalist.nz/observations/4112222>). This taxon is present throughout Italy, in most of the central-northern regions of Italy and though absent south of Toscana [16]. Our finding is the first for Mediterranean islands. This is noteworthy as it is believed to be absent from Corsica [72].

***Kalanchoë ×houghtonii* D. B. Ward** [≡ *Bryophyllum ×houghtonii* (D. B. Ward) P. I. Forst.; *Kalanchoë daigremontiana* Raym. -Hamet and H. Perrier × *Kalanchoë delagoensis* Eckl. and Zeyh.]

Crassulaceae Ch succ Neophyte, horticultural origin

*First record for Basilicata* (naturalized)

Specimen: 3-8-2017, Porto (Maratea, Potenza province), calcareous sea cliffs, 6 m a.s.l., 39.98835° N-15.70995° E, *leg.* A. Stinca et M. Eviano, *det.* A. Stinca (PORUN-Herb. Stinca).

*Note:* At Maratea *Kalanchoë ×houghtonii* seems to form populations capable of self-sustaining reproduction. Indeed, because of the viviparous nature, whereby the leaf lamina produces myriad plantlets this species has the potential to be highly invasive. It is recorded as naturalized from Liguria, Toscana, Lazio, and Calabria; it is present as casual in Campania, Puglia, Sardegna, and Sicilia [17].

***Kickxia spuria* (L.) Dumort. subsp. *spuria*** [≡ *Antirrhinum spurium* L. subsp. *spurium*]

Plantaginaceae Therophyte scapose Eurasian

*First record for Campania*

Specimen: 29-7-2014, near Vallone Serra Melito (Capaccio Paestum, Salerno province), arable land, 40.41596° N-15.08801° E, *leg. et det.* A. Stinca (PORUN-Herb. Stinca).

*Note:* This is the first record for the Southern Italian peninsula [16].

***Lantana montevidensis* (Spreng.) Briq.** [≡ *Lippia montevidensis* Spreng.]

Verbenaceae Nano-phanerophyte Neophyte, S-America

*First record for Sardegna* (casual)

Specimen: 30-8-2018, Su Giudeu (Domus de Maria, Cagliari province), crevices in the walls, 5 m a.s.l., 38.88749° N-8.85886° E, *leg. et det.* L. Rosati et M. Marignani (HLUC).

*Note:* Previously reported as a casual alien only from Liguria and Calabria regions [17]. In Sardegna

this species is widely grown in urban green areas, pots, and Mediterranean gardens (pers. observ.) so further naturalizations are likely.

***Lathyrus cirrhosus* Ser.**

Fabaceae Hemicryptophyte NW-Steno-Mediterranean

*Exclusion for Italy (Sardegna)*

*Note:* This taxon was reported only once at Monte Arviganu and Monte S. Giuliano, near Alghero, Sardegna by Schmid [49]. Pignatti [19,47] and Arrigoni [73] stated that the presence of *L. cirrhosus* in Sardegna is doubtful because of the probable confusion with *L. heterophyllus* L. Nevertheless, it was considered present in Sardegna in the Italian Flora checklists of vascular plants [16,74]. We have unsuccessfully searched for this species in the two sites during the last decade, and in the absence of verified herbarium evidence of its historic presence we recommend that *L. cirrhosus* be excluded from the flora of Sardegna and Italy.

***Lathyrus inconspicuus* L.**

Fabaceae Therophyte scapose Euri-Mediterranean

*First records for Lazio*

Specimens: 11-6-2015, Monte Porillo (Micigliano, Rieti province), secondary grassland with *Bromopsis erecta* and *Brachypodium rupestre*, gently marly slopes, 1000 m a.s.l., 42.45552° N-13.06439° E, *leg.* E. Del Vico *et* L. Facioni, *det.* E. Del Vico (Herb. Del Vico); 28-6-2016, Micigliano (Rieti province), secondary grassland with *Bromopsis erecta* and *Brachypodium rupestre*, gently marly slopes, 1130 m a.s.l., 42.46011° N-13.06226° E, *leg. et det.* E. Del Vico (Herb. Del Vico); 8-6-2016, Monte Porillo (Micigliano, Rieti province), secondary grassland with *Bromopsis erecta* and *Brachypodium rupestre*, gently marly slopes, 1130 m a.s.l., 42.46301° N-13.05907° E, *leg.* E. Del Vico *et* S. Bonacquisti, *det.* E. Del Vico (Herb. Del Vico); 20-7-2016, Monte Porillo (Micigliano, Rieti province), secondary grassland with *Cynosurus cristatus*, 1110 m a.s.l., 42.46596° N-13.06396° E, *leg. et det.* E. Del Vico (Herb. Del Vico); 20-7-2016, Erta (Micigliano, Rieti province), secondary grassland with *Brachypodium rupestre*, marly substratum, 1110 m a.s.l., 42.46428° N-42.46428° E, *leg. et det.* E. Del Vico (Herb. Del Vico).

*Note:* In peninsular Italy *L. inconspicuus* was previously recorded from Toscana, Marche, Abruzzo, and Puglia; indeed, in Umbria and Campania its presence is doubtful [16]. It is absent in the southern and insular regions [16].

***Linum tenuifolium* L.**

Linaceae Chamaephyte subshrubs Steno-Mediterranean-Euxinian

*Exclusion for Sardegna*

*Note:* The presence of this taxon in Sardegna was reported by Mossa *et al.* [50] and so accepted in the Italian checklist of vascular flora [16,74]. Nevertheless, the species is excluded by [75] who considers its presence a mistake, because of the confusion with *L. bienne*. Our surveys in the site from where *Linum tenuifolium* was reported by Mossa *et al.* [50] found only *L. bienne*. Therefore, *L. tenuifolium* has to be excluded from Sardegna. It was also reported by mistake in Sicilia region [16].

***Lonicera japonica* Thunb.**

Caprifoliaceae Phanerophyte climbing Neophyte, E-Asia

*First record for Basilicata (casual)*

Specimen: 14-6-2019, Macchia Romana, Campus of University of Basilicata (Potenza), crevices in road pavements close to the walls, 40.68829° N-15.80848° E, 735 m a.s.l, *leg. et det.* L. Rosati (HLUC).

*Note:* *Lonicera japonica* has been recorded from all Italian regions except for Molise and Basilicata [17]. It is considered invasive in several regions of Northern Italy [17].

***Lupinus albus* L. subsp. *graecus* (Boiss. and Spruner) Franco and P. Silva [≡ *L. graecus* Boiss. and Spruner]**

Fabaceae Therophyte scapose E-Steno-Mediterranean

*First record for Campania*

Specimen: 22-4-2011, M. Vesole (Rocccadaspide, Salerno province), chestnuts, 40.41538° N-15.17548° E, 500 m a.s.l., *leg. et det.* G. Salerno (Herb. Salerno).

*Note:* Previously reported from the Italian Peninsula for all of the regions, except Abruzzo, Molise, and Campania [16].

***Melampyrum barbatum* Waldst. and Kit. subsp. *carstiense* Ronniger**

Orobanchaceae Therophyte scapose SE-European

*First record for Basilicata and confirmation for Puglia*

Specimens: 9-6-1981, Trivigno (Potenza), oak forests, 500 m a.s.l., 40.58074° N-15.98965° E, *legit et det.* F. Cremonini (HLUC); 6-6-2018, V.ne Mariano (Laurenzana, Potenza province), edge of *Quercus pubescens* woods, siliceous substratum, 40.48337° N-15.96811° E, *leg.* L. Rosati *et* G. Potenza, *det.* L. Rosati (HLUC); 20-7-2014, Foresta Umbra (Vico del Gargano, Foggia province), roadside of forest road and edge of forest clearing, 560 m a.s.l., 41.854115° N-16.001818° E, *leg. et det.* G. Mei (ANC, Herb. Mei).

*Note:* In Southern Italy previously known only from doubtful historic records [16].

***Metrosideros excelsa* Sol. ex Gaertn. [= *M. tomentosa* A. Rich.; = *Nania tomentosa* (A. Rich.) Kuntze]**

Myrtaceae Phanerophyte caespitose Neophyte, New Zealand

*First record for Europe (Azores and Madeira excluded) (casual)*

Specimen: 31-5-2013, Costa Rei, Monte Nai (Muravera, Cagliari province), urban areas, 20 m a.s.l., 39.2565° N-9.575611° E, *leg. et det.* P.J. de Lange (AK, SS).

*Note:* A few seedlings, and saplings growing in the vicinity of the planted adult trees; this species is common in many coastal towns and resorts around Sardegna (see for example <https://inaturalist.nz/observations/1715168>). *Metrosideros excelsa*, commonly known as “New Zealand Christmas tree,” is a coastal evergreen tree that produces a brilliant display of red flowers. It has been recently added to the list of host plants referred to in Article 1(b) of Commission Implementing Decision (EU) 2015 2417 of 17 December 2015, which have been found to be susceptible to *Xylella fastidiosa* in the European Union territory.

Until this record *Metrosideros excelsa* had been recorded in Europe as a naturalized plant only from the Azores and Madeira (Portugal) by [76]. Thus, our finding represents the first record for Europe (Azores and Madeira excluded).

***Muscari parviflorum* Desf.**

Asparagaceae Geophyte bulbouse Central-E-Mediterranean

*Confirmation for Calabria*

Specimen: 10-10-2011, Orsomarso (Cosenza), fallows, 488 m a.s.l., 39.78545° N-15.90759° E, *leg. et det.* S. Fascetti (HLUC).

*Note:* Previous records of this species from Calabria had been considered doubtful [16].

***Nicandra physalodes* (L.) Gaertn. [= *Atropa physalodes* L.]**

Solanaceae Therophyte scapose Neophyte, S-American

*First record for Calabria (casual)*

Specimen: 3-6-2019, S. Litterata (Belvedere Marittimo, Cosenza province), fallows, 35 m a.s.l., 39.65594° N-15.83856° E, *leg. et det.* A. Capano (HLUC).

*Note:* This species was recorded in Italy from several regions; it is present in almost all of the central and northern regions as a casual alien; in Piemonte, Trentino-Alto Adige, and Friuli-Venezia Giulia it is considered naturalized [17]. It is absent in most of the southern regions, except for Sicilia [17].

***Nigella arvensis* L. subsp. *glaucescens* (Guss.) Greuter and Burdet [≡ *N. arvensis* L. var. *glaucescens* Guss.]**

Ranunculaceae Therophyte scapose Euri-Mediterranean

*First record for Basilicata and confirmation for Puglia*

Specimens: 15-4-2019, Padula (Ferrandina, Matera province), fallows, 40.5237° N-16.39444° E, *leg.* G. Marsilio, *det.* L. Rosati (HLUC); 15-4-2019, Accetta Grande (Statte, Taranto province), herbaceous fallows, 500 m a.s.l., 40.55389° N-17.17667° E, *leg.* G. Santoro, *det.* G. Santoro *et* L. Rosati (HLUC).

*Note:* Previously it was only recorded from Calabria, Sicilia, and Sardegna; no recent records are found from Puglia [16]. The presence of this taxon in Basilicata (Matera and Potenza Province) was also

reported in the Forum Acta Plantarum ("*Nigella arvensis* subsp. *glaucescens* (Guss.) Greuter and Burdet—Scheda IPFI, Acta Plantarum." Available on line (access date: 02-10-2019): [http://www.actaplantarum.org/flora/flora\\_info.php?id=5297](http://www.actaplantarum.org/flora/flora_info.php?id=5297)).

***Nothoscordum gracile* (Aiton) Stearn** [≡ *Allium gracile* Aiton]

Amaryllidaceae Geophyte bulbouse Neophyte, S-America

First record for Calabria (casual)

Specimen: 3-5-2019, Lazzaro (Motta San Giovanni, Reggio Calabria province), crevices in the sidewalks, 17 m a.s.l., 37.97408° N-15.66485° E, leg. et det. C.M. Musarella (REGGIO).

Note: Probably escaped from cultivated plants growing in pots placed on the sidewalks from where it had spread into crevices and the edge of the roadside. It was recorded as naturalized in Toscana, Campania, and Puglia [17] and as casual alien in Piemonte, Liguria, and Sardegna [17].

***Oeosporangium tinaei* (Tod.) Fraser-Jenk.** [≡ *Cheilanthes tinaei* Tod.; = *C. corsica* Reichst. and Vida]

Pteridaceae Hemicryptophyte rosulate Steno-Mediterranean-Macaronesian

First record for Lazio

Specimen: 23-5-2012, Cerveteri (Roma province), trachytes steep slope, 60 m a.s.l., 42.00000° N-12.10000° E, leg. et det. E. Del Vico et L. Facioni (HRO).

Note: Although new to the Lazio region this West steno-Mediterranean species has been recorded in all Italian peri-Thyrrhenian regions, except for Campania [16].

***Oloptum miliaceum* (L.) Röser and H. R. Hamasha** [≡ *Agrostis miliaceum* L.; ≡ *Oryzopsis miliacea* (L.) Asch. and Schweinf.; ≡ *Piptatherum miliaceum* (L.) Coss.]

oaceae Hemicryptophyte caespitose Mediterranean-Turanian

First records for Sardegna

Specimens: 2-6-2018, Sirigragiu, Corongiu (Maracalagonis, Cagliari province), reforestation with *Eucalyptus*, 84 m a.s.l., 9.2791° E-39.28434° N, leg. et det. E. Lallai (Herb. E. Lallai); 7-6-2018, C. D'Aquila, Stagno di Quartu (Quartu Sant'Elena, Cagliari province), olive grove, 3 m a.s.l., 9.17736° E-39.22613° N, leg. et det. E. Lallai (Herb. E. Lallai); 14-6-2018, Corti de Perda (Quartucciu, Cagliari province), reforestation with *Eucalyptus* and *Pinus* spp., 135 m a.s.l., 9.32868° E-39.24517° N, leg. et det. E. Lallai (Herb. E. Lallai).

Note: In the recent checklist of Italian vascular flora only *O. thomasi* and not *O. miliaceum* has been reported from Sardegna [16]. However, *O. miliaceum* is the only species that has ever been considered present in the flora treatments of Sardegna e.g., [47,74,75]. In addition, several authors consider questionable the distinction between these two taxa and include *O. thomasi* in *O. miliaceum*. Our observations confirm the presence of *O. miliaceum*, accordingly this name has to be re-added to the checklist of vascular flora of Sardegna. *O. miliaceum* is present in almost all Italian regions except Valle d'Aosta, Piemonte e Molise [16].

***Ophrys crabronifera* Mauri** [≡ *O. argolica* H. Fleischm. ex Vierh. subsp. *crabronifera* (Mauri) Faurh.; = *O. exaltata* Ten. subsp. *sundermannii* Soó; = *O. fuciflora* (F. W. Schmidt) Moench subsp. *sundermannii* Soó]

Orchidaceae Geophyte bulbouse Italian endemic

First record for Basilicata

Observation: 15-4-2015; 30-4-2019, along the road SP 12 Vietrese (Vietri di Potenza, Potenza province), roadside on calcareous substratum, 371 m a.s.l., 40.57086° N-15.52102° E, photo et det. V.A. Romano (Figure 2).

Note: This species was previously recorded in almost all the peninsular regions except for Puglia, Calabria, and Basilicata. This observation extends southward the range of this endemic taxon in Italy [16]. It is absent in the insular regions [16].

***Ophrys marmorata* G. Foelsche and W. Foelsche** [≡ *Ophrys fusca* Link subsp. *marmorata* (G. Foelsche and W. Foelsche) Kreutz]

Orchidaceae Geophyte bulbouse Italian endemic

First record for Basilicata



Observation: 14-2-2015, Lido di Scanzano Jonico (Scanzano Jonico, Matera province), *Pinus halepensis* forest, 10 m a.s.l., 40.26114° N-16.75518° E, photo *et det.* S. Fascetti *et* V.A. Romano (Figure 2).

*Note:* Since 2005, a few isolated flowering plants have been observed at this site flowering between February and March. The new findings extend southward the range of this endemic taxon in Italy; previously it had only been recorded from Toscana [16].

***Ophrys sipontensis* (Gumpr.) O. Danesch and E. Danesch** [= *O. sphegodes* Mill. subsp. *sipontensis* Gumpr.; = *O. garganica* O. Danesch and E. Danesch subsp. *sipontensis* (Gumpr.) Del Prete]

Orchidaceae G bulbouse Italian endemic

*First record for Basilicata*

Observation: 25-4-2015, Balvano (Potenza province), shrublands with *Spartium junceum*, 726 m a.s.l., 40.67352° N-15.52065° E, photo *et det.* S. Fascetti *et* V.A. Romano (Figure 2).

*Note:* Since 2002, at this location only a few isolated flowering plants have been observed flowering between April and May. Hitherto this endemic orchid has only been recorded from Campania and Puglia regions [16].

***Ophrys speculum* Link** [= *O. ciliata* Biv.]

Orchidaceae G bulbouse W-Steno-Mediterranean

*Confirmation for Calabria*

Observation: 15-4-2010, Frascineto (Cosenza province), roadside, 39.801091° N-16.241693° E, 420 m a.s.l., photo H. Presser, *det.* V.A. Romano (Figure 2).

*Note:* Previously reported from southern Italy only from Campania and Molise, it had otherwise been regarded as doubtfully present in Calabria [16].

***Oxalis debilis* Kunth** [= *O. corymbosa* DC.]

Oxalidaceae G. bulbouse Neophyte, S-America

*First record for Calabria* (casual)

Specimens: 3-5-2019, Lazzaro (Motta San Giovanni, Reggio Calabria province), crevices in the road pavements, 17 m a.s.l., 37.97405° N-15.66492° E, *leg. et det.* C.M. Musarella, *conf.* A. Stinca (PORUN-Herb. Stinca, REGGIO); 25-09-2019, Catona (Reggio Calabria, Reggio Calabria province), along the roadside, 15 m a.s.l., 38,189334° N- 15,643462° E, *leg.* V.L.A. Laface, *det.* V.L.A. Laface *et* C.M. Musarella *conf.* A. Stinca (PORUN-Herb. Stinca, REGGIO).

*Note:* At these locations only a few plants were recorded growing in the crevices and at the edge of the roadside; these probably escaped from plants cultivated in pots on the sidewalks. It is reported for several regions of Italy as a naturalized or casual alien [17]; it is considered doubtfully present in Lazio, Basilicata, and Puglia [17].

***Oxalis latifolia* Kunth**

Oxalidaceae Geophyte bulbouse Neophyte, America

*First record for Calabria* (casual)

Specimens: 10-5-2018, Tortora Marina (Tortora, Cosenza province), fallows close to a plant nursery, 12 m a.s.l., 39.92276° N-15.76723° E, *leg. et det.* S. Fascetti (HLUC); 29-7-2019, Catona (Reggio Calabria, Reggio Calabria province), sidewalks, 15 m a.s.l., 38.187390° N-15.643697° E, *leg.* V.L.A. Laface, *det.* V.L.A. Laface, C.M. Musarella *et* G. Spampinato (REGGIO); 29-7-2019, Porelli di Bagnara SS18 (Bagnara Calabria, Reggio Calabria province), along the roadside, 142 m a.s.l., 38.286887° N-15.810304° E, *leg.* V.L.A. Laface, *det.* V.L.A. Laface, C.M. Musarella *et* G. Spampinato *conf.* A. Stinca (PORUN-Herb. Stinca, REGGIO); 25-9-2019, Ferrito SS. 18 (Villa San Giovanni, Reggio Calabria province), along the roadside, 38 m a.s.l., 38.233512° N-15.660117° E, *leg.* V.L.A. Laface, *det.* V.L.A. Laface, C.M. Musarella, G. Spampinato (REGGIO); 27.07.2019, Catona (Reggio Calabria, Reggio Calabria province), sidewalks, 10 m a.s.l., 38.188338° N-15.641358° E, *leg.* V.L.A. Laface, *det.* V.L.A. Laface, C.M. Musarella *et* G. Spampinato *conf.* A. Stinca (PORUN-Herb. Stinca, REGGIO); 25.09.2019, Melia di Scilla (Melia di Scilla, Reggio Calabria province), 653 m a.s.l., 38.228695° N-15.757547° E, *leg.* V.L.A. Laface, *det.* V.L.A. Laface, C.M. Musarella (REGGIO); 28.09.2019, Pietrastorta (Reggio Calabria, Reggio Calabria province), along the roadside, 317 m a.s.l., 38.113405° N-15.684027° E, *leg. et det.*

V.L.A. Laface (REGGIO); 21.10.2019, Molochio (Molochio, Reggio Calabria province), along the sidewalks, 316 m a.s.l., 38.310638° N-16.029284° E, *leg. et det.* V.L.A. Laface (REGGIO).

*Note:* Abundantly naturalized. In some stations of Calabria, it probably escaped from plants grown in pots cultivated on the sidewalks as plants were seen in nearby crevices and on the nearby roadside. It was previously reported for almost all the Italian regions except for Molise, Basilicata, and Calabria in southern Italy [17]. In Basilicata region it is reported in the forum Acta Plantarum (2007 on— "*Oxalis latifolia* Kunth—Scheda IPFI, Acta Plantarum." Available on line (access date: 16/10/2019): [http://www.actaplantarum.org/flora/flora\\_info.php?id=502806](http://www.actaplantarum.org/flora/flora_info.php?id=502806)).

***Paspalum notatum* Flüggé [= *P. sauræ* (Parodi) Parodi]**

Poaceae Hemicryptophyte caespitose Neophyte, Central - S-America

*First record for Basilicata* (casual)

Specimen: 3-8-2017, Porto (Maratea, Potenza province), shores, 1 m a.s.l., 39.98927° N-15.70905° E, *leg.* A. Stinca *et* M. Eviano. *det.* A. Stinca (PORUN-Herb. Stinca).

*Note:* Hitherto reported for Italy from the Calabria region as a casual alien at Scalea [77].

***Pedicularis petiolaris* Ten.**

Orobanchaceae Hemicryptophyte scapose E-Mediterranean

*Confirmation for Campania*

Specimen: 27-5-2014, Mandranello (Padula, Salerno province), carbonatic dry grasslands, 1100 m a.s.l., 40.38762° N-15.68548° E, *leg. et det.* L. Rosati (HLUC).

*Note:* In Italy it was previously reported only for Abruzzo, Basilicata, and Calabria regions [16]. In Campania it had previously only been considered doubtful present [16].

***Pittosporum crassifolium* Banks and Sol. ex A. Cunn.**

Pittosporaceae Nano-phanerophyte Neophyte, New Zealand

*First record for Italy* (casual)

Specimen: 11-03-2013, Sardegna, Lungomare Valencia (Alghero, Sassari province), at back of disco bar near former castle, 9 m a.s.l., 40.55058° N-8.31974° E, *leg. et det.* P.J. de Lange (AK)

*Note:* Associated with the superficially similar *Pittosporum tobira* (by far the most commonly grown and naturalized *Pittosporum* species in Sardegna). *Pittosporum crassifolium* was only seen here and at Torre Nuova (Alghero). Seedlings occasional, these appear to be pure *Pittosporum crassifolium*. In Europe it has previously recorded only from Great Britain [60].

***Phoenix canariensis* H. Wildpret**

Arecaceae Phanerophyte scapose Neophyte, Macaronesia

*First record for Basilicata* (casual)

Specimens: 14-12-2017, S. Basilio, Marina di Pisticci (Pisticci, Matera province), roadside along *Pinus halepensis* forests, 5 m a.s.l., 40.29815° N-16.77887° E, *leg. et det.* S. Fascetti (HLUC); 25-08-2019, Pisticci (Matera province), road escarpment of SS Jonica 106, 21 m a.s.l., 40.325447° N-16.746782° E, *leg. et det.* C.M. Musarella (REGGIO).

*Note:* In loc. S. Basilio a few juvenile plants were observed probably spread from nearby gardens. In loc. Pisticci two mature individuals, away from each other about 50 m, were recorded at the edge of a drainage channel along the SS Jonica 106, outside of a lay-by. *Phoenix canariensis* is reported as casual or naturalized for almost all coastal regions of peninsular Italy [17].

***Phyla nodiflora* (L.) Greene [= *Lippia nodiflora* (L.) Michx.; = *Verbena nodiflora* L.]**

Verbenaceae Neophyte, Tropical America, Africa and Asia

*Confirmation for Marche* (casual)

Specimen: 3-8-2019, Osteria (Serra de' Conti, Ancona province), lawn borders and slopes of agricultural ditches for rainwater runoff, 135 m a.s.l., 43.541875° N-13.020947° E, *leg. et det.* G. Mei (ANC, Herb. Mei).

*Note:* Previously *P. nodiflora* was reported as naturalized from almost all the peninsular regions but it was considered as doubtfully present in Marche [17].

***Phyllostachys aurea* Carrière ex Rivière and C. Rivière**

Poaceae Phanerophyte caespitose Neophyte, E-Asia

*First record for Calabria* (casual)

Specimens: 2-7-2019, Pellaro, Torrente Fiumarella (Reggio Calabria, Reggio Calabria province), dry riverbed, 6 m a.s.l., 38.02138° N-15.64416° E, *leg. et det.* C.M. Musarella (REGGIO); 2-9-2019, C. da Monacelli, (Melicucco, Reggio Calabria province), roadside, 118 m a.s.l., 38.44528° N-16.04166° E, *leg. et det.* C.M. Musarella (REGGIO); 9-8-2019, C. da Sant'Angelo (Melia di San Roberto, Reggio Calabria province), road escarpment, 749 m a.s.l., 38.22281° N-15.77548° E, *leg.* V.L.A. Laface, *det.* V.L.A. Laface *et* G. Spampinato (REGGIO); 19.10.2019, Fiumara di S. Lorenzo (S. Lorenzo, Reggio Calabria province), bedriver, 6 m a.s.l., 37.920494° N-15.839534° E, *leg. et det.* V.L.A. Laface (REGGIO).

*Note:* In southern Italy it was previously recorded only for Campania (naturalized) and Sicilia (casual) [17].

***Physalis peruviana* L.**

Solanaceae Hemicryptophyte scapose Neophyte, S-America

*First record for Calabria* (casual)

Specimen: 23-8-2019, Thurio (Corigliano Calabro, Cosenza province), fallows, 8 m a.s.l., 39.69515° N-16.46777, *leg.* P. Nicoletti, *det.* L. Rosati (HLUC).

*Note:* In southern Italy recorded previously only from Puglia and Sicilia regions [17].

***Pinus nigra* J. F. Arnold subsp. *laricio* Palib. ex Maire** [= *P. laricio* Poir. subsp. *calabrica* (Loud.) Cesca and Peruzzi]

Pinaceae Phanerophyte scapose Italo-Corsican Endemic

*First record for Basilicata* (casual) *and Campania* (casual)

Specimens: 15-05-18, Mandrano, Monti della Maddalena (Paterno, Potenza province), pastures and roadsides, 1110 m a.s.l., 40.36917° N-15.71119° E, *leg. et det.* L. Rosati (HLUC); 15-05-18, Mandrano, Monti della Maddalena (Padula, Salerno), pastures and roadsides 1075 m a.s.l., 40.36901° N-15.70758° E, *leg. et det.* L. Rosati (HLUC).

*Note:* Several young trees from the nearby reforestation areas where this species had been deliberately planted were observed. It was recorded as alien taxa in others Italian regions (Sardegna, Friuli-Venezia Giulia, Toscana), whereas it is considered native only in Calabria and Sicilia [16].

***Plantago argentea* Chaix subsp. *argentea***

Plantaginaceae Hemicryptophyte rosulate S-European-S-Siberian

*First record for Campania*

Specimen: 20-7-2014, M. Alburno under M. Panormo (Sicignano degli Alburni, Salerno province), rocky slopes, 1402 m a.s.l., 40.53226° N-15.33386° E, *leg.* A. Stinca *et* M. Ravo, *det.* A. Stinca (PORUN-Heb. Stinca).

*Note:* *Plantago argentea* was previously indicated in sensu lato in Campania, thus, here we report the presence of the nominal subspecies [16].

***Plumbago auriculata* Lam.** [= *Plumbago capensis* Thunb.]

Plumbaginaceae Nano-phanerophyte Neophyte, S-Africa

*First record for Calabria* (casual)

Specimen: 02-09-2019, C. da Monacelli (Melicucco, Reggio Calabria), roadside, 117 m a.s.l., 38.445020° N-16.042060° E, *leg. et det.* C. M. Musarella (REGGIO).

*Note.* In Calabria, we observed a few individuals growing along the roadside; these had probably escaped from a nearby garden. It is reported as casual alien from almost all the regions of Italian peninsula, except for Umbria, Molise, and Basilicata; in Sardegna it is considered naturalized [17].

***Polygala rupestris* Pourr.**

Polygalaceae Chamaephyte subshrubs W-Mediterranean

*First record for Sardegna and confirmation for Italy*

Specimens: 02-11-2005; 14-05-2014; 08-04-2016, Ca

nale Oma Molt (Alghero, Sassari province), garrigues with *Rosmarinus officinalis* and *Viola arborescens*, 33 m a.s.l., 40.52452° N-8.33371° E, *leg. et det.* E. Farris (SS).

*Note:* In the recent checklist of the Italian vascular flora the presence of this species was considered doubtful in Italy [16]. We found this species in Sardegna along the coast South of Alghero, where it was usually present, though at low densities in the calcareous coastal garrigues. The nearest known localities of this species, according to Flora Gallica and Flora Iberica are in Provence (S-France) and Balearic Islands (Spain).

***Populus ×canescens (Aiton) Sm.* [≡ *P. alba* L. var. *canescens* Aiton]**

Salicaceae Phanerophyte scapose S-European

*First record for Sardegna*

Specimens: 21-6-2016, Settefratelli, along the road from Codoleddu to the giant's tombstone (Maracalagonis, Cagliari province), near the creek, 465 m a.s.l., 39.26022° N-9.37907° E, *leg. et det.* L. Rosati (HLUC); 13-5-1981, Mandas (Mandas, Cagliari province), uscita dal paese verso Sorgono, 30 m a.s.l., 39.65376° N-9.12843° E, *leg. et det.* I. Camarda (SS); 23-5-1975, Piana di Posada (Nuoro province), 5 m a.s.l., 40.635480° N-9.72371° E, *leg. S.* Vanelli *et B.* Corrias (SS); 01-06-2018, Sedda Brandanu, Corongiu (Maracalagonis, Cagliari province), remnants of riparian forest, 140 m a.s.l., 39.29282° N-9.29236° E, *leg. et det.* E. Lallai (Herb. E. Lallai).

*Note:* In North Sardegna this species was also reported in a vegetation survey from the Cala Regina (Isola dell'Asinara, Sassari province) by [78]. In Italy it is widespread and known from all regions except for Liguria. This hybrid was reported for Sardegna by Camarda and Valsecchi [79] and Arrigoni [80] but not subsequently considered (by mistake?) in the recent checklist of vascular flora [74,16]. In the last checklist of the Italian vascular flora [16] it is not indicated as a hybrid (i.e. *P. canescens* (Aiton) Sm).

***Potamogeton pusillus* L.**

Potamogetonaceae Idrophyte rooted Subcosmopolitan

*Confirmation for Campania*

Specimen: 16-7-2016, Sele river, Oasi Persano (Serre, Salerno province), lotic freshwaters, 40.60488° N-15.13717° E, *leg. et det.* L. Rosati *et G.* Salerno, *rev.* L. Lastrucci (HLUC).

*Note:* Outside Campania this species is not known from the southern Italian Peninsula [16]; it was recently confirmed from Basilicata [39].

***Prangos ferulacea* (L.) Lindl.** [≡ *Laserpitium ferulaceum* L.; ≡ *Cachrys ferulacea* (L.) Calest.]

Apiaceae Hemicryptophyte scapose Mediterranean-Turanian

*Confirmation for Lazio*

Specimen: 16-7-2015, Monte Tilia, Fondo del Laghetto (Leonessa, Rieti province), secondary grasslands with *Brachypodium genuense*, marly slopes, 1400 m a.s.l., 42.55842° N-12.95441° E, *leg. et det.* E. Del Vico (Herb. Del Vico).

*Note:* Doubtfully reported from Lazio on the basis of a historic record (1914) from Terminillo of Cavara and Grande which had not been confirmed by recent surveys [81]. On the basis of the record above *Prangos ferulacea* is now verified from the Lazio region. This species is, with the exception of Molise, otherwise known from the other regions of the Italian Peninsula [16].

***Puccinellia festuciformis* (Host) Parl. subsp. *festuciformis*** [≡ *Poa festuciformis* Host]

Poaceae Hemicryptophyte caespitose Steno-Mediterranean

*Confirmation for Campania*

Specimen: 12-6-2014, Patria lake, close to the dewatering pump (Giugliano in Campania, Napoli province), temporary flooded grasslands, 0 m a.s.l. 40.94181° N-14.0235° E, *leg. et det.* A. Stinca *et G.* Salerno (PORUN-Herb. Stinca).

*Note:* Until this discovery the presence of this grass in Campania had been considered doubtful [16]. Outside Campania this *Puccinellia* had been reported from several regions of the Italian Peninsula and considered as extinct in Abruzzo [16].

***Quercus petraea* (Matt.) Liebl. subsp. *austrotyrrhenica* Brullo, Guarino and Siracusa**

Fagaceae Phanerophyte scapose Italian endemic

*First record for Basilicata*



Specimens: 15-6-2015, M.te Serranetta (Abriola, Potenza province), oak forests, 1300 m a.s.l., 40.56351° N-15.81886° E, *leg. et det.* S. Fascetti (HLUC); 15-8-2002, Serra di Calvello (Calvello, Potenza province), oak forests, 1300 m a.s.l., 40.45683° N-15.77855° E, *leg. et det.* M.R. Lapenna (HLUC).

*Note:* This Italian endemic is uncommon in Basilicata, where it is generally found in mixed forests with *Quercus cerris*, in relatively xeric habitats on mountain ridges, exclusively on subacid substrata (e.g. Flysch Galestrino). Previously it was recorded only from Calabria and Sicilia regions [16].

***Rosa ×bishopii* Wolley-Dod** [= *Rosa micrantha* Borrer ex Sm. × *R. agrestis* Savi]

Rosaceae Nano-phanerophyte

*First record for Basilicata*

Specimen: 3-6-2011, Fiumara di Laurenzana (Laurenzana, Potenza province), shrubland in dry riverbed, 577 m s.l.m., 40.49004° N-15.9583° E, *leg. et det.* S. Fascetti, *conf.* E. Lattanzi (HLUC).

*Note:* Several hybrids into the wild dog roses group have been reported mainly in north-central Europe [82]; on the other hand, in southern Europe, knowledge concerning existence and distribution of these hybrids is very scarce. As a consequence, chorology for this taxon is not defined.

***Rosa montana* Chaix × *R. villosa* L.**

Rosaceae Nano-phanerophyte

*First record for Basilicata*

Specimen: 25-6-2016, Piano Jannace (San Severino Lucano, Potenza province), pastures, 1679 m a.s.l., 39.93977° N-16.19668° E, *leg. et det.* S. Fascetti, *conf.* E. Lattanzi (HLUC).

*Note:* *Rosa villosa* is one of the species of sect. *Caninae* DC. that can easily hybridize with other sympatric dog roses [83]. According to some authors, it is probably the most common hybridogenic species among the dog roses [84]. To the best of our knowledge, a binomial name for this hybrid does not exist yet. As a consequence, chorology for this taxon is not defined.

***Rosa subcollina* (Christ) Vuk.** [≡ *R. coriifolia* Fr. f. *subcollina* Christ]

Rosaceae Nano-phanerophyte European-W-Asian

*First record for Basilicata*

Specimen: 16-6-2011, Fossa Cupa (Pignola, Potenza province), shrublands, 1000 m a.s.l., 40.55197° N-15.73003° E, *leg. et det.* S. Fascetti, *rev.* E. Lattanzi (HLUC).

*Note:* It is recorded from most of the Italian Peninsula regions.

***Rumex maritimus* L.**

Polygonaceae Therophyte scapose Eurasian

*First records for Campania*

Specimens: 23-5-2014, near the harbour (Pozzuoli, Napoli province), sea sands, 0 m a.s.l., 40.82935° N-14.11412° E, *leg. et det.* A. Stinca (PORUN-Herb. Stinca); 2-6-2014, Ponte del Diavolo on the banks of the Patria lake (Castel Volturno, Napoli province), artificial river bank, 1 m a.s.l., 40.92918° N-14.0287° E, *leg.* A. Stinca *et* G. Salerno, *det.* A. Stinca (PORUN-Herb. Stinca); 3-6-2014, along the Canale Vico Patri close by Masseria De Chiara (Villa Literno, Napoli province), artificial river bank, 3 m a.s.l., 40.95818° N-14.04141° E, *leg.* A. Stinca *et* G. Salerno, *det.* A. Stinca (PORUN-Herb. Stinca).

*Note:* Previously recorded only from Calabria in southern Italy [16].

***Salvinia minima* Baker**

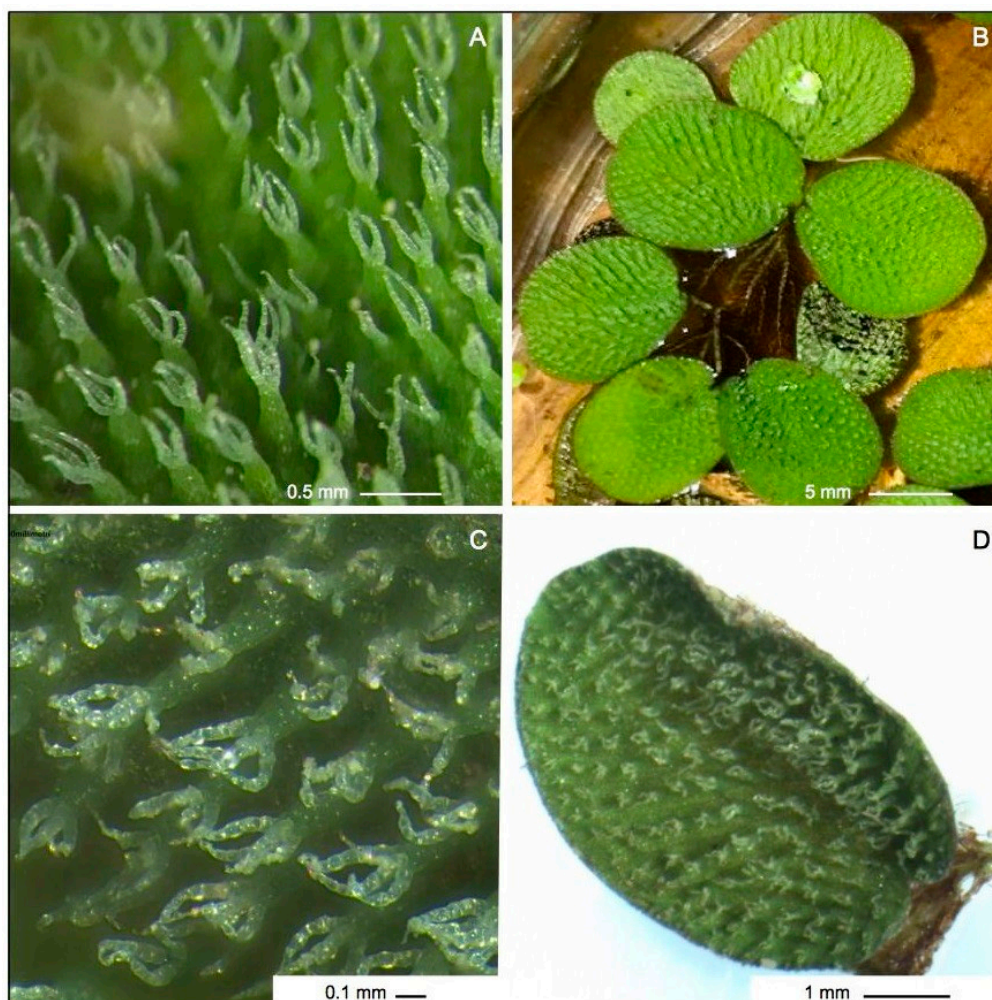
Salviniaceae Idrophyte floating Neophyte Central-S-America

*First record for Europe* (casual)

Specimen: 1-7-2019, Petile di Calanna (Calanna, Reggio Calabria province), impluvium, 38.19045° N-15.73117° E, *leg.* V.L.A. Laface, *det.* V.L.A. Laface *et* C. M. Musarella (REGGIO).

*Note:* *Salvinia minima* is a non-rooted aquatic fern native to South and Central America. Madeira et al. [85] report this species as locally introduced for Spain, citing Lawarlee in Flora Europaea [42]. However, *S. minima* is not considered in Flora Europaea, neither in Flora Iberica [86]. For this reason, it may be that this record for Calabria is not the first for Italy but also for Europe. In this context, a case of accidentally introduction of *Salvinia minima* in Europe has been only documented in the botanical garden greenhouses in Jibou, Romania [87]. Detailed images of plants collected in Calabria

are shown in Figure A2. The collected plants were identified using [88–91]; diacritical characters useful to distinguish *S. minima* with respect to the most similar taxa are shown in Table A2.



**Figure A2.** *Salvinia minima* plants collected in Calabria and photographed in laboratory at the University of Reggio Calabria: (A, C, D) upper side leaf hairs at different magnification, note distinctive hairs not joined at their tips (B) entire plants with the typical rounded leaves shape.

**Table A2.** Distinguishing characters between *Salvinia minima* and the most similar species (data retrieved from [91] including measures taken on our samples collected in Calabria).

	Floating Blade Length (mm)	Hairs on Papillae	Length/Width Ratio	Papillae on Upper Face (mm)
<i>S. adnata</i> Desv. (= <i>S. molesta</i> D. S. Mitch.)	15–25	Joined into dark knot at tips	<1.5	≤ 1
<i>S. oblongifolia</i> Mart.	25–45	Not joined at their tips	2–3	<0.1
<i>S. minima</i> Baker	5–10 (15)	Not joined at their tips	<1.5	≤ 1
	6–9	Not joined at their tips	<1.5	≤ 1

***Semprevivum tectorum* L.**

Crassulaceae Chamaephyte S-European

First record for Basilicata

Specimen: 15-6-2019, M. Volturino (Marsico Vetere, Potenza province), siliceous rocks and cliffs, 1500 m a.s.l., 40.4026° N-15.81642° E, leg. L. Rosati et G. Potenza, det. L. Rosati (HLUC).

*Note:* Present in central and northern regions of Italy but in southern regions, records of it from Puglia, Basilicata, and Calabria have been treated as mistakes [16]. Therefore, the discovery of Mt. Volturino reported here now confirms its presence in the southern Apennine.

***Solanandra maxima* (Sessé and Moc.) P. S. Green** [= *Datura maxima* Sessé and Moc.]

Solanaceae Phanerophyte climbing Neophyte, Central America

*First record for Calabria* (casual) *and Sicilia* (casual)

Specimen: 9-8-2019, Ferrito (Villa San Giovanni, Reggio Calabria province), roadside, 34 m a.s.l., 38.23229° N-15.64493° E, *leg.* V.L.A. Laface, *det.* V.L.A. Laface, C.M. Musarella *et* G. Spampinato (REGGIO); 5-7-2019, Canalicchio (Catania), road escarpment, 91 m a.s.l., 37.53119° N-15.09410° E, *leg.* C.M. Musarella, *det.* C.M. Musarella *et* G. Spampinato (REGGIO).

*Note:* *Solanandra maxima* was recorded for the first time in Europe from the Campania region [92]. Our two records are therefore the second for the Italian peninsula and the first for Calabria and Sicilia respectively.

***Tagetes erecta* L.** [= *T. patula* L.]

Asteraceae Therophyte scapose Neophyte, Central American

*First record for Basilicata* (casual)

Specimen: 3-8-2017, Porto (Maratea, Potenza province), crevices in road pavements, 16 m a.s.l., 39.98889° N-15.70958° E, *leg.* A. Stinca *et* M. Eviano. *det.* A. Stinca (PORUN-Herb. Stinca).

*Note:* This species has been recorded as casual alien from many Italian regions [17].

***Tetragonia tetragonoides* (Pall.) Kuntze** [= *Demidovia tetragonoides* Pall.]

Aizoaceae Therophyte scapose Neophyte, Australia and New Zealand

*Confirmation for Sardegna* (casual)

Specimen: 19-05-2013, Golfo di Orosei, Cala Gonone (Orosei, Nuoro province), cobble beach, 1 m a.s.l., 40.28270° N-9.63620° E, *leg. et det.* P.J. de Lange (AK).

*Note:* Flowering and fruiting plants have been observed (see <https://inaturalist.nz/observations/1509928>). In Italy it was previously reported in Friuli Venezia Giulia, Trentino-Alto Adige, Lombardia, Toscana, Lazio, Campania, and Sicilia regions [17]. Prior to this record this species was known from Sardegna on the basis of old reports that required confirmation [17].

***Trifolium spumosum* L.**

Fabaceae Therophyte scapose E-Steno-Mediterranean

*Confirmation for Basilicata*

Specimen: 16-6-2014, Anglona Sanctuary (Tursi, Matera province), dry grassland, 262 m a.s.l., 40.2449° N-16.55653° E, *leg.* G. Salerno *et* M.R. Lapenna, *det.* G. Salerno (Herb. Salerno).

*Note:* The presence of this species in Italy was ascertained only from Sardegna, Sicilia, Calabria, and Lazio [16]. In recent times this species has not been recorded from most of the Italian peninsular regions [16]. Our discovery from Basilicata confirms its continued presence from at least part of that region.

***Urginea fugax* (Moris) Steinh.** [= *Anthericum fugax* Moris]

Asparagaceae Geophyte bulbouse W-Mediterranean

*Exclusion for continental and peninsular Italy (Basilicata)*

*Note:* In Italy, we can only confirm this species as present in Sardegna [16], which is consistent with its W-Mediterranean distribution. Accordingly, we regard past records of the species from Basilicata and neighboring regions as erroneous. Although Gavioli [51] reported the species from Basilicata in 1915 the samples he noted had been lost, so the record cannot be verified. In absence of further specimens of this distinctive plant from the Italian Peninsula we suggest that *U. fugax* had probably been reported by mistake, because of the confusion with a similar species (likely small size

individuals of *Urginea maritima* auct. Fl. Ital.). Therefore, we recommend that this species is excluded from the flora of Basilicata.

***Veronica spicata* L. subsp. *fischeri* (Trávn.) Albach** [= *Pseudolysimachion spicatum* (L.) Opiz subsp. *fischeri* Trávn]

Plantaginaceae Hemicryptophyte crawling Eurasian

First records for Lazio

Specimens: 2-7-2015, Monte Rosato (Poggio Bustone, Rieti province), secondary grassland with *Bromopsis erecta*, *Carex humilis* and *Plantago argentea*, calcareous slopes, 1300 m a.s.l., 42.51662° N-12.88791° E, leg. et det. E. Del Vico (Herb. Del Vico); 10-7-2016, Monte Rosato (Poggio Bustone, Rieti province), secondary grassland with *Bromopsis erecta*, calcareous slopes, 1350 m a.s.l., 42.51387° N-12.88557° E, leg. E. Del Vico et L. Facioni det. E. Del Vico (Herb. Del Vico).

Note: In Italy this taxon has a northern (Lombardia, Trentino-Alto Adige, Veneto) and central (Marche, Umbria, Abruzzo) disjunct distribution [16]. In Piemonte it is recorded by mistake [16]. Subspecies identification of our samples was based on the key reported in [20]; however, in our view the subspecies delimitation of *V. spicata* as stated in [20] is unclear and needs further study.

***Viola kitaibeliana* Schult.**

Violaceae Therophyte scapose European-Caucasian

Confirmation for Campania

Specimen: 1-3-2016, Campitello, M. della Maddalena (Padula, Salerno province), pastures on siliceous schistous substrate, 1300 m a.s.l., 40.34573° N-15.69029° E, leg. et det. L. Rosati (HLUC).

Note: *Viola kitaibeliana* is recorded from most of the peninsular regions, except for Emilia-Romagna, Molise, and Puglia; it was previously considered as doubtfully present in Campania [16]. Our discovery now fills this gap along the Apennine chain.

***Wisteria sinensis* (Sims) Sweet** [= *Glycine sinensis* Sims]

Fabaceae Phanerophyte climbing Neophyte, E-Asia

First record for Calabria (casual)

Specimen: 2-9-2019, C. da Monacelli (Melicucco, Reggio Calabria province), roadside, 118 m a.s.l., 38.44528° N-16.04166° E, leg. et det. C.M. Musarella (REGGIO).

Note: A few individuals of *Wisteria sinensis* were noted growing together with *Phyllostachys aurea* and *Plumbago auriculata* along the roadside, probably escaped from a nearby garden. Previously *Wisteria sinensis* was recorded as casual alien from almost all of the Italian regions but only from Campania in the southern ones [17]. In Sardegna it is considered naturalized [17].

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