

Second record of *Hammarbya paludosa* (L.) Kuntze (Orchidaceae) in Italy

Filippo Prosser¹, Alessio Bertolli¹

¹ Fondazione Museo Civico di Rovereto, Largo S. Caterina 41, I-38068, Rovereto, Italy

Corresponding author: Filippo Prosser (prosserfilippo@fondazionemcr.it)

Academic editor: L. Peruzzi | Received 30 May 2016 | Accepted 3 July 2016 | Published 1 August 2016

Citation: Prosser F, Bertolli A (2016) Second record of *Hammarbya paludosa* (L.) Kuntze (Orchidaceae) in Italy. Italian Botanist 2: 1–6. doi: [10.3897/italianbotanist.2.9381](https://doi.org/10.3897/italianbotanist.2.9381)

Abstract

A new population of *Hammarbya paludosa*, a rare orchid typical of peat bogs, has been discovered in Cinque Valli (Valsugana, Roncegno municipality, province of Trento). In Italy, this species was previously known only in one other locality in the province of Bolzano, near Anterselva/Antholz (Rasun-Anterselva/Rasen-Antholz municipality).

Keywords

Flora of Italy, Trentino-Alto Adige/Südtirol region

Introduction

Hammarbya paludosa (L.) Kuntze (\equiv *Malaxis paludosa* (L.) Sw.) is a tiny circumboreal orchid (Meusel et al. 1965). This species is typical of peat bogs and characteristic of the alliance *Rhynchosporion albae* W.Koch (Oberdorfer 2001). *Hammarbya paludosa* was discovered for the first time in Italy in 1979 by Franco Pedrotti in the Bolzano province, near Anterselva (Rasun-Anterselva municipality) in a small population with 15–20 individuals (Pedrotti 1980). In this site, there are currently very few individuals, which do not flower every year (Perazza and Lorenz 2013).

Description of the new record

On June 18th 2014, during a field trip aimed at investigating some potentially interesting bogs, a small population of *H. paludosa* was discovered in Cinque Valli, on the southern side of Lagorai, Valsugana (municipality of Roncegno; WGS84: ca. 46°3'N 11°22'E; MTB: 9934/1). At the time of discovery, we observed a dozen plants, about half of them at the beginning of flowering. A plant was collected and deposited in the herbarium of the Museo Civico di Rovereto (ROV, acc. n. 67391). The plants were in full anthesis a month later, as documented by Giorgio Perazza with photos taken on July 19th 2014. One year later 10 flowering and about 20 sterile plants were counted by A. Bertolli, G. Tomasi and R. Vettori. This finding was already mentioned by Perazza in GIROS (2016) for the province of Trento without the exact location.

In the province of Trento this species was not found with certainty earlier. The only indication is found in a letter dated November 10th 1992 by A. J. B. Brilli-Cattarini (botanist in Pesaro who died in 2006) to F. Prosser, where the former informed that his collaborators in Berne found *H. paludosa* in *Sphagnum* samples collected in two localities of Val di Fassa (see Perazza 1993). However, investigation at these two sites, namely the High Val San Pellegrino and Val di Grepa, and considerations about the ecology of the species, led Perazza and Decarli Perazza (2005) to consider these records as erroneous. In any case, specimens of *H. paludosa* from the localities cited by Brilli-Cattarini are not present in the herbarium PESA (L. Gubellini, in litt.).

Discussion

Among the species so far assessed for the Red List of the Italian Flora (Rossi et al. 2013), *H. paludosa* is considered Critically Endangered (CR). The total number of fertile individuals, including the Cinque Valli station, occurring in Italy remains below 50; thus, following criterion D of the IUCN guidelines (IUCN 2012), the category should remain unchanged. In the Red List of the flora of the province of Bolzano (Wihalm and Hilpold 2006), the species had also been assessed as Critically Endangered. Finally, *H. paludosa* should be also be added, again as Critically Endangered, in the Red List of the flora of the province of Trento (Prosser 2001).

Hammarbya paludosa, despite its ecological and phytogeographical significance, is not part of the species mentioned in the annexes of the Council Directive 92/43/EEC and in the Berne Convention. However, it is protected in the province of Trento based on Annex A of the regulation following the provincial law L.R.11/2007, which includes all wild Orchidaceae with the exception of the most common ones.

While the Anterselva population is inside a Natura 2000 area (Torbiera di Rasun/Rasner Möser), the Cinque Valli population is not in a protected area. Here *H. paludosa* grows in its typical environment, on *Sphagnum* mounds, in a restricted zone. The inconspicuous aspect of the plant, its delicate environment of growth, the absolute rarity in Italy and the desirability for photographers are factors that expose the popula-



Figure 1. *Hammarbya paludosa* (L.) Kuntze photographed in Cinque Valli (province of Trento, Roncogno municipality) on July 19th 2015 (photo by A. Bertolli).

tion of *H. paludosa* to trampling damage. For this reason exact coordinates of the site of occurrence are omitted.

The population of *H. paludosa* nearest to Cinque Valli is Anterselva, which is over 100 km in a straight line to the northeast (see Fig. 2). Pedrotti (1980) considered the

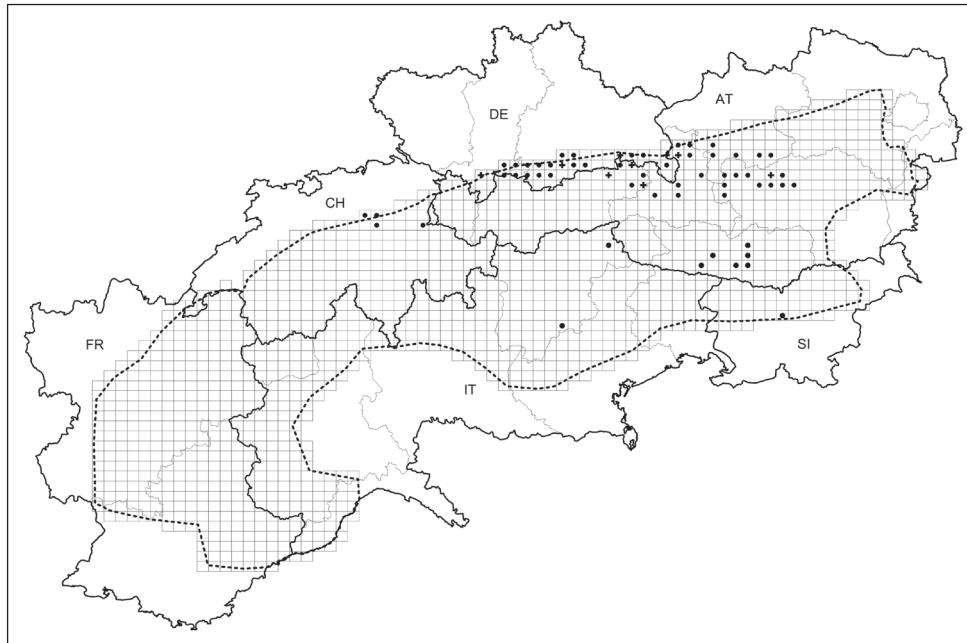


Figure 2. Distribution map of *Hammarbya paludosa* (L.) Kuntze in the Alps (dotted line) after the MTB-grid (see Ehrendorfer and Hamann 1965). The data are drawn from the following sources: <https://www.infoflora.ch/it/> (accessed 24.06.2016) for Switzerland; Bettinger et al. (2013) for Germany; Griebl (2013) for Austria, with integrations by H. Niklfeld and K. Zernig (in litt.); Jogan (2001) for Slovenia. Dots: confirmed after 1950 ca.; crosses: not confirmed after 1950 ca.

latter as the only station on the southern side of the Alps, interpreting it as a relict. This should apply even more to the Cinque Valli population, being even more southern. Other rare bog species were also found in the province of Trento in recent years, such as *Carex buxbaumii* Wahlenb., *Carex chordorrhiza* L.f. and *Eriophorum gracile* W.D.J.Koch ex Roth (Bertolli and Prosser 2011).

The considerable altitude of the population of Cinque Valli, which is located at ca. 1400 m a.s.l., should also be highlighted. This may be the highest altitude reached by this species in the Alps and one of the highest in Europe; Dusak and Prat (2010) reported 1400 m as the maximum elevation in France, while for Bulgaria the maximum altitude reported is 1500 m (Peev et al. 2011).

Conclusion

The discovery of a second site of *H. paludosa* in Italy can raise some optimism about the chances of survival of this species in our country. The absence of protection of the Cinque Valli site is undoubtedly a problem, especially because it lies several kilometers away from the nearest Natura 2000 area.

Acknowledgments

We thank Giorgio Perazza (Fondazione Museo Civico di Rovereto) for critical reading of the text, Leonardo Gubellini (Centro Ricerche Floristiche Marche) for searching *H. paludosa* in herbarium PESA, Harald Niklfeld (University of Vienna) and Kurt Zernig (Museum Joanneum, Graz) for providing Austrian distribution data.

References

- Bertolli A, Prosser F (2011) Segnalazioni Floristiche Tridentine. VIII. Annali del Museo Civico di Rovereto. Sezione Archeologia, Storia, Scienze Naturali 26 (2010): 269–318.
- Bettinger A, Buttler KP, Caspari S, Klotz J, May R, Metzing D (Eds) (2013) Verbreitungsatlas der Farn- und Blütenpflanzen Deutschlands. Netzwerk Phytodiversität Deutschlands (NetPhyD) & Bundesamt für Naturschutz (BfN), Bonn - Bad Godesberg, 912 pp.
- Dusak F, Prat D (Eds) (2010) Atlas des Orchidées de France. Biotope, Mèze (Collection Parthénope), Muséum national d'Histoire naturelle, Paris, 398 pp.
- Ehrendorfer F, Hamann U (1965) Vorschläge zu einer floristischen Kartierung von Mitteleuropa. Berichte der Deutschen Botanischen Gesellschaft 78: 35–50.
- GIROS (2016) Orchidee d'Italia. Guida alle orchidee spontanee. Seconda edizione. Il Castello, Cornaredo, Milano, 368 pp.
- Griebl N (2013) Die Orchideen Österreichs. Freya Verlag, Linz, 479 pp.
- IUCN (2012) IUCN Red List Categories and Criteria: Version 3.1. 2 ed. IUCN Species Survival Commission. IUCN, Gland, Cambridge. http://jr.iucnredlist.org/documents/redlist_cats_crit_en.pdf [accessed 24.06.2016]
- Jogan N (Ed.) (2001) Materials for the Atlas of Flora of Slovenia. Miklavaž na Dravskem polju. Center za kartografijo favne in flora, 443 pp.
- Meusel H, Jäger E, Weinert E (1965) Vergleichende Chorologie der zentraleuropäischen Flora, Vol. 1 (Text und Karten). Fischer-Verlag, Jena, 418 pp + 258 pp.
- Oberdorfer E (2001) Pflanzenekologische Exkursionsflora für Deutschland und angrenzende Gebiete. Ulmer, Stuttgart, 1051 pp.
- Pedrotti F (1980) *Hammarbya paludosa* (L.) O.Kuntze, specie nuova per la flora italiana. Studi Trentini di Scienze Naturali, Acta Biologica 56 (1979): 37–43.
- Peev D, Petrova AS, Anchev M, Temniskova D, Denchev CM, Ganeva A, Gussev Ch, Vladimirov V (Eds) (2011) Red Data Book of the Republic of Bulgaria Vol. 1 (Plants and Fungi). Ministry of Environment and of Environment and Waters of Bulgaria (MEWB), Sofia. <http://e-ecodb.bas.bg/rdb/en/vol1/Hampalud.html> [accessed 24.06.2016]
- Perazza G (1993) Le Orchidee del Trentino (Die Orchideen des Trentino). Mitteilungsblatt, Arbeitskreis Heimische Orchideen Baden-Württemberg, 25(1): 73–109.
- Perazza G, Decarli Perazza M (2005) Cartografia delle orchidee tridentine (COT): mappatura delle orchidee spontanee in provincia di Trento (Italia settentrionale), aggiornamento generale. Annali del Museo Civico di Rovereto. Sezione Archeologia, Storia, Scienze Naturali 20 (2004): 153–339.

- Perazza G, Lorenz R (2013) Le orchidee dell'Italia nordorientale. Atlante corologico e guida al riconoscimento. Edizioni Osiride, Rovereto, Trento, 447 pp.
- Prosser F (2001) Lista Rossa della flora del Trentino. Pteridofite e Fanerogame. 89^a Pubblicazione Museo Civico di Rovereto, Rovereto, Trento, 109 pp.
- Rossi G, Montagnani C, Gargano D, Peruzzi L, Abeli T, Ravera S, Cogoni A, Fenu G, Magrini S, Gennai M, Foggi B, Wagensommer RP, Venturella G, Blasi C, Raimondo FM, Orsenigo S (Eds) (2013) Lista Rossa della Flora Italiana. 1. Policy species e altre specie minacciate. Comitato Italiano IUCN e Ministero dell'Ambiente e della Tutela del Territorio e del Mare, Roma. <http://www.governo.it/backoffice/allegati/71184-8693.pdf> [accessed 24.06.2016]
- Wilhalm T, Hilpold A (2006) Rote Liste der gefährdeten Gefäßpflanzen Südtirols. *Gredleriana* 6: 115–198.

Distribution and taxonomy of the Italian clovers belonging to *Trifolium* sect. *Vesicastrum* subsect. *Mystillus* (Fabaceae)

Anna Scoppola¹, Edda Lattanzi², Liliana Bernardo³

1 Department of Agriculture and Forestry Sciences (DAFNE), Tuscia University, via S. Camillo De Lellis, I-01100 Viterbo, Italy **2** Via V. Cerulli 59, 00143 Roma, Italy **3** Department of Biology, Ecology and Earth Science (DIBEST), University of Calabria, 87036 Arcavacata di Rende (Cosenza), Italy

Corresponding author: Anna Scoppola (scoppola@unitus.it)

Academic editor: L. Peruzzi | Received 31 August 2016 | Accepted 1 October 2016 | Published 14 October 2016

Citation: Scoppola A, Lattanzi E, Bernardo L (2016) Distribution and taxonomy of the Italian clovers belonging to *Trifolium* sect. *Vesicastrum* subsect. *Mystillus* (Fabaceae). Italian Botanist 2: 7–27. doi: 10.3897/italianbotanist.2.10361

Abstract

In this paper, we focused our attention on the taxonomy and distribution in Italy of taxa belonging to *Trifolium* sect. *Vesicastrum* subsect. *Mystillus*. A short description of these closely related clovers, based on the study of fresh plant material, revision of herbarium specimens, and analysis of the relevant literature, is provided. Diagnostic features were highlighted by means of high-resolution digital images and, accordingly, an identification key is given. *Trifolium spumosum*, *T. vesiculosum*, *T. mutabile* and *T. setiferum* are reported to be distributed throughout Italy. We have updated the Italian distribution of the first three species by providing new occurrences from Tuscany, Umbria, Campania, Basilicata, and Calabria and by correcting previous references. The current presence of *T. multistriatum* in southern Italy is confirmed by our study, while *T. setiferum* must be excluded from the flora of Sicily. The study resulted in five new regional occurrences and 16 changes of presence status. Finally, intermediate forms between *T. vesiculosum*, *T. multistriatum* and *T. mutabile* were found both in living material and in the revised herbarium specimens.

Keywords

Central and southern Italy, clovers, identification key, new records, *Trifolium* subsect. *Mystillus*

Introduction

The genus *Trifolium* L. is cosmopolitan, with about 255 species occurring mostly in the northern hemisphere (Zohary and Heller 1984, Gillett and Taylor 2001, Smýkal et al. 2015). According to Ellison et al. (2006) and Zohary and Heller (1984), the genus presumably originated in the eastern regions of the Mediterranean where the largest number and greatest variety of species are concentrated to date. In this area, it is represented by over 150 species, the richest country being Turkey (over 100 species), the poorest Egypt (22 species) (Euro+Med 2006 onwards). Italy holds 72 species (Conti et al. 2005) and 7 out of 8 sections that are typically recognized in the infrageneric classification of the genus *Trifolium* based on morphology (Zohary and Heller 1984, Greuter et al. 1989, Coulot and Rabaute 2013, George et al. 2013). Clovers are widely grown as green manure crops, pasture, livestock forage or silage; crop species have become extensively naturalized and are becoming increasingly widespread. At least 16 species of *Trifolium* are actively cultivated (Gillett and Taylor 2001), of which 10 are of considerable agricultural importance (Zohary and Heller 1984).

Based on the more recent classification of the genus, derived from molecular phylogenetic evidence (Ellison et al. 2006), the traditional *Trifolium* sect. *Mystillus* (C.Presl) Godr. is included in subgenus *Trifolium* as sect. *Vesicastrum* Ser. subsect. *Mystillus* (C.Presl) Coulot & Rebaute (Coulot and Rabaute 2013). As widely reported in the literature, all species classified in this subsection present a well-developed bracteolate flower, regarded as a primitive feature, with a persistent corolla, which assumes an important role in fruit dispersion. The fruiting calyx is symmetrically, more or less inflated or vesicular and multi-nerved, at least in the upper part (Gibelli and Belli 1892, Pignatti 1982, Zohary and Heller 1984).

There is a wealth of literature on the European *Trifolium* representatives. Zohary and Heller (1984) summarized the extensive taxonomical history of *Trifolium* by providing detailed descriptions and illustrations of all recognized species, although information regarding some species within the Italian territory was lacking (Scoppola and Lattanzi 2016). Other reports were made by Coombe (1968), Muñoz and Devesa (1988), Greuter et al. (1989), Muñoz Rodriguez (1992, 1995), and Euro+Med (2006 onwards).

Among the classical studies, the monograph by Gibelli and Belli (1892) of sect. *Trigantheum* Gibelli & Belli (= sect. *Mystillus* p.p.) is the most exhaustive concerning the Italian species; their delimitation of the species is noteworthy and proves their great knowledge of the genus (Zohary and Heller 1984, Scoppola and Lattanzi 2016). Other treatments were made by Bertoloni (1850), Fiori (1925), Zangheri (1976), Pignatti (1982) and Conti et al. (2005) (see Table 1).

Currently, *T. mutabile* Port., *T. setiferum* Boiss., *T. spumosum*, and *T. vesiculosum* have been reported within the Italian territory and regarded as distinct species, while *T. multistriatum* W.D.J.Koch has either been completely ignored (Pignatti 1982), considered as a synonym of *T. setiferum* (Greuter et al. 1989, Conti et al. 2005, Giardina et al. 2007), or even included in *T. vesiculosum* as a variety (Fiori 1925, Gavioli 1948, Zohary and Heller 1984, Coulot and Rabaute 2013) or as a subspecies (Gams 1923,

Table I. Main taxonomical treatments of the *Trifolium* subsection *Mystellus* species in Italy.

	<i>T. multistratum</i> W.D.J.Koch	<i>T. mutabile</i> Port.	<i>T. setiferum</i> Boiss.	<i>T. spinosum</i> L.	<i>T. vesiculosum</i> Savi
Euro+Med (2006 onwards)	<i>T. mutabile</i> Port. (<i>T. leiocacinum</i> Boiss. & Spruner)	<i>T. setiferum</i> Boiss. (<i>T. rumelicum</i> (Griseb.) Halacsy; <i>T. multistratum</i> Koch) (provisional)	<i>T. spinosum</i> L.	<i>T. vesiculosum</i> Savi	
Conti F et al. 2005	<i>T. mutabile</i> Port.	<i>T. setiferum</i> Boiss.	<i>T. spinosum</i> L.	<i>T. vesiculosum</i> Savi	
Greuter W et al. 1989	<i>T. mutabile</i> Port. (<i>T. leiocacinum</i> Boiss. & Spruner in Boiss., <i>T. vesiculosum</i> subsp. <i>mutabile</i> (Portenschl.) Ponert.)	? <i>T. setiferum</i> Boiss. (<i>T. multistratum</i> Koch, <i>T. rumelicum</i> (Griseb.) Halacsy; <i>T. vesiculosum</i> subsp. <i>multistratum</i> (Koch) Arcangeli	<i>T. spinosum</i> L.	<i>T. vesiculosum</i> Savi	
Zohary M & Heller D 1984	<i>T. vesiculosum</i> Savi var. <i>rumelicum</i> Griseb. (<i>T.</i> <i>multistratum</i> Koch)	<i>T. mutabile</i> Portenschl. (<i>T. leiocacinum</i> Boiss., <i>T. paleaceum</i> Portenschl.)	<i>T. setiferum</i> Boiss. <i>T. spinosum</i> L. (<i>T. apulum</i> Horst ex All.)	<i>T. spinosum</i> L. var. <i>vesiculosum</i>	<i>T. vesiculosum</i> Savi
Pignatti S 1982	<i>T. vesiculosum</i> subsp. <i>multistratum</i> (Koch) Arcangeli	<i>T. mutabile</i> Portenschlag.		<i>T. spinosum</i> L.	<i>T. vesiculosum</i> Savi
Zangheri P 1976	<i>T. vesiculosum</i> subsp. (<i>T. setiferum</i> Boiss.)	<i>T. mutabile</i> Portenschl.		<i>T. spinosum</i> L.	<i>T. vesiculosum</i> Savi subsp. <i>vesiculosum</i>
Coombe DE 1968	<i>T. multistratum</i> Koch (<i>T. setiferum</i> Boiss., <i>T.</i> <i>rumelicum</i> (Griseb.) Halacsy)	<i>T. mutabile</i> Portenschl. (<i>T. leiocacinum</i> Boiss.)		<i>T. spinosum</i> L.	<i>T. vesiculosum</i> Savi
Fiori A 1925	<i>T. vesiculosum</i> Savi γ <i>mutabile</i> <i>multistratum</i> Koch	<i>T. vesiculosum</i> Savi γ <i>mutabile</i> Portschg.		<i>T. spinosum</i> L. (<i>T. apulum</i> All.)	<i>T. vesiculosum</i> Savi α typicum
Gibelli G & Belli S 1892	<i>T. multistratum</i> Koch	<i>T. mutabile</i> Portenschlag. (<i>T. leiocacinum</i> Boiss. & Sprunn.)	<i>T. setiferum</i> Boiss. (<i>T. vesiculosum</i> var. <i>rumelicum</i> Griseb.)	<i>T. spinosum</i> L. (incl. <i>T. apulum</i> All., <i>T. argutum</i> Russel.)	<i>T. vesiculosum</i> Savi
Bertoloni A 1850		<i>T. mutabile</i> Portenschl. (<i>T. multistratum</i> Koch, <i>T. vesiculosum</i> Reich. non Sav., <i>T. setiferum</i> Boiss.)		<i>T. spinosum</i> L. (<i>T. apulum</i> All.)	<i>T. vesiculosum</i> Sav.

Zangheri 1976). Scoppola and Lattanzi (2016) have recently restored it as a distinct species, mostly based on features provided by Gibelli and Belli (1892).

The gaps in knowledge and doubts indicated in the reports over the years concerning the units of the group clearly denote their problematic identification. More specifically, ‘Flora d’Italia’ (Pignatti 1982), the floristic reference in use for over 30 years, does not deal comprehensively with this group, even when referring to the monograph by Gibelli and Belli (1892), and only provides an incomplete description of the species. Therefore, the Italian distribution and coenology, particularly of *T. spumosum*, *T. multistriatum* and *T. mutabile*, are still under debate.

This paper is part of a broader research aimed at updating the distributional range and taxonomy of the Italian clovers. In particular, the aim of this study was to provide new chorological data on *T.* subsect. *Mystillus*, in the light of the new findings from central and southern Italy, the recent re-evaluation of *T. multistriatum*, field surveys, revision of herbarium specimens, and literature analysis.

Material and methods

This study is based on analysis of relevant literature, including protogues, field surveys and examination of herbarium specimens kept in BEOU, CAT, CLU, E, FI, GE, JE, K, L, LEC, MPU, NAP, PAD, RO, TSM, UTV (acronyms according to Thiers 2016), including some relevant or original material (according to McNeill et al. 2012) for the studied names.

We collected flowering and fruiting samples of *Trifolium multistriatum*, *T. mutabile* and *T. vesiculosum* from May 2015 to July 2016 in several central and southern Italian regions (for the collection sites refer to the collected specimens). Geographical coordinates, when indicated, are in the form of Decimal Degrees (DD) as defined by the World Geodetic System of 1984 (WGS84). The study involved the acquisition of high-resolution digital images of floral details from fresh and dried material, useful for species identification and comparison. Morphological observations were done under a Leica M60 stereomicroscope, using a Leica IC80 HD Digital camera. The images were processed by means of the application LAS V-3.8. Plants from some of the sampled populations were cultivated in pots and seeds were stored for further studies.

The geographical arrangement of each species involved in this study has been updated. It refers to the Italian administrative regions and uses the following symbols, according to Conti et al. (2005): “+” occurring, “0” no longer recorded, “-” recorded in the past by mistake, “A” alien plant at regional level. The new records or changes of presence status at regional level are highlighted with “new” in brackets.

Results

Based on our observations of fresh and dry material and of several digital images, we found that the following characters are crucial for the identification of *Trifolium* sub-

sect. *Mystillus* species occurring in Italy: shape of flowering and fruiting heads, corolla/calyx ratio, shape of the calyx tube and teeth, consistency and thickness of the fruiting calyx, presence/absence of prominent longitudinal nerves and transverse veins in the fruiting calyx, and leaflets shape of the lower leaves.

The studied clovers are annual species with a spring-summer cycle, inhabiting grassy places among shrubs, roadsides, field margins and other dry fallow lands. *Trifolium spumosum* is the earliest species, flowering in April-May. It is easily recognizable by its smaller size, highly branched, prostrate or sub-erect stem, small flower heads, and corollas slightly protruding from the calyx. The vegetative parts of *T. multistriatum* do not differ from those of *T. vesiculosum* and *T. mutabile* in the case of vigorous plants and when grown in fertile soil. The latter species, more thermophilous and xerophilous, often appears with plants of very small size. All these species are glabrous, with many erect or ascending stems, rather long-petioled lower leaves, short-petioled to sub-sessile upper leaves, elliptical, acute, serrulate-dentate and mucronulate leaflets. They have many flower heads, which are terminal and axillary, globular to elongate in fruit (Figure 1), sustained by long or short, thick, peduncles; the floral bracts are lanceolate with prominent longitudinal nerves; the calyx is variable in shape among different species (Figure 2A–C); the corolla exerts from the calyx, it is white at anthesis then reddish to purple, persistent and then becoming scarious after flowering (Figure 1). The pod is membranous, long-beaked, generally 2-seeded; the seeds are granulate-verruculose, sub-globular to ovoid in shape and light brown or dark mottled (Figures 3–5). *Trifolium setiferum*, conversely, has rather short-petioled leaves, obovate-cuneate leaflets with a long spiny mucro at the apex, rather short peduncles, smaller heads, and subulate-setaceous calyx teeth, with a lanceolate base that is ciliolate.

The study resulted in five new regional occurrences and 16 changes of presence status.

Distribution and taxonomy

Trifolium multistriatum W.D.J.Koch, *Syn. Fl. Germ. Helv.*, ed. 2. 190. 1843 [19-21 Jun 1843]

Type (holotype indicated by Scoppola and Lattanzi 2016: 276). S. Andrea bey Triest, August 1840, Tommasini (L).

Description. Heads large; fruiting calyx ovoid with thick, longitudinal nerves all along, closed-spaced, transverse veins slightly visible; corolla > than twice as long as the calyx tube, seeds ovoid, light brown and dark mottled (Figures 1, 2B and 3).

Updated geographical distribution. Friuli Venezia-Giulia: 0A, Liguria: 0A, Campania: + (new), Basilicata: + (new), Calabria: + (new), Sicily: - (new).

Notes. The identity and autonomy of the name *Trifolium multistriatum* compared to the other species with whom it is closely related is discussed by Scoppola and Lattanzi (2016). The original material (L!) was recorded in northern Italy during the second half of the nineteenth century and later disappeared. Its occurrence might be



Figure 1. Flowering head of *Trifolium multistriatum* from Seminara (Reggio Calabria) (Photo by L. Bernardo, 1 June 2016).

due to the transport of seeds by ship solid ballasts collected at the port of departure during the commercial activities of the Austrian Lloyd shipping company in the mid-to late-1800s (Mack 2004). In BEOU, FI, PAD and TSM, there is evidence of the presence of the species at that time also in Dalmatia, Albania and Montenegro (Visiani 1852, Nyman 1878). Specimens at MPU were collected in 1831, 1851 and 1858 at Port-Juvénal, Hérault (southern France), where *T. multistriatum* (under the name *T. vesiculosum* var. *rumelicum* Griseb.) is considered as a historical alien species (Coulot and Rabaute 2013) as in Austria and Switzerland (Gams 1923, Zohary and Heller 1984). Even Fiori (1925) lists the species for Liguria as sub *T. vesiculosum* var. *multistriatum* W.D.J.Koch, writing: “È stato osservato avvent. ... in Lig. ma a quanto pare vi è scomparso”. According to the above, the report appears plausible.

The delimitation, status and distribution of *T. multistriatum*, with respect to *T. setiferum* and to *T. vesiculosum* var. *rumelicum*, is still under debate (see also Greuter et al. 1989, Euro+Med 2006, Scoppola and Lattanzi 2015, 2016). Here we confirm the



Figure 2. Comparison between mature calyces of *Trifolium* subsect. *Mystillus* species in Italy (bar = 1 mm). Left: *T. vesiculosum* (**A**) and *T. spinosum* (**A'**), middle *T. multistriatum* transitional (**B**) and typical (**B'**) forms, right *T. mutabile* s.str. (**C**) and *T. mutabile* var. *gussoneanum* (**C'**).

historical populations of Basilicata and Calabria (Fiori 1925, Gavioli 1948) and add a new locality in Campania. The presence in Campania at the foothills of the Vesuvius (RO!) was not confirmed either by Ricciardi et al. (1986) nor by our own research. However, the discovery in 2015 of a native population of the species in the Ofanto valley (Aquilona, Avellino) has confirmed its occurrence in Campania. Gavioli (1948) collected the species in Basilicata in 1939 in the historical locality of Mt. Vulture, already known to Fiori (FI!). We also found it around the lakes of Monticchio and at San Michele (Rionero in Vulture), even at the edges of resting fields. We cannot exclude the presence of transitional forms towards *T. vesiculosum*, already assumed by Gibelli and Belli (1892) in this area (Figure 3). We also confirm the Calabrian historical localities where the species is locally abundant; some populations, still under study, show longitudinal calyx nerves that are more prominent and often in greater number and a less swollen calyx (Figure 2B'), which are not typical for *T. multistriatum* (Boissier 1872, Gibelli and Belli 1892, Hossain 1961, Zohary and Heller 1984). We also found transitional forms towards *T. mutabile* var. *gussoneanum* Gibelli & Belli, a variety already known for Sicily (Giardina et al. 2007; La Rosa 2011) and confirmed by our study in Calabria, that deserves further investigation.

The sole report of this species from Sicily (provisionally treated as *T. setiferum* by Greuter et al. 1989, Conti et al. 2005 and Giardina et al. 2007) is based on an old record “Castellammare, Todaro (sine indicatione nominis ac loci typici)....” in Lojaccono (1909). Giardina et al. 2007 do not confirm its autonomy; in addition, Todaro’s alleged sample, who reports the location Castellana, and not Castellammare (PAL!), is undoubtedly to be referred to *T. mutabile* var. *gussoneanum*. In the absence of clear references and specimens, we prefer not to confirm the presence of this species in Sicily.



Figure 3. *Trifolium multistriatum*, transitional forms (bar = 1 mm). Fresh flowers (24 June 2016) and seeds (5 August 2016) from plants collected in Rionero in Vulture (Potenza); detailed calyces from a specimen collected in the Ofanto valley (Aquilonia, Avellino) (CLU).

Collected specimens. Italy. Campania: Aquilonia, nei pressi del Fiume Ofanto, 40.963606°N 15.557549°E, 339 m, 22 June 2016, A. Scoppola and E. Lattanzi (UTV); **Basilicata:** Rionero in Vulture, Laghi di Monticchio presso le rovine, 40.933504°N 15.610037°E, 670 m, 4 June 2016, M. Pellegrino (UTV); *ibidem*, nei pressi dell'Abbazia di S. Michele, 40.936284°N 15.615824°E, 740 m, 21 June 2016, A. Scoppola (UTV); *ibidem*, lungo la SS167 al km 12, 40.937079°N 15.593855°E, 708 m, 21 June 2016, A. Scoppola and E. Lattanzi (UTV). **Calabria:** Zagarise, SP Cuccuma-Mortilla nei pressi del ponte sul Torrente Ucria, 38.961982°E 16.709727°N, 24 June 2015, L. Bernardo and P. Rizzo (CLU); Tarsia, prov. Cosenza, poco oltre la diga, sulla strada che sale per Quercia tonda e Masseria Conte Giannone, 39.618701°N 16.314887°E, 100 m, 9 June 2016, L. Bernardo and G. Maiorca (CLU); Fiumefreddo Bruzio, prov. Cosenza, lungo la SP 45 nei pressi di Contrada Santa Serra, 39.229793°N 16.072064°E, 350 m, 20 June 2016, A. Scoppola, L. Bernardo and E. Lattanzi (CLU, UTV); *ibidem*, lungo la SP 45, fra le contrade Santa Serra e San Biase, 39.227341°N 16.076843°E, 410 m, 20 June 2016, A. Scoppola, L. Bernardo and E. Lattanzi (CLU, UTV); San Giovanni in Fiore, prov. Cosenza, Contrada Pietramela, lungo la SS108 per Savelli, 39.273356°N 16.720064°E, 958 m, 21 June 2016, A. Scoppola, L. Bernardo and E. Lattanzi (CLU, UTV); *ibidem*, Contrada Appendicane, lungo la SS108 per Savelli, 39.292576°N 16.744233°E, 803 m, 20 June 2016, A. Scoppola, L. Bernardo and E. Lattanzi (CLU, UTV); Varco San Mauro, prov. Cosenza, lungo la SS279, Rose, 39.419186°N 16.378297°E, 1221 m, 21 June 2016, A. Scoppola, L. Bernardo and E. Lattanzi (CLU, UTV); Seminara, prov. Reggio Calabria, lungo il sentiero Tracciolino poco più in basso dei Piani della Corona, 38.323697°N 15.837171°E, 450 m, 1 June 2016, L. Bernardo and G. Maiorca (CLU).

***Trifolium mutabile* Port., Enum. Pl. Dalmatia 16. 1824**

Type (holotype indicated by Zohary and Heller 1984: 283). In ins. Lissa, in campo grande 4 (Plate 12, Figure 1 in Portenschlag-Ledermayer 1824).

Description. Heads large, fruiting calyx tubular, longitudinal nerves barely visible in the distal portion; corolla > than twice as long as the calyx tube, seeds irregularly ovoid, light brown (Figures 2C and 4).

Updated geographical distribution. Liguria: 0A, Tuscany: +A (new), Umbria: +A (new), Lazio: +A (new), Campania: 0 (new), Apulia: +, Basilicata: 0 (new), Calabria: +, Sicily: +.

Notes. Species endemic to the Mediterranean area (Greuter et al. 1989), which was described for Dalmatia. In the wild it is widespread in the western Balkans (Dalmatia, Greece, Albania) and in southern Italy, from Campania to Sicily (Euro+Med 2006 onwards, Conti et al. 2005), where it is represented by *T. mutabile* var. *gussoneanum* (Figure 2C'), endemic to southern Italy "...Varietas haec *T. mutabilem* cum *T. multistriatum* ideo conjungit." (Gibelli and Belli 1892). The Sicilian authors propose to rank it as subspecies (Brullo in La Rosa 2011). The presence of *T. mutabile* in the Iberian Peninsula is most likely occasional (Muñoz and Devesa 1988, Greuter et al. 1989).

Here, we report it for the first time in central Italy both in the countryside south of Manciano (Grosseto), where it was found to be abundant in fallow and resting fields as well as wood edges, and in the outskirts of Castel Giorgio and of Orvieto (Terni), not far from the Lazio border, where it was observed in small populations of fallow fields and roadsides. In both stations, together with the one recently reported in Lazio (Lopez Tirado et al. 2015), the species is believed to be a naturalized alien. In central Italy, it is used as forage in multiple crops with *T. squarrosum* L. or *T. incarnatum* L. in arid localities (e.g. San Lazzaro, Viterbo) where it escapes from cultivation. As a non-native species it was reported in Liguria by Fiori and Paoletti (1900) but never confirmed.

Trifolium mutabile is known in Campania (Conti et al. 2005), where it was reported from Roccamonfina (Caserta) by Croce et al. (2008), although samples are not available. Here we repeatedly looked for it in the outskirts of the Masseria S. Anna but were only able to find *T. vesiculosum*. Nevertheless, two different historical samples collected in the Campi Flegrei area by Nicola Terracciano (NAP!) and near the Lake of Agnano by Heldreich in 1840 (FI!, revised by Gibelli and Belli as var. *gussoneanum*) belong to this species. Thus, the presence of the species in Campania deserves to be confirmed. It is considered as occurring in Apulia by Conti et al. (2005) based on Pignatti (1982) and Fiori (1925, RO!) and by Mele et al. (2006); it was also collected by P. Medagli (LEC!).

Finally, the current presence of *T. mutabile* in Basilicata (Conti et al 2005) needs confirmation, since it is only based on the specimens reported by Gavioli (1948) as a variety of *T. vesiculosum* (kept in FI! and revised by us as *T. mutabile* var. *gussoneanum*), dating back to the 1930s.

Collected specimens. Italy. Tuscany: Manciano, strada sterrata verso il Pod. Il Pelargone 42.538296°N 11.543912°E, 253 m, 26 May 2016, A. Scoppola (UTV); **Umbria:** Orvieto, SR71 ter Umbro-Casentinese al km 14.6, 541 m, 42.662446°N



Figure 4. *Trifolium mutabile* collected in Viterbo (bar = 1 mm). Flowers (15 May 2015), seeds (15 July 2016).

12.031857°E, 25 June 2016, A. Scoppola (UTV); Castel Giorgio, Loc. Casa Perazza, 42.680235°N 11.979294°E, 580 m, 25 June 2016, A. Nizzoli and A. Scoppola (UTV). **Lazio:** Viterbo, strada San Lazzaro, 42.443156°N 12.078430°E, 311 m, 14 May 2016, A. Scoppola (UTV). **Calabria:** (*T. mutabile* var. *gussoneanum* Gibelli & Belli) – Nocera Terinese, prov. Catanzaro, A3 direzione Nord, fra la galleria e il viadotto Ogliastro, fra gli svincoli di Falerna e San Mango d’Aquino, 39.042581°N 16.145387°E, 162 m, 1 June 2016, L. Bernardo and G. Maiorca (CLU).

Trifolium setiferum Boiss., Diagn. Pl. Orient. ser. 1, 2: 32. 1843 [Mar 1843]

Type (holotype indicated by Zohary and Heller 1984: 280): (Prov. Izmir) Montagne de Jenidje, May 1842, Boissier (G).

Description. Heads small; fruiting calyx inflated, calyx teeth with ciliolate base; longitudinal veins numerous; corolla longer than calyx. Seeds brown (Zohary and Heller 1984).

Updated geographical distribution. Calabria: - (new), Sicily: - (new).

Notes. Described from the Province of Izmir in Turkey, it is probably an eastern Mediterranean endemic naturally occurring only in Turkey and Greece, although many sources suggest it has a wider distribution based on its assumptive synonymy with *T. rumelicum* and/or *T. multistriatum*. We agree with Boissier (1872) and Zohary and Heller (1984) who separate this species from the latter based on the smaller size of the flower heads, the different shape of the leaves, the inflated calyces characterized by bristles at the base of the teeth. Pignatti (1982) does not report the species at all in Italy. All citations for Italy in fact have to be referred to *T. multistriatum* (Zangheri 1976, Greuter et al. 1989, Scoppola and Lattanzi, 2016). The species is only reported for Calabria by Zohary and Heller (1984), who probably refer to the same sample of *T. multistriatum* by Fiori of 1899 (FI, RO!) also cited under the name *T. vesiculosum*

var. *rumeicum*. Greuter et al. (1989) report it as putative species for the mainland and Sicily also according to the synonymy with *T. vesiculosum* subsp. *multistriatum* (W.D.J.Koch) Arcang., indicated by Zangheri (1976), who reported the entity in southern Italy and Sicily. Accordingly, no evidence was found to confirm its presence on the Italian territory.

***Trifolium spumosum* L. Sp. Pl. 2: 771. 1753 [1 May 1753]**

Type (lectotype designated by Zohary and Heller 1984: 274): In Gallia, Italia, Apulia. Hort. Clifford, 373, 7 (BM).

Description. Flowering heads small (15-20 mm); fruiting calyx vesicular-turbinate, netted-nerved; corolla short, slightly protruding from the calyx (Figure 2A'), seed ovoid, light brown.

Updated geographical distribution. Liguria: 0 (new), Tuscany: 0 (new), Marche: 0, Lazio: +, Abruzzo: 0 (new), Campania: 0 (new), Apulia: 0 (new), Basilicata: 0 (new), Calabria: +, Sicily: +, Sardinia: +.

Notes. It is a widespread steno-Mediterranean thermophilous and xerophilous species, especially found in dry uncultivated lands of coastal areas. It was described on the basis of collections made in Italy and France. Based on our data, the distribution in Italy is very fragmented and in decline, especially in the central regions. A similar depletion has been reported in southern France where the species is classified as naturalized over most of the territory (Coulot and Rabaute 2013). It is quite widespread in Sicily (Giardina et al. 2007, La Rosa 2011), where it mostly grows in arid uncultivated hilly and mountain areas. However, its current presence in the Italian southern regions, especially in Campania and Apulia, has probably been underestimated due to confusion with other taxa (e.g. *T. vesiculosum*, *T. resupinatum* L.).

Peccenini (2007) cites the report by Bertoloni (1850) “ex Liguria orientali in litorie Clavarensi a Turio; Genua all’Acquasola a Vincentio” and by Fiori (1925) for Liguria; moreover her recent report in the outskirts of Sarzana (FI!, GE; Peccenini 2007) must be corrected, as the sample actually refers to *T. resupinatum*. Thus, we record the species as requiring confirmation in Liguria. Concerning Tuscany, no herbarium material can confirm the historical records of this species between Grosseto and Castiglione della Pescaia (Savi in Caruel 1862, Pignatti 1982, Selvi 2010), but several specimens from the Elba, Giglio, and Pianosa islands (FI!) confirm its presence in the past. Also in need of confirmation is its occurrence in Marche, where it was collected in Senigallia (Ancona) in 1876 (FI! as *T. vesiculosum*; Gubellini et al. 2014). The occurrence of the species in Abruzzo (Conti 1998) is by Zodda (1954) and by Crugnola (1894, 1900) who refers to a sample by Petrilli from the Mavone valley (Valle del Vomano, Teramo); we have been unable to trace it. The occurrence in Campania and Basilicata (Conti et al. 2005) is only based on historical records from the outskirts of Avellino, “Ad Aiello del Sabato” (Milani 1890, Casali 1901, Trotter 1905) and Caserta at S. Silvestro (Terracciano 1872) and on a gathering from an unknown locality by Tenore (NAP; A. Santangelo, pers. com.).

The Apulian material dating back to the 1970s, deposited in PAD and labeled as *T. spumosum*, actually refers to *T. resupinatum*. *Trifolium spumosum* has been reported from Apulia by Conti et al. (2005) based on these gatherings and on Bertoloni (1850), who cited a specimen collected in Foggia by Gussone (NAP!). The species is also reported in Salento by Bruni (1857) and Marinosci (1870), confirmed by Mele et al. (2006) and - for the Province of Brindisi - by Tomaselli et al. (2010). As no recent samples were found either in LEC or BI (P. Medagli and V. Tomaselli, pers. com.), we still consider the species in need of confirmation for the current Apulian flora. The presence in Lazio, Calabria, and Sardinia (Conti et al. 2005) is confirmed.

***Trifolium vesiculosum* Savi, Fl. Pis. 2: 165. 1798 (as ‘*T. vessiculosum*’)**

Type (‘lectotype’ designated by Zohary and Heller 1984: 276): Clairières de bois, Pisa, Juillet, *P. Savi* (M).

Description. Flowering heads large; fruiting calyx vesicular, turbinate, shining, netted-nerved, calyx teeth with base not ciliolate; corolla longer than calyx, seeds sub-globular, light brown (Figures 2A and 5).

Updated geographical distribution. Tuscany: +, Umbria: +, Lazio: +, Abruzzo: +, Campania: +, Apulia: 0 (new), Basilicata: 0 (new), Calabria: 0 (new), Sicily: 0 (new), Sardinia: +.

Notes. It is a Mediterranean species growing from southern to central Europe on fertile, well-drained soils. This clover is cultivated on a large scale for forage and has a good ability of self-sowing because of the high production of hard seeds (Gillett and Taylor 2001, Coulot and Rabaute 2013). It was repeatedly cited by Italian botanists for central and southern Italy. However, its presence has probably been overestimated mainly in the past due either to the different taxonomical treatments of closely-related species or to confusion among them. In particular, we cannot confirm the species in Apulia, although it is indicated by Conti et al. (2005). Tenore (1835–1838) reports it for Gargano where it is not confirmed by Licht (2008). Additional data come from Béguinot (in Fenaroli 1970) but we were not able to find herbarium samples for the mentioned locality (Bosco Sfilzi). Concerning Basilicata, the indications from Balvano (Barbazita) and Muro Lucano (N. Terracciano), as well as the samples by Trotter (Gavioli 1848) could not be verified till now. Gibelli and Belli (1892) identify a *T. vesiculosum* var. *stenodictyon* Gibelli & Belli from Mt. Vulture, based on samples collected by Terracciano and Gussone, corresponding to intermediate forms (hybrids?) between *T. vesiculosum* and *T. multistriatum*, but *T. vesiculosum* s.str. is not confirmed either from the literature or by recent gatherings.

This species is considered as occurring in Calabria by Conti et al. (2005), based on Zohary and Heller (1984), who assigned a specimen of *T. multistriatum* from Fiumefreddo Bruzio (A. Fiori, 1899, FI!) to *T. vesiculosum* var. *rumelicum*. Moreover, for the same region there are also some old reports (Porta 1879, Macchiatì 1884) dating back



Figure 5. *Trifolium vesiculosum* collected in Viterbo (bar = 1 mm). Flowers (4 July 2016), pod and seeds (2 August 2016).

to a time when *T. mutabile* and *T. multistriatum*, both currently occurring in Calabria, were considered as varieties of *T. vesiculosum*. Thus, the latter species is here recorded as requiring confirmation.

The presence of the species by Conti et al. (2005) in Sicily derives from Brullo (1982), who cites it in some phytosociological relevés. It is also reported by Gussone (1843) and by Giardina et al. (2007), but questioned by La Rosa (2011) and by Giardina et al. (2007), who quote many references and state "... all localities of Southern Sicily are doubtful due perhaps to the limited identification made by the authors to the rank of species to *T. mutabile* (*T. vesiculosum* Savi subsp. *mutabile* Portenschl.)". To the latter species we attribute the Sicilian reports of *T. vesiculosum*. However, the sample in CAT (<http://www.dipbot.unict.it/herbarium/foto/06/006028.jpg>) from Cefalù, clearly refers to *T. vesiculosum* and confirms the presence of the species, at least in the past.

Collected specimens. Italy. Tuscany: Manciano, Monti di Castro Loc. Campigliola, 42.526919°N 11.519618°E, 27 June 2015, A. Scoppola (UTV). **Umbria:** Castel Giorgio, lungo variante via Parma 42.712320°N 11.979294°E, 543 m, 25 June 2016, A. Nizzoli and A. Scoppola (UTV); Orvieto, Loc. Canonica, 42.700492°N 12.050351°E, 460 m, 25 June 2016, A. Nizzoli and A. Scoppola (UTV); **Lazio:** S. Martino al Cimino, Viterbo, Loc. Chiesa Nuova, 42.366113°N 12.120279°E, 517 m, 4 Jul 2016, A. Scoppola (UTV). **Campania:** Sessa Aurunca, Parco regionale Roccamonfina, lungo strada per S. Maria Valogno, 41.303914°N 13.894509°E, 60 m, 3 June 2016, A. Scoppola and E. Lattanzi (UTV); *ibidem*, lungo SS430 nei pressi di Masseria S. Anna, 26 m, 41.309700°N 13.896533°E, 3 June 2016, A. Scoppola (UTV); *ibidem*, SS430 incrocio strada per S. Carlo, 41.319240°N 13.890250°E, 27 m, 3 June 2016, E. Lattanzi (RO); Masseria S. Anna, Parco di Roccamonfina, 41.311930°N 13.897133°E, 42 m, 5 June 2016, A. Nizzoli (UTV).

Identification key to the species of *Trifolium* subsect. *Mystillus* in Italy

- 1 Fruiting calyx inflated, more or less vesicular, turbinate and shining (Figure 2A), netted-nerved, with longitudinal and transverse veins all along; the largest heads with very close flowers..... **2**
- Fruiting calyx tubular or oblong to ovate, not or slightly inflated, opaque and rigid, never vesicular (Figure 2C), longitudinal nerves more or less thick, transverse veins absent or barely visible in the distal tube portion and teeth (or in dry plants); heads elongating in fruit, with less dense flowers **3**
- 2 Flowering heads small (15–20 mm), ovoid; bracts broad and shorter than the calyx tube; standard slightly protruding from the calyx (< than twice the tube length), straight after anthesis; leaflets obovate to rhombic, truncate to retuse at apex ***T. spumosum***
- Flowering heads larger, dense, bracts narrower and as long as the calyx tube; standard longer than calyx (≥ than twice the tube length), deflexed after anthesis; leaflets elliptic to obovate, acute, mucronulate **4**
- 3 Calyx tube oblong, cylindrical, not narrowed at throat in fruit, with longitudinal veins slightly visible only in the distal portion (below the teeth)
- ***T. mutabile***
- Calyx tube ovoid, slightly narrowed at throat in fruit, with many longitudinal, thick nerves all along, generally very closed spaced; transverse veins not visible or slightly, thick and forming very small and regular meshes
- ***T. multistriatum***
- 4 Calyx teeth lanceolate-subulate with base not ciliolate, fruiting tube vesicular, turbinate, shining, clearly netted-nerved, with wide meshes; terminal heads larges (25–45 × 20–35 mm), globular to ovate, elongating in fruit; leaflets large, elliptic, acute or mucronulate ***T. vesiculosum***
- Calyx teeth subulate-setaceous, with base ciliolate; fruiting tube inflated, white, thin walled, not vesicular; longitudinal veins numerous, transverse ones slightly visible; terminal and axillary heads smaller (20–25 × 15–20), ovate-globular to ovoid in fruit; leaflets obovate-cuneate with a terminal spiny mucro..... ***T. setiferum***

Concluding remarks

Our study has shown that knowledge on the distribution of clovers belonging to *Trifolium* subsect. *Mystillus* in Italy is still largely incomplete. The revision of herbarium samples, the study of all literature data as well as field collections and observations have highlighted that, in many Italian regions, *T. vesiculosum* and *T. spumosum* have been reported in the past by mistake or through lack of recent reports; *T. setiferum*, instead, must be excluded from the national flora (Figure 6). On the other hand, both *T. mutabile* and *T. multistriatum* should be added to the flora of several Italian administrative regions.

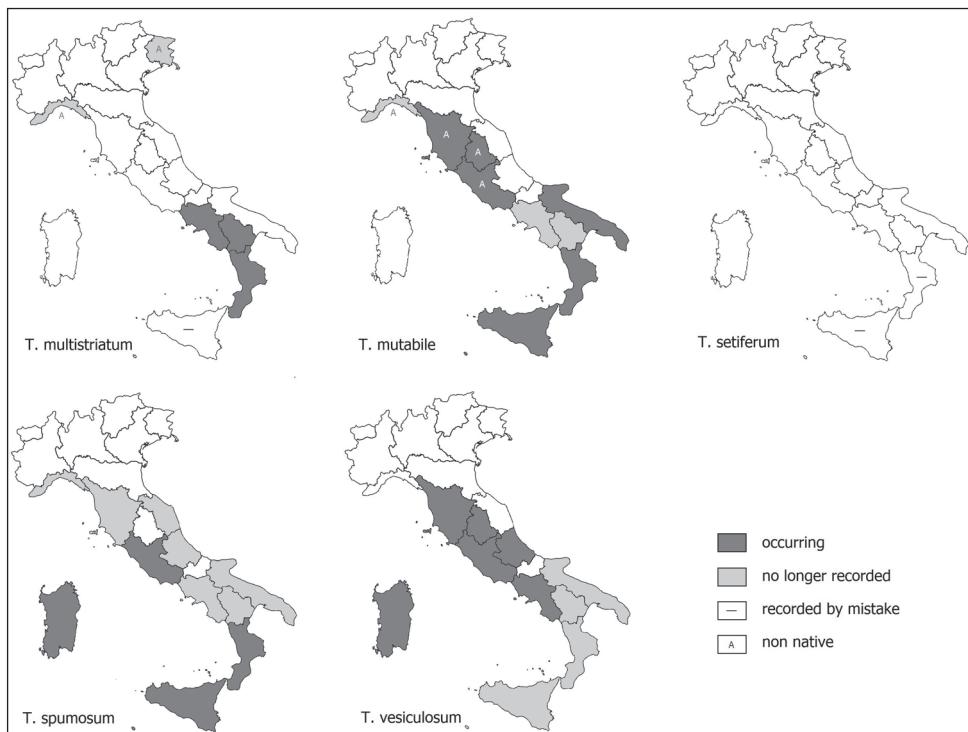


Figure 6. Regional distribution maps of the concerned species.

The delimitation and status of *T. multistriatum*, with respect to *T. vesiculosum* var. *rumelicum*, is to be considered problematic (see also Coombe 1968, Greuter et al. 1989, Conti et al. 2005, Euro+Med 2006 onwards, Scoppola and Lattanzi 2016). The fresh material examined, in fact, showed a high similarity both with the original material from Trieste and also with the samples of *T. vesiculosum* var. *rumelicum* present in FI, RO, BEOU. Halász (1901) elevated *T. vesiculosum* var. *rumelicum* to species rank explaining that *T. rumelicum* (Griseb.) Halász (1901: 399) "... differt a *T. multistriatum* calyce fructifero breviore, turbinato, inflato, inter nervos obscure ruguloso-reticulato, laciniis latioribus brevioribus". Some of these characters are also present in the Italian populations (Figures 2B and 3). We do not know the type (in GOET, Zohary 1970) of this variety but in FI there are samples from Bulgaria, Macedonia and Greece that are useful for comparison.

Based on a careful examination of the floral details of the relevant material of *T. multistriatum* in PAD, and TSM and according to its alleged status as occasional historical alien, at the present state of our knowledge, we can agree with other authors in classifying the two names as heterotypic synonyms, confirming the rank of species to the entity *Trifolium multistriatum*. This unit, in fact, has long been neglected or considered of uncertain location and may result from repeated episodes of hybridization, as we can hypothesize for the Balkan Peninsula. In southern Italy, this could have occurred

from sympatric populations of *T. vesiculosum* and *T. mutabile*. These episodes may have occurred repeatedly, resulting in forms converging into each other, thus in that continuum of morphological traits of the calyx (Figure 2) or vegetative apparatus that have been highlighted in this study both in fresh and dry specimens of the populations from Campania, Basilicata and Calabria. In particular, in Calabria the populations of *T. multistriatum* of the historical localities of Fiumefreddo (A. Fiori, RO) and San Giovanni in Fiore (G. Lopez, RO) appear to be solid and well characterized, also from a palynological point of view (A. Scoppola and collaborators, in preparation). Conversely, the population of Varco San Mauro appears to be a transitional form to *T. vesiculosum*, based on calyx and corolla morphology, poor fertility and color of the seeds. S. Gentile collected this unit in resting fields in the nearby Ceraso valley already in 1960, a time when large areas of the Sila massif were intensively cultivated with cereals and forage.

Finally, *T. mutabile* var. *gussoneanum* should certainly be re-evaluated, since it is widespread and well characterized at least in Sicily, where neither *T. vesiculosum* nor *T. multistriatum* have been confirmed; already in Calabria it appears to be more variable and with transitional forms to *T. vesiculosum* s.str. or to *T. multistriatum* and requires confirmation in Basilicata and Campania.

Acknowledgements

We are grateful to A. Santangelo, P. Medagli, V. Tomaselli, L. Cecchi, R. Marcucci, S. Peccenini, R. Wagensommer, A. Croce, G. Domina, F. Conti, F. Bartolucci, A. Millozza, L. Rosati, R. Galesi, and G. Veronico for useful information; to Directors and Curators of some quoted Herbaria for their support during our visit, for loans or scanned images. We also thank F. Manzano Gutierrez, A. Nizzoli and M. Pellegrino for high-resolution digital images of floral details, to G. Cannata for the online literature review and to F. Bartolucci and two anonymous reviewers for their detailed revisions that greatly improved the manuscript.

References

- Bertoloni A (1850) Flora Italica 8: 183. Masi, Bologna.
- Boissier E (1872) Flora Orientalis 2. H. Georg, Basilea, 110–156. doi: 10.5962/bhl.title.20323
- Brullo S (1982) Le associazioni sub-nitrofile dell'Echo-Galactition tomentosae in Sicilia. Bollettino dell'Accademia Gioenia di Scienze Naturali in Catania 15: 405–452.
- Bruni A (1857) Descrizione botanica delle campagne di Barletta 98. Stamperia e Cartiere del Fibreno, Napoli. doi: 10.5962/bhl.title.9655
- Caruel T (1862) Prodromo della Flora Toscana 2. Firenze, 168–169.
- Casali C (1901) Flora Irpina. R. Scuola di Viticoltura ed Enologia di Avellino. Tipografia E. Pergola, Avellino, 149 pp.
- Conti F (1998) An annotated check-list to the flora of the Abruzzo. Boccone 10: 1–276.

- Conti F, Abbate G, Alessandrini A, Blasi C (Eds) (2005) An annotated checklist of the Italian vascular flora. Palombi Editori, Roma, 420 pp.
- Coombe DE (1968) *Trifolium* L. In: Tutin TG, Heywood VH, Burges NA, Moore DM, Valentine DH, Walters SM, Webb DA (Eds) Flora Europaea 2. University Press, Cambridge, 157–172.
- Coulot P, Rabaute P (2013) Monographie des Leguminosae de France. Tome 3. Tribù des Trifolieae. Société Botanique du Centre-Ouest, Jarnac, 760 pp.
- Croce A, La Valva V, Motti R, Nazzaro R, Strumia S (2008) La flora del Vulcano di Roccamonfina (Campania, Italia). *Webbia* 63(2): 251–291. doi: 10.1080/00837792.2008.10670844
- Crugnola G (1894) La vegetazione al Gran Sasso d'Italia. G. Fabbri ed., Teramo, 273 pp.
- Crugnola G (1900) Materiali per la flora dell'Abruzzo teramano. Un secondo manipolo di piante del Gran Sasso d'Italia. *Giornale Botanico Italiano* 7: 233–247.
- Ellison NW, Liston A, Steiner JJ, Williams WM, Taylor NL (2006) Molecular phylogenetics of the clover genus (*Trifolium*-Leguminosae). *Molecular Phylogenetics and Evolution* 39: 688–705. doi: 10.1016/j.ympev.2006.01.004
- Euro+Med (2006 onwards) Euro+Med PlantBase—the information resource for Euro-Mediterranean plant diversity. Available from: <http://ww2.bgbm.org/EuroPlusMed/> [accessed: 12 June 2016]
- Fenaroli L (1970) Florae Garganicae Prodromus. Pars II. *Webbia* 24(2): 435–578. doi: 10.1080/00837792.1970.10669916
- Fiori A (1925) Nuova Flora Analitica d'Italia 1(6): 859–860.
- Fiori A, Paoletti G (1900) Flora analitica d'Italia 2(1): 57–58.
- Gams H (1923) Genus *Trifolium*. In: Hegi G (Ed.) *Illustrierte Flora von Mittel-Europa* 4(3): 1280.
- Gavioli O (1948) Synopsis Florae Lucanae. *Nuovo Giornale Botanico Italiano*, nuova serie 54(1947): 134–135.
- George NM, Ghareeb A, Fawziand NM, Saad S (2013) Electrophoretic pattern of seed proteins in *Trifolium* L. and its taxonomic implications. *Bangladesh Journal of Plant Taxonomy* 20: 19–26. doi: 10.3329/bjpt.v20i1.15461
- Giardina G, Raimondo F, Spadaro V (2007) A catalogue of plants growing in Sicily. *Bocconeia* 20: 181–182.
- Gibelli G, Belli S (1892) Rivista critica delle specie di *Trifolium* italiane comparate con quelle del resto d'Europa e delle regioni circummediterranee della sezione *Trigantheum* Nobis (*Mistyllus* Presl. p.p.). *Memorie della Reale accademia delle scienze di Torino*, serie 2, 42(1891): 179–222.
- Gillett JM, Taylor NL (2001) The World of Clovers. Iowa State University Press, Ames, Iowa, USA, 457 pp.
- Greuter W, Burdet HM, Long G (Eds) (1989) Med-Checklist 4. Conservatoire et Jardin Botaniques, Genève, 458 pp.
- Gubellini L, Hofmann N, Pinzi M (2014) Contributo alla conoscenza della flora vascolare delle Marche e di alcune regioni limitrofe. *Informatore Botanico Italiano* 46(1): 17–26.
- Gussone G (1843) Florae Siculae Synopsis 2. Ex Typis Tramater, Neapoli, 342 pp.
- Halácsy E von (1901) Conspectus Florae Graecae 1. G. Engelmann, Lipsiae, 399–400.

- Hossain M (1961) A revision of *Trifolium* in the Nearer East. Notes from the Royal Botanic Garden Edinburgh 23: 387–481.
- La Rosa A (2011) Indagini tassonomiche, ecologiche e distributive sul genere *Trifolium* L. in Sicilia. Ph.D. Thesis, Università degli Studi di Palermo, 169 pp.
- Licht W (2008) Bestimmungsschlüssel zur Flora des Gargano (Süd-Italien). Shaker Verlag, Aachen, 384 pp.
- Lojacono Pojero M (1909) Flora Sicula 3. Palermo, 437.
- Lopez Tirado J, Manzano Gutierrez F, Scoppola A (2015) Notula: 2139. In: Bartolucci F, Nepi C, Domina G, Peruzzi L (Eds) Notulae alla Checklist della Flora Vascolare Italiana: 20 (2130–2158). Informatore Botanico Italiano 47(2): 222–223.
- Macchiati L (1884) Catalogo delle piante raccolte nei dintorni di Reggio Calabria dal Settembre 1881 al Febbraio 1883. Nuovo Giornale Botanico Italiano 16: 59–100.
- Mack RN (2004) Global plant dispersal, naturalization and invasion: pathways, modes and circumstances. In: Ruiz GM, Carlton JT (Eds) Invasive species: vectors and management strategies. Island Press, Washington, 3–30.
- Marinosci M (1870) La Flora Salentina 1–2. Ed. Salentina, Lecce, 565 pp.
- McNeill J, Barrie FR, Buck WR, Demoulin V, Greuter W, Hawksworth DL, Herendeen PS, Knapp S, Marhold K, Prado J, Proud'Homme van Reine WF, Smith JF, Wiersema JH, Turland NJ (Eds) (2012) International Code of Nomenclature for algae, fungi and plants (Melbourne Code), adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July 2011. Koeltz Scientific Books, Königstein, 240 pp. [Regnum Vegetabile 154]
- Mele C, Medagli P, Accogli R, Beccaris L, Albano A, Marchiori S (2006) Flora of Salento (Apulia, Southeastern Italy): an annotated checklist. Flora Mediterranea 16: 193–245.
- Milani GB (1890) Elenco di Piante del Principato Ultra. Avellino, 20 pp.
- Muñoz A, Devesa JA (1988) *Trifolium* sect. *Mystillus* (C.Presl) Godron en España. Monografías del Instituto Pirenaico de Ecología 4: 293–300.
- Muñoz Rodriguez A (1992) Revisión del género *Trifolium* sect. *Trifolium* en la Península Ibérica y Islas Baleares. Acta Botanica Malacitana 17: 79–118.
- Muñoz Rodriguez A (1995) *Trifolium* sect. *Paramesum* y sect. *Trifoliastrum* en la Península Ibérica. Studia Botanica 14: 47–102.
- Nyman CF (1878) Conspectus Florae Europaeae 1. Orebro Sueciae, 177. doi: 10.5962/bhl.title.10533
- Peccenini S (2007) Notulae: 1381–1383. In: Conti F, Nepi C, Peruzzi L, Scoppola A (Eds) Notulae alla checklist della flora vascolare italiana 4 (1311–1419). Informatore Botanico Italiano 39(2): 426–427.
- Pignatti S (1982) Flora d'Italia 1. Edagricole, Bologna, 721–741.
- Porta P (1879) Viaggio botanico intrapreso da Huter, Porta e Rigo in Calabria nel 1877. Nuovo Giornale Botanico Italiano 11: 224–290.
- Portenschlag-Ledermayer F von (1824) Enumeratio plantarum in Dalmatia lectarum. Wien, 16 pp.
- Ricciardi M, Aprile GG, La Valva V, Caputo G (1986) La Flora del Somma-Vesuvio. Bollettino della Società dei Naturalisti in Napoli 96: 3–121.

- Scoppola A, Lattanzi E (2015) Tassonomia e distribuzione dei trifogli italiani: 1. Aggiornamento su *Trifolium vesiculosum*-aggr. (Fabaceae). In: Peruzzi L, Domina G (Eds) Approfondimenti floristici e sistematici sulla flora italiana. Gruppo per la Floristica, Sistemática ed Evoluzione della Società Botanica Italiana, Palermo, 19–20. doi: 10.11646/phytotaxa.277.3.5
- Scoppola A, Lattanzi E (2016) Remarks on the type material and the identity of the name *Trifolium multistriatum* W.D.J.Koch (*T. vesiculosum*-aggr., Fabaceae). Phytotaxa 277(3): 275–281.
- Selvi F (2010) A critical checklist of the vascular flora of Tuscan Maremma (Grosseto province, Italy). Flora Mediterranea 20: 47–139.
- Smýkal P, Coyne CJ, Ambrose MJ, Maxted N, Schaefer H, Matthew W, Blair MW, Berger J, Greene SL, Nelson MN, Besharat N, Vymyslický T, Toker C, Saxena RK, Roorkiwal M, Pandey MK, Hu J, Li JK, Wang LX, Guo Y, Qiu LJ, Redden R, Varshney RK (2015) Legume crops phylogeny and genetic diversity for science and breeding. Critical Reviews in Plant Sciences 34: 43–104. doi: 10.1080/07352689.2014.897904
- Tenore M (1835–1838) Flora Napolitana 5: 151–152.
- Terracciano N (1872) Relazione intorno alle peregrinazioni botaniche fatte per disposizione della Deputazione Provinciale di Terra di Lavoro in certi luoghi della provincia dal Dottor N. Terracciano. Nobile e C., Caserta, 240 pp.
- Thiers B (2016) Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. <http://sweetgum.nybg.org/ih/> [11 January 2016]
- Tomaselli V, Urbano M, Sciandrello S, Wagensommer RP, Costanzo E, Albano A, Medagli P, Mele C, Di Pietro R (2010) Cartografia tematica ed analisi del paesaggio vegetale ed agricolo del Parco Naturale Regionale “Saline di Punta della Contessa” (Brindisi - Puglia). Quaderni di Botanica Ambientale Applicata 21: 53–76 + 3 maps.
- Trotter A (1905) Osservazioni ed aggiunte alla Flora Irpina. Bullettino della Società Botanica Italiana 1905: 20–32.
- Visiani R de (1852) Flora Dalmatica sive enumeratio stirpium vascularium quas hactenus in Dalmatia lectas et sibi observatas descriptis, digessit rariorumque iconibus illustravit 3(2). Friedrich Hofmeister, Leipzig, 289–300.
- Zangheri E (1976) Flora Italica 1. CEDAM, Padova, 328–329.
- Zodda G (1954) La Flora Teramana. Webbia 10: 1–317. doi: 10.1080/00837792.1954.10669624
- Zohary M (1970) Genus *Trifolium* L. In: Davis PH (Ed.) Flora of Turkey and the East Aegean Islands 3. University Press, Edinburgh, 407.
- Zohary M, Heller D (1984) The Genus *Trifolium*. The Israel Academy of Sciences and Humanities, Jerusalem, 606 pp.

Selected specimens examined

Trifolium multistriatum W.D.J.Koch – **ITALY. Friuli Venezia Giulia:** Trieste, S. Andrea, August 1840, *M. Tommasini* (L n. 1997850 digital image!); Trieste, im munizione di Campo Marzio, 29 Jul 1840, *M. Tommasini* (TSM!); S. Andrea di Trieste, sine die, *M. Tommasini* (PAD!); **Campania:** Vesuvio all'Eremita, sine die, *G.A. Pasquale* (RO! under the name *T. vesiculosum* Savi); **Basilicata:** In Vulturis herbosis arenosis, June 1859, *N. Terracciano* (FI! under the name *T. mutabile* Port.); Rionero in Vulture, 700 m, 18 July 1918, *A. Fiori* (FI!); Rionero, ad pendices montis S. Michele prope lacum, 2 July 1939, *O. Gavioli* (FI!); **Calabria:** Sila, S. Giovanni in Fiore, 23 June 1913, *G. Lopez* (RO!); Calabria occidentale presso Fiumefreddo, 12 June 1899, *A. Fiori* (FI!, RO!); Sila, Valle Ceraso, 1300 m, 21 July 1960, *S. Gentile* (GE! under the name *T. vesiculosum* Savi); Sila Gre ca, Rossano, Bosco del Patire, 16 May 2009, *L. Bernardo* (CLU!), Aiello Cala bro, Loc. Vallone presso Azienda Agritouristica Fargani, 498 m, 7 July 2005, *V. Pignataro* (CLU!). **CROATIA. Split-Dalmatia:** In histicis circa Traù, sine die, *A. Andrich* (PAD!). **ALBANIA.** Vallona: In cultis ad Pogdania prope Suerne, 29 June 1894, *A. Baldacci* (FI!). **BULGARIA. Haskovo:** Bogomil, 4 June 2013, *P. Coulot* (photo in Coulot and Rabaute 2013, under the name *T. vesiculosum* var. *rumelicum* Griseb.). **Southern Rhodope Mountains:** prope pag. Menkova, 16 June 1871, *V. Janka* (FI!); **SERBIA. Pčinja:** Vranje, 1878, *J. Pančić* (BEOU digital image!). Nišava: Bukovanj okrug Aleksinački, 1852, *J. Pančić* (BEOU digital image!). **MONTENEGRO. Danilovgrad:** Zeta pr. Sp(už), sine die, *J. Pančić* (BEOU digital image!). **GREECE. Thessalia:** In planitia pelargonica ad rad. M. Olympi, Thessaliae, 5 August 1851, *T. Heldreich* (FI!, under the name *T. vesiculosum* Savi). **FRANCE. Hérault:** Montpellier, Port Juvenal, May 1931, s.c. (MPU).

Trifolium mutabile Port. – **ITALY. Lazio:** Bomarzo, R.N. Monte Casoli, 184 m, 12 June 2009, *A. Scarfone* (UTV! under the name *T. vesiculosum* Savi); Viterbo, nei pressi del cimitero, 324 m, 15 May 2015, *J. López Tirado* (UTV!, FI!); **Apulia:** Spinazzola, in pascuis Murge dictis, 500 m, 9 June 1913, *A. Fiori* (RO!); Loc. Marangi, Lecce, 28 July 2015, *P. Medagli* (LEC digital image!); ***T. mutabile* var. *gussoneanum*** Gibelli & Belli – **Campania:** In aridis agri Neapolitani (al lago d'Agnano), September 1840, *Th. De Heldreich* (FI! under the name *T. vesiculosum* Savi); Campi Flegrei, Agnano, July 1906, *N. Terracciano* (NAP!); **Basilicata:** Potenza, Macchia Romana, 820 m, 12 July 1937, *O. Gavioli* (FI! under the name *T. vesiculosum* var. *mutabile*); Potenza, Loco S. Maria vocato, 800 m, 15 July 1937, *O. Gavioli* (FI! under the name *T. vesiculosum* var. *mutabile*). **Calabria:** Sersale, contrada Cipino Sottana, strada per Melissaro, 680 m, 5 June 2008, *L. Bernardo* (CLU!). **Sicily:** Castellana, sine die, s.c. (PAL! under the name *Trifolium*); Su ghereta di Caronie, 4 July 1983, *S. Brullo* (CAT under the name *T. mutabile* Portensch. subsp. *gussoneanum*, digital image!); Abitato di S. Gregorio di Catania, 25 May 2003, *R. Galesi* (CAT, digital image!); Monte Scuderi, Peloritani, 29 May 2007, *S. Brullo*, *C. Ronisvalle* and *S. Sciandrello* (CAT, digital image!).

Trifolium setiferum Boiss. – **TURKEY.** **Anatolia:** Caria, 1843, *C. Pinard* (RO!); Ephesus, sine die, *E. Boissier* (JE digital image!). **Manisa:** Valles Mesogis et Tmolli, July 1842, *E. Boissier* (FI!, K digital image!); **Izmir:** Mesogis, inter Dervent et Alaşehir, June 1842, *E. Boissier* (E digital image!).

Trifolium spumosum L. – **ITALY.** **Tuscany:** Elba, Rio al Padreterno, 1870, *E. Marcucci* (FI!); Isola del Giglio, 1898, *G. Doria* (FI!); Pianosa, 1909, *S. Sommier* (FI!); **Marche:** Senigallia, August 1876, *H. Ricci* (FI!); **Lazio:** Roma, Scalo Ostiense, 3 May 1951, *A. Cacciato* (RO!); ibidem, via Laurentina, 22 April 2006, *E. Lattanzi* (RO!); **Apulia:** Foggia, 16 May 1840, *G. Gussone* (NAP!); **Calabria:** Spezzano Albanese, 340 m, 20 April 1999, *L. Bernardo* (CLU!); Faudano, nei pressi del fiume Crati, S. Sofia d'Epiro, 70 m, 20 May 2006, *L. Bernardo* (CLU!); **Sardinia:** Doragli, 1980, *P.V. Arrigoni* (FI!); Condoliano, Saccaria, 17 May 2002, *E. Lattanzi* (UTV!). **Sicily:** Niscemi, Arcia, Case Coloniche, 18 April 1990, *R. Galesi* (CAT digital image!); Modica, 13 April 1979, *S. Brullo* (CAT digital image!); Pantelleria, dietro l'isola, 20 April 1975, *S. Brullo* (CAT digital image!).

Trifolium vesiculosum Savi – **ITALY.** **Lazio:** Viterbo, Poggio Pelagi, 600 m, 25 July 1997, *C. Caporali* (UTV!); Caprarola, scendendo al Lago di Vico dalla strada Cimina, 18 July 1988, *A. Scoppola* (UTV!); Roma, Castelporziano, 15 June 2014, *E. Lattanzi* (RO!); Nettuno, Poligono militare, 11 July 2007, *G. Filibeck* and *E. Lattanzi* (UTV!); Marino, Monte Cavo, 12 June 2000, *M. Pellegrini* (UTV!); Sabaudia, Parco del Circeo, 31 May 1983, *A. Scoppola* (UTV!); **Abruzzo:** Oricola, Piana del Cavaliere in loc. Prata Lunghe, 12 June 2005, *A. Colelli* and *S. Costanzi* (UTV!); Montereale, 850 m, 18 July 2009, *L. Forti* (UTV!). **Campania:** Slopes of Vesuvio 570 m, 7 July 1983, *S. Jury* et al. (FI!); **Sardinia:** Oschiri, lago Coghinas in loc. S. Giorgio, 7 November 2006, *G. Calvia* (FI!). **Sicily:** Cefalù, sine die, Herb. *F. Tornabene* (CAT digital image!).

Chromosome numbers for the Italian flora: 2

Lorenzo Peruzzi¹, Giovanni Astuti¹, Fabrizio Bartolucci²,
Fabio Conti², Francesco Roma-Marzio¹

1 Dipartimento di Biologia, Università di Pisa, Via Derna 1, 56126 Pisa, Italy **2** Scuola di Bioscienze e Medicina Veterinaria, Università di Camerino – Centro Ricerche Floristiche dell’Appennino, Parco Nazionale del Gran Sasso e Monti della Laga, San Colombo, 67021 Barisciano (L’Aquila), Italy

Corresponding author: Lorenzo Peruzzi (lorenzo.peruzzi@unipi.it)

Academic editor: G. Domina | Received 23 October 2016 | Accepted 26 October 2016 | Published 10 November 2016

Citation: Peruzzi L, Astuti G, Bartolucci F, Conti F, Roma-Marzio F (2016) Chromosome numbers for the Italian flora: 2. Italian Botanist 2: 29–42. doi: 10.3897/italianbotanist.2.10900

Abstract

In this contribution new chromosome numbers for Italian endemic taxa are presented. It includes 13 chromosome counts for *Ornithogalum* (Asparagaceae), *Anthemis*, *Carduus*, *Centaurea*, *Cirsium*, *Hieracium*, *Taraxacum* (Asteraceae), *Ayneuma* (Campanulaceae), *Knautia* (Caprifoliaceae), *Gypsophila* (Caryophyllaceae), *Linum* (Linaceae), *Helleborus* (Ranunculaceae).

Keywords

Cytogeography, cytotaxonomy, karyotype

How to contribute

The text concerning new chromosome data should be submitted electronically to Lorenzo Peruzzi (lorenzo.peruzzi@unipi.it), including indications on voucher specimens and methods used.

Chromosome counts

Linum katiae Peruzzi (Linaceae)

Chromosome number: $2n = 18$ (Fig. 1)

Voucher specimen. ITALY. Calabria. Tra la Manfriana e Timpa del Principe, ver-sante meridionale (Cosenza), substrato calcareo 4 August 2011, L. Bernardo, L. Peruzzi, D. Gargano (CLU).

Method. Squash preparations were made on root tips obtained from germinating seeds. Root tips were pre-treated with 0.4% colchicine for 3 h and then fixed in Carnoy fixative solution for 1 h. After hydrolysis in 1N HCl at 60 °C, the tips were stained in leuco-basic fuchsin.

Observations. *Linum katiae* occurs only in Calabria, restricted to a single popula-tion on the Pollino Massif (Manfriana mountain) (Peruzzi 2011). The chromosome number found is consistent with all the other existing counts reported for the Italian populations belonging to species in the *Linum perenne* group (Bedini et al. 2010 on-wards). This species also exhibits a certain morphological affinity with *L. narbonense* L., in having relatively elongated styles and sepals ciliolate at the margins (Peruzzi 2011). However, the latter species shows a completely different chromosome complement, i.e., $2n = 28$ (Ray 1944, Bari and Godward 1970, Löve and Kjellqvist 1974, Rogers 1980, González Zapatero et al. 1989, Yurkevich et al. 2009, Muravenko et al. 2010), so that any close relationship between *L. katiae* and *L. narbonense* can be excluded, according to our results.

Hieracium portanum Belli (Asteraceae)

Chromosome number: $2n = 36$ (Fig. 2)

Voucher specimen. ITALY. Calabria. Tra la Manfriana e Timpa del Principe, ver-sante meridionale (Cosenza), substrato calcareo 4 August 2011, L. Bernardo, L. Peruzzi, D. Gargano (CLU).

Method. Squash preparations were made on root tips obtained from germinating seeds. Root tips were pre-treated with 0.4% colchicine for 3 h and then fixed in Carnoy fixative solution for 1 h. After hydrolysis in 1N HCl at 60 °C, the tips were stained in leuco-basic fuchsin.

Observations. This species is endemic to Basilicata and Calabria (Peruzzi et al. 2014), and it is typical of calcareous cliffs on the Pollino Massif. According to our re-sults, *H. portanum* is tetraploid with $2n = 4x = 36$, since the base chromosome number of this genus is $x = 9$ (Ilnicki and Szelag 2011).

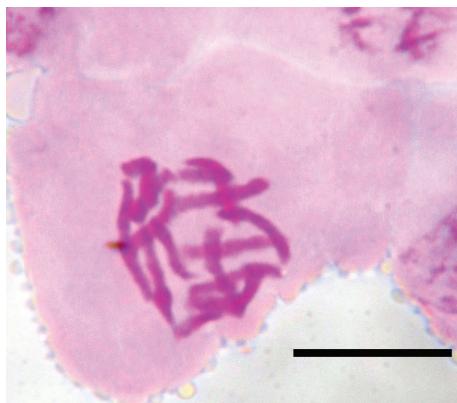


Figure 1. *Linum katiae* Peruzzi, $2n = 18$. Scale bar: 10 μm .

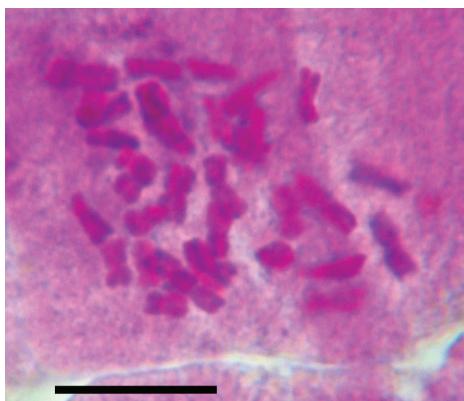


Figure 2. *Hieracium portanum* Belli, $2n = 36$. Scale bar: 10 μm .

Asyneuma trichocalycinum (Ten.) K.Malý (Campanulaceae)

Chromosome number: $2n = 64$ (Fig. 3)

Voucher specimen. ITALY. Basilicata. Fontana di Rummo, Massiccio del Pollino (Viggianello, Potenza), 13 August 2011, L. Peruzzi (seeds collected in the field).

Method. Squash preparations were made on root tips obtained from germinating seeds. Root tips were pre-treated with 0.4% colchicine for 3 h and then fixed in Carnoy fixative solution for 1 h. After hydrolysis in 1N HCl at 60 °C, the tips were stained in leuco-basic fuchsin.

Observations. This species is restricted to southern Italy, where it occurs in Campania, Basilicata, and Calabria, whereas its presence is not confirmed in Abruzzo and Sicily (Peruzzi et al. 2014). In the past, at least three chromosome counts were attributed to *A. trichocalycinum* (Contandriopoulos 1966, Tzanoudakis and Kyriakakis 1987, Anchev 1993), but according to their geographical provenance they should all be referred to *A. pichleri* (Vis.) D.Lakušić & F.Conti (Lakušić and Conti 2004).

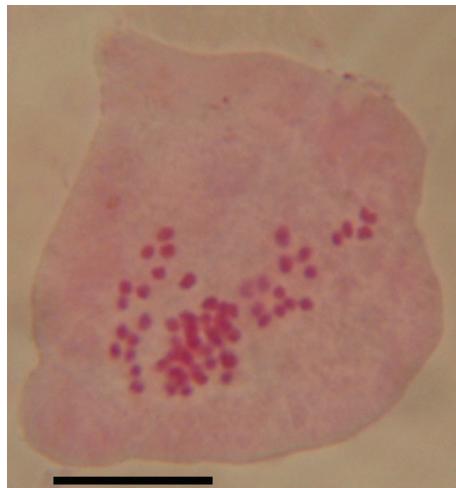


Figure 3. *Asyneuma trichocalycinum* (Ten.) K.Malý, $2n = 64$. Scale bar 10 µm.

Therefore, chromosome number also distinguishes these two species, since *Asyneuma trichocalycinum* is possibly tetraploid with $2n = 4x = 64$ chromosomes, while the closely related *A. pichleri* from the Balkans is diploid with $2n = 2x = 32$.

Carduus nutans L. subsp. *perspinosus* (Fiori) Arènes (Asteraceae)

Chromosome number: $2n = 16$ (Fig. 4)

Voucher specimen. ITALY. Calabria. Montea-Caramolo mountain range, Serra Paratizzi (San Donato di Ninea, Cosenza), 17 August 2014, L. Peruzzi (seeds collected in the field).

Method. Squash preparations were made on root tips obtained from germinating seeds. Root tips were pre-treated with 0.4% colchicine for 3 h and then fixed in Carnoy fixative solution for 1 h. After hydrolysis in 1N HCl at 60 °C, the tips were stained in leuco-basic fuchsin.

Observations. This taxon is distributed in central-southern Italy, from Emilia-Romagna to Calabria (Peruzzi et al. 2014). Like the autonymic subspecies, it has $2n = 2x = 16$ chromosomes, the only chromosome number found until now within this species (Bedini et al. 2010 onwards).

Gypsophila arrostii Guss. subsp. *arrostii* (Caryophyllaceae)

Chromosome number: $2n = 34$ (Fig. 5)

Voucher specimen. ITALY. Calabria. loc. La Cona (Tarsia, Cosenza), 15 August 2014, L. Peruzzi (PI).

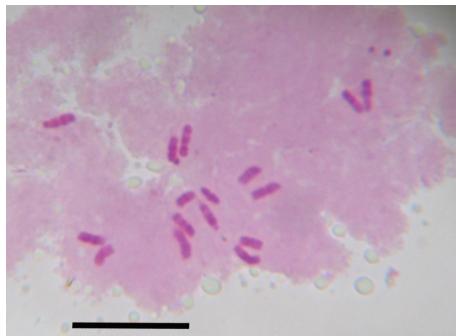


Figure 4. *Carduus nutans* L. subsp. *perspinosus* (Fiori) Arènes, $2n = 16$. Scale bar: 10 μm .

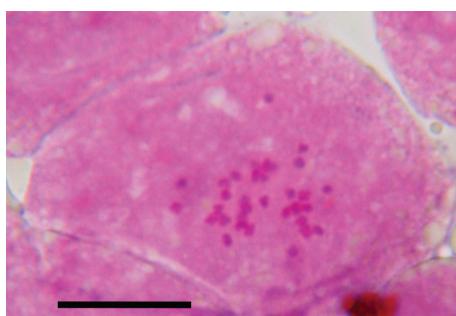


Figure 5. *Gypsophila arrostii* Guss. subsp. *arrostii*, $2n = 34$. Scale bar: 10 μm .

Method. Squash preparations were made on root tips obtained from germinating seeds. Root tips were pre-treated with 0.4% colchicine for 3 h and then fixed in Carnoy fixative solution for 1 h. After hydrolysis in 1N HCl at 60 °C, the tips were stained in leuco-basic fuchsin.

Observations. This subspecies is endemic to southern Italy (Apulia, Basilicata, Calabria, and Sicily; Peruzzi et al. 2014), whereas the species is distributed also in Turkey with *G. arrostii* Guss. subsp. *nebulosa* (Boiss. & Heldr.) Greuter & Burdet (Marhold 2011). Another count was already reported for *G. arrostii* s.l. (Blackburn in Tischler 1931; $2n = 68$), but the origin of the sampled plants (possibly tetraploid) is unknown. Therefore, our count represents the first certain chromosome number report for *G. arrostii* subsp. *arrostii* and it confirms the base chromosome number $x = 17$, which seems typical of the genus (Rice et al. 2014).

Knautia dinarica (Murb.) Borbás subsp. *silana* (Grande) Ehrend. (Caprifoliaceae)

Chromosome number: $2n = 40$ (Fig. 6)

Voucher specimen. ITALY. Basilicata. Piano Ruggio, Pollino Massif (Viggianello, Potenza), 6 August 2014, L. Peruzzi (seeds collected in the field).

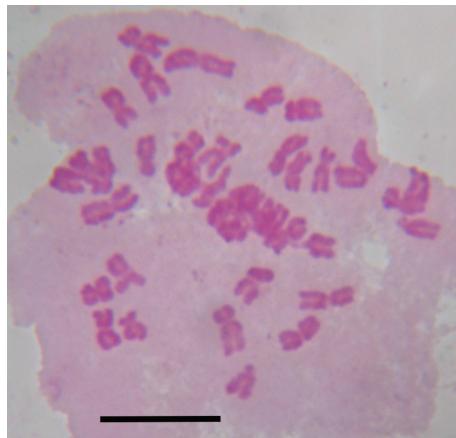


Figure 6. *Knautia dinarica* (Murb.) Borbás subsp. *silana* (Grande) Ehrend., $2n = 40$. Scale bar: 10 μm .

Method. Squash preparations were made on root tips obtained from germinating seeds. Root tips were pre-treated with 0.4% colchicine for 3 h and then fixed in Carnoy fixative solution for 1 h. After hydrolysis in 1N HCl at 60 °C, the tips were stained in leuco-basic fuchsin.

Observations. This taxon is restricted to Italy, where it occurs on the mountains of the Majella (Abruzzo), Pollino Massif (Basilicata) and Sila (Calabria) (Peruzzi et al. 2013). Two other counts are known for this taxon, one for Abruzzo ($2n = 20$; see Peruzzi et al. 2013) and one for Calabria ($2n = 40$; see Ehrendorfer 1975), the latter corresponding to the same chromosome number found by us and showing a tetraploid asset. Our finding further supports the conclusions by Peruzzi et al. (2013), who consider diploids and tetraploids as belonging to the same taxon. Indeed, the studied tetraploid plants are morphologically more similar to the diploids growing in Abruzzo than to tetraploids in the Sila (Calabria).

Ornithogalum etruscum Parl. subsp. *etruscum* (Asparagaceae)

Chromosome number: $2n = 36$ (Fig. 7)

Voucher specimen. ITALY. Basilicata. Mt. Pierno, Irpinia (San Fele, Potenza), faggete, boschi di latifoglie, pascoli e rupi calcaree (WGS84 33T 551245 E, 4515202 N), 1075–1268 m s.l.m., 5 June 2015, G. Astuti, L. Peruzzi, F. Roma-Marzio (PI).

Method. Squash preparations were made on root tips obtained from germinating seeds. Root tips were pre-treated with 0.4% colchicine for 3 h and then fixed in Carnoy fixative solution for 1 h. After hydrolysis in 1N HCl at 60 °C, the tips were stained in leuco-basic fuchsin.

Observations. *Ornithogalum etruscum* is distributed in northern and central Italy, with two subspecies: *O. etruscum* subsp. *etruscum* (in Liguria, Tuscany, Marche Um-



Figure 7. *Ornithogalum etruscum* Parl. subsp. *etruscum*, $2n = 36$. Scale bar: 10 μm .

bria, Latium, Abruzzo, Molise and Apulia) and *O. etruscum* subsp. *umbratile* (Tornad. & Garbari) Peruzzi & Bartolucci (in Emilia-Romagna, Tuscany, Marche, Umbria, Latium, and Apulia) (Peruzzi et al. 2014). The autonymic subspecies has been reported as triploid ($2n = 3x = 27$), tetraploid ($2n = 4x = 36$), hexaploid ($2n = 6x = 54$), octoploid ($2n = 8x = 72$) and decaploid ($2n = 10x = 90$) (see Tornadore et al. 2003, Peruzzi and Bartolucci 2008), whereas the latter as hexaploid, heptaploid, and octoploid (see Tornadore et al. 2003, Peruzzi and Bartolucci 2008, Scassellati and Bartolucci 2009). The source of the count with $2n = 36$, reported by Tornadore et al. (2003) for *O. etruscum* subsp. *etruscum*, is unknown. Thus, our $2n = 36$ count is the first documented for *O. etruscum* subsp. *etruscum*, and it was obtained from material representing the first record of this taxon in Basilicata (A. Stinca and collaborators, in preparation). The morphological features of the studied plants are very similar to those of the diploid *Ornithogalum orthophyllum* Ten., a further Italian endemic (Peruzzi et al. 2014). A careful biosystematic revision of these two taxa, involving several accessions all across their ranges, would be desirable. In addition, both names still lack typification (Peruzzi et al. 2015).

Taraxacum gianninii Arrigoni, Ferretti & Padula (Asteraceae)

Chromosome number: $2n = 24$ (Fig. 8)

Voucher specimen. ITALY. Tuscany. Pratofiorito (Bagni di Lucca, Lucca), sentiero a margine di bosco, 1117 m s.l.m., 20 May 2015, F. Roma-Marzio, M. D'Antraccoli, G. Astuti, L. Peruzzi (PI).

Method. Squash preparations were made on root tips obtained from germinating seeds. Root tips were pre-treated with 0.4% colchicine for 3 h and then fixed in Carnoy fixative solution for 1 h. After hydrolysis in 1N HCl at 60 °C, the tips were stained in leuco-basic fuchsin.

Observations. This species occurs only in Tuscany on the Appennino Lucchese (Arrigoni 2006). According to Kirschner et al. (2007 onwards), this taxon is included within *T.* sect. *Taraxacum*, which mostly includes diploid and triploid taxa (Richards 1969, Mogie and Richards 1983). Based on our results, *T. gianninii* is triploid, i.e., $2n = 3x = 24$.

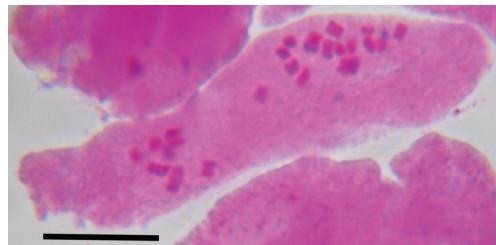


Figure 8. *Taraxacum gianninii* Arrigoni, Ferretti & Padula, $2n = 24$. Scale bar: 10 μm .

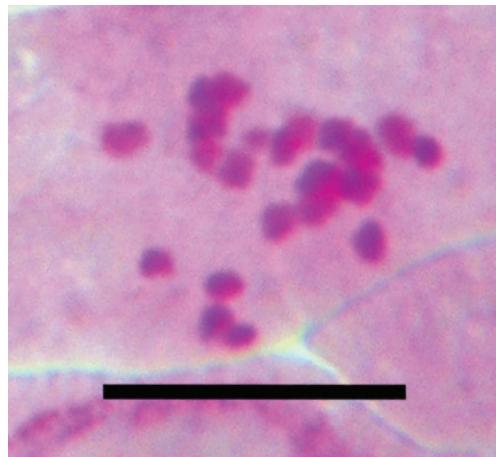


Figure 9. *Taraxacum lucense* Arrigoni, Ferretti & Padula, $2n = 24$. Scale bar: 10 μm .

Taraxacum lucense Arrigoni, Ferretti & Padula (Asteraceae)

Chromosome number: $2n = 24$ (Fig. 9)

Voucher specimen. ITALY. Tuscany. Pratofiorito (Bagni di Lucca, Lucca), sentiero a margine di bosco, 1117 m s.l.m., 20 May 2015, F. Roma-Marzio, M. D'Antraccoli, G. Astuti, L. Peruzzi (PI).

Method. Squash preparations were made on root tips obtained from germinating seeds. Root tips were pre-treated with 0.4% colchicine for 3 h and then fixed in Carnoy fixative solution for 1 h. After hydrolysis in 1N HCl at 60 °C, the tips were stained in leuco-basic fuchsin.

Observations. Similar to *Taraxacum gianninii*, *T. lucense* is distributed on the Apennino Lucchese, and sometimes these two species share the same sites (Arrigoni 2006). According to our count, *T. lucense* is also triploid with $2n = 3x = 24$, the most common chromosome number found in *T.* sect. *Erythrosperma* (Richards 1969) to which *T. lucense* belongs.

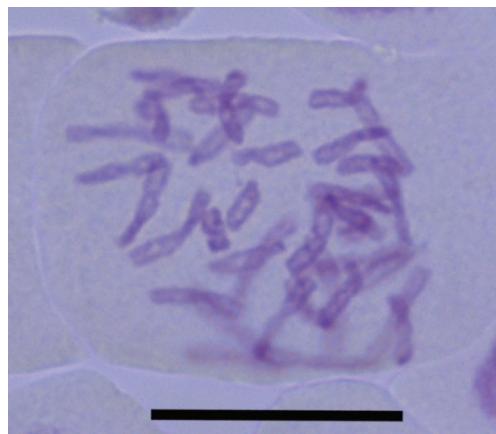


Figure 10. *Anthemis cretica* L. subsp. *petraea* (Ten.) Oberpr. & Greuter, $2n = 36$. Scale bar: 10 μm .

Anthemis cretica L. subsp. *petraea* (Ten.) Oberpr. & Greuter (Asteraceae)

Chromosome number: $2n = 36$ (Fig. 10)

Voucher specimen. ITALY. Abruzzo. Feudo d'Ugni, Majella (Pennapiedimonte, Chieti), August 2011, F. Conti, F. Bartolucci (plants cultivated under acc. n. 509/11).

Method. Squash preparations were made on root tips obtained from potted plants, originally growing in nature, cultivated at the botanical garden of Centro Ricerche Floristiche dell'Appennino. Root tips were pre-treated with 0.4% colchicine for 3 h and then fixed in Carnoy fixative solution for 1 h. After hydrolysis in 1N HCl at 60 °C, the tips were stained in leuco-basic fuchsin.

Observations. This taxon occurs exclusively in the Abruzzo administrative region (Peruzzi et al. 2014), where it is distributed on the Majella and Morrone mountains as well as on Pizzo Intermesoli and Corno Piccolo (Gran Sasso) (Conti 1998, Conti and Bartolucci 2016). This is the first chromosome count ever for this taxon, which differs from the nominal subspecies by having $2n = 36$ instead of $2n = 18$ chromosomes (Brullo and Pavone 1978). Hence, similar to five other subspecies of *A. cretica* occurring in Italy, *A. cretica* subsp. *calabrica* (Arcang.) R.Fern., *A. cretica* subsp. *carpatica* (Willd.) Grierson, *A. cretica* subsp. *columnae* (Ten.) Franzén, *A. cretica* subsp. *messanensis* (Brullo) Giardina & Raimondo, and *A. cretica* subsp. *saxatilis* (DC.) R.Fern. (Capineri 1968, Brullo et al. 1988; Selvi 2009), this taxon is probably tetraploid. This probably could be the reason for its larger size as compared to *A. cretica* subsp. *cretica* (Pignatti 1982).

Centaurea ambigua Guss. subsp. *ambigua* (Asteraceae)

Chromosome number: $2n = 36$ (Fig. 11)

Voucher specimen. ITALY. Abruzzo. Guado S. Antonio, Majella (Caramanico Terme, Pescara), August 2006, G. D'Orazio (plants cultivated under acc. n. 248/06).

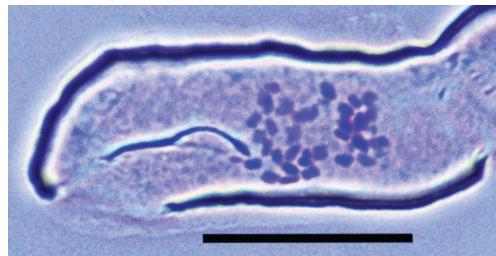


Figure 11. *Centaurea ambigua* Guss. subsp. *ambigua*, $2n = 36$. Scale bar: 10 μm .

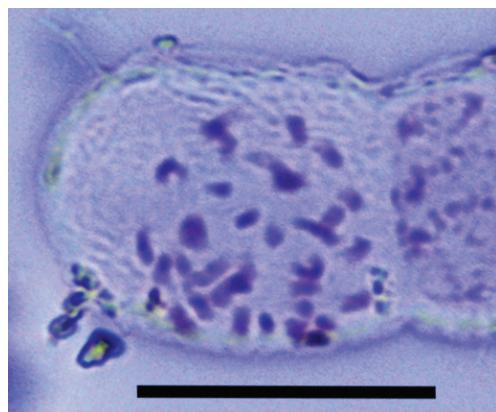


Figure 12. *Cirsium lobelii* Ten., $2n = 34$. Scale bar: 10 μm .

Method. Squash preparations were made on root tips obtained from potted plants, originally growing in nature, cultivated at the botanical garden of Centro Ricerche Floristiche dell'Appennino. Root tips were pre-treated with 0.4% colchicine for 3 h and then fixed in Carnoy fixative solution for 1 h. After hydrolysis in 1N HCl at 60 °C, the tips were stained in leuco-basic fuchsin.

Observations. *Centaurea ambigua* is endemic to Italy, distributed in central-southern zones, from Emilia-Romagna to Calabria, but doubtfully occurring in Campania. The autonymic subspecies occurs in these same regions, except Tuscany (Peruzzi et al 2014). The only other existing chromosome count for *C. ambigua* pertains to *C. ambigua* subsp. *nigra* (Fiori) Pignatti, which shows $2n = 2x = 18$ chromosomes (Baltisberger 1991), different from *C. ambigua* subsp. *ambigua*. Hence, *C. ambigua* subsp. *ambigua* probably represents a tetraploid unit.

Cirsium lobelii Ten. (Asteraceae)

Chromosome number: $2n = 34$ (Fig. 12)

Voucher specimen. ITALY. ABRUZZO. Near Lago Racollo (Santo Stefano di Sessanio, L'Aquila), July 2011, F. Bartolucci, N. Ranalli (plants cultivated under acc. n. 492/11).

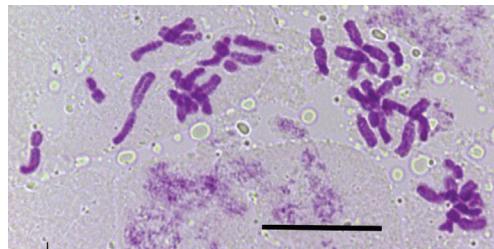


Figure 13. *Helleborus viridis* L. subsp. *abruzzicus* (M.Thomsen, McLewin & B.Mathew) Bartolucci, F.Conti & Peruzzi, $2n = 32$. Scale bar: 10 μm .

Method. Squash preparations were made on root tips obtained from potted plants, originally growing in nature, cultivated at the botanical garden of Centro Ricerche Floristiche dell'Appennino. Root tips were pre-treated with 0.4% colchicine for 3 h and then fixed in Carnoy fixative solution for 1 h. After hydrolysis in 1N HCl at 60 °C, the tips were stained in leuco-basic fuchsin.

Observations. This species is distributed in central and southern Italy (Peruzzi et al. 2014). According to our count, $2n = 34$ it shares the same chromosome number of all the other karyologically studied species within the *C. eriophorum* (L.) Scop. group, i.e., *C. eriophorum* s.str., *C. ferox* (L.) DC., and *C. vallis-demonis* Lojac. (Rice et al. 2014).

Helleborus viridis L. subsp. *abruzzicus* (M.Thomsen, McLewin & B.Mathew) Bartolucci, F.Conti & Peruzzi (Ranunculaceae)

Chromosome number: $2n = 32$ (Fig. 13)

Voucher specimen. ITALY. Abruzzo. Limite inferiore del Bosco di Fonte Novello (Fano Adriano, Teramo), 20 April 2010, *F. Bartolucci, F. Conti* (APP, n. 43338; plants cultivated under acc. n. 522/11).

Method. Squash preparations were made on root tips obtained from potted plants, originally growing in nature, cultivated at the botanical garden of Centro Ricerche Floristiche dell'Appennino. Root tips were pre-treated with 0.4% colchicine for 3 h and then fixed in Carnoy fixative solution for 1 h. After hydrolysis in 1N HCl at 60 °C, the tips were stained in leuco-basic fuchsin.

Observations. This subspecies is endemic to central (Umbria, Latium, and Abruzzo, doubtful in Marche) and southern Italy (Peruzzi et al. 2014). The chromosome number shown is the same found in *H. viridis* L. subsp. *viridis*, as well as in most other *Helleborus* species (Rice et al. 2014).

References

- Anchev ME (1993) Reports: 217–227. In: Kamari G, Felber F, Garbari F (Eds) Mediterranean chromosome number reports 3. Flora Mediterranea 3: 358–363.
- Arrigoni PV (2006) Due nuove specie di *Taraxacum* dell'Appennino Lucchese (Toscana Settentrionale). *Parlatorea* 8: 5–9.
- Baltisberger M (1991) Numeri Cromosomici per la Flora Italiana: 1208–1230. *Informatore Botanico Italiano* 22: 216–226.
- Bari G, Gordward MBE (1970) Interspecific crosses in *Linum*. *Euphytica* 19: 443–446. doi: 10.1007/BF01902918
- Bedini G, Garbari F, Peruzzi L (2010 onwards) Chrobase.it. Chromosome numbers for the Italian flora. Available from: www.biologia.unipi.it/chrobase [accessed 16 July 2016]
- Brullo S, Pavone P (1978) Numeri Cromosomici per la Flora Italiana: 464–483. *Informatore Botanico Italiano* 10: 248–264.
- Brullo S, Pavone P, Terrasi MC (1988) Osservazioni citotassonomiche sulle popolazioni tetraploidi di *Anthemis* della Sicilia e Italia meridionale. *Giornale Botanico Italiano* 122(suppl. 1): 50.
- Capineri R (1968) Cariologia di alcune specie di *Anthemis*. *Giornale Botanico Italiano* 102(6): 548.
- Contandriopoulos J (1966) Contribution à l'étude cytotaxinomique des Campanulacées de Grèce II. *Bulletin de la Société Botanique de France* 113: 453–474. doi: 10.1080/00378941.1966.10835555
- Conti F (1998) An annotated checklist of the Flora of the Abruzzo. *Bocconeia* 10: 1–273.
- Conti F, Bartolucci F (2016) The vascular flora of Gran Sasso and Monti della Laga National Park (Central Italy). *Phytotaxa* 256(1): 1–119. doi: 10.11646/phytotaxa.256.1.1
- Ehrendorfer F (1975) Taxonomic notes on *Knautia* L. In: Heywood HV (Ed.) *Flora Europaea* Notulae Systematicae ad Floram Europaeam spectantes 17. *Botanical Journal of the Linnean Society* 71: 39–41. doi: 10.1111/j.1095-8339.1975.tb00937.x
- González Zapatero MA, Elena-Roselló JA, Andrés FN (1989) Números cromosómicos de plantas occidentales, 527–532. *Anales del Jardín Botánico de Madrid* 45: 505–508.
- Ilnicki T, Szelag Z (2011) Chromosome numbers in *Hieracium* and *Pilosella* (Asteraceae) in Central and Southeastern Europe. *Acta Biologica Cracoviensia Series Botanica* 53(1): 102–110. doi: 10.2478/v10182-011-0014-3
- Kirschner J, Štepánek J, Greuter W (2007 onwards) *Taraxacum*. In: Greuter W, von Raab-Straube E (Eds) Compositae. Euro+Med Plantbase - the information resource for Euro-Mediterranean plant diversity. <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameCache=Taraxacum%20gianni nii&PTRefFk=7700000>
- Lakušić D, Conti F (2004) *Asyneuma pichleri* (Campanulaceae) a neglected species of the Balkan Peninsula. *Plant Systematics and Evolution* 247(1): 23–36. doi: 10.1007/s00606-004-0136-0
- Löve A, Kjellqvist E (1974) Cytotaxonomy of Spanish plants. IV. Dicotyledons: Caesalpinaeae Asteraceae. *Lagascalia* 4(2): 153–211.
- Marhold K (2011) *Gypsophila arrostii*. In: Greuter W, von Raab-Straube E (Eds) Caryophyllaceae. Euro+Med Plantbase - the information resource for Euro-Mediterranean plant di-

- versity. Available from: <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameId=101574&PTRefFk=7200000>
- Mogie M, Richards AJ (1983) Satellited chromosomes, systematics and phylogeny in *Taraxacum* (Asteraceae). *Plant Systematics and Evolution* 141: 219–229. doi: 10.1007/BF00989003
- Muravenko OV, Bolsheva NL, Yurkevich YO, Nosova IV, Rachinskaya OA, Samatadze TE, Zelenin AV (2010) Karyogenomics of species of the genus *Linum* L. *Russian Journal of Genetics* 46(10): 1182–1185. doi: 10.1134/s1022795410100091
- Peruzzi L, Bartolucci F (2008) Notula 1521. In: Nepi C, Peruzzi L, Scoppola A (Eds) *Notulae alla checklist della flora vascolare italiana 6*. *Informatore Botanico Italiano* 40(2): 262–263.
- Peruzzi L (2011) A new species of *Linum perenne* group (Linaceae) from Calabria (S Italy). *Plant Biosystems* 145(4): 938–944. doi: 10.1080/11263504.2011.589163
- Peruzzi L, Bartolucci F, Astuti G, Bernardo L, Conti F (2013) *Knautia dinarica* (Caprifoliaceae): taxonomy, typification and update of the Italian distribution. *Phytotaxa* 116: 34–40. doi: 10.11646/phytotaxa.116.1.3
- Peruzzi L, Conti F, Bartolucci F (2014) An inventory of vascular plants endemic to Italy. *Phytotaxa* 168: 1–75. doi: 10.11646/phytotaxa.168.1.1
- Peruzzi L, Domina G, Bartolucci F, Galasso G, Peccenini S, Raimondo FM, Albano A, Alessandrini A, Banfi E, Barberis G, Bernardo L, Bovio M, Brullo S, Brundu G, Brunu A, Camarda I, Carta L, Conti F, Croce A, Iamonico D, Iberite M, Iiriti G, Longo D, Marsili S, Medagli P, Pistarino A, Salmeri C, Santangelo A, Scassellati E, Selvi F, Soldano A, Stinca A, Villani M, Wagensommer RP, Passalacqua NG (2015) An inventory of the names of vascular plants endemic to Italy, their loci classici and types. *Phytotaxa* 196(1): 1–217. doi: 10.11646/phytotaxa.196.1.1
- Pignatti S (1982) *Anthemis* L. In: Pignatti S (Ed.) *Flora d'Italia 3*, Ed. Agricole, Bologna, 66–75.
- Ray C (1944) Cytological studies on the flax genus *Linum*. *American Journal of Botany* 27: 241–248. doi: 10.2307/2437613
- Rice A, Glick L, Abadi S, Einhorn M, Kopelman NM, Salman-Minkov A, Mayzel J, Chay O, Mayrose I (2014) The Chromosome Counts Database (CCDB) a community resource of plant chromosome numbers. <http://ccdb.tau.ac.il/home/> [accessed 21 July 2016]
- Rogers CM (1980) Reports. In: Löve A (Ed.) IOPB chromosome number reports LXVII. *Taxon* 29: 347.
- Richards AJ (1969) The biosystematics of *Taraxacum*. Durham theses, Durham University. Available from Durham E-Theses Online: <http://etheses.dur.ac.uk/1368/>
- Scassellati E, Bartolucci F (2009) Notula 1542. In: Nepi C, Peruzzi L, Scoppola A (Eds) *Notulae alla checklist della flora vascolare italiana 7*. *Informatore Botanico Italiano* 41(1): 132.
- Selvi F (2009) New findings of *Anthemis cretica* (Asteraceae) on serpentine outcrops of Tuscany (C Italy). *Flora Mediterranea* 19: 119–128.
- Thiers B (2016) Index Herbariorum: A global directory of public herbaria and associated staff. Available from: <http://sweetgum.nybg.org/ih/> [accessed 30 September 2016]
- Tischler G (1931) Pflanzliche Chromosomen-Zahlen (Nachtrag 1). *Tabulae Biologicae Periodicae* 1: 109–226.

- Tornadore N, Marcucci R, Garbari F (2003) *Ornithogalum umbratile* (Hyacinthaceae), a new species from Gargano's Promontory, south-eastern Italy. *Taxon* 52: 577–582. doi: 10.2307/3647456
- Tzanoudakis D, Kypriotakis Z (1987) Chromosome studies in the Greek flora III. Karyotypes of eight Aegean species. *Botanica Helvetica* 97: 229–237.
- Yurkevich OY, Svetlova AA, Muravenko OV (2009) Chromosome numbers of some species from the sections *Linum*, *Adenolinum* and *Stellerolinum* of the genus *Linum* (Linaceae). *Botanicheskii Zhurnal* 94(4): 588–595.

Notulae to the Italian flora of algae, bryophytes, fungi and lichens: 2

Sonia Ravera¹, Annalena Cogoni², Cecilia Totti³, Michele Aleffi⁴, Silvia Assini⁵, Stefania Caporale¹, Zuzana Fačkovcová⁶, Giorgia Filippino², Gabriele Gheza⁵, Nicola Olivieri⁷, Mauro Ottonello⁸, Luca Paoli⁹, Silvia Poponessi¹⁰, Ivan Pišút⁶, Roberto Venanzoni¹⁰

1 Dipartimento di Bioscienze e Territorio, Università degli Studi del Molise, C.da Fonte Lappone, 86090 Pesche (Isernia), Italy **2** Dipartimento di Scienze della Vita e dell'Ambiente, Università degli Studi di Cagliari, viale Sant'Ignazio da Laconi 13, 09123 Cagliari, Italy **3** Dipartimento di Scienze della Vita e dell'Ambiente, Università Politecnica delle Marche, via Brecce Bianche, 60131 Ancona, Italy **4** Scuola di Bioscienze e Medicina Veterinaria, Università degli Studi di Camerino, via Pontoni 5, 62032 Camerino (Macerata), Italy **5** Dipartimento di Scienze della Terra e dell'Ambiente, Università di Pavia, Via S. Epifanio 14, 27100 Pavia, Italy **6** Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 9, SK-84523 Bratislava, Slovakia **7** via Maestri del lavoro 40, 64100 Teramo, Italy **8** Via Primo Maggio 46, 18018 Taggia (Imola), Italy **9** Dipartimento di Scienze della Vita, Università degli Studi di Siena, Via P.A. Mattioli 4, 53100 Siena, Italy **10** Dipartimento di Chimica, Biologia e Biotecnologia, Università degli Studi di Perugia, Borgo XX giugno 74, 06121 Perugia, Italy

Corresponding author: Sonia Ravera (sonia.ravera@unimol.it)

Academic editor: L. Peruzzi | Received 15 October 2016 | Accepted 1 November 2016 | Published 22 November 2016

Citation: Ravera S, Cogoni A, Totti C, Aleffi M, Assini S, Caporale S, Fačkovcová Z, Giorgia Filippino, Gheza G, Olivieri N, Ottonello M, Paoli L, Poponessi S, Pišút I, Venanzoni R (2016) Notulae to the Italian flora of algae, bryophytes, fungi and lichens: 2. Italian Botanist 2: 43–54. doi: 10.3897/italianbotanist.2.10812

Abstract

In this contribution, new data concerning red algae, lichens and bryophytes of the Italian flora are presented. It includes new records and confirmations for the algal genus *Gratelouphia*, the bryophyte genus *Didymodon*, and the lichen genera *Buellia*, *Cladonia*, *Letharia*, *Pertusaria*, and *Pyrenula*.

Keywords

Bryidae, floristic data, lichenized ascomycetes, Rhodophyceae

How to contribute

The text of the records should be submitted electronically to: Cecilia Totti (c.totti@uni-pvm.it) for algae, Annalena Cogoni (cogoni@unica.it) for bryophytes, Alfredo Vizzini (alfredo.vizzini@unito.it) for fungi, Sonia Ravera (sonia.ravera@unimol.it) for lichens.

Floristic records

ALGAE

Grateloupia turuturu Yamada (Florideophyceae)

+ (NAT) **ABR:** Marina, Punta Turchinio, San Vito Chietino (Chieti), a pebbly beach near an artificial reef (UTM WGS84: 33T 455.4683), 24 April 2014, *N. Olivieri* (FI).
– Naturalized alien species new for the flora of Abruzzo.

An exotic species with Indo-Pacific chorology, *Grateloupia turuturu* was originally widespread in the northwestern Pacific, especially in the Japanese seas (Yoshida 1998, Xia 2004). This seaweed later became sub-cosmopolitan after a number of accidental introductions, initially limited to shellfish farming areas, and later due to the spread of aquaculture of the Asian bivalve *Crassostrea gigas* Thunberg (Grizel and Héral 1991, Maggs and Stegenga 1999, Verlaque 2001, Ribera Siguan 2002, Wallentinus 2002, Schaffelke et al. 2006). Currently *Grateloupia turuturu* occurs along the coasts of Japan, China, Korea, the Russian Far East, along the US Pacific coast, especially in California (Aguilar-Rosas et al. 2010, Miller 2012), along the American Atlantic coast (Villalard-Bohsack and Harlin 1997, Mathieson et al. 2008), along the Atlantic coast of Africa from Namibia to Mauritania, in New Zealand, and in Tasmania (D'Archino et al. 2007). In Europe, this species has been reported since the 1980s along the Atlantic coast and is currently distributed in the Netherlands, Portugal, and the British Isles (Simon-Colin et al. 2001, Araújo et al. 2003, Bárbara and Cremades 2004, Hardy and Guiry 2003, De Clerck et al. 2005, Verlaque et al. 2005, Figueroa et al. 2007). On the French Mediterranean coast, it appeared in 1982 in the Thau lagoon (Riouall et al. 1985). The first report for Italy was for the Venice lagoon (Solazzi et al. 1991-1994), where this species was reported as *G. doryphora* (Montagne) M. Howe. Later, in 2007, *G. turuturu* was found in the Mar Piccolo of Taranto (Cecere et al. 2011) and in the harbour of Ancona (Falace et al. 2010).

Monitoring activities carried out in the San Vito Chietino coast and in the surroundings highlighted that *G. turuturu* is common and settles both on natural hard substrata (conglomerate) and on artificial ones (limestone blocks) used to build breakwater reefs. As regards its vertical distribution, it occurs in the higher part of the infralittoral, even in areas affected by intense hydrodynamics. In sheltered areas where hydrodynamics are low, thalli are large, exceeding one meter in length; in such areas, it represents the macroalgal species reaching the largest dimensions. Thalli are evident

and well developed until May. After, they tend to degenerate and disappear, and during the summer only the encrusting basal part of thalli survives, although scarcely visible and often masked by other macroalgal species with different phenology, such as *Ulva rigida* C.Agardh and *Codium fragile* (Suringar) Hariot subsp. *fragile*, the latter being an alien species too. Only in some rocky jags at low light intensity, but still affected by intense hydrodynamics, thalli persist throughout the summer.

Until now, the presence of *G. turuturu* in Italy has been reported only for lagoons and harbour areas. This points to the fact that this species colonizes coastal areas, where the presence of breakwater reefs parallel and perpendicular to the coast alter the circulation and trophic condition of coastal waters, allowing the appearance of harbour-like biotic communities.

N. Olivieri

BRYOPHYTES

Didymodon sinuosus (Mitt.) Delogne (Pottiaceae)

+ SAR: S'abba Fittiana, Seui (Ogliastra), at the feet of Monte Tonneri, on *Ostrya carpinifolia* Scop. (UTM WGS84: 32S 531916.4416241), 110 m, 7 May 1996, A. Cogoni, F. Flore (CAG No. SA3/ 70.5.1). – New species for the flora of Sardegna.

Didymodon sinuosus was found in the calcareous “Tacchi” of Seui in the cortex of a mixed forest of *Quercus ilex* L. and *Ostrya carpinifolia* located at the foot of a crag on the northern slope of Monte Tonneri. Exposure to the north and shading by the crag create a special microclimate. *Didymodon sinuosus* usually grows on damp, shady basic rocks nearby streams and rivers and in sheltered habitats on walls and old buildings, among tree roots in woodlands and lowlands (Smith 2004). Associate species include *Brachythecium velutinum* (Hedw.) Ignatov & Huttunen var. *velutinum*, *Ctenidium molluscum* (Hedw.) Mitt., *Distichium capillaceum* (Hedw.) Bruch & Schimp., *Exsertotheca crispa* (Hedw.) S.Olsson, Rnroth & D.Quandt, *Frullania dilatata* (L.) Dumort., *Homalothecium sericeum* (Hedw.) Schimp., *Hypnum cupressiforme* Hedw. var. *cupressiforme*, *Leucodon sciuroides* (Hedw.) Schwägr. var. *sciuroides*, *Orthotrichum lyelli* Hook. & Taylor, *Nogopterium gracile* (Hedw.) Crosby & W.R.Buck, *Ptychostomum capillare* (Hedw.) D.T.Holyoak & N.Pedersen, and *Zygodon rupestris* Schimp. ex Lorentz. The authors followed Ros et al. (2007, 2013) for nomenclature. This species is common in the central-southern part of Italy (Aleffi et al. 2008). It is of phytogeographical interest, since it is at risk in several countries. In Europe, it is assessed as Endangered (EN) in Austria, Rumania and Sweden, and Vulnerable (VU) in the Czech Republic and Switzerland (Hodgetts 2015).

A. Cogoni, G. Filippino

Didymodon insulanus (De Not.) M.O.Hill (Pottiaceae)

+ **BAS:** Sasso Barisano, Matera, on stone wall (UTM WGS84: 33T 636046.4503094), 374 m, 31 August 2016, *S. Poponessi* (PERU). – Species confirmed for the flora of Basilicata.

Didymodon insulanus was found on the “Calcarenite di Gravina” wall, a type of limestone with which houses were built. It is a Eurasian southern-temperate species (Smith 2004). This finding, 100 years after the first reports (Zodda 1909, 1913), is the first record for the “Sassi” of Matera (Aleffi et al. 2008). *Didymodon insulanus* shares the same habitat as *Didymodon fallax* (Hedw.) R.H.Zander and is also very common. It is usually dull green and forms lax tufts or turfs on the ground. It has much longer, narrower leaves than *D. fallax*, recurved along most of their length. In Europe, it is considered Vulnerable (VU) in Switzerland and Estonia, Regionally Extinct (RE) in Finland and Slovakia, Near Threatened (NT) in Hungary and Rumania, and Data Deficient (DD) in Malta and San Marino (Hodgetts 2015).

S. Poponessi, R. Venanzoni, M. Aleffi

LICHENS

Buellia leptocline (Flot.) A.Massal. (Physciaceae)

+ **TOS:** Monticiano (Siena), near the biogenetic reserve of Tocchi, on siliceous rock (UTM WGS84: 32T 683677.4778587), 340 m, 5 June 2016, *L. Paoli, Z. Fačkovcová* (SAV). – New species for the flora of Toscana.

It is a crustose epilithic lichen, generally growing on perpendicular and overhanging rain-exposed parts of siliceous boulders (Scheidegger 1993), so far reported chiefly in N Italy (Nimis 2016).

L. Paoli, Z. Fačkovcová, I. Pišút

Cladonia cariosa (Ach.) Spreng. (Cladoniaceae)

+ **PIE:** Greggio (Vercelli), within the Lame del Sesia Natural Park, on sandy-pebbly soil in a dry grassland (*Thero-Airion*) developed in the active riverbed of the Sesia river (UTM WGS84: 32T 452817.5033781), 159 m, 4 March 2016, *G. Gheza* (Herb. Gheza); San Giacomo al Bosco, Masserano (Biella), surroundings of the farmhouse “Lo Chalet”, on bare soil at the side of a dirt road between a field and a patch of heathland and deciduous wood (UTM WGS84: 32T 441675.5044948), 240 m, 16 January 2016, *G. Gheza* (Herb. Gheza); “Vauda” of San Carlo Canavese (Torino), on bare soil among *Calluna vulgaris* (L.) Hull shrubs, in a degraded heathland encroached by

grasses (UTM WGS84: 32T 392345.5012651), 366–369 m, 8 March 2016, G. Gheza (Herb. Gheza). – Species confirmed for the flora of Piemonte.

+ **LOM:** Bernate Ticino (Milano), within the Valle del Ticino Lombardo Natural Park, surroundings of the Ticino river on bare sandy soil in a dry grassland (*Thero-Airion*) (UTM WGS84: 32T 484052.5035066), 117 m, 25 March 2016, G. Gheza (Herb. Gheza); Tornavento heathland, Lonate Pozzolo (Varese), on bare soil among shrubs of *C. vulgaris* in an unmanaged heathland (UTM WGS84: 32T 478302.5049318), 200 m, 25 March 2016, G. Gheza (Herb. Gheza); Livigno (Sondrio), surroundings of the artificial lake on soil inside a bush of *Pinus mugo* Turra (UTM WGS84: 32T 589565.5160342), about 1840 m, 18 September 2012, G. Gheza (Herb. Gheza). – Species confirmed for the flora of Lombardia.

Historical records of *C. cariosa* from both Piemonte and Lombardy refer almost exclusively to montane and alpine localities (Nimis 1993, Nimis and Martellos 2008); only Nocca and Balbis (1816) reported it for the Po Plain, in fields near Pavia (“*in campis sterilibus prope Papiam*”), while Re (1825) reported it for the Parco della Mandria near Torino, but both these records have not been confirmed in recent times. The new records reported here are, therefore, an important confirmation of the persistence of *C. cariosa* in planitial northeastern Italy after almost two centuries. In Piemonte, Baglietto and Carestia (1867, 1880) reported the species along the gravels of the Sesia river near Riva. The record from Greggio, in the Sesia riverbed, comes from a similar context, though having different substrate, altitude, and climate; transport by the river could be plausible, since the species was not found in other nearby lichen-rich sites placed above the level of the riverbed. Baglietto (1863) recorded it also on peaty soil at the Sempione Pass. In Lombardy, the most recent record is by Rivellini and Valcuvia Passadore (1996) for the Province of Sondrio, while all the others are antecedent to the 1940s. *Cladonia cariosa* is a circumboreal species with a wide distribution, typically on mineral (from sandy to gravelly) soils with low acid to base reaction, in more or less disturbed sites. It can form wide monospecific mats extending for up to several square metres.

G. Gheza

Cladonia incrassata Flörke (Cladoniaceae)

+ **LIG:** Valle del Rio Gavano, Molini di Triona (Imperia), on rotting wood at the base of an old chestnut tree, in an unmanaged chestnut wood (UTM WGS84: 32T 403396.4869732), about 450 m, 17 March 2016, Leg. M. Ottanello, Det. G. Gheza (Herb. Gheza). – New species for the flora of Liguria.

The distribution of *Cladonia incrassata* in Italy is poorly known, with rather old records. It was reported until now only in Lombardia, Piemonte, Toscana, and Calabria (Nimis 2016). In Lombardia, it has not been recorded for over a century: Rivellini and Valcuvia Passadore (1996) reported a very generic record by Jatta (1909–1911) for the Province of Sondrio, while Anzi (1866) reported the species in the Province of Como

on Mount Capiago. In Piemonte, aside from a historical record by Baglietto (1863) for Mergozzo, a recent record comes from the Conca di Oropa (Isocrono et al. 2006). Rather recent records are those from Tereglio, in Toscana (Nimis 1993) and from Monte Gariglione in Calabria (Puntillo 1996). *Cladonia incrassata* has a suboceanic affinity and its ecological optimum is found on rotting wood and humus-rich soil; rarely it is also found on bark at the base of old trees. In the new site reported here, the species was found on a single rotting trunk of an old chestnut tree together with *C. digitata* (L.) Hoffm. and *C. squamosa* Hoffm. Rotting chestnut wood is the same substrate recorded by Baglietto (1863), Anzi (1866) and Coppins (Nimis 1993). Due to the very scarce records and the specific ecological requirements, the species is considered extremely rare in Italy, where it has been found since now only in the submediterranean and montane belts (Nimis and Martellos 2008).

G. Gheza, M. Ottonello

Cladonia peziziformis (With.) J.R.Laundon (Cladoniaceae)

+ **PIE:** Torrette di Frassineto, Frassineto Po (Alessandria), surroundings of the confluence between the rivers Sesia and Po, within the Fluvial Natural Park of Po and Orba, on sandy-silty soil in a dry grassland (*Thero-Airion*) developed on a former dirt road (UTM WGS84: 32T 467109.4998260), 99 m, 20 June 2012, G. Gheza (Herb. Gheza); Greggio (Vercelli), within the Lame del Sesia Natural Park, on sandy-pebbly soil in a dry grassland (*Thero-Airion*) developed in the active riverbed of the Sesia river (UTM WGS84: 32T 452817.5033781), 159 m, 4 March 2016, G. Gheza (Herb. Gheza); San Giacomo al Bosco, Masserano (Biella), surroundings of the farmhouse “Lo Chalet”, on bare soil at the side of a dirt road between a field and a patch of heathland and deciduous wood (UTM WGS84: 32T 441675.5044948), 240 m, 16 January 2016, G. Gheza (Herb. Gheza); “Vauda” of San Francesco al Campo (Torino), on bare soil among burnt *Calluna vulgaris* shrubs, in a heathland managed with prescribed fire (UTM WGS84: 32T 397692.5009259), 295 m, 8 March 2016, G. Gheza (Herb. Gheza); “Vauda” of San Carlo Canavese (Torino), on bare soil among *Calluna vulgaris* shrubs, in a degraded heathland encroached by grasses (UTM WGS84: 32T 392345.5012651), 370 m, 8 March 2016, G. Gheza (Herb. Gheza). – New species for the flora of Piemonte.

+ **LOM:** Lonate Pozzolo (Varese), within the Valle del Ticino Lombardo Natural Park, on soil among a thick carpet of bryophytes at the edge of a dry grassland (*Thero-Airion*) evolving towards heathland and shrubland (UTM WGS84: 32T 479440.5046068), 186 m, 13 May 2016, G. Gheza (Herb. Gheza). – New species for the flora of Lombardia.

Cladonia peziziformis is considered rare in Europe (Wirth et al. 2013), even though it has a wide distribution, reaching as far as the southern hemisphere (Nimis 1993). In Italy, it was known until now for only four localities, all in Liguria, and not confirmed

after the 1960s (Valcuvia Passadore and Vittadini Zorzoli 1982), although Nimis (2016) stated that the species has probably been overlooked in Italy so far. Jatta (1909–1911) also reported this species, but only very generically for “peaty soil in the Alps”. All the records reported here come from disturbed stands. Well-developed monospecific mats several square metres wide, occur only in two stands: on the sandy-pebbly riverbed of the Sesia - encroached by the allochthonous grass *Eragrostis curvula* (Schrad.) Nees - and a dry grassland developed on a dirt road close to an abandoned quarry. In both sites, vascular vegetation belongs to the *Thero-Airion* Tüxen ex Oberdorfer 1957. Few underdeveloped thalli were found in the other sites, all located in more or less degraded heathlands or along their edges. In the “Vauda” of San Francesco al Campo heathland, the species was found in a site regularly managed with prescribed fire, a situation similar to that described for Norway (Tønsberg and Øvstedral 1995) where the species was reported as one of the first colonizers after a fire. In the other heathlands, grass and moss-encroachment have been found to overcome *C. peziziformis*, which is an uncompetitive species (Tønsberg and Øvstedral 1995).

G. Gheza

Cladonia portentosa (Dufour) Coem. (Cladoniaceae)

+ PIE: Villa Giulia, Cerano (Novara), within the Valle del Ticino Piemontese Natural Park, in a dry grassland (*Thero-Airion*) (UTM WGS84: 32T 487030.5027303), 99 m, on acid sandy-pebbly soil, 25 March 2016, G. Gheza (Herb. Gheza); Greggio (Vercelli), wood southwest of the underpass of Canal Cavour under the Sesia river, near the northern boundary of the Lame del Sesia Natural Park, in a wide clearing with *Thero-Airion* and *Corynephorion* grasslands (UTM WGS84: 32T 452785.5034282), 163–165 m, on acid sandy-pebbly soil, 3 May 2016, G. Gheza, S. Assini (Herb. Gheza).
– Species confirmed for the flora of Piemonte.

In the Po Plain, *Cladonia portentosa* has been recorded formerly only in recent years in the Valle del Ticino Piemontese Natural Park (Gheza 2015) and in the inland sand dunes of Lomellina in Lombardia (Gheza 2015, Gheza et al. 2015). All the formerly known sites are located west of the Ticino river. Those located in the fluvial valley of Ticino, more similar to the two reported here for habitat physiognomy and substrate characteristics, are more northern than that from Cerano, while those found in inland dunes are found at lower altitudes and are more southern. The stand in Cerano is located in a wide clearing in a mixed deciduous wood hosting a dry grassland referable to the *Thero-Airion* Tüxen ex Oberdorfer 1957, in which lichen and moss cover is relevant. Here, *C. portentosa* is never dominant in lichen vegetation, but is found in an evolved stage of the *Cladonietum foliaceae* Klement 1953 emend. Drehwald 1993 dominated by *Cladonia rangiformis* Hoffm. (see Gheza et al. 2016). This is the only site in the Po Plain in which the species is found in plant communities of the *Thero-Airion* and not of the *Corynephorion canescens* Klika 1931. The stand in Greggio is more similar to

the others: the species is found in a grassland referable to the *Spergulo-Corynephoretum canescens* (R.Tx. 1928) Libbert 1933. This vegetation is threatened because of the ongoing invasion of *Robinia pseudoacacia* L. and *Ailanthus altissima* (Mill.) Swingle, which is likely to compromise the conservation of the entire habitat already in the short term. All the other records of *C. portentosa* in Piemonte, except those reported above for the Po Plain, refer to montane and alpine sites (Nimis 1993, 2016).

G. Gheza, S. Assini

Letharia vulpina (L.) Hue (Parmeliaceae)

- + **LOM:** Costone, Azzone (Bergamo), on bark of *Larix decidua* Mill., in a larch wood (UTM WGS84: 32T 587851.5090651), 1697 m, 28 August 2016, *G. Gheza* (Herb. Gheza). – Species confirmed for the flora of Lombardia.
- + **LIG:** Colle Melosa, Pigna (Imperia), on bark of *L. decidua*, in a larch wood (UTM WGS84: 32T 394458.4871579), 1530 m, 28 January 2016, *M. Ottonello* (Herb. Ottonello). – Species confirmed for the flora of Liguria.

In northern Italy, this species with circumboreal-montane distribution is generally found in montane areas with continental climate, where it finds its ecological optimum in woods of *L. decidua* or *Pinus cembra* L.; it is widespread mainly in the inner part of the Alps (Nimis and Martellos 2008). Three thalli of *L. vulpina* were found on two larch trunks at the edge of a sparse larch wood in the Lombardia stand reported here. This record is interesting because, even if the species is rather common in subalpine coniferous woods in the central Alps, it has never been reported for the Prealps of Lombardia; all the records available for this region refer to inner alpine valleys (see literature cited in Nimis and Martellos 2008).

Also in Liguria, only three thalli were found, on three different trunks. This nonetheless represents an important confirmation of the presence of *L. vulpina*, because all the former records are old and rather vague reporting the species for generic high-altitude woods in the Ligurian Apennines (De Notaris 1846, 1847, Jatta 1909-1911), except for Baglietto (1858), who reports a specimen collected by prof. Balsamo in the Apennines of Bobbio.

M. Ottonello, G. Gheza

Micarea misella (Nyl.) Hedl. (Pilocarpaceae)

- + **TOS:** Abetone (Pistoia), Valle del Sestaione, on wood of *Fagus sylvatica* L. (UTM WGS84: 32T 632539.4888072), 1580 m, 28 June 2002, Leg. *S. Ravera*, Det. *B. Coppi* (Herb. Ravera No. 3226). – Species new for the flora of Toscana.

This species seems to be less rare in the Alps than in the Apennines (Nimis 2016). *M. misella* differs from the similar and more common *M. denigrata* (Fr.) Hedl. in that

spores are mostly simple, never curved, paraphyses up to a maximum of 1 µm wide, and that it has a negative reaction to hypochlorite.

S. Ravera

Pertusaria leucosora Nyl. (Pertusariaceae)

+ **TOS:** Monticiano, (Siena), near the biogenetic reserve of Tocchi, on siliceous rock (UTM WGS84: 32T 683677.4778587), 340 m, 5 June 2016, L. Paoli, Z. Fačkovcová (SAV). – Species confirmed for the flora of Toscana.

It is a crustose lichen, with large (up to 10 cm) circular thallus, rather thick and areolate, pale to dark grey, with a warted surface, often rich in rounded soralia. The thallus is characterized by a dull brown K⁺ (10% potassium hydroxide) reaction and yellow/reddish P⁺ (Paraphenylenediamine) yellow/reddish P⁺ reaction (Wirth et al. 2013). A recent review of the material stored in the Italian herbaria allowed us to describe the distribution of this species on a nationwide scale (Craighero 2010, Nimis 2016).

L. Paoli, Z. Fačkovcová, I. Pišút

Pyrenula chlorospila Arnold (Pyrenulaceae)

+ **ABR:** Vallevò fraz. di Rocca San Giovanni (Chieti), loc. Fosso della Farfalla, on bark of *Ostrya carpinifolia* Scop. (UTM WGS84: 33T 2476175.4681392), 108 m, 1 November 2014, S. Caporale, M. Facchini, C. Giancola, D. Pellicciotta (Herb. S. Caporale). – Species new for the flora of Abruzzo.

This species is a mild-temperate to Mediterranean-Atlantic epiphytic lichen, typical of trees with a smooth bark e.g. *Fraxinus* sp. pl. (Nimis 2016); it has a suboceanic affinity and lives in non-eutrophic sites. It was found in its typical habitat represented by a strip of a deciduous forest along a river incision. *Pyrenula chlorospila* is mainly Tyrrhenian, and it is considered extremely rare along the Adriatic coast where it has been found, so far, only in Puglia (Nimis 2016).

S. Caporale

References

- Aguilar-Rosas R, Aguilar-Rosas LE, Hiroshi K, NiNi W (2010) First report on the Japanese species *Grateloupia lanceolata* (Okamura) Kawaguchi and *Grateloupia turuturu* Yamada (Halymeniaceae, Rhodophyta) in Baja California, Mexico. XX International Seaweed Symposium, Ensenada, Baja California, México. International Seaweed Association and Universidad Autónoma de Baja California, México, 112–113.

- Aleffi M, Tacchi R, Cortini Pedrotti C (2008) Check-list of the Hornworts, liverworts and Mosses of Italy. *Bocconeia* 22: 5–254.
- Anzi M (1866) *Neosymbola lichenum rariorum vel novorum Italiae superioris*. Atti della Società Italiana di Scienze Naturali di Milano 9: 241–258.
- Araújo R, Bárbara I, Santos G, Rangel M, Sousa Pinto I (2003) *Fragmenta Chorologica Occidentalalia, Algae*, 8572–8640. *Anales del Jardín Botánico de Madrid* 60(2): 405–409.
- Baglietto F (1858) Enumerazione dei licheni di Liguria. *Memorie della Reale Accademia delle Scienze di Torino*, serie 2, 17: 373–444.
- Baglietto F (1863) Escursione lichenologica dal Lago Maggiore al Sempione. Commentarii della Società Crittogramologica Italiana 1(4): 287–354.
- Baglietto F, Carestia A (1867) Catalogo dei licheni della Valsesia II. Commentarii della Società Crittogramologica Italiana 2(3): 321–434.
- Baglietto F, Carestia A (1880) Anacrisi dei licheni della Valsesia. Atti della Società Crittogramologica Italiana 2(2-3): 143–356.
- Bárbara I, Cremades J (2004) *Grateloupia lanceola* versus *Grateloupia turuturu* (Gigartinales, Rhodophyta) en la Península Ibérica. *Anales del Jardín Botánico de Madrid* 61: 103–118. doi: 10.3989/ajbm.2004.v61.i2.38
- Cecere E, Moro I, Wolf MA, Petrocelli A, Verlaque M, Sfriso A (2011) The introduced seaweed *Grateloupia turuturu* (Rhodophyta, Halymeniales) in two Mediterranean transitional water systems. *Botanica Marina* 54(1): 23–33. doi: 10.1515/bot.2011.009
- Craighero T (2010) Revisione tassonomica di alcuni gruppi critici del genere *Pertusaria* DC. (Ascomiceti lichenizzati) in Italia. – Thesis. Fac. of Sciences, Università di Trieste, 99 pp.
- D'Archino R, Nelson WA, Zuccarello GC (2007) Invasive marine red alga introduced to New Zealand waters: first record of *G. turuturu* (Halymeniaceae, Rhodophyta). *New Zealand Journal of Marine and Freshwater Research* 41: 35–42. doi: 10.1080/00288330709509894
- De Clerck O, Gavio B, Frederiq S, Bárbara I, Coppejans E (2005) Systematics of *Grateloupia filicina* (Halymeniaceae, Rhodophyta), based on rbcL sequence analyses and morphological evidence, including the reinstatement of *G. minima* and the description of *G. capensis* sp. nov. *Journal of Phycology* 41: 391–410. doi: 10.1111/j.1529-8817.2005.04189.x
- De Notaris G (1846) *Prospetto della flora ligustica e dei zoofiti del mare ligustico*. Tip. Ferrando, Genova. doi: 10.5962/bhl.title.6722
- De Notaris G (1847) Frammenti lichenografici di un lavoro inedito. Su alcuni generi delle Parmeliaceae. *Giornale Botanico Italiano* 2(1-2): 176–200.
- Falace A, Alongi G, Spagnolo A, Fabi G (2010) Segnalazione di macroalghe non indigene nel porto di Ancona (medio Adriatico). *Biologia Marina Mediterranea* 17(1): 300–301.
- Figuerola FL, Korbee N, de Clerck O, Bárbara I, Gall EAR (2007) Characterization of *Grateloupia lanceola* (Halymeniales, Rhodophyta), an obscure foliose *Grateloupia* from the Iberian Peninsula, based on morphology, comparative sequence analysis and mycosporine-like amino acid composition. *European Journal of Phycology* 42: 231–242. doi: 10.1080/09670260701327702
- Gheza G (2015) Terricolous lichens of the western Padanian Plain: new records of phytogeographical interest. *Acta Botanica Gallica* 162(4): 339–348. doi: 10.1080/12538078.2015.1108867

- Gheza G, Valcuvia Passadore M, Assini S (2015) Contribution to the knowledge of lichen flora of inland sand dunes in the western Po Plain (N Italy). *Plant Biosystems* 149(2): 307–314. doi: 10.1080/11263504.2013.823133
- Gheza G, Assini S, Valcuvia Passadore M (2016) Terricolous lichen communities of *Corynephorus canescens* grasslands of Northern Italy. *Tuexenia* 36: 121–142. doi: 10.14471/2016.36.005
- Grizel H, Héral M (1991) Introduction into France of the Japanese oyster (*Crassostrea gigas*). *Journal du Conseil International pour l'Exploration de la Mer* 47: 399–403. doi: 10.1093/icesjms/47.3.399
- Hardy FG, Guiry MD (2003) A check-list and atlas of the seaweeds of Britain and Ireland. British Phycological Society, London, 435 pp.
- Hodgetts NG (2015) Checklist and country status of European bryophytes - towards a new Red List for Europe. Irish Wildlife Manuals, No. 84. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland, 125 pp.
- Jatta A (1909–1911) Flora Italica Cryptogama, pars III. Lichenes. Tipografia Cappelli, Rocca di S. Casciano, 958 pp.
- Isocrono D, Matteucci E, Pivani F, Bottelli F, Piervittori R (2006) Indagini floristiche nelle Alpi Occidentali. I licheni della Conca di Oropa (Biella, Piemonte). *Allionia* 40: 25–30.
- Maggs CA, Stegenga H (1999) Red algal exotics on north sea coasts. *Helgoländer Meeresuntersuchungen* 52: 243–258. doi: 10.1007/BF02908900
- Mathieson AC, Pederson J, Dawes CJ (2008) Rapid assessment surveys of fouling and introduced seaweeds in the Northwest Atlantic. *Rhodora* 110: 406–478. doi: 10.3119/07-4.1
- Miller KA (2012) Seaweeds of California. Updates of California Seaweed Species List. University of California Jepson Herbarium, Berkeley, 1–59.
- Nimis PL (1993) The lichens of Italy: an annotated catalogue. Monografie XII. Museo Regionale di Scienze Naturali di Torino, 897 pp.
- Nimis PL (2016) The Lichens of Italy. A Second Annotated Catalogue. EUT, Trieste, 740 pp.
- Nimis PL, Martellos S (2008) ITALIC – the information system on Italian lichens – version 4.0. University of Trieste, Department of Biology, IN4.0/1. <http://dbiodbs.univ.trieste.it/italic/italic03> [accessed 15 October 2016]
- Nocca D, Balbis GB (1823) Flora Ticinensis. Tipografia Capelli, Pavia, 849 pp.
- Re GF (1825) Flora Torinese. Tipografia Del Bianco, Torino, 374 pp.
- Ribera Siguan MA (2002) Pathways of biological invasions of marine plants. In: Ruiz GM, Carlton JT (Eds) *Invasive Species: Vectors and Management Strategies*. USA Island Press, Washington, 183–226.
- Riouall R, Guiry MD, Codomier L (1985) Introduction d'une espèce folicée de *Grateloupia* dans la flore marine de l'étang de Thau (Hérault, France). *Cryptogamie, Algologie* 6: 1–98.
- Rivellini G, Valcuvia Passadore M (1996) I licheni appartenenti ai generi *Cladonia* e *Stereocaulon* in provincia di Sondrio (Lombardia, Italia settentrionale). Il Naturalista Valtellinese – Atti del Museo Civico di Storia Naturale di Morbegno 7: 3–32.
- Ros RM, Mazimpaka V, Abou-Salama U, Aleffi M, Blockeel TL, Brugués M, Cano MJ, Cros RM, Dia MG, Dirkse GM, El Saadawi W, Erdağ A, Ganeva A, González-Mancebo JM, Herrnstadt I, Khalil K, Kürschner H, Lanfranco E, Losada-Lima A, Refai MS, Rodríguez-Núñez S, Sabovljević M, Sérgio C, Shabbara HM, Sim-Sim M, Söderström L (2007)

- Hepatics and Anthocerotae of the Mediterranean, an annotated checklist. *Cryptogamie Bryologie* 28: 351–437.
- Ros RM, Mazimpaka V, Abou-Salama U, Aleffi M, Blockeel TL, Brugués M, Cros RM, Dia MG, Dirkse GM, Draper I, El Saadawi W, Erdağ A, Ganeva A, Gabriel R, Juan M, González-Mancebo JM, González-Mancebo, Granger C, Herrnstadt I, Hugonnot V, Khalil K, Kürschner H, Losada-Lima A, Luís L, Mifsud S, Privitera M, Puglisi M, Sabovljević M, Sérgio C, Shabbara HM, Sim-Sim M, Sotiaux A, Taccchi R, Vanderpoorten A, Werner O (2013) Mosses of the Mediterranean, an annotated checklist. *Cryptogamie Bryologie* 34: 99–283. doi: 10.7872/cryb.v34.iss2.2013.99
- Schaffelke B, Smith JE, Hewitt CL (2006) Introduced macroalgae - a growing concern. *Journal of Applied Phycology* 18: 529–541. doi: 10.1007/s10811-006-9074-2
- Scheidegger C (1993) A revision of European saxicolous species of the genus *Buellia* De Not. and formerly included genera. *The Lichenologist* 25: 315–364. doi: 10.1017/S0024282993000441
- Simon-Colin C, Ar Gall E, Deslandes E (2001) Expansion of the red alga *Grateloupia doryphora* along the coasts of Brittany (France). *Hydrobiologia* 443: 23–29. doi: 10.1023/A:1017587918604
- Smith AJE (2004) The moss flora of Britain and Ireland (2nd ed.) Cambridge University Press, 1012 pp. doi: 10.1017/CBO9780511541858
- Solazzi A, Curiel D, Chiozzotto E (1991/94) Flora macroalgale dei fondali mobili (paludi e velme) della laguna di Venezia. *Nova Thalassia* 12: 59–68.
- Puntillo D (1996) I licheni di Calabria. Monografie XXII. Museo Regionale di Scienze Naturali di Torino, 229 pp.
- Valcuvia Passadore M, Vittadini Zorzoli M (1982) Flora lichenica ligure. Atti dell’Istituto Botanico e del Laboratorio Crittogramico dell’Università di Pavia, serie 7, 1: 41–136.
- Verlaque M (2001) Checklist of the macroalgae of Thau Lagoon (Hérault, France): a hot spot of marine species introduction in Europe. *Oceanologica Acta* 24: 293–312.
- Verlaque M, Brannock PM, Komatsu T, Villalard-Bohnsack M, Marston M (2005) The genus *Grateloupia* C.Agardh (Halymeniaceae, Rhodophyta) in the Thau Lagoon (France, Mediterranean): a case study of marine plurispecific introductions. *Phycologia* 44: 477–496. doi: 10.2216/0031-8884(2005)44[477:TGGCAH]2.0.CO;2
- Villalard-Bohnsack M, Harlin M (1997) The appearance of *Grateloupia doryphora* (Halymeniaceae, Rhodophyta) on the northeast coast of North America. *Phycologia* 36: 324–328. doi: 10.2216/i0031-8884-36-4-324.1
- Wallentinus I (2002) Introduced marine algae and vacular plants in European aquatic environment. In: Leppäkoski E, Gollasch S, Olenin S (Eds) *Invasive Aquatic Species of Europe, Distribution, Impacts and Management*. Kluwer Academic Publishers, Dordrecht, 27–52. doi: 10.1007/978-94-015-9956-6_4
- Wirth V, Hauck M, Schultz M (2013) Die Flechten Deutschlands. Ulmer, Stuttgart, 1244 pp.
- Yoshida T (1998) *Marine Algae of Japan*. Uchida Rokakuho Publ., Tokyo, 1222 pp.
- Xia BM (2004) *Flora algarum marinorum sinicarum*, Tomus II Rhodophyta No. III Gelidiales, Cryptonemiales, Hildenbrandiales. Science Press, Beijing, 203 pp.
- Zodda G (1909) Notizie briologiche sull’Italia meridionale. *Malpighia* 23: 23–54.
- Zodda G (1913) Studio biogeografico sulla Basilicata e catalogo delle briofite di questa provincia sin oggi conosciute. *Nuovo Giornale Botanico Italiano* 20: 155–232.

Notulae to the Italian alien vascular flora: 2

Gabriele Galasso¹, Giannantonio Domina², Nicola M.G. Ardenghi³, Pierfranco Arrigoni⁴, Enrico Banfi¹, Fabrizio Bartolucci⁵, Gianmaria Bonari⁶, Giovanni Buccino⁷, Giampiero Ciaschetti⁸, Fabio Conti⁵, Andrea Coppi⁹, Valter Di Cecco¹⁰, Luciano Di Martino⁸, Alessandro Guiggi¹¹, Lorenzo Lastrucci⁹, Maria Lucia Leporatti¹², Javier López Tirado¹³, Giovanni Maiorca¹⁴, Sara Mossini¹⁵, Nicola Olivieri¹⁶, Riccardo Pennesi¹⁷, Bruno Romiti¹⁸, Anna Scoppola¹⁹, Adriano Soldano²⁰, Adriano Stinca²¹, Filip Verloove²², Milena Villa²³, Chiara Nepi²⁴

1 Sezione di Botanica, Museo di Storia Naturale di Milano, Corso Venezia 55, 20121 Milano, Italy **2** Dipartimento di Scienze Agrarie e Forestali, Università di Palermo, Via Archirafi 38, 90123 Palermo, Italy **3** Dipartimento di Scienze della Terra e dell'Ambiente, Università di Pavia, Via Sant'Epifanio 14, 27100 Pavia, Italy **4** Via Concordia 8, 23868 Valmadrina (Lecco), Italy **5** Scuola di Bioscienze e Medicina Veterinaria, Università di Camerino – Centro Ricerche Floristiche dell'Appennino, Parco Nazionale del Gran Sasso e Monti della Laga, San Colombo, 67021 Barisciano (L'Aquila), Italy **6** Dipartimento di Scienze della Vita, Università di Siena, Via P.A. Mattioli 4, 53100 Siena, Italy **7** Via Sagunto 20, 00174 Roma, Italy **8** Ufficio Botanico, Parco Nazionale della Majella, Via Badia 28, 67039 Sulmona (L'Aquila), Italy **9** Dipartimento di Biologia, Università di Firenze, Via G. La Pira 4, 50121 Firenze, Italy **10** Via Napoli 50, 66015 Fara San Martino (Chieti), Italy **11** Polo Botanico, Dipartimento di Scienze della Terra, dell'Ambiente e della Vita (DISTAV), Università di Genova, Corso Dogali 1/m, 16136 Genova, Italy **12** Piazza Tuscolo 24, 00183 Roma, Italy **13** Departamento de Ciencias Integradas, Facultad de Ciencias Experimentales, Universidad de Huelva, 21071 Huelva, Spain **14** Agenzia Regionale per lo Sviluppo dell'Agricoltura Calabrese (ARSAC), Viale Trieste 95, 87100 Cosenza, Italy **15** Quartiere San Giorgio 3, 28070 Terdobbiate (Novara), Italy **16** Via Maestri del Lavoro 40, 64100 Teramo, Italy **17** Dipartimento di Scienze della Vita, Università di Trieste, Via L. Giorgieri 10, 34127 Trieste, Italy **18** Via Nezzana 29, 54021 Bagnone (Massa-Carrara), Italy **19** Dipartimento di Scienze Agrarie e Forestali (DAFNE), Università della Tuscia, Via San Camillo de Lellis snc, 01100 Viterbo, Italy **20** Largo Brigata Cagliari 6, 13100 Vercelli, Italy **21** Dipartimento di Agraria, Università di Napoli Federico II, Via Università 100, 80055 Portici (Napoli), Italy **22** Botanic Garden of Meise, Nieuwelaan 38, 1860 Meise, Belgium **23** Via Lauro 4, 23888 Rovagnate (Lecco), Italy **24** Sezione di Botanica Filippo Parlatore, Museo di Storia Naturale, Università di Firenze, Via G. La Pira 4, 50121 Firenze, Italy

Corresponding author: Gabriele Galasso (gabriele.galasso@comune.milano.it)

Academic editor: L. Peruzzi | Received 10 November 2016 | Accepted 16 November 2016 | Published 25 November 2016

Citation: Galasso G, Domina G, Ardenghi NMG, Arrigoni P, Banfi E, Bartolucci F, Bonari G, Buccomino G, Ciaschetti G, Conti F, Coppi A, Di Cecco V, Di Martino L, Guiggi A, Lastrucci L, Leporatti ML, López Tirado J, Maiorca G, Mossini S, Olivieri N, Pennesi R, Romiti B, Scoppola A, Soldano A, Stinca A, Verloove F, Villa M, Nepi C (2016) Notulae to the Italian alien vascular flora: 2. Italian Botanist 2: 55–71. doi: 10.3897/italianbotanist.2.11144

Abstract

In this contribution, new data concerning the Italian distribution of alien vascular flora are presented. It includes new records, exclusions and confirmations for Italy or for Italian administrative regions for taxa in the genera *Ageratum*, *Aster*, *Buddleja*, *Cedrus*, *Centranthus*, *Cephalotaxus*, *Clerodendrum*, *Cotoneaster*, *Cyperus*, *Honorius*, *Lantana*, *Ligustrum*, *Morus*, *Muscari*, *Oenothera*, *Opuntia*, *Platycladus*, *Plumbago*, *Pseudotsuga*, *Sedum*, *Sporobolus*, *Stachys*, *Ulmus* and *Yucca*. A *nomen novum*, *Stachys talbotii*, is proposed as a replacement name for *Sideritis purpurea*.

Keywords

Floristic data, Italy, new combination

How to contribute

The text for the new records should be submitted electronically to Chiara Nepi (chiara.nepi@unifi.it). The corresponding specimen must be sent to the FI herbarium: Sezione di Botanica Filippo Parlatore del Museo di Storia Naturale, Via G. La Pira 4, 50121 Firenze (Italy). Texts concerning nomenclatural novelties (typifications only for accepted names), exclusions, and confirmations should be submitted electronically to Gabriele Galasso (gabriele.galasso@comune.milano.it). The text must not exceed 2,000 characters (spaces included).

Floristic records

Ageratum houstonianum Mill. (Asteraceae)

+ (CAS) **EMR:** Piacenza (Piacenza), stazione FS, lato S, ingresso degli uffici RFI (WGS84: 45.04969°N; 9.705276°E), fessure tra la pavimentazione, 54 m, 11 November 2015, N.M.G. Ardenghi (FI). – Casual alien species new for the flora of Emilia-Romagna.

Approximately 20 individuals were detected over the paved area in front of the Piacenza railway station, originated from the dissemination of cultivated plants in nearby public pots.

N.M.G. Ardenghi

Aster ageratoides Turcz. (Asteraceae)

≡ *Aster trinervius* Roxb. ex D.Don. subsp. *ageratoides* (Turcz.) Grierson

+ (CAS) **ITALIA (TOS):** Podenzana (Massa-Carrara), strada tra Cereseto e la Madonna della Neve (WGS84: 44.211425°N; 9.943638°E), margine tra strada asfaltata e bosco, 387 m, 30 November 2015, B. Romiti, det. N.M.G. Ardenghi (FI). – Casual alien species new for the flora of Italy (Toscana).

Aster ageratoides is a native of eastern Asia, increasingly recorded as an escaped across the European continent, where its cultivation for ornamental purposes has become popular in recent years (Yeo 2000, Chen et al. 2011, Verlooove 2014a). There is no general consensus about the taxonomic rank: here, in line with Ito and Soejima (1995), we chose the rank of species. The population in Podenzana is composed of about ten individuals scattered along a road edge; the presence of the plant in the site of collection was confirmed in October 2016 (B. Romiti: www.actaplantarum.orgfloraitaliae/viewtopic.php?f=102&t=91873). The identification of the plant was possible thanks to the online forum Acta Plantarum, where some pictures of this taxon have been uploaded.

B. Romiti & N.M.G. Ardenghi

Buddleja davidii Franch. (Scrophulariaceae)

+ (CAS) **ABR:** L'Aquila (L'Aquila), fraz. Pianola, Via San Lorenzo, muraglione presso la sede stradale (WGS84: 42.323483°N; 13.403102°E), mura, ca. 740 m, 30 June 2016, N. Olivier (FI). – Casual alien species new for the flora of Abruzzo.

Some individuals of the species have developed on the top of a wall made of limestone and cement blocks delimiting the roadway. The plants may have originated from wind-dispersed seeds produced by ornamentals growing in nearby private gardens. *Buddleja davidii* is an Asian species, cultivated for the beauty of its long-blooming flowers, which is listed as adventitious in all the Italian administrative regions, except Molise, Calabria, Sicilia and Sardegna. It is invasive in almost all the northern regions and casual in southern ones (Celesti-Grapow et al. 2009).

N. Olivier

Cedrus atlantica (Endl.) G.Manetti ex Carrière (Pinaceae)

+ (CAS) **ABR:** Poggio Picenze (L'Aquila) (WGS84: 42.321786°N; 13.544075°E), aiuola, 758 m, 26 February 2016, A. Stinca (FI, APP); L'Aquila (L'Aquila), loc. Montelupo di Roio (WGS84: 42.339797°N; 13.372780°E), radura nei pressi di impianto

di rimboschimento, ca. 980 m, 30 June 2016, N. Olivieri (FI). – Casual alien species new for the flora of Abruzzo.

This species is recorded from Lombardia, Lazio, Sicilia and Sardegna (Celestini-Grapow et al. 2009, Raimondo and Spadaro 2009, Buccino et al. 2013).

A. Stinca, F. Conti, F. Bartolucci & N. Olivieri

Centranthus macrosiphon Boiss. (Valerianaceae)

+ (CAS) **ABR:** Teramo (Teramo), strada secondaria che conduce in Via A. De Gasperi (WGS84: 42.662313°N; 13.711452°E), bordo stradale, ca. 250 m, SW, 9 April 2016, N. Olivieri (FI). – Casual alien species new for the flora of Abruzzo.

Individuals of this species grow with young specimens of *Cirsium vulgare* (Savi) Ten. in the interstices between the asphalt road margin and a pavement belonging to a private property. The site is located on a slight slope in an urban area with several private gardens.

N. Olivieri

Cephalotaxus fortunei Hook. (Taxaceae)

– **ITALIA (LOM):** – Alien species to be excluded from the flora of Italy (Lombardia).

On the basis of the following Notula, this species is to be excluded from Italy.

G. Galasso, E. Banfi, M. Villa & P. Arrigoni

Cephalotaxus harringtonii (Knight ex J. Forbes) K.Koch (Taxaceae)

= *Cephalotaxus drupacea* Siebold & Zucc. = *Cephalotaxus pedunculata* Siebold & Zucc.
– *Cephalotaxus fortunei* auct. p.p., non Hook.

+ (CAS) **ITALIA (LOM):** Castelvecchia (Varese), dopo Caldè, verso il confine con Porto Valtravaglia (WGS84: 45.95580°N; 8.66817°E ± 100 m), bosco caducifoglio, ca. 200 m, NW, 22 June 2007, G. Galasso (MSNM sub *C. fortunei*); Pavia (Pavia), San Lanfranco, Piazzale Tevere (CFCE 0820-2: Pavia SW) (WGS84: 45.195022°N; 9.124762°E), base di aiuola al margine di un parcheggio, un giovane esemplare a ca. 10 m dalla pianta madre (coltivata), 69 m, no exp., 19 May 2011, N. Ardenghi (MSNM sub *C. fortunei*); *ibidem*, pianta colta, pianta madre di un giovane esemplare nato da seme, 69 m, no exp., 19 May 2011, N. Ardenghi (MSNM sub *C. fortunei*); Montevetta (Lecco), loc. Abbandonato, presso la destra idrografica di un piccolo affluente di

destra del Torrente Curone (WGS84: 45.699696°N; 9.388618°E), margine boschivo, 270 m, SE, 12 February 2015, *M. Villa* (*Herb. Parco Montevercchia*); *ibidem*, 18 February 2016, *M. Villa* (FI, MSNM). – Casual alien species new for the flora of Italy (Lombardia).

Cerabolini et al. (2008) recorded *Cephalotaxus fortunei* Hook. in the province of Varese (Lombardia) based on a specimen collected near Castelvecchia. This report was confirmed by Banfi et al. (2009) and Banfi and Galasso (2010). Subsequently, Ardenghi (2013) found the plant again in the province of Pavia (Lombardia). A further finding in the province of Lecco encouraged us to re-examine specimens kept in MSNM herbarium under the name *C. fortunei*. All of them belong to *C. harringtonii*, except for a doubtfully attributable gathering [Moso (Biella), Mosso Santa Maria, Parco di Palazzo Sella, August 1956, *A. Piazzoli Perroni*] (Lang et al. 2013). Both species are E-Asian orophytes (*C. harringtonii* widely spread from western China to Malaysia; *C. fortunei* is present in China, Laos and Myanmar). In Italy, they occur in botanical gardens, private and public parks, and commercial nurseries. However, it seems that *C. fortunei* is overall rarer and easily misidentified.

G. Galasso, E. Banfi, M. Villa & P. Arrigoni

Clerodendrum trichotomum Thunb. (Lamiaceae)

+ (CAS) **PIE:** Terdobbiate (Novara), Quartiere San Giorgio, Via Nibbiola (WGS84: 45.372285°N; 8.686450°E), ciglio stradale, 124 m, 12 August 2015, *N.M.G. Ardenghi & S. Mossini* (FI). – Casual alien species new for the flora of Piemonte.

Young individuals were observed along a road edge in Terdobbiate, most likely originated from the dissemination of nearby plants cultivated for ornamental purposes.

N.M.G. Ardenghi & S. Mossini

Cotoneaster lacteus W.W.Sm. (Rosaceae)

– *Cotoneaster coriaceus* auct., non Franch.

+ (CAS) **LAZ:** Roma (Roma), pressi di Via M. Bianchini, poco lontano dalla confluenza con Viale E. Spalla (WGS84: 41.833525°N; 12.501536°E), inculto con vegetazione arbustiva al di sotto di alcuni esemplari di *Eucalyptus camaldulensis*, ca. 45 m, W, 24 April 2016, *N.Olivieri* (FI). – Casual alien species new for the flora of Lazio.

Some individuals of this species grow in a shady area, not far from road margin, located beneath the foliage of some specimens of *Eucalyptus camaldulensis* Dehnh. subsp. *camaldulensis*, part of a vegetation consisting of *Viburnum tinus* L. subsp. *tinus*, *Ligustrum lucidum* W.T.Aiton, *Hedera helix* L., *Laurus nobilis* L. and *Crataegus*

monogyna Jacq., settled on a substrate made up of ancient coarse pyroclastic deposits. The site is located on a gentle slope in the outskirts of the city, where recently built residential areas alternate with rugged areas. The species has been identified according to Fryer and Hylmö (2009).

N. Olivieri

Cyperus microiria Steud. (Cyperaceae)

– CAL. – Alien species to be excluded from the flora of Calabria.

Originally native of East Asia, *Cyperus microiria* is locally naturalized outside its native range, mostly as a weed of paddy fields, for instance in parts of North America (Tucker et al. 2002). In Europe it is only known as a naturalized weed from Italy. Conti et al. (2005) cited this species from Emilia-Romagna, Friuli Venezia Giulia, Lombardia and Piemonte. Soon afterwards, however, it was excluded from Friuli Venezia Giulia (Conti et al. 2007). In turn, Celesti-Grapow et al. (2009) also reported *C. microiria* from Calabria and Veneto. During a thorough revision of *Cyperus* in Europe the presence of *C. microiria* was confirmed in Emilia-Romagna, Lombardia and Piemonte (Verloove 2014b), subsequently also in Veneto (Pellizzari and Verloove in press). In these northern regions, *C. microiria* is a common weed of rice fields, exposed river banks and similar temporarily damp habitats. Claims from Calabria, however, were geographically quite disjunct and hence potentially suspect. In Calabria, *C. microiria* was known solely from the natural reserve “Foce del Fiume Crati” (Maiorca et al. 2005, Maiorca et al. 2007, Gangale and Uzunov 2011). A herbarium specimen was recently revised by one of us (F. Verloove). Although immature, it could be ascribed to the very variable native species *C. fuscus* L. As a consequence, *C. microiria* should be removed from the flora of Calabria.

F. Verloove & G. Maiorca

Cyperus odoratus L. (Cyperaceae)

+ (NAT) TOS: Larciano (Pistoia), Area del Padule di Fucecchio, loc. Le Morette (UTM ED50: 32T 646.4853), 15 m, 20 September 2004, M. La Rosa (FI sub *Cyperus strigosus*); Pisa (Pisa), quai de l'Arno rive droite (UTM ED50: 32T 612.4841), September 2007, J.-M. Tison (Herb. J.-M. Tison sub *Cyperus strigosus*); Larciano (Pistoia), Riserva Naturale del Padule di Fucecchio, area Le Morette (UTM ED50: 32T 646040.4852425), letto di un canale in fase di prosciugamento, substrato fangoso, 4 September 2015, L. Lastrucci & A. Coppi (FI, BR). – Naturalized alien species new for the flora of Toscana.

Cyperus odoratus is a pantropical species, naturalized in many parts of southern Europe and widely confused with *Cyperus strigosus* L. (Verloove 2014b). The specimens collected in Larciano show an annual behaviour, a low number of spikelets, and short glumes, leading us to determine them as *C. odoratus*. In the collection site, the species is widely present along the bottom and banks of a canal, at the edge of a vegetation dominated by *Phragmites australis* (Cav.) Trin. ex Steud. Several authors reported the presence of *C. strigosus* in the area of Le Morette and some nearby wetlands (Franzese 2004, Franzese 2006, Lastrucci et al. 2007, La Rosa et al. 2008); nevertheless, the specimen preserved in FI relative to the Notula 1439 (La Rosa et al. 2008) belongs to *C. odoratus*. It is probable that the other reports of *C. strigosus* from this locality also have to be referred to *C. odoratus*. Based on a scan from the private herbarium of J.-M. Tison examined by us, the claim of *C. strigosus* from Pisa (La Rosa et al. 2008) also belongs to *C. odoratus*. A further record of *C. strigosus* comes from the “River Arno, near Nave di Carmignano, Prato” (Gestri and Peruzzi 2013). The analysis of this specimen (PI) allows us to exclude *C. strigosus*; being immature, we cannot confirm with certainty that the specimen belongs to *C. odoratus*. As a consequence, there seem to be no confirmed records of *C. strigosus* from Toscana.

L. Lastrucci, A. Coppi & F. Verloove

Cyperus strigosus L. (Cyperaceae)

– **TOS.** – Alien species to be excluded from the flora of Toscana.

On the basis of the previous Notula, this species is to be excluded from Toscana.

L. Lastrucci, A. Coppi & F. Verloove

Honorius nutans (L.) Gray (Asparagaceae)

≡ *Ornithogalum nutans* L.

+ (NAT) **LAZ:** Viterbo (Viterbo), Riserva Naturale Valle dell’Arcionello, Strada Monte Pizzo (WGS84: 42.419482°N; 12.120606°E), incolto al margine della strada in prossimità della boscaglia a *Quercus pubescens*, 391 m, 26 March 2016, J. López Tirado, det. J. López Tirado & A. Scoppola (UTV-33965, scan in FI). – Naturalized alien species confirmed for the flora of Lazio.

According to Conti et al. (2005) and Celesti-Grapow et al. (2009), the Italian distribution of this species includes gaps and doubtful occurrences. It is a not confirmed alien species in Lazio where its status is controversial. Sanguineti (1864) reports it from Rome “in incultis et pomariis nonullis. A monte Mario in copia nelle Ville Pamphilj, Patrizi, etc.”; the author, in fact, collected it in Villa Pamphilj (Rome) before 1853

and before 1876 (FI, C. Nepi *in verb.*). In the surroundings of Viterbo (Monte Palanzana) the species was recorded for the first time by Macchiati (1888). Pignatti (1982) and Conti et al. (2005) report it as escaped from cultivation or as naturalized alien species, whereas Anzalone et al. (2010) consider it a casual species, locally extinct in the wild. The latter authors, however, report a specimen collected in Roma [Bioparco: Villa Borghese, A. Pavesi, 1998 (*Herb. A. Pavesi*)], referring to an isolated plant that was never recovered (*A. Pavesi in verb.*). In fact, the species was not confirmed for the Lazio region neither by Pretto et al. (2009), nor by Celesti-Grapow et al. (2013), Nimiris et al. (2016) and Iamonico et al. (2012, 2014). Last year, a fruiting specimen was observed under the canopy of *Quercus pubescens* Willd. subsp. *pubescens* near the road for Monte Pizzo, not far from Viterbo and very close to the first finding of Macchiati (1888). Some plants have been found recently in the ditch of the same road, spreading as far as several meters from the roadside towards the open oak wood. Thus, we can state that *H. nutans* is naturalized in the Viterbo surroundings, the only existing settlement of this species nowadays in Lazio.

J. López Tirado & A. Scoppola

Lantana camara L. subsp. *aculeata* (L.) R.W.Sanders (Verbenaceae)

+ (CAS) **MOL:** Termoli (Campobasso), mura del borgo antico (WGS84: 42.003858°N; 14.996908°E), mura, ca. 18 m, S, 9 July 2016, N. Olivieri (FI). – Casual alien species new for the flora of Molise.

Some individuals of this species have settled on the southern side of the walls that surround the old town. They grow on a sub-vertical substrate formed by limestone and sandstone blocks, colonized mainly by specimens of *Capparis spinosa* L. subsp. *spinosa*. The area is positioned at a short distance from the Adriatic Sea and is protected from the northerly wind. *Lantana camara* subsp. *aculeata* is cultivated for ornamental purposes in some flowerbeds located nearby where it bears fruit. The species was identified according to Sanders (2012).

N. Olivieri

Ligustrum lucidum W.T.Aiton (Oleaceae)

+ (CAS) **MOL:** Termoli (Campobasso), scarpata della massicciata ferroviaria situata a S dell'abitato (WGS84: 41.995552°N; 14.997080°E), scarpata ferroviaria, ca. 25 m, 29 March 2016, N. Olivieri (FI). – Casual alien species new for the flora of Molise.

Some specimens of the species grow within a bush formed predominantly by *Robinia pseudoacacia* L., with the presence of *Laurus nobilis* L., *Hedera helix* L. and *Smilax aspera* L., developed on the western side of the railway embankment, facing the valley of

the River Riovivo. The area has a rather humid and shady microclimate and it is close to the shore of the Adriatic Sea, which is located east of the railway line. The plants grow on a sandy substrate, resulting from arenaceous rocks. In the area, some specimens of *Ligustrum lucidum* are cultivated in public and private gardens from which the seeds could have arrived.

N. Olivieri

Morus indica L. (Moraceae)

= *Morus australis* Poir. = *Morus bombycina* Koidz.

+ (CAS) **LAZ:** Roma (Roma), bordo del Fosso di Tor Carbone presso Via Ardeatina (WGS84: 41.834525°N; 12.517508°E), bordo di fosso, ca. 40 m, 25 June 2016, *N. Olivieri*, det. *E. Banfi & G. Galasso* (FI). – Casual alien species new for the flora of Lazio.

Young specimens of this species, some more than 2 m tall and with polylobate leaves, grow in the established riparian vegetation along the edges of the Fosso di Tor Carbone, together with patches of *Arundo donax* L. and scattered trees of *Populus nigra* L., on alluvial soil consisting of ancient coarse pyroclastic deposits. The plant was tentatively identified as *Morus kagayamae* Koidz., a Japanese endemic increasingly cultivated as ornamental in Spain (Laguna Lumbreras and Ferrer Gallego 2014), Italy, and France and locally escaped in the latter two countries (Ardenghi and Polani 2016, Tison and de Foucault 2014). However, upon closer examination, it turned out to belong to a very similar species, *Morus indica*. This taxon is currently referred as *Morus australis* Poir. (Zou and Gilbert 2003, Iwatsuki et al. 2006), i.e., a posterior synonym (Rao and Jarvis 1986). The main character discriminating the two species consists of minute strigae that are abundant on the adaxial leaf surface giving it a marked roughness; furthermore, the adaxial surface is dull (Iwatsuki et al. 2006). These features are completely lacking in *M. kagayamae*, the leaves of which are smooth and lustrous, although idioblasts with dot-like tips are present that may cause a very slight roughness (Iwatsuki et al. 2006). The natural range of *M. indica* comprises Bhutan, China, India, Japan, Korea, Myanmar, Nepal, and Sikkim (Zou and Gilbert 2003); elsewhere the species is cultivated for gardens, parks and road mastings.

N. Olivieri, E. Banfi & G. Galasso

Muscari armeniacum Leichtlin ex Baker (Asparagaceae)

+ (CAS) **ABR:** Teramo (Teramo), prato presso il margine stradale di Via A. De Gasperi (WGS84: 42.662744°N; 13.708780°E), prato, ca. 255 m, 2 April 2016, *N. Olivieri* (FI). – Casual alien species new for the flora of Abruzzo.

Some specimens of the species have settled on the edge of a small dry sloping meadow, near the edge of a road located at the outskirts of the town, in a hilly area. The site has an arenaceous substrate and it is partially shaded by the presence of some trees of *Aesculus hippocastanum* L. *Muscari armeniacum* is cultivated for ornamental purposes next to houses.

N. Olivieri

Oenothera pedemontana Soldano (Onagraceae)

+ (NAT) **VDA:** Gaby (Aosta), poco a N del paese, su uno slargo a lato della pista ciclabile (WGS84: 45.719306°N; 7.877444°E), margine stradale, 1060 m, 12 August 2015, A. Soldano 17865 (FI). – Naturalized alien species new for the flora of Valle d'Aosta.

A. Soldano

Opuntia robusta H.L.Wendl. ex Pfeiff. (Cactaceae)

+ (NAT) **TOS:** Capalbio Scalo (Grosseto), Strada Origlio (WGS84: 42.402532°N; 11.405348°E), 10 m, 31 March 2016, G. Bonari, det. A. Guiggi (FI, SIENA); Orbetello (Grosseto), Strada Provinciale San Donato (WGS84: 42.610898°N; 11.155849°E), 20 m, 30 April 2016, G. Bonari, det. A. Guiggi (SIENA); *ibidem* (WGS84: 42.576713°N; 11.195646°E), 15 m, 30 April 2016, G. Bonari, det. A. Guiggi (SIENA). – Naturalized alien species new for the flora of Toscana.

Opuntia robusta is a widely distributed species on the Mexican Altiplan (Guiggi pers. observ.), characterized by orbiculate, blue-glaucous, and thick cladodes with a variable number of spines, often absent, subulate, usually whitish (Guiggi 2008). It was previously recorded in Puglia, Liguria and Sicilia (Guiggi 2005, Celesti et al. 2009, Guiggi 2014). It is normally cultivated as ornamental plant and is used as a fence. The species has been introduced in disturbed areas, for example for fencing off roads near cultivated lands, where it escaped and was subsequently naturalized.

A. Guiggi & G. Bonari

Platycladus orientalis (L.) Franco (Cupressaceae)

+ (CAS) **MAR:** Fossombrone (Pesaro e Urbino), alle Gole del Furlo (WGS84: 43.649037°N; 12.727346°E), muro in pietra calcarea lungo l'argine, 493 m, 14 July 2016, R. Pennesi, A. Stinca & F. Conti (FI). – Casual alien species new for the flora of Marche.

This species is recorded for Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Friuli Venezia Giulia, Liguria, Umbria, Lazio and Abruzzo (Masin and Tietto 2005, Celesti-Grapow et al. 2009, Galasso 2014, Olivieri 2014).

R. Pennesi, A. Stinca & F. Conti

Plumbago auriculata Lam. (Plumbaginaceae)

+ (CAS) **LAZ:** Roma (Roma), Circonvallazione Gianicolense, muraglione di contenimento del terrapieno stradale (WGS84: 41.872900°N; 12.456233°E), fessure del muro, 33 m, 13 November 2015, G. Buccomino & M.L. Leporatti (FI). – Casual alien species new for the flora of Lazio.

Only one well-developed individual has been collected in the discovery spot at Circonvallazione Gianicolense in Roma, between the cracks of the embankment retaining the wall built in tufa blocks, along with numerous *Parietaria judaica* L. This species is native to South Africa and it is widely used as ornamental. In the wild it is known from Campania, Marche, Liguria (Celesti-Grapow et al. 2009) and Sardegna (Bacchetta et al. 2009).

G. Buccomino & M.L. Leporatti

Pseudotsuga menziesii (Mirb.) Franco (Pinaceae)

+ (CAS) **ABR:** Pietracamela (Teramo), loc. Fonte Barile (WGS84: 42.514036°N; 13.546986°E), radure nei pressi di impianto di rimboschimento, ca. 1170 m, 27 June 2016, N. Olivieri (FI). – Casual alien species new for the flora of Abruzzo.

The species appears with some young individuals in clearings located on the edge of a conifer reforestation area in a wood of *Ostrya carpinifolia* Scop. and *Fagus sylvatica* L. subsp. *sylvatica*. They grow on limestone rocks covered with moss in the valley of the Rio Arno, near the Gran Sasso massif. Because of its morphology, the area presents a cool, moist microclimate and it is affected by a prolonged shading period. In this locality *Pseudotsuga menziesii* is accompanied by underbrush species, mainly *Geranium nodosum* L., *Hedera helix* L., *Sanicula europaea* L. and *Salvia glutinosa* L. Specimens have originated from seeds produced by mature individuals present in the reforestation systems that characterize the lower part of the valley.

N. Olivieri

***Sedum sarmentosum* Bunge (Crassulaceae)**

+ (CAS) **ABR:** Fara San Martino (Chieti), centro della città all'incrocio tra Via Napoli e Via San Pietro (WGS84: 42.090186°N; 14.204472°E), negli interspazi della pavimentazione, 435 m, 19 May 2015, V. Di Cecco (FI). – Casual alien species new for the flora of Abruzzo.

This species, identified according to Cullen (1995), is cultivated in the area as an outdoor ornamental plant. Fifteen fully blooming individuals were found on the site. This is the second report for peninsular Italy after Emilia-Romagna (Celesti Grapow et al 2009).

V. Di Cecco, G. Ciaschetti & L. Di Martino

***Sporobolus michauxianus* (Hitchc.) P.M.Peterson & Saarela (Poaceae)**

= *Spartina pectinata* Bosc ex Link

+ (CAS) **ITALIA (LOM):** Milano (Milano), parco Rubattino Maserati, tra Via Caduti di Marcinelle e Via R. Rubattino, incolto lungo il confine orientale del parco (WGS84: 45.479589°N; 9.253592°E ± 100 m), incolto, 116 m, no exp., 21 August 2015, E. Banfi (FI, MSNM). – Casual alien species new for the flora of Italy (Lombardia).

Some spontaneous individuals of *Sporobolus michauxianus* grow singly about 100 m from a flower bed made up of this species. The species comes from North America, ranging from southern Canada to central and eastern United States (coastal and inland prairies; see Barkworth 2003). Known as *Spartina pectinata* Bosc ex Link, it has to be ascribed to the genus *Sporobolus* (Peterson et al. 2014a, Peterson et al. 2014b, Applequist 2016). It is used and traded as a garden ornamental.

E. Bnafi & G. Galasso

***Stachys talbotii* Bartolucci & Galasso, nom. nov. (Lamiaceae)**

urn:lsid:ipni.org:names:77158801-1

≡ *Sideritis purpurea* Fox Talbot ex Benth., Labiat. Gen. Spec. 7: 742. 1835 ≡ *Sideritis romana* L. subsp. *purpurea* (Fox Talbot ex Benth.) Heywood, Bot. J. Linn. Soc. 65(4): 355. 1972 ≡ *Hesiodia purpurea* (Fox Talbot ex Benth.) Soják, Čas. Nář. Muz. Praze, Rada Přir. 148(2) (1979): 79. 1980.

Blocking name: *Stachys purpurea* Poir., Encycl. [J. Lamarck & al.] Suppl. 5. 1: 227. 1817.

In the framework of the new edition of the checklist of the Italian vascular flora (Bartolucci et al. 2016, Galasso et al. 2016), and according to the systematic proposal of Bartolucci et al. (2014), *Stachys* L. is regarded in its broad sense including also the genus *Sideritis* L. *Sideritis purpurea* Fox Talbot ex Benth. is a Balkan endemic (Greuter et al. 1986) described

from the Greek islands of Corfu and Zakynthos (Bentham 1835). It is usually regarded as a subspecies of *Sideritis romana* L. (e.g. Heywood 1972, Govaerts 2016), but recognized as independent species in the recent checklist of the Greek vascular flora (Dimopoulos et al. 2013). In agreement with the latter treatment, we propose here a new name for *Sideritis purpurea* in the genus *Stachys*. The epithet *purpurea* is unavailable in *Stachys* because of *Stachys purpurea* Poir. (Art. 6.11 of the ICN, McNeill et al. 2012). The new epithet is named after the British scientist William Henry Fox Talbot (11 February 1800 – 17 September 1877). *Stachys talbotii* was recorded by Murr (1900b) along the railway near the Pergine Valsugana station (Trentino-Alto Adige). At that time, the Valsugana railway had just been built and, along it, extensive greening was carried out using seeds from Greece. The result was an impressive entrance of Balkan species, several of them new for the flora of Tyrol (Murr 1900a, Murr 1900b, Murr 1901). *Stachys talbotii* was not recorded in recent times from Italy and should be considered as a casual alien in Trentino-Alto Adige.

F. Bartolucci & G. Galasso

Ulmus pumila L. (Ulmaceae)

+ (CAS) **ABR:** San Vito Chietino (Chieti), loc. Marina, distesa ghiaiosa nei pressi del Torrente Feltrino (WGS84: 42.307177°N; 14.443263°E), gretto ghiaioso, ca. 5 m, 10 July 2016, N.Olivieri (FI). – Casual alien species new for the flora of Abruzzo.

Many young individuals of the species have developed together with specimens of *Populus nigra* L. on an artificial gravelly area located near the riverbed of the Stream Feltrino. The site is flat and sunny but has a rather humid microclimate. Plantlets have arisen from samaras dispersed by the wind and produced by some trees at the edge of a public garden located in the vicinity, but at higher altitude, near the village.

N. Olivieri

Yucca aloifolia L. (Asparagaceae)

+ (CAS) **ABR:** Ortona (Chieti), loc. Bardella, bordi dell'alveo del Fiume Moro (WGS84: 42.326941°N; 14.422383°E), sponda fluviale, ca. 6 m, 2 June 2016, N.Olivieri (FI). – Casual alien species new for the flora of Abruzzo.

An individual of this species, about 1 m tall, grows on the dry riverbed edge of the River Moro, on a sandy sedimentary substrate, in a sufficiently lit area, despite the relatively close presence of some individuals of *Populus nigra* L. The vegetation of the clearing is dominated by *Convolvulus sepium* L. This specimen may have developed from plant waste transported by the river during high flow. The species is also present with a smaller individual on the seashore of the neighboring municipality of San Vito Chietino (Chieti) (pers. observ.).

N. Olivieri

References

- Anzalone B, Iberite M, Lattanzi E (2010) La Flora vascolare del Lazio. Informatore Botanico Italiano 42(1): 187–317.
- Applequist WL (Ed.) (2016) Report of the Nomenclature Committee for Vascular Plants: 67. Taxon 65(1): 169–182. doi: 10.12705/651.15
- Ardenghi NMG (2013) Notulae 143–161. In: Galasso G, Banfi E (Eds) Notulae ad plantas advenas longobardiae spectantes: 3 (141–208). Pagine Botaniche 36(2012): 19–27.
- Ardenghi NMG, Polani F (2016) La Flora della provincia di Pavia (Lombardia, Italia settentrionale). 1. L’Oltrepò Pavese. Natural History Sciences 3(2): 51–79. doi: 10.4081/nhs.2016.269
- Bacchetta G, Mayoral García-Berlanga O, Podda L (2009) Catálogo de la flora exótica de la Isla de Cerdeña (Italia). Flora Montiberica 41: 35–61.
- Banfi E, Galasso G (Eds) (2010) La flora esotica lombarda. Museo di Storia Naturale di Milano, Milano, 1–274. [Cd-Rom]
- Banfi E, Galasso G, Assini S, Brusa G, Gariboldi L (2009) Regional Experts: Lombardia. In: Celesti-Grapow L, Pretto F, Brundu G, Carli E, Blasi C (Eds) A thematic contribution to the National Biodiversity Strategy. Plant invasion in Italy, an overview. Ministry for the Environment Land and Sea Protection, Nature Protection Directorate, Roma, 1–32. [Cd-Rom]
- Barkworth ME (2003) *Sporobolus* R.Br. In: Flora of North America Editorial Committee (Ed) Flora of North America, Vol. 25. Oxford University Press, New York, Oxford, 240–250.
- Bartolucci F, Peruzzi L, Soldano A (2014) Notulae: 2064–2069. In: Bartolucci F, Nepi C, Domina G, Peruzzi L (Eds) Notulae alla checklist della flora vascolare italiana: 16 (2027–2070). Informatore Botanico Italiano 46(1): 81–83.
- Bartolucci F, Peruzzi L, Galasso G, Conti F (2016) Checklist aggiornata della flora vascolare autoctona d’Italia. In: Domina G, Peruzzi L (Eds) Minilavori della Riunione scientifica del Gruppo per la Floristica, Sistemática ed Evoluzione. 21–22 ottobre 2016, Roma. Notiziario della Società Botanica Italiana 0: 5–6.
- Bentham G (1835) *Labiatarum Genera et Species*, Fasc. 7. James Ridgway and sons, Piccadilly, London, 645bis–783.
- Buccino G, Travaglini A, Paolella F (2013) Notula: 165. In: Barberis G, Nepi C, Peccenini S, Peruzzi L (Eds) Notulae alla flora esotica d’Italia: 8 (161–184). Informatore Botanico Italiano 45(1): 106–107.
- Celesti-Grapow L, Pretto F, Brundu G, Carli E, Blasi C (Eds) (2009) A thematic contribution to the National Biodiversity Strategy. Plant invasion in Italy, an overview. Ministry for the Environment Land and Sea Protection, Nature Protection Directorate, Roma, 1–32. [Cd-Rom]
- Celesti-Grapow L, Capotorti G, Del Vico E, Lattanzi E, Tilia A, Blasi C (2013) The vascular flora of Rome. Plant Biosystems 147(4): 1059–1087. doi: 10.1080/11263504.2013.862315
- Cerabolini BEL, Brusa G, Grande D (2008) Analisi dei fattori che inducono modificazioni delle comunità forestali insubriche ad opera di specie esotiche invasive. In: Galasso G, Chiozzi G, Azuma M, Banfi E (Eds) Le specie alloctone in Italia: censimenti, invasività e piani di azione. Memorie della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano 36(1): 17–18.

- Chen Y, Brouillet L, Semple JC (2011) *Aster* Linnaeus. In: Wu ZY, Raven PH, Hong DY (Eds) Flora of China, Vol. 20–21. Science Press, Beijing, Missouri Botanical Garden Press, St. Louis, 574–632.
- Conti F, Abbate G, Alessandrini A, Blasi C (Eds) (2005) An annotated checklist of the Italian vascular flora. Palombi Editori, Roma.
- Conti F, Alessandrini A, Bacchetta G, Banfi E, Barberis G, Bartolucci F, Bernardo L, Bonacquisti S, Bouvet D, Bovio M, Brusa G, Del Guacchio E, Foggi B, Frattini S, Galasso G, Gallo L, Gangale C, Gottschlich G, Grünanger P, Gubellini L, Iiriti G, Lucarini D, Marchetti D, Moraldo B, Peruzzi L, Poldini L, Prosser F, Raffaelli M, Santangelo A, Scassellati E, Scortegagna S, Selvi F, Soldano A, Tinti D, Ubaldi D, Uzunov D, Vidali M (2007) Integrazioni alla checklist della flora vascolare italiana. *Natura Vicentina* 10(2006): 5–74.
- Cullen J (1995) Crassulaceae. In: Cullen J, Alexander JCM, Brady A, Brickell CD, Green PS, Heywood VH, Jörgensen P-M, Jury SL, Knees SG, Leslie AC, Matthews VA, Robson NKB, Walters SM, Wijnands DO, Yeo PF (Eds) The European Garden Flora, Vol. 4. Cambridge University Press, Cambridge, 170–244.
- Dimopoulos P, Raus T, Bergmeier E, Constantinidis T, Iatrou G, Kokkini S, Strid A, Tzanoudakis D. (2013) Vascular plants of Greece: An annotated checklist. Botanic Garden and Botanical Museum Berlin-Dahlem, Berlin, Hellenic Botanical Society, Athens.
- Franzese M (2004) Attività di monitoraggio delle comunità floristico-vegetazionali e faunistiche nelle aree oggetto di interventi di miglioramento ambientale nell’ambito del progetto di sistema “Lungo le Rotte Migratorie”. Studio delle comunità vegetazionali ed aggiornamento cartografico della vegetazione 2004. Centro di Ricerca, Documentazione e Promozione del Padule di Fucecchio, Castelmartini (Larciano, Pistoia). <http://www.zoneumidetoscane.it/sites/default/files/eventi/LRM5%20-%20Monitoraggio%20flora.pdf> [accessed 02.11.2016]
- Franzese M (2006) Indagine floristico-vegetazionale. In: Bartolini A, Franzese M, Vezzani A (Eds) Il Bosco di Chiusi e la Padulettina di Ramone. Indagine sugli assetti floristico-vegetazionali e sulla comunità ornitica finalizzate alla gestione dell’area. Centro di Ricerca, Documentazione e Promozione del Padule di Fucecchio, Castelmartini (Larciano, Pistoia), 4–39. <http://www.zoneumidetoscane.it/sites/default/files/eventi/Relazione%20Bosco%20Chiusi%20-%20Padulettina%20Ramone.pdf> [accessed 02.11.2016]
- Fryer J, Hylmö B (2009) Cotoneasters. A comprehensive Guide to Shrubs for Flowers, Fruit, and Foliage. Timber Press, Portland, London.
- Galasso G (2014) Notulae: 217–218. In: Barberis G, Nepi C, Peccenini S, Peruzzi L (Eds) Notulae alla flora esotica d’Italia: 10 (202–226). Informatore Botanico Italiano 46(1): 85–86.
- Galasso G, Bartolucci F, Peruzzi L, Ardenghi NMG, Banfi E, Celesti-Grapow L, Conti F (2016) Checklist aggiornata della flora vascolare alloctona d’Italia. In: Domina G, Peruzzi L (Eds) Minilavori della Riunione scientifica del Gruppo per la Floristica, Sistemática ed Evoluzione. 21–22 ottobre 2016, Roma. Notiziario della Società Botanica Italiana 0: 25–26.
- Gangale C, Uzunov D (2011) *Cyperus* L. In: Bernardo L, Peruzzi L, Passalacqua NG (Eds) Flora vascolare della Calabria. Prodromo. Vol. I. Informatore Botanico Italiano 43(2): 261–262.
- Gestri G, Peruzzi L (2013) I fiori di Leonardo. La flora vascolare del Montalbano in Toscana. Aracne Editrice, Ariccia (Roma).
- Govaerts R (2016) World Checklist of Lamiaceae. Facilitated by the Royal Botanic Gardens, Kew. <http://apps.kew.org/wcsp/> [accessed 14.10.2016]

- Greuter W, Burdet MM, Long G (1986) Med-Checklist, Vol. 3. Conservatoire et Jardin Botaniques de la Ville de Genève, Genève, Berlin.
- Guiggi A (2005) *Opuntia*. In: Conti F, Abbate G, Alessandrini A, Blasi C (Eds) An annotated checklist of the Italian vascular flora. Palombi Editori, Roma, 136.
- Guiggi A (2008) Catalogo delle Cactaceae naturalizzate in Italia con osservazioni tassonomiche, nomenclaturali e corologiche. Rivista Piemontese di Storia Naturale 29: 103–140.
- Guiggi A (2014) Repertorium Cactorum Italicum. Cactology 4: 1–20.
- Heywood VH (1972) *Sideritis* L. In: Tutin TG, Heywood VH, Burges NA, Moore DM, Valentine DH, Walters SM, Webb DA (Eds) Flora Europaea, Vol. 3. Cambridge University Press, Cambridge, 172–182.
- Iamonico D, Iberite M, Lattanzi E (2012) Aggiornamento della flora esotica del Lazio (Italia centrale). I. Informatore Botanico Italiano 44(2): 347–354.
- Iamonico D, Iberite M, Nicolella G (2014) Aggiornamento alla flora esotica del Lazio (Italia centrale). II. Informatore Botanico Italiano 46(2): 215–220.
- Ito M, Soejima A (1995) *Aster* L. In: Iwatsuki K, Yamazaki T, Boufford DE, Ohba H (Eds) Flora of Japan, Vol. 3b. Kodansha, Tokyo, 59–73.
- Iwatsuki K, Boufford DE, Ohba H (2006) Flora of Japan, Vol. 2a. Kodansha, Tokyo.
- Laguna Lumbres E, Ferrer Gallego PP (2014) Sobre la identidad de *Morus alba* var. *kagayamiae*, planta alóctona ornamental en España. Bouteloua 18: 36–43.
- Lang X-D, Su J-R, Lu S-G, Zhang Z-J (2013) A taxonomic revision of the genus *Cephalotaxus* (Taxaceae). Phytotaxa 84(1): 1–24. doi: 10.11646/phytotaxa.84.1.1
- La Rosa M, Peruzzi L, Tison J-M (2008) Notula: 1439. In: Nepi C, Peruzzi L, Scoppola A (Eds) Notulae alla checklist della flora vascolare italiana: 5 (1420–1474). Informatore Botanico Italiano 40(1): 104.
- Lastrucci L, Viciani D, Nuccio C, Melillo C (2008) Indagine vegetazionale su alcuni laghi di origine artificiale limitrofi al Padule di Fucecchio (Toscana, Italia Centrale). Annali del Museo Civico di Rovereto. Sezione: Archeologia, Storia, Scienze Naturali 23 (2007): 169–203.
- Macchiati L (1888) Prima contribuzione alla flora del Viterbese. Atti della Società dei naturalisti di Modena, ser. 3 7: 7–61.
- Maiorca G, Cameriere P, Crisafulli A, Spampinato G, Caridi D, Grasso S, Paleologo P (2005) Carta della vegetazione reale della Foce del Fiume Crati (CS-Calabria). ARSSA, Progetto Phytos.I.S., Monografia n. 2. De Rose, Cosenza.
- Maiorca G, Spampinato G, Crisafulli A, Cameriere P (2007) Flora vascolare e vegetazione della Riserva Naturale Regionale “Foce del Fiume Crati” (Calabria, Italia meridionale). Webbia 62(2): 121–174. doi: 10.1080/00837792.2007.10670821
- Masin R, Tietto C (2006) Flora vascolare della Provincia di Padova (Italia Nord-Orientale). Natura Vicentina 9 (2005): 7–103.
- McNeill J, Barrie FR, Buck WR, Demoulin V, Greuter W, Hawksworth DL, Herendeen PS, Knapp S, Marhold K, Prado J, Prud'Homme Van Reine WF, Smith GF, Wiersema JH, Turland NJ (2012) International Code of Nomenclature for algae, fungi, and plants (Melbourne Code) adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July 2011. Regnum Vegetabile 154: 1–240.
- Murr J (1900a) „Griechische Kolonie“ in Valsugana (Südtirol). Allgemeine Botanische Zeitschrift für Systematik 6(1): 1–3.

- Murr J (1900b) „Griechische Kolonie“ in Valsugana (Südtirol) (Fortsetzung.). Allgemeine Botanische Zeitschrift für Systematik 6(2): 20–23.
- Murr J (1901) Zweiter Bericht über die „Griechische Kolonie“ in Valsugana. Allgemeine Botanische Zeitschrift für Systematik 7(1): 1–3.
- Nimis PL, Attore F, Blasi C, Celesti-Grapow L, Chiancone E, Fanelli G, Lattanzi E, Moro A, Pittao E, Tilia A, Martellos S (2016) Portale della flora di Roma. <http://dryades.units.it/Roma/> [accessed 27.10.2016]
- Olivieri N (2014) Notulae: 229–231. In: Barberis G, Nepi C, Peccenini S, Peruzzi L (Eds) Notulae alla Flora esotica d’Italia: 11 (227–243). Informatore Botanico Italiano 46(2): 278.
- Pellizzari M, Verloove F (in press) The genus *Cyperus* in the lower Po Plain (Italy): historical and recent data. *Webbia*.
- Peterson PM, Romaschenko K, Herrera Arrieta Y, Saarela JM (2014a) A molecular phylogeny and new subgeneric classification of *Sporobolus* (Poaceae: Chloridoideae: Sporobolinae). *Taxon* 63(6): 1212–1243. doi: 10.12705/636.19
- Peterson PM, Romaschenko K, Herrera Arrieta Y, Saarela JM (2014b) (2332) Proposal to conserve the name *Sporobolus* against *Spartina*, *Crypsis*, *Ponceletia*, and *Heleochochloa* (Poaceae: Chloridoideae: Sporobolinae). *Taxon* 63(6): 1373–1374. doi: 10.12705/636.23
- Pignatti S (1982) Flora d’Italia, Vol. 3. Edagricole, Bologna.
- Pretto F, Celesti-Grapow L, Carli E, Lattanzi E, Blasi C (2009) Regional Experts: Lazio. In: Celesti-Grapow L, Pretto F, Brundu G, Carli E, Blasi C (Eds) A thematic contribution to the National Biodiversity Strategy. Plant invasion in Italy, an overview. Ministry for the Environment Land and Sea Protection, Nature Protection Directorate, Roma, 1–32 + Cd-Rom.
- Raimondo FM, Spadaro V (2009) *Addenda et emendanda* to the “A catalogue of the plants growing in Sicily”. *Flora Mediterranea* 19: 303–312.
- Rao CK, Jarvis CE (1986) Lectotypification, taxonomy and nomenclature of *Morus alba*, *M. tatarica* and *M. indica* (Moraceae). *Taxon* 35(4): 705–708. doi: 10.2307/1221619
- Sanders RW (2012) Taxonomy of *Lantana* sect. *Lantana* (Verbenaceae): II. Taxonomic revision. *Journal of the Botanical Research Institute of Texas* 6(2): 403–441.
- Sanguinetti P (1864) *Florae Romanae prodromus alter exhibens plantas vasculares. Ex Typographeo Bonarum Artium*, Romae.
- Tison J-M, de Foucault B (2014) Flora Gallica. Flore de France. Biotope Éditions, Mèze.
- Tucker GC, Marcks GC, Carter RJ (2002) *Cyperus* Linnaeus. In: Flora of North America Editorial Committee (Ed) Flora of North America, Vol. 23. Oxford University Press, Oxford, 141–191.
- Verloove F (2014a) *Aster ageratoides*. In: Manual of the Alien Plants of Belgium. <http://alien-plantsbelgium.be/content/aster-ageratoides> [accessed 09.03.2016]
- Verloove F (2014b) A conspectus of *Cyperus* s.l. (Cyperaceae) in Europe (incl. Azores, Madeira and Canary Islands), with emphasis on non-native naturalized species. *Webbia* 69(2): 179–223. doi: 10.1080/00837792.2014.975013
- Yeo PF (2000) *Aster* Linnaeus. In: Cullen J, Alexander JCM, Brickell CD, Edmondson JR, Green PS, Heywood VH, Jørgensen P-M, Jury SL, Knees SG, Maxwell HS, Miller DM, Robson NKB, Walters SM, Yeo PF (Eds) The European Garden Flora, Vol. 6. Cambridge University Press, Cambridge, 570–578.
- Zhou Z, Gilbert MG (2003) Moraceae. In: Wu ZY, Raven PH, Hong DY (Eds) Flora of China, Vol. 5. Science Press, Beijing, Missouri Botanical Garden Press, St. Louis, 21–73.

Notulae to the Italian native vascular flora: 2

Fabrizio Bartolucci¹, Giannantonio Domina², Michele Adorni³,
Carlo Argenti⁴, Giovanni Astuti⁵, Sergio Bangoni⁶, Fabrizio Buldrini⁷,
Mirella Benedetta Campochiaro⁸, Francesca Carruggio⁸, Lorenzo Cecchi⁹,
Fabio Conti¹, Antonia Cristaudo¹⁰, Francesco Saverio D'Amico⁸, Giuseppe D'Auria¹¹,
Emilio Di Gristina¹², Franz-Georg Dunkel¹³, Luigi Forte⁸, Carmen Gangale¹⁴,
Luigi Ghillani¹⁵, Günter Gottschlich¹⁶, Francesca Mantino⁸, Mauro Mariotti¹⁷,
Carmen Novaro¹⁷, Nicola Olivieri¹⁸, Gino Palladino¹⁹, Maurizio Pascale²⁰,
Alessandra Pepe⁸, Enrico Vito Perrino²¹, Lorenzo Peruzzi⁵, Sergio Picollo²²,
Domenico Puntillo¹⁴, Francesco Roma-Marzio⁵, Alessandro Rosiello⁸,
Giovanni Russo²³, Claudio Santini²⁴, Federico Selvi²⁵, Filippo Scafidi¹²,
Anna Scoppola²⁶, Adriano Stinca²⁷, Milena Villa²⁸, Chiara Nepi²⁹

1 Scuola di Bioscienze e Medicina Veterinaria, Università di Camerino – Centro Ricerche Floristiche dell’Appennino, Parco Nazionale del Gran Sasso e Monti della Laga, San Colombo, 67021 Barisciano (L’Aquila), Italy

2 Dipartimento di Scienze Agrarie e Forestali, Università degli Studi di Palermo, Via Archirafi 38, 90123 Palermo, Italy **3** Via degli Alpini 7, 43037 Lesignano de’ Bagni (Parma), Italy **4** Via Pietriboni 7, 32100 Belluno, Italy

5 Dipartimento di Biologia, Università di Pisa, Via Derna 1, 56126 Pisa, Italy **6** Via Sarcidano vic E snc, 08029 Siniscola (Nuoro), Italy **7** Dipartimento di Scienze Biologiche, Geologiche e Ambientali, Università di Bologna, Via Irnerio 42, 40126 Bologna, Italy **8** Museo Orto Botanico – Campus Universitario “E. Quagliariello”, Università degli Studi di Bari, Via Orabona 4, 70125 Bari, Italy **9** Università degli Studi di Firenze, Museo di Storia Naturale, sezione botanica “Filippo Parlatore”, Via G. La Pira 4, 50121 Florence, Italy **10** Dipartimento di Scienze Biologiche, Geologiche e Ambientali, Università degli Studi di Catania, Via A. Longo 19, 95124 Catania, Italy

11 Servizio Fitosanitario, Regione Lazio, Via del Serafico 107, 00142 Roma, Italy **12** Dipartimento STEBICEF, Sezione di Botanica ed Ecologia vegetale, Università degli Studi di Palermo, Via Archirafi 38, 90123 Palermo, Italy

13 Am Saupurzel 1, D-97753 Karlstadt, Germany **14** Museo di Storia Naturale della Calabria ed Orto Botanico, Università della Calabria, 87036 Arcavacata di Rende (Cosenza), Italy **15** Via Carlo Casalegno 6, 43123 Parma, Italy **16** Hermann-Kurz-Strasse 35, D-72074 Tübingen, Germany **17** Università di Genova, DISTAV. Dipartimento di Scienze della Terra, dell’Ambiente e della Vita, Corso Europa 26, 16132 Genova, Italy **18** Via Maestri del Lavoro 40, 64100 Teramo, Italy **19** Via Soldato Ercolino 14, 71013 San Giovanni Rotondo (Foggia), Italy

20 Via della Repubblica 14, 12018 Roccavione (Cuneo), Italy **21** CIHEAM, Agronomic Mediterranean Institute of Bari, Via Ceglie 9, 70010 Valenzano (Bari), Italy **22** Via Alcide De Gasperi 8, 43044 Collecchio (Parma), Italy **23** Via Ercolino, n. 11, 71013 San Giovanni Rotondo (Foggia), Italy **24** Gruppo Flora del Modenese, Via Sant’Orsola 7, 41121 Modena, Italy **25** Università degli Studi di Firenze, Dipartimento di Scienze delle Produzioni Agroalimentari e dell’Ambiente (DISPAA), Laboratori di Botanica, Piazzale delle Cascine 28, 50144 Firenze, Italy **26** DAFNE, Dipartimento di Scienze Agrarie e Forestali, Università della Tuscia, Via San Camillo de Lellis snc 01100 Viterbo, Italy **27** Dipartimento di Agraria, Università di Napoli Federico II, Via Università 100, 80055 Portici (Napoli), Italy **28** Via Lauro 4, 23888 La Valletta Brianza (Lecco), Italy **29** Sezione di Botanica Filippo Parlatore, Museo di Storia Naturale, Università di Firenze, Via G. La Pira 4, 50121 Firenze, Italy

Corresponding author: Fabrizio Bartolucci (fabrizio.bartolucci@gmail.com)

Academic editor: S. Biondi | Received 7 November 2016 | Accepted 15 November 2016 | Published 29 November 2016

Citation: Bartolucci F, Domina G, Adorni M, Argenti C, Astuti G, Bangoni S, Buldrini F, Campochiaro MB, Carruggio F, Cecchi L, Conti F, Cristaudo A, D'Amico FS, D'Auria G, Di Gristina E, Dunkel F-G, Forte L, Gangale C, Ghillani L, Gottschlich G, Mantino F, Mariotti M, Novaro C, Olivieri N, Palladino G, Pascale M, Pepe A, Perrino EV, Peruzzi L, Picollo S, Puntillo D, Roma-Marzio F, Rosiello A, Russo G, Santini C, Selvi F, Scafidi F, Scoppola A, Stinca A, Villa M, Nepi C (2016) Notulae to the Italian native vascular flora: 2. Italian Botanist 2: 73–92. doi: 10.3897/italianbotanist.2.11060

Abstract

In this contribution new data concerning the Italian distribution of native vascular flora are presented. It includes new records, exclusions, and confirmations to the Italian administrative regions for taxa in the genera *Arctostaphylos*, *Artemisia*, *Buglossoides*, *Convolvulus*, *Crocus*, *Damasonium*, *Epipogium*, *Ficaria*, *Filago*, *Genista*, *Heptaptera*, *Heracleum*, *Heteropogon*, *Hieracium*, *Myosotis*, *Ononis*, *Papaver*, *Pilosella*, *Polygonum*, *Pulmonaria*, *Scorzonera*, *Silene*, *Trifolium*, *Vicia* and *Viola*.

Keywords

Floristic data, Italy

How to contribute

The text for the new records should be submitted electronically to Chiara Nepi (chiara.nepi@unifi.it). The corresponding specimen has to be sent to FI Herbarium: Sezione di Botanica Filippo Parlatore del Museo di Storia Naturale, Via G. La Pira 4, 50121 Firenze (Italy). Those texts concerning nomenclatural novelties (typifications only for accepted names), exclusions, and confirmations should be submitted electronically to: Fabrizio Bartolucci (fabrizio.bartolucci@gmail.com). Each text should be within 2,000 characters (spaces included).

Floristic records

Arctostaphylos uva-ursi (L.) Spreng. (Ericaceae)

+ **CAL:** San Donato di Ninea (Cosenza), Cozzo del Pellegrino (WGS84: 39.739022°N, 16.004854°E), margine di faggeta di quota, su pietraia calcarea, 1880 m, 19 September 2015, Leg. D. Puntillo, Det. D. Puntillo & C. Gangale (FI, CLU, Herb. Gangale & Uzunov). – Species new for the flora of Calabria.

This species is a well-known circumboreal Artic-Alpine element, recorded in Italy on the Alps, in the northern and central Apennines and up to Campania (Conti et al.

2005). A small population, covering about 12 m², was observed on the top of Cozzo del Pellegrino, one of the highest peaks of Orsomarso mountains, in the SW sector of Mt. Pollino. Its finding in Calabria is very significant because it extends southward the distribution of this taxon.

D. Puntillo, C. Gangale

***Artemisia arborescens* (Vaill.) L. (Asteraceae)**

+ (CAS) **ABR:** San Vito Chietino (Chieti), località Marina, bordi di una canaletta in cemento per il deflusso delle acque meteoriche situata sul margine stradale (WGS84: 42.307681°N; 14.446533°E), ca. 25 m, 10 July 2016, N. Olivieri (FI). – Casual alien species new for the flora of Abruzzo.

An individual of this species grows in a crevice of the edge of a concrete channel in a shaded area and next to the Adriatic Sea. The site of discovery is located in an urban area and the individual has grown from seed produced by a plant cultivated for ornamental purposes in a private garden.

N. Olivieri

***Buglossoides incrassata* (Guss.) I.M.Johnst. subsp. *permixta* (Jord.) L.Cecchi & Selvi (Boraginaceae)**

+ **IT:** valle della Dora Riparia [Torino] inter Salbertrand et Oulx (WGS84: 45.054531°N; 6.858531°E), 22 Jun 1879, F. Ungern-Sternberg (TO); Alpi Cozie [Torino], nei coltivati presso Chiomonte (WGS84: 45.115814°N; 6.976436°E), Oulx e Boulard, 18 May 1896, E. Ferrari & F. Vallino (FI); Saluzzo [Cuneo], Mongrosso, La Manta (WGS84: 44.618680°N; 7.483210°E), 8 May 1909, A. Zola, Herb. Gavoli No.6281 (FI); Argentera [Cuneo] (WGS84: 44.395602°N; 6.938284°E), pendici d'Alpe [illegible], 28 May [illegible], G.B. Biadego (VER); valle di Susa [Torino], Signols (WGS84: 45.044566°N; 6.801774°E), prati falciati e prati abbandonati nei pressi dell'abitato, 1100 m, 4 Jun 1980, F. Montacchini, Lomagno & G. Forneris (TO). – Subspecies new for the flora of Italy (Piemonte).

Based on the recent findings by Cecchi et al. (2014), *Buglossoides incrassata* (Guss.) I.M. Johnst. occurs in Italy with two subspecies: *B. incrassata* subsp. *incrassata* and *B. incrassata* subsp. *splitgerberi* (Guss.) E.Zippel & Selvi. The former is found in Sicily and in part of the southern regions, while the latter is distributed in Sicily and part of the peninsular and northern regions. However, its exact distribution requires further investigation and is still to be defined. Based on both morphological and molecular data (Cecchi et al. 2014), *Lithospermum permixtum* Jord. also belongs to the *B. incrassata* complex, rather than in the *B. arvensis* group as proposed by Fernandes (1972) and

accepted by most authors (e.g. Aeschimann et al. 2004, Conti et al. 2005). Accordingly, it was recently transferred to this species as *B. incrassata* subsp. *permixta*. This is a W Mediterranean taxon occurring from S Spain to the Maritime Alps, especially the French parts (Tison and De Foucault 2014). The historical herbarium records found in FI (originally identified as *Lithospermum arvense* L. var. *coeruleascens* DC.), TO (one of which originally identified as *L. arvense* L. var. *coeruleascens* DC., the other already referred by F. Ungern-Sternberg to *L. permixtum* Jord.) and VER (originally identified as *L. arvense* L.) show the presence of this taxon also in Piemonte, where it probably reaches its eastern limit.

L. Cecchi, F. Selvi

Convolvulus cneorum L. (Convolvulaceae)

+ **SAR:** Baunei (Ogliastra), Golfo di Orosei, Bacu Padente (WGS84: 40.13944°N; 9.65880°E), cenge su pareti calcaree, 145 m, 2 June 2016, S. Bangoni (FI). – Species new for the flora of Sardegna.

Convolvulus cneorum is recorded for Tunisia, Sicilia, Tyrrhenian coast of the Italian peninsula from Calabria to Toscana (the occurrence in Lazio is doubtful), and Ionian coast of the Balkan peninsula from Croatia to Albania (Greuter et al. 1986, Conti et al. 2005, Nikolić 2016). The population reported here is very far from any residential area, supporting the native status of the species in Sardegna.

S. Bangoni

Crocus neapolitanus (Ker Gawl.) Loisel. (Iridaceae)

- **PIE.** – Species to be excluded from the flora of Piemonte.
- **LOM.** – Species to be excluded from the flora of Lombardia.
- **MAR.** – Species to be excluded from the flora of Marche.

Crocus neglectus Peruzzi & Carta (Iridaceae)

+ **PIE:** Valle Tanaro, tra Garesso e Trappa (Cuneo) (WGS84: 44.189°N; 8.009°E), prato, 620 m, 12 March 2014, Leg. M. Pascale, Det. L. Peruzzi (PI); Valle Tanaro, poco a valle dell'abitato di Nucetto (Cuneo) (WGS84: 44.3446°N; 8.0590°E), prato falciato, 445 m, 12 March 2014, Leg. M. Pascale, Det. L. Peruzzi (FI). – Species new for the flora of Piemonte.

+ **LOM:** Ai piedi di M. Palanzone: luoghi selvatici, 14 March 1889, Mari (FI, as *Crocus vernus* All. var. *medius* Parl.); Merate (Lecco), al termine di via Regondino, confinante

con via Paravino di Cernusco Lombardone (WGS84: 45.702637°N; 9.394753°E), boscaglia, 270 m, 28 February 2007, Leg. *M. Villa*, Det. *L. Peruzzi* (FI). – Species new for the flora of Lombardia.

0 **UMB:** Pascoli prope M.te Pennino, s.d., *A. Batelli* (FI, as *Crocus vernus* L.); M.te Pennino, May 1886, *A. Batelli* (FI, as *C. vernus*). – Species new for the flora of Umbria, not recently confirmed.

+ **MAR:** Fonte Verna, M. Catria, 21 May 1924, Aiuti (FI, as *Crocus vernus* Hill); Monti Sibillini, Rifugio Sibilla (WGS84: 42.90823°N; 13.29145°E), 1536 m, 25 April 2014, *L. Peruzzi*, *B. Pierini* (PI). – Species new for the flora of Marche.

0 **ABR:** Monte dei Fiori pr. Ascoli, May 1874, *P. Porta*, *G. Rigo* (FI, as *Crocus*). – Species new for the flora of Abruzzo, not recently confirmed.

According to Harpke et al. (2015), seven species of *Crocus* ser. *Verni* occur in Italy: the autumn flowering *C. longiflorus* Raf., occurring in S Italy and Sicily; the short-styled, spring flowering *C. siculus* Tineo and *C. vernus* (L.) Hill, endemic to Sicily the former, very common above 1,500 m in N Italy, the second; the long-styled, spring flowering *C. etruscus* Parl., *C. ilvensis* Peruzzi & Carta, *C. neapolitanus* (Ker Gawl.) Loisel. (= *C. vernus* auct. pro parte), *C. neglectus* Peruzzi & Carta (= *C. vernus* auct. pro parte). While the first two taxa, both narrow endemics to Toscana, are not particularly problematic (Carta et al. 2010, Peruzzi and Carta 2011, Harpke et al. 2015), whereas the remaining species (*C. neapolitanus* and *C. neglectus*) are more difficult to identify. *Crocus neapolitanus* has been recorded generically for the “Italian peninsula”, but it is absent from Emilia-Romagna, Liguria, and Toscana, where *C. neglectus* occurs (Harpke et al. 2015). Given that records of long-styled plants are known also for other regions in northern (see e.g. Aeschimann et al. 2004) and central Italy, we carried out herbarium and field studies in order to clarify the distribution of these taxa. In a previous work, Peruzzi et al. (2013) already showed that in Valle D’Aosta only *C. vernus* (L.) Hill s.str. occurs. According to our results, it was possible to highlight that the plants so far referred to as “*C. neapolitanus*” or “*C. vernus* auct.” from Friuli Venezia Giulia actually belong to an eighth species, not previously recorded for Italy: *C. heuffelianus* Herb. (Peruzzi 2016a). The plants referred to as “*C. vernus* auct.” or “*C. neapolitanus*” in Lombardia, Piemonte, Marche, most of Umbria and a single locality in the very Northern Abruzzo actually pertain to *C. neglectus*. It should be noted that, based on the specimen cited above, the occurrence in Abruzzo remains questionable. Indeed, Montagna dei Fiori is a mountain range falling across the administrative borders between Marche and Abruzzo. However, given that most of the mountain meadows (typical habitat for *C. neglectus*) pertain to the territories of Abruzzo, we believe its historical presence in this administrative region to be plausible. Incidentally, the rejection of the name *C. purpureus* Weston, which should have nomenclatural priority for the latter species, was recently proposed (Peruzzi 2016b). While *C. neapolitanus* certainly also occurs in Abruzzo, we can safely exclude this species from Piemonte, Lombardia and Marche. Gaps in distribution (and/or in knowledge) of these plants are apparent between Lombardia and Veneto, and in parts of central Italy between northern Lazio/

Abruzzo and southern Toscana/Umbria/Marche. Further field investigations should be carried out in these areas, to check if these taxa are completely allopatric, as the data available today seem to suggest.

L. Peruzzi, M. Villa & M. Pascale

Crocus variegatus Hoppe & Hornsch. (Iridaceae)

+ **EMR:** Sala Baganza (Parma), Boschi di Carrega (WGS84: 44.721914°N; 10.211219°E), 180–200 m, February 2016, Leg. S. Picollo, L. Ghillani, M. Adorni, Det. L. Peruzzi (FI, PI). – Species confirmed for the flora of Emilia-Romagna.

According to Harpke et al. (2014), *Crocus variegatus* Hoppe & Hornsch. is a bulbous geophyte occurring from Italy to northwestern Balkans. The known Italian populations, recorded from Friuli Venezia Giulia, Lazio and Abruzzo (Conti et al. 2005, Bartolucci 2007), were previously wrongly referred to *C. reticulatus* Steven ex Adams, a species endemic to the Caucasus (Harpke et al. 2014). A historical record of “*C. variegatus*” does exist for Emilia-Romagna (Parlatore 1858: “*Barbieri me ne ha favorita una pianta dei monti di Parma: dubito però di sbaglio di luogo*” [Barbieri provided me with a plant from the mountains around Parma: however I suspect that the locality is erroneous]); the same record was later quoted by Bolzon (1920). In the light of our finding, the presence of this species in the Parma province (and in Emilia-Romagna) is indeed fully confirmed. *Crocus variegatus* has been found in three distinct localities within the Parco Boschi di Carrega, but its occurrence also in other parts of the protected area is likely.

S. Picollo, L. Peruzzi, L. Ghillani & M. Adorni

Damasonium polyspermum Coss. (Alismataceae)

+ **PUG:** Mottola (Taranto), Masseria Semeraro (UTM ED50: 33T 4498003N; 674582E), vegetazione acquatica, 29 April 2010, Leg. et Det. E.V. Perrino, Rev. L. Forte & F. Carruggio (BI-35781, as *Damasonium alisma* subsp. *alisma*); Mottola (Taranto), Masseria Semeraro, lungo la S.P. 28, (WGS84: 40.612708°N; 17.062869°E), vaschetta di erosione su substrato calcareo, 136 m s.l.m., 08 May 2014, Leg. F. Carruggio, F. Mantino & L. Forte, Det. F. Carruggio, F. Mantino & L. Forte (FI); Mottola (Taranto), Masseria Semeraro, lungo la S.P. 28, (WGS84: 40.612708°N; 17.062869°E), vaschetta di erosione su substrato calcareo, 136 m s.l.m., 8 May 2014, Leg. F. Carruggio, F. Mantino & L. Forte, Det. F. Carruggio, F. Mantino & L. Forte (BI-36676). – Species new for the flora of Puglia.

This taxon is one of at least two species currently accepted for *Damasonium* Mill. in Europe and in the Mediterranean area, together with *D. alisma* Mill. (Pignatti 1982,

Vuille 1987, Rich and Nicholls-Vuille 2001, Conti et al. 2005, Talavera and Talavera 2010). Conversely, not all authors recognize *D. bourgaei* Coss. as a distinct species, including it in *D. alisma* (Pignatti 1982, Conti et al. 2005). *Damasonium polyspermum* has a western–Mediterranean distribution (Rich and Nicholls-Vuille 2001), but it is present also in the Near East (Danin 2000). In Italy, this taxon was until now reported only in Sicilia (Conti et al. 2005). In Puglia, only *D. alisma* subsp. *alisma* has been recorded to date (Pignatti 1982, D'Amico and Signorile 2001, D'Amico et al. 2003, Conti et al. 2005, Giannico 2011, Alfonso et al. 2014). However, according to Alfonso et al. (2014) the presence of the taxon in the area of Alta Murgia, at the San Giuseppe pond, has to be confirmed, while the record near Masseria Semeraro reported by Giannico (2011) is probably to be considered erroneous, due to confusion with *D. polyspermum*. In fact, a herbarium specimen revision (BI-35781, Masseria Semeraro, Mottola, 29 April 2010, Perrino as *D. alisma* subsp. *alisma*) and new field surveys allowed to verify the presence of *D. polyspermum* in this site. The site is a small cupular pool, a karstic form in limestone. Less than 50 individuals were observed. Serious threats affect the site, especially owing to accidental and arson fires.

F. Carruggio, F. Mantino & L. Forte

Epipogium aphyllum Sw. (Orchidaceae)

+ **PUG:** Monte Sant'Angelo (Foggia), Monte Spigno (WGS84: 41.7796°N; 15.8819°E), bordi di un sentiero in faggeta, suolo ricco in humus e calcare, 831 m, 30 June 2016, L. Palladino (FI). – Species new for the flora of Puglia.

Epipogium aphyllum is a species with Eurosiberian distribution (Pignatti 1982), occurring in Italy in many regions, but not recorded in Valle d'Aosta, Umbria, Sardegna and, until now, Puglia (Perazza 2016). In the Puglia site, we found only a single plant. After undertaking a rich photographic documentation, a specimen with a single flower and part of the stem was prepared and stored in FI.

L. Palladino, G. Russo

Ficaria verna Huds subsp. *calthifolia* (Rchb.) Nyman (Ranunculaceae)

≡ *Ranunculus ficaria* L. subsp. *calthifolius* (Rchb.) Arcang.

+ **PUG:** Monte Cornacchia (Faeto, prov. Foggia) (WGS84: 41.363233°N; 15.157632°E), margine rimboschimento a conifere, 1138 m, WSW, 24 April 2015, A. Stinca, G. D'Auria, E.V. Perrino (FI, PORUN). – Species confirmed for the flora of Puglia.

Ficaria verna subsp. *calthifolia* is distributed in eastern-central and southeastern Europe, and Libya (Sell 1994, Veldkamp 2015, Hörandl and Raab-Straube 2015).

It was previously reported in Puglia by Fenaroli (1970, sub *Ranunculus ficaria* subsp. *calthaefolius*) from “Monte Nero, in vetta”[Mt. Nero, on the top], but not recently confirmed (e.g. Conti et al. 2005, 2007, Wagensommer et al. 2014).

A. Stinca, G. D'Auria & E.V. Perrino

Filago pygmaea L. (Compositae)

+ **LIG:** Cervo (Imperia), pendici SW del Colle di Cervo, a lato della “Strada al Ciapà”, tra Cervo e Bande di Là-Rollo (WGS84: 43°55'43"N; 8°7'19"E), 155 m, 2 August 2016, C. Novaro, det. M. Mariotti (FI). – Species confirmed for the flora of Liguria.

De Notaris (1844, as *Evax pygmaea* (L.) Brot.) recorded this species for the first time in Liguria at “Bordighiera” on the basis of a specimen collected by Panizzi. Ricca (1870) cited *E. pygmaea* as abundant in dry places with compact soil of the coastal zone, under 400 m a.s.l., of Diana Marina and Cervo Valleys (western Liguria). Conti et al. (2005) cited the species as no longer recorded in Liguria and not present in the other regions of northern Italy. The population reported here is estimated at just over 100 individuals patchily scattered over an area of about 200 m². The habitat belongs to the *Filagini-Vulpinetum* Oberd. association and falls within the Priority Habitat type 6220 according to Annex I of Directive 92/43/EEC. *Filago pygmaea* seems to be expanding, but there are threats such as fires, fragmentation linked to the presence of a road, and abandonment of waste.

C. Novaro, M. Mariotti

Genista etnensis (Raf.) DC. (Fabaceae)

+ (CAS) **ABR:** L'Aquila (L'Aquila), loc. Monteluco di Roio, incolto su pendio presso il bordo stradale (WGS84: 42.339202°N; 13.374081°E) ca. 980 m, 30 June 2016, N. Olivieri (FI). – Casual alien species new for the flora of Abruzzo.

Some individuals of this species, of different ages, have colonized the barren slopes facing SW at the edge of the road leading up to the summit of Monte Luco di Roio. The plants have originated from some individuals introduced in the past in a reforestation area with conifers.

N. Olivieri

Heptaptera angustifolia (Bertol.) Tutin (Apiaceae)

+ **PUG:** Spinazzola (Bari), Vallone Ciotola (WGS84: 40.970169°N; 16.068883°E), 370 m s.l.m., cerreta 15 July 2014, F. Carruggio, A. Rosiello & L. Forte (BI-36678);

Spinazzola (Bari), Vallone Ciotola (WGS84: 40.971622°N; 16.070078°E), 360 m s.l.m., cerreta, 15 July 2014, F. Carruggio, A. Rosiello & L. Forte (BI-36679). – Species confirmed for the flora of Puglia.

Heptaptera, a small genus of the Apiaceae, has a distribution centered mostly in the Balkan region and the Middle East (Roskov et al. 2016). This species is endemic to southern Italy (Peruzzi et al. 2014, 2015), and it is also the unique member of this genus in the Italian peninsula (Tutin 1968). It was certainly known until today only in Basilicata (Conti et al. 2005) and Calabria (Bernardo 2014). Differently its presence in Puglia was uncertain (Conti et al. 2005, Wagensommer et al. 2013), based on a single ancient finding by Gasparrini (“*ex maritimis Apuliae prope Gravinam a Gasparrinio*”, Bertoloni 1838), repeatedly cited by several authors (Caruel 1889, Fiori 1925, Pignatti 1982). This new locality lies in a sub-mesophilous Turkey oak wood, alongside the slope of one of the erosive cracks, locally known as “*valloni*”, which are present in the Spinazzola area. Only about 30 individuals were observed.

F. Carruggio, A. Rosiello & L. Forte

Heracleum sphondylium L. subsp. *sibiricum* (L.) Simonk. (Apiaceae)

+ CAL: San Giovanni in Fiore (Cosenza), presso la diga del Lago Arvo, Loc. Nocelle (WGS84: 39.247042°N, 16.544429°E), margine pineta, 1308 m, 19 July 2015, Leg. D. Puntillo, det. D. Puntillo & C. Gangale (FI, CLU, Herb. Gangale & Uzunov). – Subspecies confirmed for the flora of Calabria.

In Calabria, this species is rare and known only in Mt. Pollino, where *H. sphondylium* subsp. *elegans* (Crantz) Schubl. & G.Martens is recorded. The population found in Mt. Sila, new for this territory, consists of about 10-12 individuals, along a road at the edge of a pine forest. Morphological characters of leaves and fruits are those of *H. sphondylium* subsp. *sibiricum* (Klimko et al. 2013), which Conti et al. (2005) considered as recorded in the past by mistake in Calabria. The old record of *H. sphondylium* var. *cordatum* (Gavioli 1932) for Mt. Pollino has to be referred to *H. sphondylium* subsp. *elegans*.

D. Puntillo, C. Gangale

Heteropogon contortus (L.) P. Beauv. ex Roem. & Schult. (Poaceae)

+ PUG: Manfredonia (Foggia), sulla strada tra Manfredonia e Ruggiano, (UTM ED50: 33T 4613017N; 573381E), 310 m s.l.m., prateria rocciosa, 19 July 1995, Leg. E.S. D'Amico & L. Forte, Det. E.S. D'Amico & L. Forte (BI- 36680); San Giovanni Rotondo (Foggia), a monte di C. Lanzetta, (WGS84: 41.659578°N; 15.807217°E), 290 m s.l.m., prateria a *Stipa oligotricha*, 17 March 2007, Leg. F. Mantino & L. Forte, Det.

F. Mantino & L. Forte (BI-36681); Laterza (Taranto), a est di Masseria Gallo, lungo la S.P. 8, (WGS84: 40.576425°N; 16.817828°E), 190 m s.l.m., pascolo roccioso, 14 September 2007, Leg. *F. Carruggio & L. Forte*, Det. *F. Carruggio & L. Forte* (BI-36677); Laterza (Taranto), Canale S. Pellegrino, (WGS84: 40.577404°N; 16.785956°E), 214 m s.l.m., prateria rocciosa, 3 December 2007, Leg. *F. Carruggio*, Det. *F. Carruggio & A. Cristaudo* (FI). – Species new for the flora of Puglia.

This thermophilous species occurs in large tropical and subtropical areas of the world (Pignatti 1982, USDA 2011). In Europe, it is present mostly in the central-western Mediterranean region (Clayton 1980), while it is very rare eastwards (Euro+Med 2006 onwards). In Italy, it is quite uncommon although reported, with some gaps, for several regions in the north, in the centre and in the south of the country (Conti et al. 2005). There is only an informal note about the presence of this taxon in Puglia (Acta Plantarum 2008). The occurring sites are characterized by thermophilous xeric grassland communities located in the Gargano and in the area of Arco Jonico.

F. Mantino, F. Carruggio, F.S. D'Amico, A. Cristaudo & L. Forte

Hieracium falcatum Arv.-Touv. subsp. *falcatum* (Asteraceae)

+ **VDA:** Aosta (Aosta), 1,1 km NW Chardonney, Straße Richtung Dondenaz (WGS84: 45°37'32"N; 07°35'39"E), Felsrasen, Schotterflur über Kalk, 1860 m, 10 August 2014, *F. G. Dunkel* (FI, *Herb. Dunkel, Herb. Gottschlich*). – Species confirmed for the flora of Valle d'Aosta.

Hieracium falcatum was recorded in Italy by Vignolo-Lutati (1953) based on specimens collected in Valle d'Aosta. This record was not reported by Conti et al. (2005) and Bovio (2014). *Hieracium falcatum* subsp. *falcatum* is a rare endemic to the western Alps, recorded for France in Savoie (Col du Galibier), Haute-Savoie (Chapelle d'Abondance, Vallorcine, Passy, Col de Vernaz) and in the Département des Hautes-Alpes (Col du Lautaret, Montgenèvre). Two other subspecies, *H. falcatum* subsp. *glaucoides* (Beck) Zahn and *H. falcatum* subsp. *falciforme* (Degen & Zahn) Zahn, occur in Austria, southern Austria (Schneeberg), and in Croatia (Istria, Velebit) (Zahn 1922-1938).

G. Gottschlich, F.G. Dunkel

Myosotis speluncicola (Boiss.) Rouy (Boraginaceae)

+ **MAR:** Montefortino (Fermo), Parco Nazionale dei Monti Sibillini, Gole dell'Ifernaccio (WGS84: 42.914257°N; 13.255262°E), shady rock crevices along the pathway going across the gorges of Fiume Tenna, 1102 m, 24 May 2016, *L. Peruzzi* (FI, PI). – Species confirmed for the flora of Marche.

Myosotis speluncicola is a rare annual species with scattered distribution in Europe, occurring in SE France, Balkans, S Anatolia, and possibly extending to N & W Iran (Strid and Tan 1999, Barina and Pifkó 2008). It also certainly occurs in Italy in Abruzzo (Conti and Bartolucci 2016, Conti et al. 2016), and in Trentino-Alto Adige (Bertolli and Prosser 2011), whereas it was historically recorded in the Marche (Conti et al 2005). The presence in this region is based on some ancient specimens preserved in FI and collected in the so-called “Grotta di Foce Scura” on the Sibillini massif (Béguinot 1904 as *M. marcillyana* Burnat ex Bég., Fiori 1907 as *M. arvensis* var. *marcillyana* (Burnat ex Bég.) Fiori, Grau 1968, Pignatti 1982). According to Ballelli et al. (2010) this species should be excluded from the massif, but its historical presence is confirmed by Conti et al. (2016).

L. Peruzzi, F. Roma-Marzio

***Ononis alopecuroides* L. subsp *exalopecuroides* (G. López) Greuter & Burdet (Fabaceae)**

+ **PUG:** Bari (Bari), nei pressi dell'area commerciale (WGS84: 16.906557°N; 41.078590°E), prateria annuale a *Stipa capensis* Thunb. su substrato di natura calcarea, 43 m s.l.m., 6 May 2016, Leg. A. Pepe & M.B. Campochiaro, Det. A. Pepe & F. Carruggio (FI); Bari (Bari), a ridosso della S.S. 100 (WGS84: 16.904580°N; 41.074979°E), prateria annuale a *Stipa capensis* Thunb. su substrato di natura calcarea, 46 m s.l.m., 26 May 2016, M.B. Campochiaro & A. Pepe, det. A. Pepe & F. Carruggio (BI-36674, BI-36675). – Species and subspecies new for the flora of Puglia.

This stenomediterranean entity is present in north-western Africa (Algeria, Morocco, Tunisia), Corsica, Malta and in the eastern Mediterranean countries (Lebanon, Syria, Israel and Jordan); it is doubtfully native in the ex-Yugoslav area, doubtfully present in Greece and adventitious in France (Greuter et al. 1989). In Italy, it was known until today in Sicilia, Calabria, Basilicata (Conti et al. 2005), Abruzzo (Conti et al. 2016), Campania (Nazzaro et al. 2007), and Sardegna (De Martis et al. 2009), while it was no longer recorded in Liguria, despite previously being reported by Pignatti (1982). Therefore, the present records extend eastward the Italian distribution area. Both occurring sites, only about 500 m from each other, are close to the urban area of Bari, in no longer cultivated fields, the second one being closer to olive groves. The sites are characterized by sub-nitrophilous annual communities. Isolated individuals of this taxon were recorded. Because of its therophytic life-form and the probable soil seed bank formation, being a leguminous plant, it would be interesting to verify the actual rarity of the taxon in relation to possible fluctuations in the number of individuals over the years.

A. Pepe, F. Carruggio, M.B. Campochiaro & L. Forte

Papaver setigerum DC. (Papaveraceae)

+ **ABR:** Francavilla (Chieti), loc. Postilli, margini della massicciata ferroviaria ed incolti al bordo della Strada Statale 16 Adriatica, (WGS84: 42.402141°N; 14.321103°E), bordo stradale, ca. 3 m, 14 May 2016, N. Olivieri (FI). – Species new for the flora of Abruzzo.

+ **MOL:** Campomarino (Campobasso) loc. Nuova Cliternia, vegetazione lungo il bordo della Strada Statale 16 Adriatica, (WGS84: 41.935792°N; 15.091713°E), bordo stradale, ca. 5 m, 29 March 2016, N. Olivieri (FI). – New species for the flora of Molise.

In Abruzzo, this species appears with some individuals together with *Papaver rhoeas* L. within ruderal thermophilic vegetation at the road edge and along the nearby railway embankment, on unstable sandy and gravelly soil. In Molise, some individuals of *P. setigerum* grow within the terophytic herbaceous vegetation settled on the edge of a road, on sandy substrate, in an area close to the Adriatic Sea. *Papaver setigerum* is a western Mediterranean species that, in Italy, was known for Sicilia, Sardegna, Calabria, Basilicata, Campania, Lazio, Toscana, Liguria (Conti et al. 2005) and Puglia (Biscotti 2002, Licht and Wagensommer 2008).

N. Olivieri

Polygonum romanum Jacq. (Polygonaceae)

+ **SIC:** Misilmeri (Palermo), locality Contrada Rigano (WGS84: 38°01'23.11"N; 13°26'49.54"E), 127 m, road edge near waste land, 16 October 2015, F. Scafidi (PAL-102713, FI). – Species new for the flora of Sicily.

This is a Mediterranean species typical of pastures, uncultivated lands and ruderal environments, not listed for Sicily by Conti et al. (2005) and Raimondo et al. (2010). The identification was made on the basis of the description by Raffaelli (1982). To date, the locality reported here represents the southern limit of the Italian range of this species.

F. Scafidi, E. Di Gristina & G. Domina

Pilosella glaciella (Nägeli & Peter) Soják (Asteraceae)

+ **VEN:** Malga Zingari Alti (Falcade, Belluno) (WGS84: 46°21'07"N; 11°48'26"E), pascolo su silice, 2100 m, 16 July 2015, C. Argenti (FI, Herb. Argenti). – Species new for the flora of Veneto.

Pilosella glaciella is a typical Alpine species, which always grows together with *P. glacialis* (Reyn. ex Lachen.) F.W.Schultz & Sch.Bip. This leads to hypothesize that

P. glaciella is a hybrid formed *in situ* with *P. officinarum* Vaill. as second parent species. Even though *P. glacialis* can be found all over the Alps, its origin of diffusion is likely in the western Alps. Therefore, in the western Alps, more intermediate species, generated by hybridisation of *P. glacialis* with other *Pilosella* species, can be found. Similarly, intermediate species are rarer in the eastern Alps, for example *P. glaciella*, which was so far unknown in Veneto.

G. Gottschlich, C. Argenti

Pulmonaria officinalis L. subsp. *officinalis*

+ MAR: Montefortino (Fermo), Parco Nazionale dei Monti Sibillini, Gole dell’Infernaccio (WGS84 42.914381°N; 13.260342°E), woods along the pathway going across the gorges of Fiume Tenna, 1000 m, 24 May 2016, L. Peruzzi (FI, PI). – Species confirmed for the flora of Marche.

Pulmonaria officinalis is a perennial species widespread in Europe, where it occurs mainly in the central part of the continent and on the mountains in the Mediterranean area (Meeus et al. 2013, Astuti et al. 2014). In Italy, it certainly occurs in moist broad-leaf woods of the northern regions, including NW Toscana, and in the central Apennines (Abruzzo) (Bartolucci et al. 2012, Cecchi and Selvi 2015). On the other hand, it was historically recorded from the Marche (Paolucci 1890-1891), but its presence in this administrative region was excluded by later authors (Pignatti 1982, Conti et al. 2005, Ballelli et al. 2010, Cecchi and Selvi 2015). Our finding confirms its presence in the Marche and particularly in one of the sites where it was historically recorded, i.e., Montefortino (Paolucci 1890-1891).

L. Peruzzi & G. Astuti

Scorzonera villosa Scop. subsp. *columnae* (Guss.) Nyman (Asteraceae)

+ ABR: Lentella (Chieti), pendici del M. Calvario (WGS84: 41.992746° 14.688606°), 330 m s.l.m., pendii aridi, 12 April 2010, F. Bartolucci s.n. (APP, FI). – Species new for the flora of Abruzzo.

Scorzonera villosa Scop. subsp. *columnae* is endemic to southern Italy (Peruzzi et al. 2014, 2015). It has been recorded in Campania, Puglia, Basilicata, Calabria, and Sicilia (Conti et al. 2005). The previous record of *Scorzonera hirsuta* L. for Lentella in southern Abruzzo (Conti and Manzi 1996) is to be referred to this species.

F. Conti, F. Bartolucci

Silene roemerii Friv. subsp. staminea (Bertol.) Nyman (Caryophyllaceae)

+ **CAL:** Castrovillari (Cosenza), Monte Pollino, loc. Canale Malavento (WGS84: 39.899424°N; 16.200165°E), prati calcarei, 1980 m, 1 July 2015, Leg. D. Puntillo, Det. D. Puntillo & C. Gangale (FI, CLU). – Subspecies new for the flora of Calabria.

Silene roemerii subsp. *staminea* is endemic to the central and southern Apennines (Peruzzi et al. 2014, 2015). Reevaluated by Foggi and Ricceri (1993), it was successively recognized at subspecies level (Greuter 1995), as a vicariant of the Balkan *S. roemerii* subsp. *roemerii*. In Foggi and Ricceri (1993), a record for Mt. Pollino is reported: “Calabria – Appennino Calabro-Lucano. Gruppo del Pollino, Serra delle Ciavole, praterie cacuminali esp. Ovest, alt. 2100, 25.7.1972, Nardi, Bavazzano, Posca, as *S. roemerii* Friv. (FI)”. Accordingly, Conti et al. (2005) indicated this taxon for Basilicata. A small population was recently observed in the upper grasslands between the peaks of Mt. Pollino and Serra Dolcedorme, close to the regional border, on the Calabrian side, confirming its presence in both administrative regions.

D. Puntillo, C. Gangale

***Trifolium hirtum* All. (Fabaceae)**

+ **UMB:** Castel Giorgio (Terni), all’ingresso del paese (WGS84: 42.703224°N; 11.982842°E), scarpata rupestre con prato arido, 544 m, 25 June 2016, A. Scoppola (FI, UTV n. 34152). – Species new for the flora of Umbria.

This submediterranean annual species, partially spread in the Italian peninsula (Lombardia, Veneto, Toscana, Lazio and Calabria, Conti et al. 2005), grows mostly in dry hillsides, arid grasslands and roadsides, on acidic or acidified dry and poor soils. *Trifolium hirtum* was described by Carlo Allioni from Piemonte, “Loc. in Monteferato secus agros” (Allioni 1798), and the original material is in TO. The presence in Piemonte is nowadays in doubt; moreover, it is not confirmed in Liguria (Conti et al. 2005). Considering that the Italian distribution range for this species shows many gaps (Conti et al. 2005), a larger occurrence and regional confirmations are to be expected through further investigation.

A. Scoppola

***Vicia narbonensis* L. subsp. *serratifolia* (Jacq.) Ces. (Fabaceae)**

+ **CAL:** Morano Calabro (Cosenza), lungo la strada per Piano di Ruggio (WGS84: 39.900524°N; 16.098626°E), margine di faggeta, altitudine 1521 m, 8 June 2016, Leg. D. Puntillo, Det. D. Puntillo & C. Gangale (FI, CLU, Herb. Gangale & Uzunov). – Subspecies confirmed for the flora of Calabria.

Less widespread than the nominal subspecies, *V. narbonensis* subsp. *serratifolia* is easily recognizable for the number of teeth on leaves, stipules, and the number of flowers. Old records for Calabria at Mt. Sila by Sarfatti (1959, 1965) as *V. narbonensis* v. *serratifolia* were not listed in Conti et al. (2005). Terracciano (1900) also refers *V. serratifolia* Jacq. from Mt. Pollino (Campotenese, San Basile).

D. Puntillo, C. Gangale

Viola pumila Chaix (Violaceae)

+ **LOM:** Formigosa (Mantova), loc. Vecchia Fornace (WGS84: 45.117322°N; 10.858805°E), 21 m a.s.l., 16 April 2016, *F. Buldrini, C. Santini* (FI). – Species new for the flora of Lombardia.

Viola pumila is extremely rare at the Italian (Pignatti 1982) and European level (Schnittler and Günther 1998). This is the fifth population today known in Italy. Here *V. pumila* grows on the edge of the escarpment of a quarry basin. It is the most abundant population of Italy: the individuals are nearly 100, 62 of them were flowering and many of the remnant were young. The site is trampled and frequented by fishermen, with risk of ground slips and plant removal. The associated flora consists of very common or alien species. The discovery of this new population does not modify the risk category of *V. pumila*, which is critically endangered (Buldrini and Dallai 2011), and poses the problem of its real distribution on the national territory: the global Italian population might be partly underestimated, due to the species' scarce visibility and its presence in places considered not particularly interesting, such as semi-natural embankment meadows and the edges of small country ditches. In Italy, *V. pumila* lives at the SW margin of its distribution: the current range may be a relict of a former presence extended throughout the entire Po valley and the Venetian plain (Buldrini et al. 2013).

F. Buldrini, C. Santini

References

- Aeschimann D, Lauber K, Moser DM, Theurillat J-P (2004) Flora Alpina, Vols. 1–2. Zanichelli, Bologna.
- Acta Plantarum (2008) *Heteropogon contortus* (L.) P.Beauv. <http://www.actaplantarum.org/floraitaliae/viewtopic.php?t=8138> [accessed 22.07.2016]
- Alfonso G, Frassanito A, Beccaris L, Belmonte G (2014) Relazione Finale del Progetto: Stagni temporanei del Parco Nazionale dell'Alta Murgia: peculiarità biologiche. Report 2014. Di.S.Te.B.A., Università del Salento – Ente Parco Nazionale dell'Alta Murgia.
- Allioni C (1789) Auctarium Floram Pedemontanam cum notis et emendationibus: 20. Augustae Taurinorum.

- Astuti G, Cristofolini G, Peruzzi L, Pupillo P (2014) A new subspecies of *Pulmonaria officinalis* (Boraginaceae) from the southern Alps. *Phytotaxa* 186(3): 148–157. doi: 10.11646/phytotaxa.186.3.3
- Ballelli S, Cesaretti S, Gatti R, Montenegro BF, Vitanzi A, Catorci A (2010) Catalogo bibliografico della flora vascolare dei Monti Sibillini (Appennino centrale, Italia). *Braun-Blanquetia* 47: 1–127.
- Barina Z, Pifkó D (2008) Additions and amendments to the flora of Albania. *Willdenowia* 38: 455–464. doi: 10.3372/wi.38.38206
- Bartolucci F (2007) Notula: 1354. In: Conti F, Nepi C, Peruzzi, Scoppola A (Eds) Notulae alla checklist della flora vascolare italiana: 4 (1311–1419). *Informatore Botanico Italiano* 39(2): 416.
- Bartolucci F, Ranalli N, Bouvet D, Cancellieri L, Fortini P, Gestri G, Di Pietro R, Lattanzi E, Lavezzo P, Longo D, Marsili S, Peccenini S, Peruzzi L, Salerno G, Soldano A, Tilia A, Turcato C, Viciani D, Wagensommer RP, Conti F (2012) Contributo alla conoscenza floristica del settore settentrionale del Gran Sasso d'Italia (Parco Nazionale del Gran Sasso e Monti della Laga) (Abruzzo): resoconto dell'escursione del Gruppo di Floristica (S.B.I.) nel 2010. *Informatore Botanico Italiano* 44: 355–385.
- Béguinot A (1904) Materiali per una monografia del genere *Myosotis* L. *Annali di Botanica* 1: 275–295.
- Bernardo L (2014) Notula: 2028. In: Nepi C, Peccenini S, Peruzzi L (Eds) Notulae alla checklist della flora vascolare italiana: 17 (2027–2070). *Informatore Botanico Italiano* 46(1): 71.
- Bertolli A, Prosser F (2011) Segnalazioni Floristiche Tridentine, VIII. *Annali dei Musei Civici Rovereto* 26 (2010): 269–318.
- Bertoloni A (1838) Flora Italica, Vol. 3. Richardi Masii, Bologna.
- Biscotti N (2002) Botanica del Gargano, Vols. 1–2. Gerni Ed., San Severo.
- Bolzon P (1920) Flora della Provincia di Parma e del confinante Appennino Tosco-Ligure-Piacentino. Tip. Ricci, Savona.
- Bovio M (2014) Flora vascolare della Valle d'Aosta. Repertorio commentato e stato delle conoscenze. Testolin Ed., Sarre (Aosta).
- Buldrini F, Dallai D (2011) Schede per una Lista Rossa della Flora vascolare e crittogramica italiana: *Viola pumila* Chaix. *Informatore Botanico Italiano* 43(2): 435–438.
- Buldrini F, Conte L, Dallai D, Ferrari C (2013) Genetic diversity of the rare and endangered meadow violet (*Viola pumila* Chaix) at the southern margin of its range. *Plant Biosystems* 147(3): 563–572. doi: 10.1080/11263504.2012.754383
- Carta A, Pierini B, Alessandrini A, Frignani F, Peruzzi L (2010) Contributo alla conoscenza della flora vascolare endemica di Toscana ed aree contermini. 1. *Crocus etruscus* Parl. (Iridaceae). *Informatore Botanico Italiano* 42(1): 47–52.
- Caruel T (1889) Flora italiana, Vol. VIII. Le Monnier, Firenze.
- Cecchi L, Coppi A, Hilger HH, Selvi F (2014) Non-monophly of *Buglossoides* (Boraginaceae: Lithospermeae): phylogenetic and morphological evidence for the expansion of *Glandora* and reappraisal of *Aegonychon*. *Taxon* 63(5): 1065–1078. doi: 10.12705/635.4
- Cecchi L, Selvi F (2015) Synopsis of Boraginaceae subfam. Boraginoideae tribe Boragineae in Italy. *Plant Biosystems* 149(4): 630–677. doi: 10.1080/11263504.2015.1057261

- Clayton WD (1980) *Heteropogon* Pers. In: Tutin TG, Heywood VH, Burges NA, Moore DM, Valentine DH, Walters SM, Webb DA (Eds) Flora Europaea, Vol. 5. Cambridge University Press, Cambridge, 266.
- Conti F, Abbate G, Alessandrini A, Blasi C (Eds) (2005) An annotated checklist of the Italian vascular flora. Palombi Editori, Roma.
- Conti F, Alessandrini A, Bacchetta G, Banfi E, Barberis G, Bartolucci F, Bernardo L, Bonacquisti S, Bouvet D, Bovio M, Brusa G, Del Guacchio E, Foggi B, Frattini S, Galasso G, Gallo L, Gangale C, Gottschlich G, Grünanger P, Gubellini L, Iirit G, Lucarini D, Marchetti D, Moraldo B, Peruzzi L, Poldini L, Prosser F, Raffaelli M, Santangelo A, Scassellati E, Scortegagna S, Selvi F, Soldano A, Tinti D, Ubaldi D, Uzunov D, Vidali M (2007) Integrazioni alla checklist della flora vascolare italiana. Natura Vicentina 10(2006): 5–74.
- Conti F, Bartolucci F (2016) The vascular flora of Gran Sasso and Monti della Laga National Park (Central Italy). Phytotaxa 256(1): 1–119. doi: 10.11646/phytotaxa.256.1.1
- Conti F, Bartolucci F, Manzi A, Paolucci M, Santucci B, Petriccione B, Ciaschetti G, Stinca A (2016) Integrazioni alla flora vascolare dell'Italia centrale. Atti Società Toscana di Scienze naturali, Memorie, serie B 122 (2015): 33–42.
- Conti F, Manzi A (1996) Note floristiche per Abruzzo, Molise e Puglia. Archivio Geobotanico 2(1): 83–90.
- D'Amico FS, Signorile G (2001) Osservazioni sulle comunità vegetali igrofile nei "laghi" di Conversano (Ba). In: Macchia F (Ed.) Territorio e Società nelle aree meridionali – Atti del convegno, Bari-Matera, 24–27 Ottobre 1996. Mario Adda Editore, Bari, 137–146.
- D'Amico FS, Signorile G, Forte L (2003) Aspetti botanici ed ecologici dei "laghi di Conversano" (Ba). In: Montacchini F, Soldano A (Eds) Atti del Convegno Nazionale "Botanica delle zone umide". Vercelli – Albano Vercellese 10-11 Novembre 2000. Atti Mus. Reg. Sci. Nat. Torino. Ages Arti Grafiche S.p.a., Torino, 231–248.
- Danin A (2000) The Nomenclature News of Flora Palaestina. Fl. Medit. 10: 109–172.
- De Martis G, Serri G, Mulas B (2009) Notula 1620. In: Nepi C, Peccenini S, Peruzzi L (Eds) Notulae alla checklist della flora vascolare italiana: 8 (1568–1622). Informatore Botanico Italiano 41(2): 358.
- De Notaris G (1844) Repertorium floriae ligusticae. Ex Regio Typographeo, Taurini, 495 pp.
- Euro+Med (2006 onwards) Euro+Med PlantBase – the information resource for Euro-Mediterranean plant diversity. Published on the Internet <http://ww2.bgbm.org/EuroPlusMed/> [accessed 22.07.2016]
- Fenaroli L (1970) Florae Garganicae Prodromus. Pars Altera. Webbia 24(2): 435–578. doi: 10.1080/00837792.1970.10669916
- Fernandes RB (1972) *Buglossoides* Moench. In: Tutin TG, Heywood VH, Burges NA, Moore DM, Valentine DH, Walters SM, Webb DA (Eds) Flora Europaea, Vol. 3. Cambridge University Press, Cambridge, 87–88.
- Fiori A (1907) Flora Analitica d'Italia, Vol. 4(1). Tipografia del Seminario, Padova.
- Fiori A (1925) Nuova flora analitica d'Italia, Vol. II(1). Tipografia M. Ricci, Firenze, 1–160.
- Foggi B, Ricceri C (1993) On the revaluation of *Silene staminea* Bertol. (*Caryophyllaceae*) Webbia 47(2): 191–201. doi: 10.1080/00837792.1993.10670540

- Gavioli O (1932) Contributo allo studio della Flora Del M. Pollino. Archivio botanico per la sistematica, fitogeografia e genetica (storica e sperimentale) VIII: 46–64.
- Giannico S (Ed.) (2011) Territorio e ambiente dell'Arco Jonico. Elementi per un programma di valorizzazione. Amministrazione Provinciale di Taranto – Università degli Studi di Bari, Dpt. di Economia e Politica Agraria, Estimo e Pianificazione Rurale, Adda Editore, Bari.
- Grau J (1968) Cytotaxonomische bearbeitung der gattung *Myosotis* L. III. Die annuellen sippen. Mitteilungen der Botanischen Staatssammlung München 7: 17–100.
- Greuter W, Burdet HM, Long G (1986) Med-Checklist, Vol. 3. Dycotiledones (Convolvulaceae-Labiatae). Conservatoire et Jardin botaniques de la Ville de Genève, Genève.
- Greuter W, Burdet HM, Long G (1989) Med-Checklist, Vol. 4. Dycotiledones (Lauraceae-Rhamnaceae). Conservatoire et Jardin botaniques de la Ville de Genève, Genève.
- Greuter W (1995) Studies in Greek Caryophylloideae: *Agrostemma*, *Silene*, and *Vaccaria*. Willdenowia 25: 105–142.
- Harpke D, Carta A, Tomović G, Randelović V, Randelović N, Blattner FR, Peruzzi L (2015) Phylogeny, karyotype evolution and taxonomy of *Crocus* ser. *Verni* (Iridaceae). Plant Systematics and Evolution 301(1): 309–325. doi: 10.1007/s00606-014-1074-0
- Harpke D, Peruzzi L, Kerndorff H, Karamplianis T, Constantinidis T, Randelović V, Randelović N, Juković M, Pasche E, Blattner FR (2014) Phylogeny, geographic distribution, and new taxonomic circumscription of the *Crocus reticulatus* species group (Iridaceae). Turkish Journal of Botany 38: 1182–1198. doi: 10.3906/bot-1405-60
- Hörndl E, Raab-Straube E von (2015) Ranunculeae. In: Euro+Med Plantbase - the information resource for Euro-Mediterranean plant diversity. <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameCache=Ficaria+calthifolia&PTRefFk=7500000> [accessed 28.10.2016]
- Klimko M, Truchan M, Wysakowska I (2013) Fruit and seed morphology of the genus *Heracleum* L. (Apiaceae) in Poland. Roczniki Akademii Rolniczej w Poznaniu. Botanika-Steciana 17: 13–24.
- Licht W, Wagensommer RP (2008) Nuove acquisizioni per la flora della Puglia. Informatore Botanico Italiano 40(1): 15–22.
- Meeus S, Honnay O, Jacquemyn H (2013) Differences in fine-scale spatial genetic structure across the distribution range of the distylos forest herb *Pulmonaria officinalis* (Boraginaceae). BMC Genetics 2013 14: 101. doi: 10.1186/1471-2156-14-101
- Nazzaro R, Menale B, La Valva V (2007) Check-list della flora del Monte Taburno (Campania). Delpinoa 47 (2005): 37–55.
- Nikolić T (Ed.) (2016) Flora Croatica Database. Department of Botany, Faculty of Science, University of Zagreb. Published on the Internet <http://hirc.botanic.hr/fcd> [accessed 3.11.2016]
- Paolucci L (1890-91) Flora Marchigiana. Tipografia Federici, Pesaro.
- Parlatore F (1858) Flora Italiana, Vol. 3. Le Monnier, Firenze.
- Perazza G (2016) *Epipogium aphyllum* Sw. In: GIROS (Eds) Orchidee d'Italia. Guida alle orchidee spontanee. Il Castello, Cornaredo, Milano, 318.
- Peruzzi L (2016a) *Crocus heuffelianus* (Iridaceae), a new record for the Italian flora. Phytotaxa 261(3): 291–294. doi: 10.11646/phytotaxa.261.3.10
- Peruzzi L (2016b) (768) Proposal to reject the name *Crocus purpureus* (Iridaceae). Taxon 65(4): 886. doi: 10.12705/654.21

- Peruzzi L, Carta A (2011) *Crocus ilvensis* sp. nov. (sect. *Crocus*, Iridaceae), endemic to Elba Island (Tuscan Archipelago, Italy). Nordic Journal of Botany 29(1): 6–13. doi: 10.1111/j.1756-1051.2010.01023.x
- Peruzzi L, Conti F, Bartolucci F (2014) An inventory of vascular plants endemic to Italy. Phytotaxa 168(1): 1–75. doi: 10.11646/phytotaxa.168.1.1
- Peruzzi L, Ganz C, Bovio M (2013) Notulae: 2000–2001. In: Barberis G, Nepi C, Peccenini S, Peruzzi L (Eds.) Notulae alla Checklist della flora italiana: 16. Informatore Botanico Italiano 45(2): 299–300.
- Peruzzi L, Domina G, Bartolucci F, Galasso G, Peccenini S, Raimondo FM, Albano A, Alessandrini A, Banfi E, Barberis G, Bernardo L, Bovio M, Brullo S, Brundu G, Brunu A, Camarda I, Carta L, Conti F, Croce A, Iamónico D, Iberite M, Iiriti G, Longo D, Marsili S, Medagli P, Pistarino A, Salmeri C, Santangelo A, Scassellati E, Selvi F, Soldano A, Stinca A, Villani M, Wagensommer RP, Passalacqua NG (2015) An inventory of the names of vascular plants endemic to Italy, their loci classici and types. Phytotaxa 196(1): 1–217. doi: 10.11646/phytotaxa.196.1.1
- Pignatti S (1982) Flora d'Italia, Vols. 1–3. Edagricole, Bologna.
- Raffaelli M (1982) Contributi alla conoscenza del genere *Polygonum* L. 4. Le specie italiane della sect. *Polygonum*. Webbia 35(2): 361–406. doi: 10.1080/00837792.1982.10670232
- Raimondo FM, Domina G, Spadaro V (2010) Checklist of the vascular flora of Sicily. Quaderni di Botanica ambientale e applicata 21(2010): 189–252.
- Ricca L (1870) Catalogo delle piante vascolari spontanee della zona olearia nelle due Valli di Diana Marina e di Cervo. Atti della Società Italiana di Scienze Naturali 13: 60–143.
- Rich TCG, Nicholls–Vuille FL (2001) Taxonomy and distribution of European *Damasonium* (Alismataceae). Edinburgh Journal of Botany 58(1): 45–55. doi: 10.1017/s0960428601000464
- Roskov Y, Abucay L, Orrell T, Nicolson D, Flann C, Bailly N, Kirk P, Bourgoin T, DeWalt RE, Decock W, De Wever A (Eds) (2016) Species 2000 & ITIS Catalogue of Life, 2016 Annual Checklist. Species 2000: Naturalis, Leiden, the Netherlands. ISSN 2405-884X. Digital resource at www.catalogueoflife.org/annual-checklist/2016 [accessed 27.10.2016].
- Sarfatti G (1959) Prodromo della flora della Sila (Calabria). Webbia 15(1): 169–248. doi: 10.1080/00837792.1959.10669697
- Sarfatti G (1965) Prodromo della flora della Sila (Calabria), parte II. Webbia 20(2): 355–425. doi: 10.1080/00837792.1965.10669820
- Schnittler M, Günther KF (1999) Central European vascular plants requiring priority conservation measures - an analysis from national Red Lists and distribution maps. Biodiversity and Conservation 8: 891–925.
- Sell PD (1994) *Ranunculus ficaria* L. sensu lato. Watsonia 20(1): 41–50.
- Strid A, Tan K (1999) *Myosotis speluncicola* (Boiss.) Rouy. In: Greuter W, Raus T (Eds) Med-Checklist Notulae 18. Willdenowia 29: 51–67. doi: 10.1023/A:1008828704456
- Talavera S, Talavera MM (2010) *Damasonium* Mill. In: Talavera S, Gallego MJ, Romero Zarco C, Herrero A (Eds) Flora iberica. Vol. XVII – Butomaceae–Juncaceae, 18–22.
- Terracciano N (1900) Addenda ad Synopsidem plantarum vascularium Montis Pollini. Annuario del R. Istituto Botanico di Roma, Vol. IX: 23–88.
- Tison J-M, De Foucault B (2014) Flora Gallica - Flore de France. Biotopes, Mèze.

- Tutin TG (1968) *Heptaptera* Margot & Reuter. In: Tutin TG, Heywood VH, Burges NA, Moore DM, Valentine DH, Walters SM, Webb DA (Eds) Flora Europaea, Vol. 2. Cambridge University Press, Cambridge, 344.
- USDA (2011) USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network – (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. <https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?id=18953> [accessed 19.07.2016]
- Veldkamp JF (2015) De nomenclatuur van Speenkruiden (*Ficaria verna* Huds. s.l., Ranunculaceae). *Gorteria* 37(3–4): 84–116.
- Vignolo-Lutati F (1953) Hieracia Pedemontana. Catalogo sistematico. *Allionia* 1(2): 289–456.
- Vuille FL (1987) Reproductive biology of the genus *Damasonium* (Alismataceae). *Plant Systematics and Evolution* 157: 63–71. doi: 10.1007/BF00939181
- Wagensommer RP, Marrese M, Perrino EV, Bartolucci F, Cancellieri L, Carruggio F, Conti F, Di Pietro R, Fortini P, Galasso G, Lattanzi E, Lavezzo P, Longo D, Peccenini S, Rosati L, Russo G, Salerno G, Scoppola A, Soldano A, Stinca A, Tilia A, Turco A, Medagli P, Forte L (2014) Contributo alla conoscenza floristica della Puglia: resoconto dell’escursione del Gruppo di Floristica (S.B.I.) nel 2011 nel settore meridionale dei Monti della Daunia. *Informatore Botanico Italiano* 46(2): 175–208.
- Wagensommer RP, Medagli P, Perrino EV (2013) Piante vascolari minacciate e Liste Rosse: aggiornamento delle conoscenze in Puglia. *Informatore Botanico Italiano* 45(2): 393–432.
- Zahn KH (1922–1938) *Hieracium*. In: Ascherson PFA & Graebner KOPP: Synopsis der mitteleuropäischen Flora 12(1): 1–80 (1922), 81–160 (1924), 161–400 (1929), 401–492 (1930); 12(2): 1–160 (1930), 161–480 (1931), 481–640 (1934), 641–790 (1935); 12(3): 1–320 (1936), 321–480 (1937), 481–708 (1938). Borntraeger, Leipzig, Berlin.

Global and Regional IUCN Red List Assessments: 2

Giuseppe Fenu¹, Gianluigi Bacchetta^{2,3}, Liliana Bernardo⁴, Giacomo Calvia⁵, Sandra Citterio⁶, Bruno Foggi⁷, Mauro Fois², Carmen Gangale⁸, Gabriele Galasso⁹, Domenico Gargano⁴, Matilde Gennai⁷, Rodolfo Gentili⁶, Gianluca Larroux¹⁰, Enrico V. Perrino¹¹, Lorenzo Peruzzi¹², Francesco Roma-Marzio¹², Dimitar Uzunov¹³, Ilda Vagge¹⁴, Daniele Viciani⁶, Robert P. Wagensommer¹⁵, Simone Orsenigo¹⁴

1 Department of Environmental Biology, “Sapienza” University of Rome, Rome, 00185, Italy **2** Centre for the Conservation of Biodiversity (CCB), Department of Life and Environmental Sciences, University of Cagliari, Cagliari, 09123, Italy **3** Hortus Botanicus Karalitanus (HBK), University of Cagliari, Cagliari, 09123, Italy **4** Department of Biology, Ecology, and Earth Sciences, University of Calabria, Arcavacata di Rende, 87036, Italy **5** Department of Environmental and Natural Sciences, University of Sassari, Sassari, 07100, Italy **6** Department of Earth and Environmental Sciences, University of Milano-Bicocca, Milan, 20126, Italy **7** Department of Biology, University of Florence, Florence, 50121, Italy **8** Museo di Storia Naturale ed Orto Botanico University of Calabria, Arcavacata di Rende, 87036, Italy **9** Sezione di Botanica, Museo di Storia Naturale di Milano, Milano, 20121, Italy **10** DC Sport, Benessere e Qualità della vita, Settore Verde e Agricoltura, Municipality of Milan, Milan, 20123, Italy **11** CIHEAM – Mediterranean Agronomic Institute of Bari, Valenzano (BA), 70010, Italy **12** Department of Biology, University of Pisa, Pisa, 56126, Italy **13** CHLORA sas, San Fili (CS), 87037, Italy **14** Department of Agricultural and Environmental Sciences - Production, Landscape, Agroenergy, University of Milan, Milan, 20122, Italy **15** Department of Chemistry, Biology and Biotechnology, University of Perugia, Perugia, 06123, Italy

Corresponding author: Orsenigo Simone (simone.orsenigo@unimi.it)

Academic editor: R. Lansdown | Received 31 October 2016 | Accepted 15 November 2016 | Published 29 November 2016

Citation: Fenu G, Bacchetta G, Bernardo L, Calvia G, Citterio S, Foggi B, Fois M, Gangale C, Galasso G, Gargano D, Gennai M, Gentili R, Larroux G, Perrino EV, Peruzzi L, Roma-Marzio F, Uzunov D, Vagge I, Viciani D, Wagensommer RP, Orsenigo S (2016) Global and Regional IUCN Red List Assessments: 2. Italian Botanist 2: 93–115. doi: 10.3897/italianbotanist.2.10975

Abstract

In this contribution the conservation status assessment of six plant species according to IUCN categories and criteria are presented. It includes the assessment at global level of *Charybdis glaucophylla* Bacch., Brullo, D’Emerico, Pontec. & Salmeri, *Euphorbia nicaeensis* All. subsp. *japygica* (Ten.) Arcang., *Hieracium australe* Fr. subsp. *australe*, *Limonium multiflorum* Pignatti, *Onosma helvetica* Boiss. em. Tepner subsp. *lucana* (Lacaita) Peruzzi, Aquaro & Cesca and the assessment at national level (Italy) of *Lathyrus laxiflorus* (Desf.) Kuntze subsp. *laxiflorus*.

Keywords

Conservation, extinction risk, IUCN protocol, threats

How to contribute

The text of the national and global assessment should be submitted electronically to Simone Orsenigo (Simone.Orsenigo@unimi.it) or to Giuseppe Fenu (gfenu@unica.it); text up to 8000 characters in length (space included) must include a distribution map and a picture of the assessed species.

Red List assessments

Charybdis glaucophylla Bacch., Brullo, D'Emerico, Pontec. & Salmeri

Global assessment

Taxonomy and nomenclature

Order: Asparagales *Family:* Asparagaceae

Charybdis glaucophylla Bacch., Brullo, D'Emerico, Pontec. & Salmeri, Phytotaxa 69: 18 (2012).

Common name. Scilla dalle foglie glauche (It); Scille avec feuilles glauques (Fr); Scilla with glaucous leafs (En)

Geographic distribution range. *Charybdis glaucophylla* (Fig. 1) is endemic to the Sardo-Corsican biogeographical province (Fenu et al. 2014); its known distribution consists of seven populations in Sardinia and one population in Corsica (Fig. 2). Until recently, *C. glaucophylla* was known only from the Sulcitano-Iglesiente biogeographic sector (Isola di San Pietro, Pranu Sartu, Is Arenas and Monte Linas; Fenu et al. 2014). In recent years, this taxon was also discovered in three small localities in the mountainous inlands of Monte Limbara (north Sardinia). The only Corsican population was recently discovered in the islet of Lavezzi (southern Corsica).

Distribution. Countries of occurrence: Italy (Sardinia) and France (Corsica)

Biology. Plant growth form: perennial (geophyte)

Flowering and fruiting time. From late July to August and fruiting from August to September.

Reproduction. No information on pollination, dispersal strategy or seed germination are available.

Habitat and ecology. This species has a relatively wide ecological range. In coastal areas, it is associated with both rocky and sandy places. It is usually a member of sub-halophilous plant communities characterised by a number of endemic species, such as *Bellium crassifolium* Moris, *Hyoseris taurina* (Pamp.) Martinoli and *Limonium sulcita-*

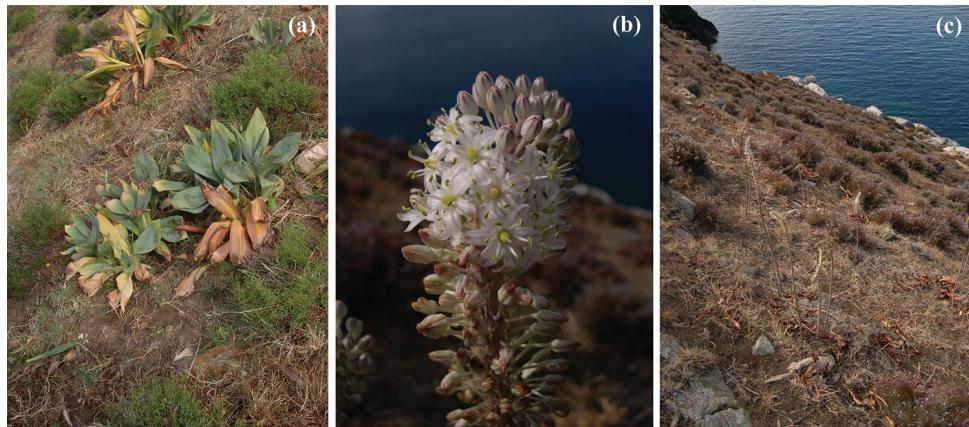


Figure 1. Phenological features of *Charybdis glaucophylla* Bacch., Brullo, D'Emrico, Pontec. & Salmeri; of winter foliation (a), summer flowering (b) and natural late-summer habit (c) in Sardinia. Photograph by G. Bacchetta.

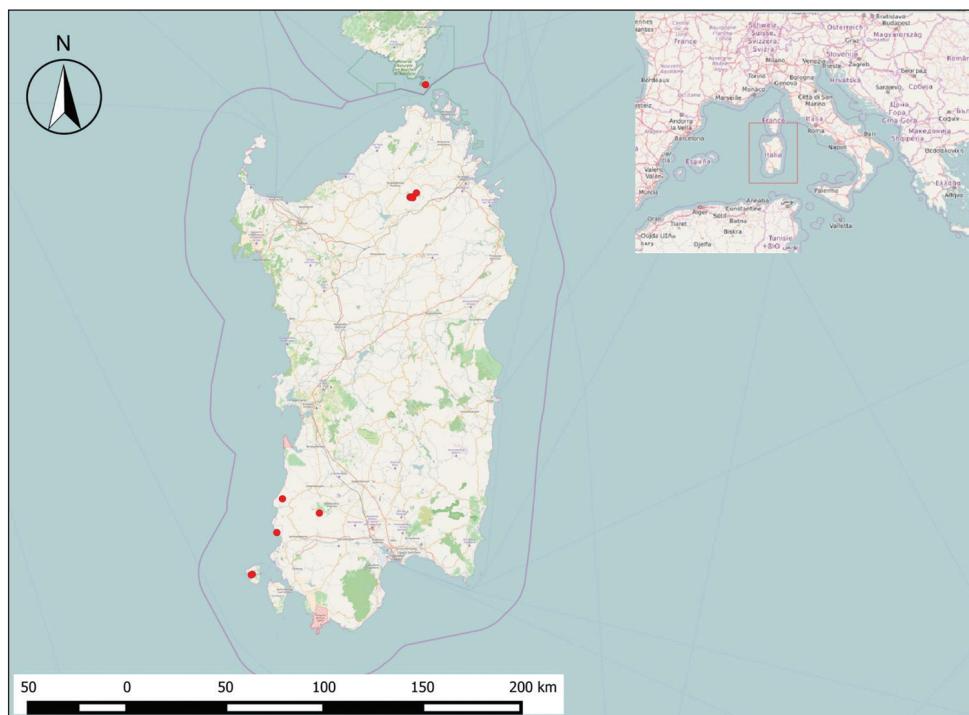


Figure 2. Geographic range and distribution map of *Charybdis glaucophylla*.

num Arrigoni. On sand dunes, this species grows together with various psammophytes, such as *Ephedra distachya* L., *Genista arbusensis* Vals. and *Scrophularia ramosissima* Loisel. (Bacchetta et al. 2012). However, *Charybdis glaucophylla* also occurs in mountainous areas up to 1,300 m elevation. Here it generally grows in garrigue characterised

by *Teucrium marum* L., *Genista corsica* (Loisel.) DC. and *Helichrysum microphyllum* subsp. *tyrrhenicum* Bacch., Brullo & Giusso as well as other geophytes, such as *Crocus minimus* DC. and *Romulea requienii* Parl.

Population information. There is no detailed information available on population dynamics. However, due to its habitats, the population trend and the number of mature individuals can be considered stable.

Threats. 2.3.1 *Nomadic grazing*: The presence of domestic and wild animals (in particular wild boar *Sus scrofa*) could limit the reproductive success of this taxon.

CRITERIA APPLIED:

Criterion B: **EOO:** 3,743 km² calculated with minimum convex hull in ArcGis 9.1
AOO: 36 km² calculated with a 2×2 km cell fixed grid

Decline. No documented decline in EOO, AOO, number of subpopulations, quality of the habitat or number of mature plants.

Red List category and Criteria (Global Assessment)

LC	Least Concern
----	---------------

Rationale for the assessment. *Charybdis glaucophylla* is a Corso-Sardinian endemic that is found in eight distinct populations, mainly concentrated in Sardinia. It has an extent of occurrence of ca. 4,000 km² and an area of occurrence of 36 km². Despite the small size of most populations and the observed grazing impact, there is no evidence of a decline. Indeed, most populations occur in remote places, reached only by few animals and humans, and impacts could be considered marginal and/or potential. For this reason, this plant is assessed as Least Concern at global level.

Previous assessment. *Charybdis glaucophylla* was considered Vulnerable (VU D2) at the regional level in Sardinia (Bacchetta et al. 2012); it was not evaluated (NE) previously at the global (IUCN 2016) or at the regional level in Corsica (Delage and Hugot 2015).

Conservation actions. *Charybdis glaucophylla* is unprotected by either international, national or regional laws. To-date, seeds are not stored in any germplasm bank, although some individuals are cultivated in the Botanical Garden of Cagliari (Sardinia, Italy). In Sardinia, all known locations are included in the Natura 2000 network; in particular, southwestern populations are in SCIs ITB040027 “Isola di San Pietro”, ITB040029 “Costa di Nebida”, ITB040071 “Da Piscinas a Riu Scivu”, ITB041111 “Monte Linas Marganai”, and in the Natura 2000 SPA ITB043035 “Costa e entroterra tra Punta Cannoni e Punta delle Oche”. All populations in northern Sardinia are included within the SCI ITB011109 “Monte Limbara”. The only population in Corsica is within the Corsican Nature Reserve of “Bouches de Bonifacio” and in the Natura 2000 SCI FR9400591 and SPA FR9410021 “Plateau de Pertusato/ Bonifacio et îles Lavezzi”.

Conservation actions needed. Research activities are recommended in order to better understand the reproductive biology; *ex situ* conservation and monitoring programs

are encouraged in order to prevent and evaluate the possible development of threats (e.g. increasing grazing, human activities or stochastic events), which could rapidly change the current conservation status, in particular of the small and scattered populations.

Notes. *Charybdis glaucophylla* presents relevant karyological, morphological and phenological features, such as wide and short, rigid and glaucous-pruinose leaves, as well as the very late winter foliation (Bacchetta et al. 2012). Indeed, it showed only some relationships with *C. pancratii* for the whitish bulb tunics and the diploid chromosome complement, and with *C. maura* and *C. aphylla* due to the glaucous leaves. *Charybdis glaucophylla* was considered a relictual schizoendemic arisen by a gradual diversification as a consequence of a long geographic isolation (Bacchetta et al. 2012). However, due to the recent discovery of populations in northern Sardinia and Corsica, the phylogenesis of this taxon should be revisited and supported by updated investigations.

Mauro Fois, Giuseppe Fenu, Giacomo Calvia, Gianluigi Bacchetta

Euphorbia nicaeensis All. subsp. *japygica* (Ten.) Arcang.

Global assessment

Taxonomy and nomenclature

Order: Malpighiales Family: Euphorbiaceae

Euphorbia nicaeensis All. subsp. *japygica* (Ten.) Arcang., Comp. Fl. Ital.: 620 (1882)
 \equiv *Euphorbia japygica* Ten. (basionym), Fl. Napol. 4: 266 (1830) \equiv *Euphorbia seguieriana* Neck. var. *japygica* (Ten.) Fiori in Fiori & Bég., Fl. Ital. 2(2): 286 (1901)

Common name. Euforbia pugliese (It)

Geographic distribution range. This endemic taxon (Fig. 3) is found only in Puglia, Basilicata and Campania (Italy; Fig. 4). In Puglia, it is known for several localities; it is quite common in the Murge area and less common in the Gravine dell'Arco Jonico, occurring in Corato (Bari), Cassano delle Murge (Bari), Altamura (Bari), Gravina in Puglia (Bari) and Laterza (Taranto) (Forte et al. 2005 and unpublished data), with one occurrence in Gargano (Licht 2008) at Montenero. The record from Salento must be referred to *E. nicaeensis* s.l., without indication of the subspecies (Mele et al. 2006).

In Campania, this taxon is recorded only for Acqua delle Tavole at Monte Polveracchio (Campagna, Salerno; Del Guacchio 2010). In Basilicata, it grows only in the Parco Regionale della Murgia Materana, where it is very common (Medagli and Gambetta 2003, Medagli et al. 2014).

Distribution. Countries of occurrence: Italy

Biology. Plant growth form: perennial (chamaephyte)

Flowering time. From May to July

Reproduction. No information on pollination strategy or seed germination is available.



Figure 3. *Euphorbia nicaeensis* subsp. *japygica* photographed in National Park of Alta Murgia (Altamura). Photograph by E.V. Perrino.



Figure 4. Geographic range and distribution map of *Euphorbia nicaeensis* subsp. *japygica*.

Habitat and ecology. *Euphorbia nicaeensis* subsp. *japygica* grows typically on arid grassland and garrigues, up to about 1,000 m a.s.l. From a phytosociological point of view it is a characteristic species of the *Acino suaveolentis-Stipetum austroitalicae* Forte & Terzi in Forte, Perrino & Terzi 2005 association of the alliance *Hippocrepido glaucae-Stipion austroitalicae* Forte & Terzi in Forte, Perrino & Terzi 2005 (Forte et al. 2005).

Population information. There is no detailed information available on population dynamics.

Threats. *7.1.1 Increase in fire frequency/intensity:* an increase in fire frequency or intensity would negatively affect the populations.

7.3 Other ecosystem modifications: natural succession, favoured by the occurrence of the populations in protected areas, would lead to a loss of habitat for the species.

CRITERIA APPLIED:

Criterion B: **EOO:** 9,452 km² calculated with minimum convex hull (with Google Earth Pro)

AOO: 64 km² calculated with a 2×2 km cell fixed grid (but probably underestimated)

- a) Number of locations: 9 (according to threat 7.1.1)
- b) No documented decline in EOO (i), AOO (ii), area, extent and/or quality of habitat (iii), number of subpopulations (iv) or number of mature individuals (v)
- c) No extreme fluctuations

Red List category and Criteria (Global Assessment)

LC	Least Concern
----	---------------

Rationale for the assessment. *Euphorbia nicaeensis* subsp. *japygica* is an Italian endemic that is found only in Puglia, Basilicata and Campania. It has an extent of occurrence of 9,452 km² and an area of occupancy of at least 64 km². Although some threats have been detected, there is no evidence of a decline. Therefore, it is classified as Least Concern.

Previous assessment. *Euphorbia nicaeensis* subsp. *japygica* was not evaluated (NE) previously (IUCN 2016).

Conservation actions. *Euphorbia nicaeensis* subsp. *japygica* is unprotected by international, national or regional laws. Since 2009, under the “GRASTEPP” project, some populations in Puglia are monitored and seed lots are stored *ex situ* in the Germplasm Bank of the Botanical Museum of the University of Bari (BG-MOBB).

Conservation actions needed. research and monitoring activities are recommended, in order to better understand the reproductive biology, ecology and the threats of the species and the population trend.

Note. *Euphorbia nicaeensis* subsp. *japygica* differs from *E. nicaeensis* subsp. *nicaeensis* essentially in having hairy capsules (Smith and Tutin 1968).

Enrico Vito Perrino, Robert Philipp Wagensommer

Hieracium australe Fr. subsp. *australe*

Global assessment

Taxonomy and nomenclature

Order: Asterales Family: Asteraceae

Hieracium australe Fr., Symb. Hist. Hierac.: 120 (1848)

≡ *Hieracium australe* Fr., Nova Acta Regiae Soc. Sci. Upsal., s. 3 14: 120 (1850),
isonym ≡ *Hieracium australe* subsp. *mediolanense* Fen. & Zahn, Bot. Jahrb. Syst.
61(138): 27 (1927), nom. illeg.

Common name. Sparviere milanese (It)

Geographic distribution range. *Hieracium australe* Fr. subsp. *australe* (Fig. 5) is an Italian endemic with a very narrow range. It is known only from a single locality in the city of Milano (Fig. 6), where it grows on the walls of the Sforza castle (Galasso et al. 2011).

Distribution. Countries of occurrence: Italy

Biology. Plant growth form: perennial (hemicryptophyte)

Flowering time. From June to September

Reproduction. No detailed information on pollination, dispersal strategy or seed germination is available. However, the species is known to produce apomictic seeds

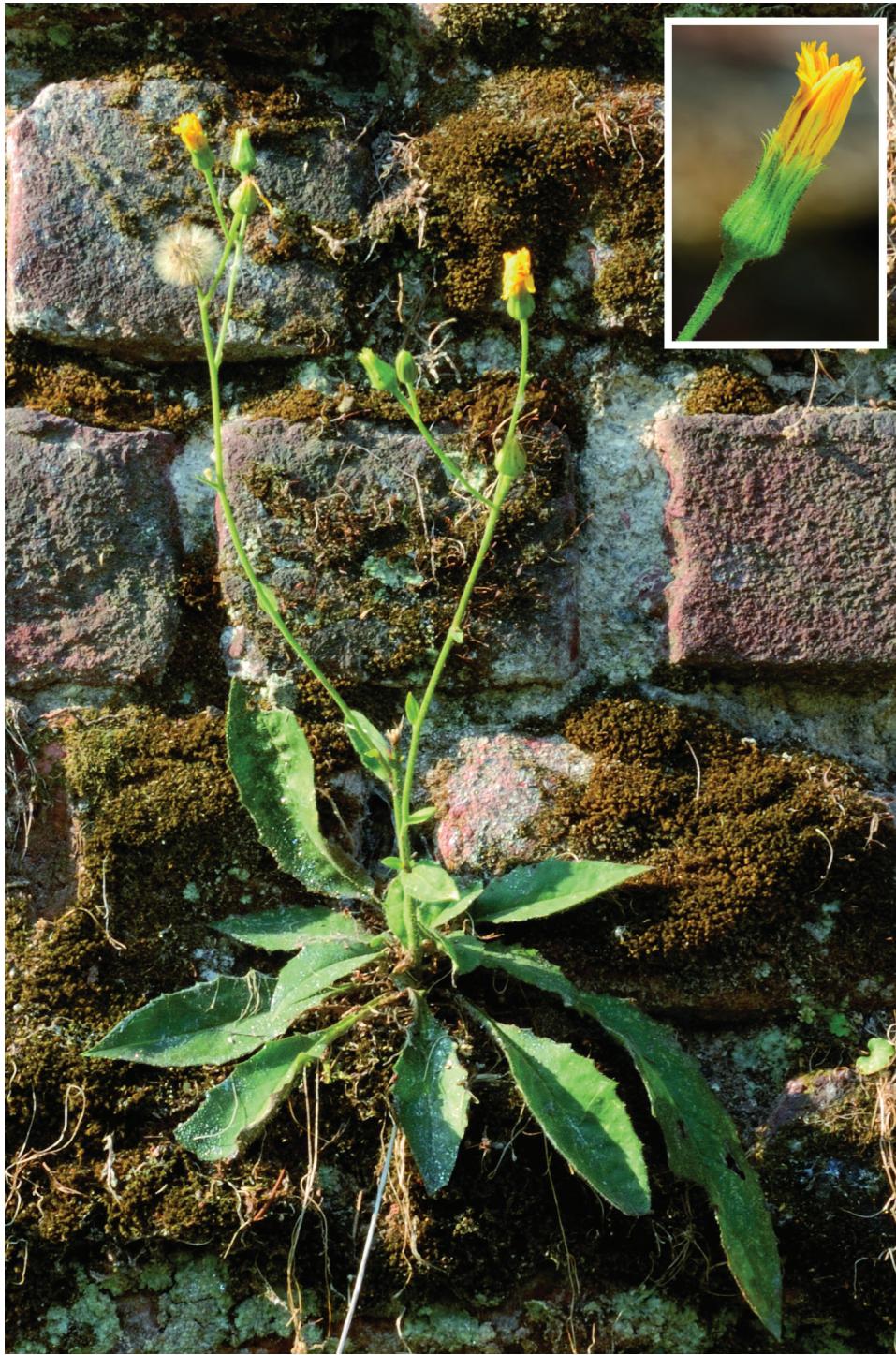


Figure 5. *Hieracium austrole* subsp. *austrole* photographed in Sforza Castle (Milano). Photograph by G. Bardelli.



Figure 6. Distribution map of *Hieracium australe* subsp. *australe*.

(Banfi et al. 2015), which seem to be dispersed by wind and that can easily germinate (unpublished data).

Habitat and ecology. This species is confined to a single site in the city center of Milano, where it grows on the walls of the Sforza castle. In the past, it was collected also on the old defensive city walls (almost completely destroyed at the beginning of the twentieth century), but today its range is limited to few square meters on the castle walls, where it grows together with common species, such as *Cymbalaria muralis* G.Gaertn., B.Mey. & Scherb. subsp. *muralis*, *Parietaria judaica* L. and *Sonchus oleraceus* L.

Population information. Only one population of 4-5 individuals is currently known. In 2011, a dozen individuals were discovered after almost thirty years in which the species was no longer recorded (Banfi and Galasso 1998). However, most of the individuals were decimated by the herbicides used during the cleaning of the walls for EXPO 2015.

Threats. 5.2.3 *Gathering terrestrial plants, Persecution/control:* the plant was removed during the cleaning of the old walls of the Sforza castle.

9.3.3 *Pollution, Herbicides and pesticides:* the use of herbicides for the containment of climbing plant species (native and invasive alien) threatens the few remaining individuals.

CRITERIA APPLIED:

Criterion B: **AOO:** 4 km² calculated with a 2×2 km cell fixed grid

Decline. Documented decline in quality of the habitat (iii) and number in mature individuals (v)

Criterion D: Number of mature individuals < 50

Red List category and Criteria (Global Assessment)

CR	Critically Endangered	B2ab(iii,v) + D1
----	-----------------------	------------------

Rationale for the assessment. *Hieracium austrole* Fr. subsp. *austrole* is an Italian endemic that is found only on the walls of the Sforza castle in Milano, with an AOO of 4 km² (although the real distribution area is a few square meters). The only known population suffered a drastic decline in 2015, with only 4-5 individuals currently surviving. For this reason this taxon is listed as Critically Endangered B2ab(iii,v) + D1.

Previous assessment. *Hieracium austrole* Fr. subsp. *austrole* was not evaluated (NE) previously (IUCN 2016).

Conservation actions. *Hieracium austrole* Fr. subsp. *austrole* is unprotected by international, national, or regional laws. One seed sample is stored *ex situ* at the Millennium Seed Bank (Royal Botanic Garden, Kew, UK).

Conservation actions needed. Urgent monitoring and management programme are required in order to save this species from extinction. In 2016, seeds were collected to start an *ex situ* cultivation programme, in order to plan future population reinforcement actions and reintroductions in other ancient walls of Milano.

Simone Orsenigo, Gabriele Galasso, Rodolfo Gentili, Gianluca Larroux, Sandra Citterio, Ilda Vagge

Limonium multiflorum Pignatti

Global Assessment

Taxonomy and nomenclature

Order: Caryophyllales Family: Plumbaginaceae

Limonium multiflorum Pignatti, Webbia 36(1): 52 (1982)

Common name. Limonio multiforme (It)

Geographic distribution range. *Limonium multiflorum* (Fig. 7) is endemic to central-southern Toscana (Italy) (Rizzotto 1984), where it occurs on the sea cliffs between Livorno and the Monte Argentario promontory (De Dominicis 1988, Biondi et al. 2000, Selvi 2010), including three islets (Baldini 1991, Foggi et al. 2000, Foggi et al. 2009; Fig. 8). Currently eight subpopulations have been identified (1. rocky coasts between Livorno and Rosignano Marittimo; 2. Piombino promontory; 3. Punta Ala; 4. Monte dell'Uccellina; 5. Mt. Argentario-Ansedonia; 6. islet of Sparviero; 7. islet of Argentario; 8. islet of Porto Ercole).

Distribution. Countries of occurrence: Italy

Biology. Plant growth form: perennial (chamaephyte)



Figure 7. *Limonium multiflorum* Pignatti in Calafuria cliffs, near Livorno (Tuscany). Photograph by D. Viciani.

Flowering time. From June to July (August)

Reproduction. No detailed information on pollination, dispersal strategy or seed germination is available. However, the species is known to be autogamous, and seeds are dispersed by sea.

Habitat and ecology. *L. multiflorum* grows on cliffs and rocky coasts close to the sea directly exposed to the marine aerosol. This species is characteristic of the association

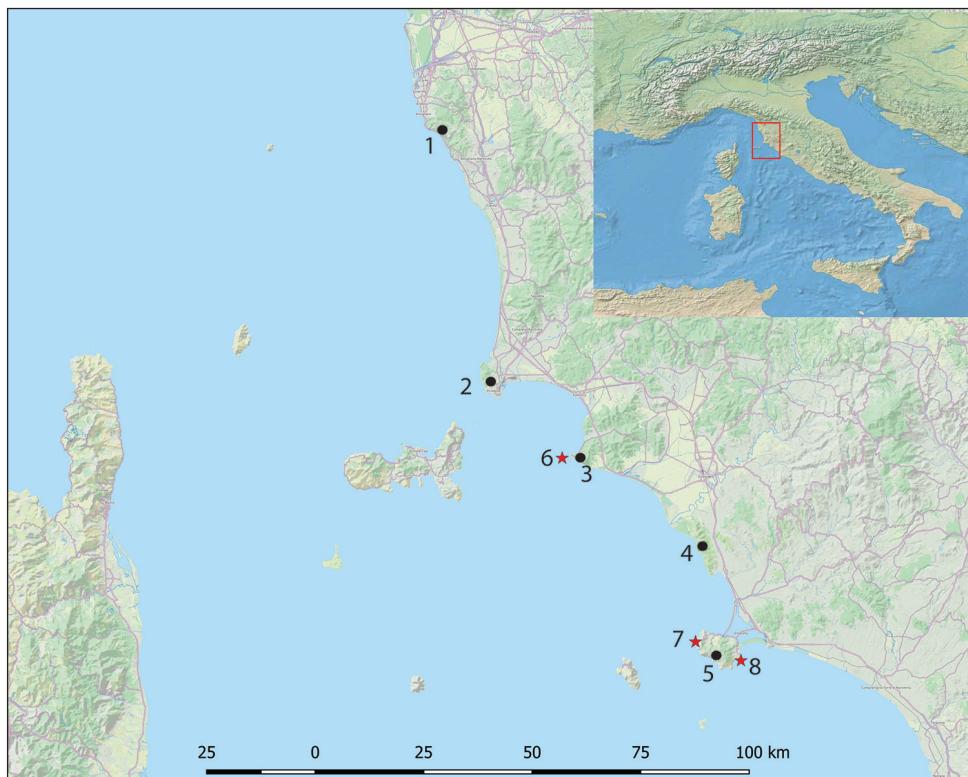


Figure 8. Geographic range and distribution map of *Limonium multififorme*.

Crithmo-Limonietum multifloris Arrigoni, Nardi & Raffaelli 1985 (Arrigoni et al. 1985, Arrigoni and Di Tommaso 1997, Foggi et al. 2006) belonging to the alliance *Crithmo maritimi-Staticion* Molinier 1934 (Habitat Directive: 1240 “Vegetated sea cliffs of the Mediterranean coasts with endemic *Limonium* spp.”).

Population information. There is no detailed information available on population dynamics, and trend nor on the number of mature individuals.

Threats. 1.1 *Housing & Urban areas*: some coastal areas close to Livorno are highly urbanized and can be subject to future developments.

6.1 *Recreational activities*: human trampling, and other tourist activities represent a threat for some of the populations (localities close to the city of Livorno, the Piombino promontory, Punta Ala and Mt. Argentario).

8.1.2 *Invasive non-native/alien species (named species)*: in many sites, the species' habitat is threatened by the expansion of *Carpobrotus acinaciformis* (L.) L.Bolus, *Opuntia* sp. pl. and *Agave* sp. pl.

8.2.2 *Problematic Native Species, (named species)*: trampling and increased nutrients (guano) due to the abundance of nesting colonies of *Larus michahellis* Naumann can damage the islet populations of *L. multififorme*, thereby favouring the growth of more nitrophilous species.

CRITERIA APPLIED:

Criterion B: **EEO:** 2,260 km² calculated with minimum convex hull in QGis 2.14
AOO: 104 km² calculated with a 2×2 km cell fixed grid

- a) Number of locations: six locations have been identified according to the detected Threats. Mt. Argentario-Ansedonia; Monte dell'Uccellina; Punta Ala; Piombino promontory; rocky coasts between Livorno and Rosignano Marittimo; the three small islets. The islets are considered as a single location according to threat 8.2.2, since the impact of increased yellow-legged gull nests is a common problem in all Tuscan islets.
- b) Decline in extent and quality of the habitat (iii)

Red List category and Criteria (Global Assessment)

VU	Vulnerable	B1ab(iii) + 2ab(iii)
----	------------	----------------------

Rationale for the assessment. *Limonium multiflorum* is an Italian endemic that is found only in eight sites in the central and southern rocky coastal area of Toscana between Livorno and the Mt. Argentario promontory. This area is highly frequented by tourists in summer and the anthropic pressure facilitates the spread of invasive alien species that affect the habitat of *L. multiflorum*. The species also occurs in three small islets where the abundance of yellow-legged gulls impact the habitat of *L. multiflorum* by trampling and by altering the chemical properties of the soil with guano production. For all these reasons, a decline in the extent and quality of the habitat is expected; *L. multiflorum* is, therefore, assessed as Vulnerable B1ab(iii) + 2ab(iii).

Previous assessment. *Limonium multiflorum* was previously not evaluated (NE; IUCN 2016).

Conservation actions. *Limonium multiflorum* is protected at the Regional level (LR 56/2000) but is unprotected by international or national laws. Some populations are included in SCIs (IT5160009 “Promontorio di Piombino e Monte Massoncello”, IT51A0007 “Punta Ala e Isolotto dello Sparviero”, IT51A0016 “Monti dell’Uccellina”, IT51A0025 “Monte Argentario, Isolotto di Porto Ercole e Argentario”) and in a regional protected area (“Parco Naturale della Maremma”).

Conservation actions needed. Further monitoring and research activities are recommended in order to better understand the species' population trend .

Note. According to Rizzotto (1984), *L. multiflorum* includes the synonyms: *L. argentario* Pignatti, *L. herculis* Pignatti, *L. trojae* Pignatti.

Matilde Gennai, Daniele Viciani, Bruno Foggi

Onosma helvetica Boiss. em. Teppner subsp. *lucana* (Lacaita) Peruzzi, Aquaro & Cesca

Global assessment

Taxonomy and nomenclature

Order: Boraginales *Family:* Boraginaceae



Figure 9. *Onosma helvetica* subsp. *lucana* near the village of Farneta (Castroregio, Cosenza, Calabria), a locality included in the Pollino National Park. Photograph by F. Roma-Marzio.

Onosma helvetica Boiss. em. Teppner subsp. *lucana* (Lacaita) Peruzzi, Aquaro & Cesca, Phyton (Horn) 44(1): 76 (2004)
≡ *O. lucana* Lacaita Nuovo Giorn. Bot. Ital., n.s. 31: 33 (1924)

Common name. Viperina lucana (It)

Geographic distribution range. *Onosma helvetica* subsp. *lucana* (Fig. 9) is an Italian endemic, confined to Basilicata and Calabria (Peruzzi et al. 2014). To date, this taxon is known for 15 sites, which are split into three nuclei: the northernmost one (in-

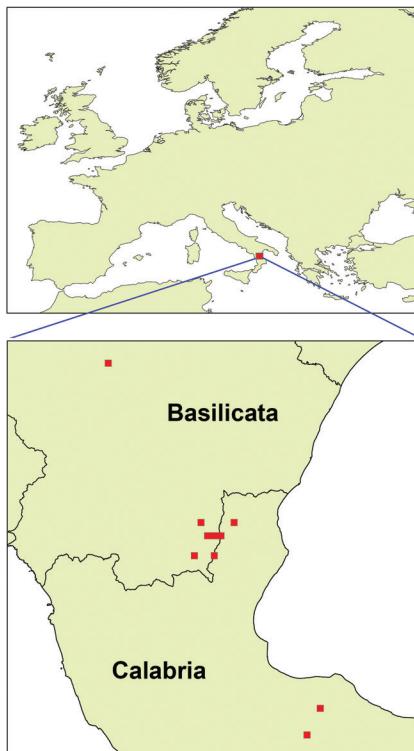


Figure 10. Geographic range and distribution map of *Onosma helvetica* subsp. *lucana*.

cluding the *locus classicus*) is within the borders of the Regional Park of Gallipoli Cognato – Piccole Dolomiti Lucane, the second one is located in the north-eastern part of the Pollino National Park, while the southernmost one occurs in the so-called Sila Greca and it is partially included in the Sila National Park (Gavioli 1936, Peruzzi et al. 2004, Conti et al. 2007, Roma-Marzio and Peruzzi 2015) (Fig. 10). These three nuclei could be considered as distinct subpopulations due to their geographical separation.

Distribution. Countries of occurrence: Italy

Biology. Plant growth form: perennial (suffruticose chamaephyte)

Flowering time: from May to September

Reproduction. Based on our field observations, the plants seem mainly pollinated by hymenopterans. No information on seed dispersal and germination is available

Habitat and ecology. The preferred habitat of *Onosma helvetica* subsp. *lucana* is represented by eroded slopes at the border of roads. Typically, this taxon is hosted by garrigue communities rich in therophytes and hemicryptophytes, mainly established on limestone, at an altitude ranging from 300 to 1,100 m a.s.l. (Peruzzi et al. 2004, Conti et al. 2007, Roma-Marzio and Peruzzi 2015).

Population information. There is no detailed information available on population dynamics, however, due to its habitat, the population trend and the number of mature individuals are likely to be in decline.

Threats. *2.3 Livestock and farming and ranching:* some sites are subjected to trampling and grazing due to nomadic domestic animals.

4.1 Roads and railroads: the construction and the management of roads have a negative impact on the plant communities growing in their proximity.

6.1 Recreational activities: some sites are threatened by human intrusion for recreational activities (e.g. trampling, off-road vehicles).

7.3 Other ecosystems modifications: locally, vegetation dynamics can originate habitat variations unfavourable for this plant.

10.3 Avalanches and landslides: some populations can be lost or reduced by landslides caused by the erosion of the slopes where the plant is found.

CRITERIA APPLIED:

Criterion B: **EOO:** 1,100 km² calculated with minimum convex hull polygon in ArcGIS 9.3

AOO: 40 km² calculated with a 2 × 2 km fixed cell grid

a) Number of locations: the following four locations have been identified according to threats 4.1 and 7.3: Gallipoli Cognato – Piccole Dolomiti Lucane, Calabrian side of the Pollino Massif, Lucanian side of the Pollino Massif, and Sila Greca. Individuals occurring on the Calabrian side of the Pollino Massif were included into a single location because they grow along roads subjected to a similar management regime. An unfavourable management of road borders can simultaneously threaten all the individuals growing in that area.

b) Decline in extent and quality of the habitat (iii); decline in number of mature individuals (v). No documented decline in AOO and EOO.

Red List category and Criteria (Global Assessment)

EN	Endangered	B1ab(iii,v) + 2ab(iii,v)
----	------------	--------------------------

Rationale for the assessment. *Onosma helvetica* subsp. *lucana* is an Italian endemic (Peruzzi et al. 2014) that occurs in a few sites in the southern Apennines. It has an extent of occurrence of 1,100 km² and an area of occurrence of 40 km². The populations are fragmented and most of them are declining due to the human disturbance caused by the proximity of roads (Peruzzi et al. 2004, Roma-Marzio and Peruzzi 2015). Further threats to populations are locally represented by landslides, grazing, and habitat modifications. Because of the rarity and the overall decline of population size and habitat quality, this taxon qualifies as Endangered B1ab(iii,v) + 2ab(iii,v).

Previous assessment. at a global level, this taxon was previously not evaluated (NE; IUCN 2016).

Conservation actions. The populations of *Onosma helvetica* subsp. *lucana* partially occur within the following regional or national nature reserves: the Regional Park of Gallipoli Cognato – Piccole Dolomiti Lucane, the Pollino National Park, and the Sila National Park.

Conservation actions needed. improved management of vegetation growing at road borders and further monitoring efforts are needed in order to better understand the population trends. *Ex situ* conservation of seeds in seed banks is recommended.

Francesco Roma-Marzio, Liliana Bernardo, Lorenzo Peruzzi, Domenico Gargano

Lathyrus laxiflorus (Desf.) Kuntze subsp. *laxiflorus*

Regional assessment (Italy)

Taxonomy and nomenclature

Order: Fabales *Family:* Fabaceae

Lathyrus laxiflorus (Desf.) Kuntze, Trudy Imp. S.-Peterburgsk. Bot. Sada 10: 185 (1887)

Common name. Cicerchia laxiflora, Cicerchia a fiori distanziati o Cicerchia lassiflora (It.).

Geographic distribution range. *Lathyrus laxiflorus* subsp. *laxiflorus* (Fig. 11) has a S-European-Irano-Turanian distribution range, while *L. laxiflorus* subsp. *angustifolius* (Post ex Dinsm.) Davis is an endemic of Turkey (southern Anatolia). *Lathyrus laxiflorus* subsp. *laxiflorus* in Italy is localised exclusively in Calabria, in the NW sector of Mt. Sila. It occurs in two small sites, about 5.5 km apart (Fig. 12): Valle del Cecita (Longobucco, Cosenza), and Fossiata (Spezzano della Sila, Cosenza).

Distribution. Countries of occurrence: Italy, Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, Albania, Republic of Macedonia, Bulgaria, Greece, Turkey, Azerbaijan, Georgia, Lebanon, Ukraine (Crimea), Iran and Syria.

Biology. *Plant growth form:* perennial (hemicryptophyte). *Chromosome number:* $2n = 14$ (Strid and Franzen 1981, Franzen and Gustavsson 1983, Papanicolaou 1984)

Flowering time. From June to July (in Italy)

Reproduction. no information on pollination, dispersal strategy nor seed germination for the Italian population is available

Habitat and ecology. In Greece, *Lathyrus laxiflorus* subsp. *laxiflorus* is a characteristic and diagnostic species of thermophilous deciduous woods with *Quercus frainetto* Ten. (Bergemeier and Dimopoulos 2008). The Calabrian population occurs in pine forests with *Pinus nigra* J.F.Arnold subsp. *calabrica* (Loud.) A.E.Murray, on granitic substrate, with well-drained forest soil, at an altitude of 1150–1350 m.

Population information. The only known population occurs in the same area recorded by Fiori (1919), who already considered the species very rare. It was not recorded until its finding by the authors in 2014; a population study was conducted in June 2015. Currently, the Italian population consists of two nuclei: a main nucleus with about 3,000 individuals and a second one with only 33 plants placed in a former forestry nursery and probably of secondary origin.



Figure 11. *Lathyrus laxiflorus* subsp. *laxiflorus* in Vallone Cecita (1,150 m a.s.l., Longobucco, Cosenza, Italy). Photograph by C. Gangale.

Threats. 2.3.1 *Nomadic grazing*: in the main location (Vallone Cecita), cattle grazing is frequent and not controlled.

6.1. *Recreational activities*: in both sites, plants grow at the border or very close to roads and trails, such that human trampling represents a major threat.

7.1.1 *Increase in fire frequency/intensity*: the main nucleus (Vallone Cecita) suffered a fire in the recent past.

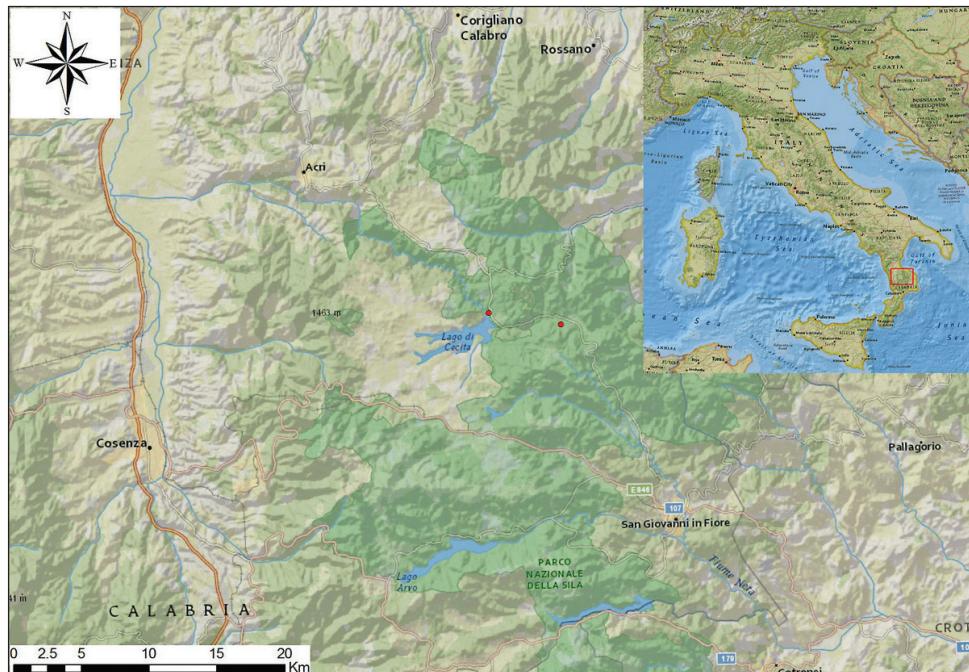


Figure 12. Geographic range and distribution map of *Lathyrus laxiflorus* subsp. *laxiflorus* in Italy.

CRITERIA APPLIED:

Criterion B: AOO: 8 km² calculated with a 2×2 km cell fixed grid

Number of locations. One (according to threats 2.3.1, 6.1, 7.1.1)

Decline. A continuing decline is observed in quality of the habitat (iii) and in number of mature individuals (v).

Red List category and Criteria (Regional Assessment)

CR	Critically Endangered	CR B2ab(iii, v)
----	-----------------------	-----------------

Rationale for the assessment. In Italy, *Lathyrus laxiflorus* subsp. *laxiflorus* is listed as Critically Endangered under Criterion B due to its restricted AOO (8 km²), the number of locations and the serious threat acting on the population that result in a continuous decline in habitat quality (iii) and in number of mature individuals (v). The population in Italy is very isolated from other eastern populations in the Balkans; therefore, also considering the dispersal strategy, down-listing was not applied.

Previous assessment. in Italy, the species was not evaluated previously either at a global level (NE; IUCN 2016), nor at the Regional level (Conti et al. 1997, Rossi et al. 2016).

Conservation actions. The species is unprotected in Italy. The population is included in the National Park of Sila, and the smallest nucleus is in the SCI Cozzo del Principe (IT9310079).

Conservation actions needed. further monitoring and research activities are recommended in order to better understand its reproductive biology, its demographic trends, and the reasons for its restricted distribution in Italy.

Carmen Gangale, Dimitar Uzunov

References

- Arrigoni PV, Di Tommaso PL (1997) La vegetazione del Monte Argentario (Toscana meridionale). *Parlatore 2*: 5–38.
- Arrigoni PV, Nardi E, Raffaelli M (1985) La vegetazione del Parco Naturale della Maremma (Toscana). Con carta in scala 1:25000. Università degli Studi di Firenze, 39 pp.
- Bacchetta G, Brullo S, D'Emerico S, Pontecorvo C, Salmeri C (2012) *Charybdis glaucophylla* (Asparagaceae), a new species from Sardinia. *Phytotaxa* 69: 16–26. doi: 10.11646/phytotaxa.69.1.4
- Baldini RM (1991) Flora delle isole satelliti del Monte Argentario (Arcipelago Toscano) *Webbia* 46(1): 107–123. doi: 10.1080/00837792.1991.10670510
- Banfi E, Ceppi G, Ferranti R, Galasso G, Lanzani A, Perego S, Picco P, Villa M (2015) Fiori di Lombardia. Gruppo Botanico Milanese, Milano.
- Banfi E, Galasso G (1998) La flora spontanea della Città di Milano alle soglie del terzo millennio e i suoi cambiamenti a partire dal 1700. *Memorie della Società di Scienze Naturali e del Museo Civico di Storia Naturale di Milano* 28: 267–388.
- Bergemeier E, Dimopoulos P (2008) Identifying plant communities of thermophilous deciduous forest in Greece: Species composition, distribution, ecology and syntaxonomy. *Plant Biosystems* 142(2): 228–254. doi: 10.1080/11263500802150357
- Biondi E, Vagge I, Mossa L (2000) On the phytosociological importance of *Anthyllis barba-jovis* L. *Colloques Phytosociologiques* 27(1997): 95–104.
- Conti F, Bartolucci F, Tinti D, Bernardo L, Costalunga S, Lattanzi E, Lavezzo P, Salerno G, Fascetti S, Iocchi M, Mele C, Tardella FM (2007) Secondo contributo alla conoscenza floristica della Basilicata: resoconto dell'escursione del Gruppo di Floristica (S.B.I.) nel 2004. *Informatore Botanico Italiano* 39(1): 11–33.
- Conti F, Manzi A, Pedrotti F (1997) Liste rosse regionali delle piante d'Italia. Dipartimento Botanica ed Ecologia, Università Camerino, Camerino, 139 pp.
- De Dominicis V, Casini S, Mariotti M, Bosagli A (1988) La vegetazione di Punta Ala (Prov. di Grosseto). *Webbia* 42(1): 101–143. doi: 10.1080/00837792.1988.10670430
- Del Guacchio E (2010) Appunti di floristica campana: novità e precisazioni. *Informatore Botanico Italiano* 42(1): 35–46.
- Delage A, Hugot L (2015) Liste rouge régionale de la flore vasculaire de Corse. Conservatoire Botanique National de Corse, Office de l'Environnement de la Corse, Corte, 72 pp.
- Fenu G, Fois M, Cañadas E, Bacchetta G (2014) Using endemic-plant distribution and geology in biogeography: the case of Sardinia (Mediterranean Basin). *Systematics and Biodiversity* 12: 181–193. doi: 10.1080/14772000.2014.894592

- Fiori A (1919) Note di floristica calabrese e lucana. I° escursione alla Sila (Calabria). Bollettino della Società Botanica Italiana 26: 129–139.
- Foggi B, Chegia B, Viciani D (2006) Contributo alla conoscenza della vegetazione del Promontorio di Piombino (Livorno - Toscana). Parlatorea 8: 121–139.
- Foggi B, Guidi T, Capecchi M, Baldini RM, Grigioni A (2009) Biological Flora of the Tuscan Archipelago islets (Tyrrenian Sea). Webbia 64(1): 23–45. doi: 10.1080/00837792.2009.10670851
- Foggi B, Signorini MA, Grigioni A, Clauser M (2000) La vegetazione di alcuni isolotti dell'Arcipelago toscano. Fitosociologia 37(1): 69–91.
- Forte L, Perrino EV, Terzi M (2005) Le praterie a *Stipa austroitalica* Martinovský ssp. *austroitalica* dell'Alta Murgia (Puglia) e della Murgia Materana (Basilicata). Fitosociologia 42(2): 83–103.
- Franzen R, Gustavsson LA (1983) Chromosome numbers in flowering plants from the high mountains of Sterea Ellas, Greece. Willdenowia 13: 101–106
- Galasso G, Gentili R, Gilardelli F, Sgorbati S, Cappelli CI, Banfi E (2011) Flora delle mura del castello sforzesco di Milano (Lombardia, Italia). Dati preliminari. Pagine Botaniche 35(2011): 3–25.
- Gavioli O (1936) Ricerche sulla distribuzione altimetrica della vegetazione in Italia. III. Limiti altimetrici delle formazioni vegetali nel gruppo del Pollino (Appennino Calabro-Lucano). Nuovo Giornale Botanico Italiano, nuova serie 43(3): 636–706. doi: 10.1080/11263503609438739
- IUCN (2016) The IUCN Red List of threatened species. Version 2015–4. <http://www.iucn-redlist.org> [accessed 30 September 2016]
- Licht W (2008) Bestimmungsschlüssel zur Flora des Gargano (Süd-Italien). Shaker Verlag, Aachen.
- Medagli P, Gambetta G (2003) Guida alla Flora del Parco. Parco Regionale della Murgia Materana, Matera, Italy.
- Medagli P, Gambetta G, Wagensommer RP (2014) Notula: 2095. In: Barberis G, Nepi C, Peccenini S, Peruzzi L (Eds), Notulae alla checklist della flora vascolare italiana, 18. Editore Botanico Italiano 46(2): 275.
- Mele C, Medagli P, Accigli R, Beccaris L, Albano A, Marchiori S (2006) Flora of Salento (Apulia, Southeastern Italy): an annotated checklist. Flora Mediterranea 16: 193–245.
- Papanicolaou K (1984) Chromosome Number Reports LXXXII. Taxon 33: 126–134.
- Peruzzi L, Aquaro G, Cesca G (2004) Distribution, karyology and taxonomy of *Onosma helvetica* subsp. *lucana* comb. nova (Boraginaceae), a schizoendemic in Basilicata and Calabria (S. Italy). Phyton (Horn) 44: 69–81.
- Peruzzi L, Conti F, Bartolucci F (2014) An inventory of endemic vascular plants to Italy. Phytotaxa 168(1): 1–75. doi: 10.11646/phytotaxa.168.1.1
- Rizzotto M (1984) A systematic study of the *Limonium* populations of the tuscan peninsular coasts. Webbia 37(2): 259–275. doi: 10.1080/00837792.1984.10670279
- Roma-Marzio F, Peruzzi L (2015) *Onosma helvetica* subsp. *lucana* (Lacaita) Peruzzi, Aquaro & Cesca (Boraginaceae): nuove stazioni nella Calabria Nord-Orientale. Atti della Società Toscana di Scienze Naturali, Memorie, Serie B (2014) 121: 25–27.
- Rossi G, Orsenigo S, Montagnani C, Fenu G, Gargano D, Peruzzi L, Wagensommer RP, Foggi B, Bacchetta G, Domina G, Conti F, Bartolucci F, Gennai M, Ravera S, Cogoni A, Magrini

- S, Gentili R, Castello M, Blasi C, Abeli T (2016) Is legal protection sufficient to ensure plant conservation? The Italian Red List of policy species as a case study. *Oryx* 50: 431–436. doi: 10.1017/S003060531500006X
- Selvi F (2010) A critical checklist of the vascular flora of Tuscan Maremma (Grosseto province, Italy). *Flora Mediterranea* 20: 47–139.
- Smith AR, Tutin TG (1968) *Euphorbia nicaeensis* All. In: Tutin TG, Heywood VH, Burges NA, Moore DH, Valentine DH, Walters SM, Webb DA (Eds) *Flora Europaea*, Vol. 2. Cambridge University Press, Cambridge, 223–224.
- Strid A, Franzen R (1981) In Chromosome number reports LXXIII. *Taxon* 30: 829–842.

