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RESEARCH ARTICLE

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Global and Regional IUCN Red List Assessments: 2

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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 multiforme* Pignatti, *Onosma helvetica* Boiss. em. Teppner subsp. *lucana* (Lacaita) Peruzzi, Aquaro & Cesca and the assessment at national level (Italy) of *Lathyrus laxiflorus* (Desf.) Kuntze subsp. *laxiflorus*.

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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 subhalophilous plant communities characterised by a number of endemic species, such as *Bellium crassifolium* Moris, *Hyoseris taurina* (Pamp.) Martinoli and *Limonium sulcita-*

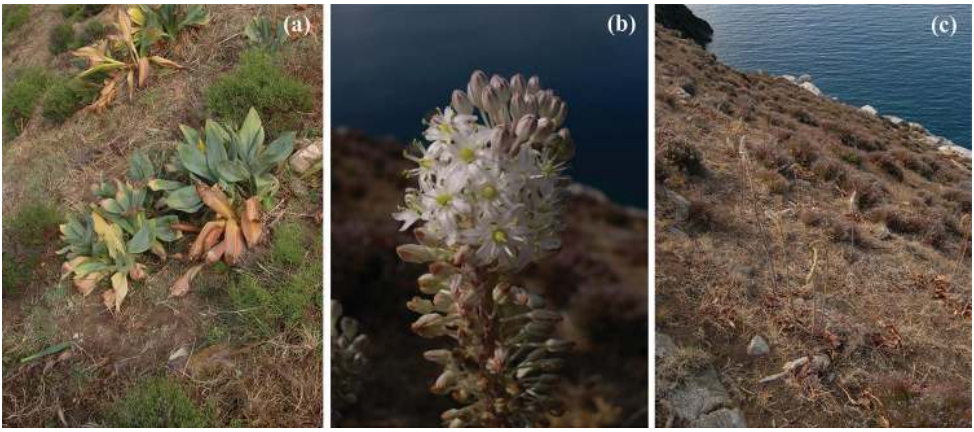

Figure 1. Phenological features of *Charybdis glaucophylla* Bacch., Brullo, D'Emerico, Pontec. & Salmeri; of winter foliation (**a**), summer flowering (**b**) and natural late-summer habit (**c**) in Sardinia. Photograph by G. Bacchetta.

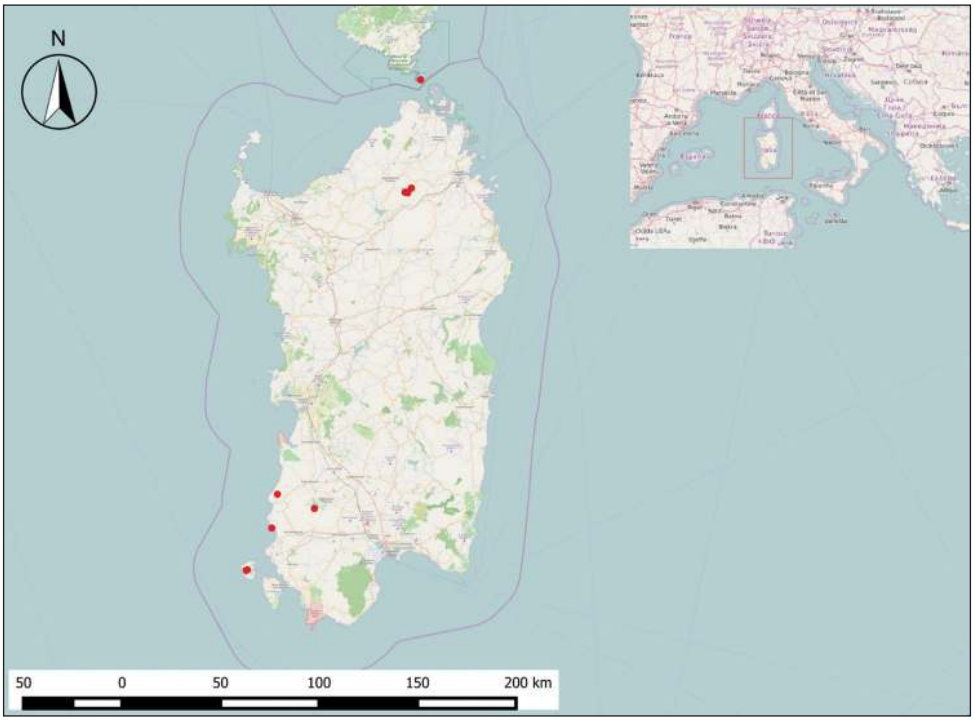

Figure 2. Geographic range and distribution map of *Charybdis glaucophylla*.

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 km^2 calculated with minimum convex hull in ArcGis 9.1
AOO: 36 km^2 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 km^2 and an area of occurrence of 36 km^2. 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 Nature 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. pancration* 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) ≡ *Euphorbia japygica* Ten. (basionym), Fl. Napol. 4: 266 (1830) ≡ *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 km^2 calculated with minimum convex hull (with Google Earth Pro)

AOO: 64 km^2 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 km^2 and an area of occupancy of at least 64 km^2. 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

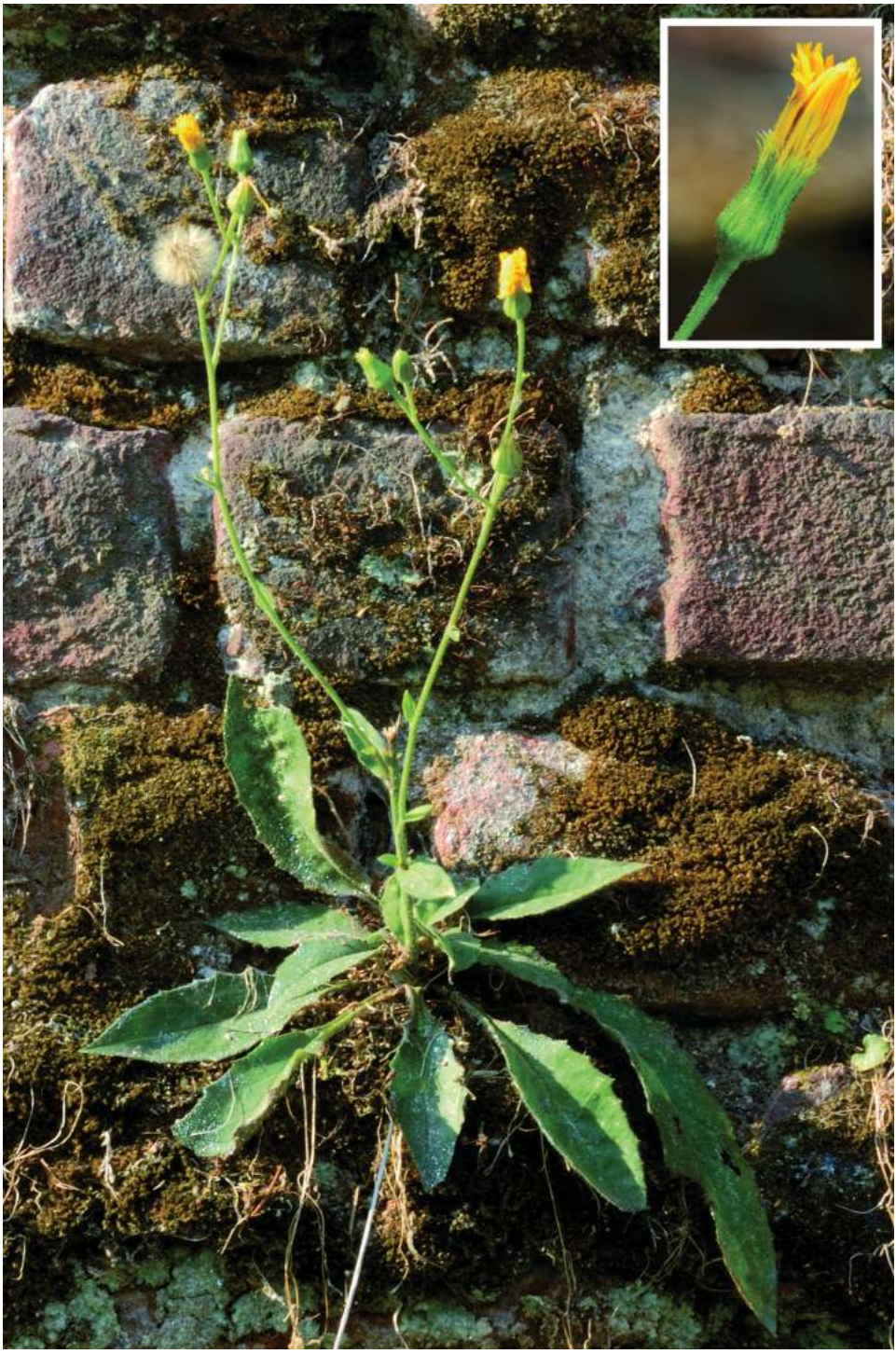

Figure 5. *Hieracium australe* subsp. *australe* photographed in Sforza Castle (Milano). Photograph by G. Bardelli.

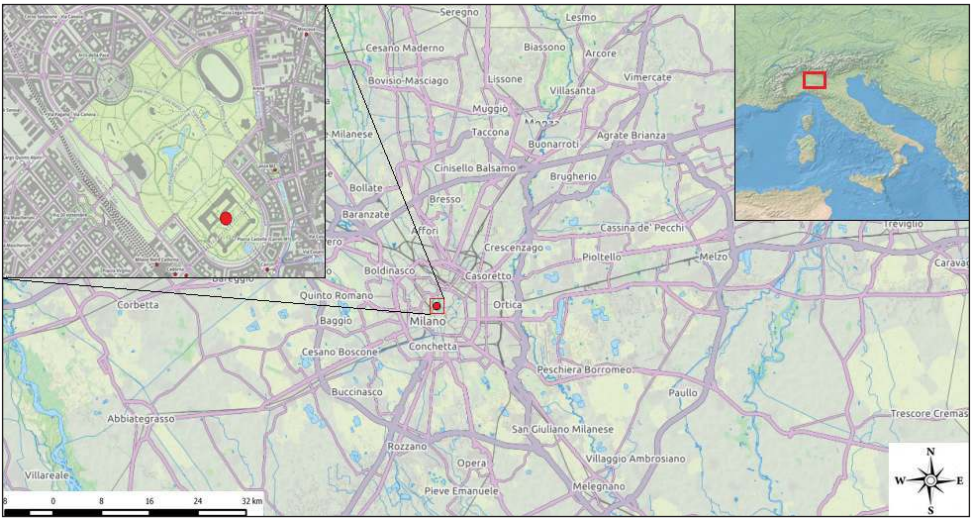

Figure 6. Distribution map of *Hieracium australe* subsp. *australe*.

(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 km^2 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 australe* Fr. subsp. *australe* is an Italian endemic that is found only on the walls of the Sforza castle in Milano, with an AOO of 4 km^2 (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 australe* Fr. subsp. *australe* was not evaluated (NE) previously (IUCN 2016).

Conservation actions. *Hieracium australe* Fr. subsp. *australe* 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 multiforme Pignatti

Global Assessment

Taxonomy and nomenclature

Order: Caryophyllales *Family:* Plumbaginaceae

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

Common name. Limonio multiforme (It)

Geographic distribution range. *Limonium multiforme* (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 Argentarola; 8. islet of Porto Ercole).

Distribution. Countries of occurrence: Italy

Biology. *Plant growth form:* perennial (chamaephyte)

Figure 7. *Limonium multiforme* 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. multiforme* grows on cliffs and rocky coasts close to the sea directly exposed to the marine aerosol. This species is characteristic of the association

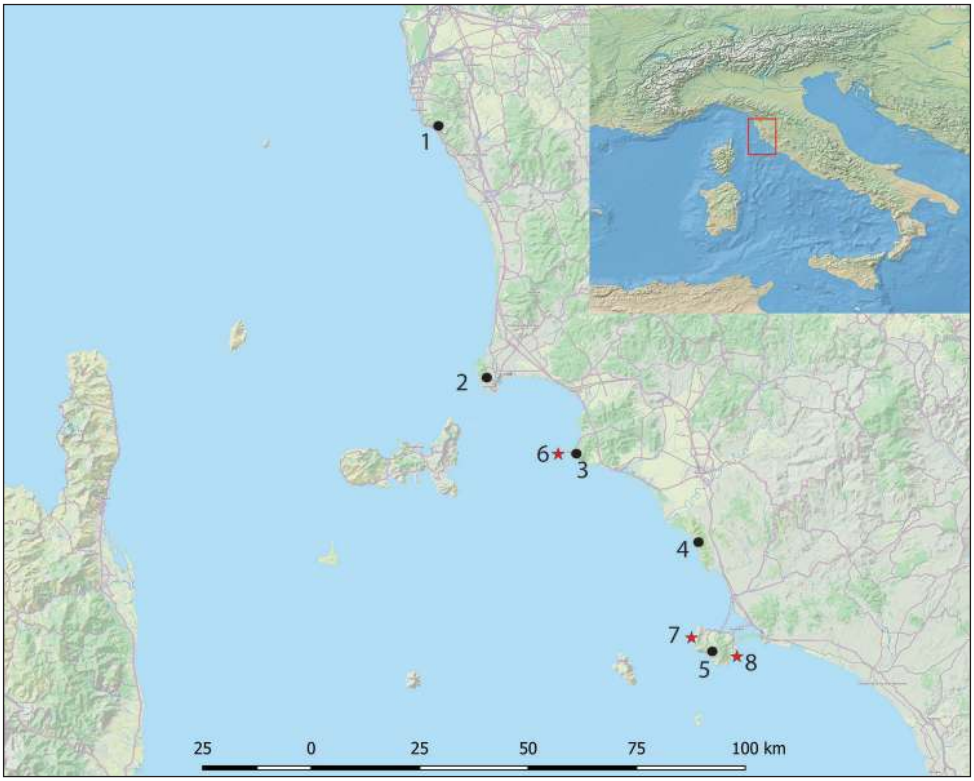

Figure 8. Geographic range and distribution map of *Limonium multiforme*.

Crithmo-Limonietum multiformis 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. multiforme*, thereby favouring the growth of more nitrophilous species.

CRITERIA APPLIED:

Criterion B: **EOO:** 2,260 km^2 calculated with minimum convex hull in QGis 2.14
AOO: 104 km^2 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 multiforme* 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. multiforme*. The species also occurs in three small islets where the abundance of yellow-legged gulls impact the habitat of *L. multiforme* 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. multiforme* is, therefore, assessed as Vulnerable B1ab(iii) + 2ab(iii).

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

Conservation actions. *Limonium multiforme* 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 Argentarola") 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. multiforme* includes the synonyms: *L. argentarium* 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-

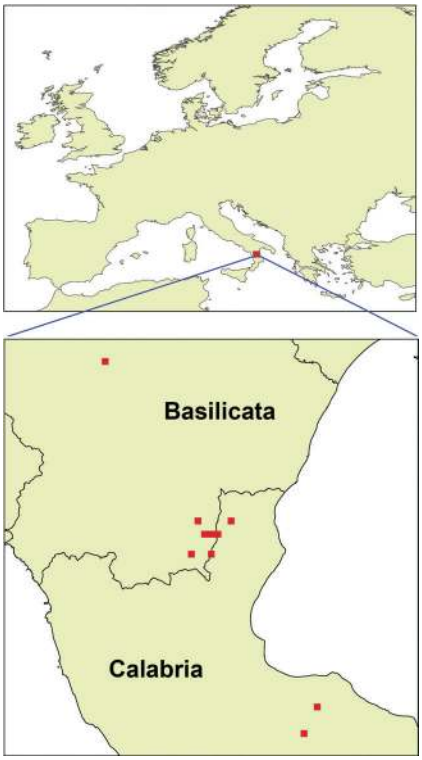

Figure 10. Geographic range and distribution map of *Onosma helvetica* subsp. *lucana*.

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 km^2 calculated with minimum convex hull polygon in ArcGIS 9.3

AOO: 40 km^2 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 km^2 and an area of occurrence of 40 km^2. 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.

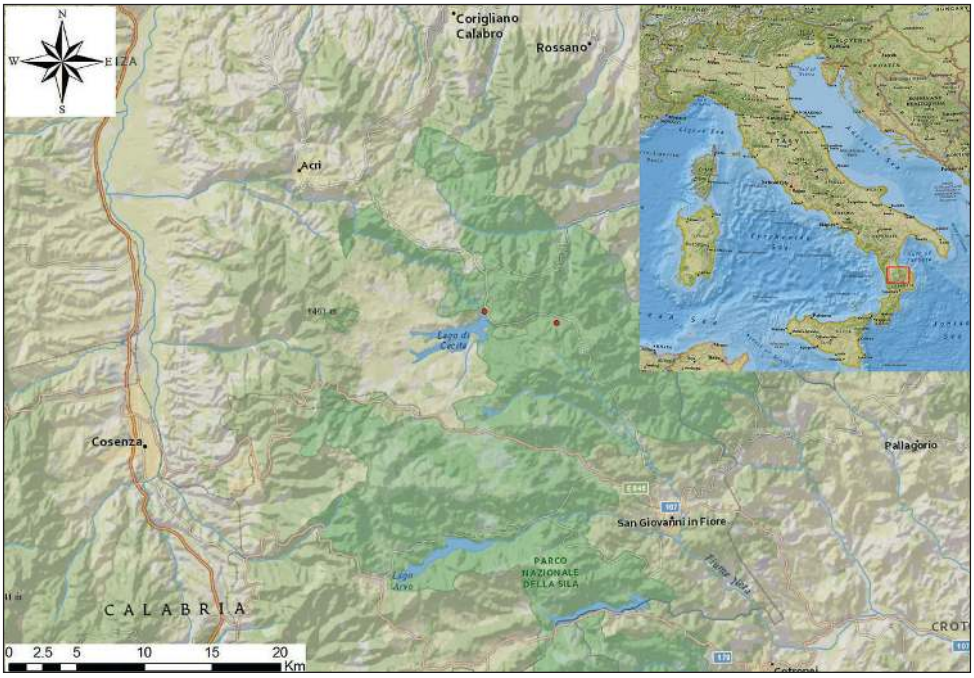

Figure 12. Geographic range and distribution map of *Lathyrus laxiflorus* subsp. *laxiflorus* in Italy.

CRITERIA APPLIED:

Criterion B: **AOO**: 8 km^2 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 km^2), 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). Parlatorea 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, Ceffali 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, Costalonga 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, Boscagli 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.iucnredlist.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. Informatore Botanico Italiano 46(2): 275.

Mele C, Medagli P, Accogli R, Beccarisi 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.