

RIBES, the Italian network of seed-banks: *first data on the ex situ conservation of the endemic taxa*

Sara Magrini*, Bacchetta G., Bedini G., Borzatti A., Carasso V., Casavecchia S.,
Ceriani R., Cristaudo A., Di Cecco V., Di Martino L., Fabrini G., Gasparri R., Gratani L.,
Guglielmo F., Mariotti M., Negri V., Porceddu M., Salmeri C., Scialabba A., Villani M.,
Zappa E., Bonomi C.



RIBES, Rete Italiana Banche del Germoplasma

*Tuscia Germplasm Bank, Università della Tuscia, Viterbo - ITALY



RIBES network

RIBES is the Italian national seed-bank network for native species conservation.

It was established in December 2005 and today it includes 17 members representing 14 Italian regions.

17 seed-banks

14 Italian administrative regions



NODI RIBES

1. BG delle Alpi sud occidentali
2. Lombardy Seed Bank
3. Trentino Seed Bank
4. BG di Padova
5. BG dei Giardini Hanbury
6. BG di Pisa
7. BG di Livorno
8. BG delle Marche
9. BG di Perugia (dal 2012)
10. BG della Tuscia
11. BG di Roma
12. BG della Majella
13. BG della Sardegna
14. BG di Palermo
15. BG di Catania
16. BG di Udine (dal 2016)
17. BG della Valle d'Aosta (dal 2017)

International partnerships

RIBES is a member/partner of other wider networks so providing an active connection with the international context:

- ENSCONET (*European Native Seed Conservation Network*)
- INSR (*International Network for Seed-based Restora*





RIBES target

The ultimate goal of the network is the general improvement of the quality and safety of the germplasm reserves of native plant species in Italy to ensure an effective long-term conservation and protection of the endangered and/or endemic flora.



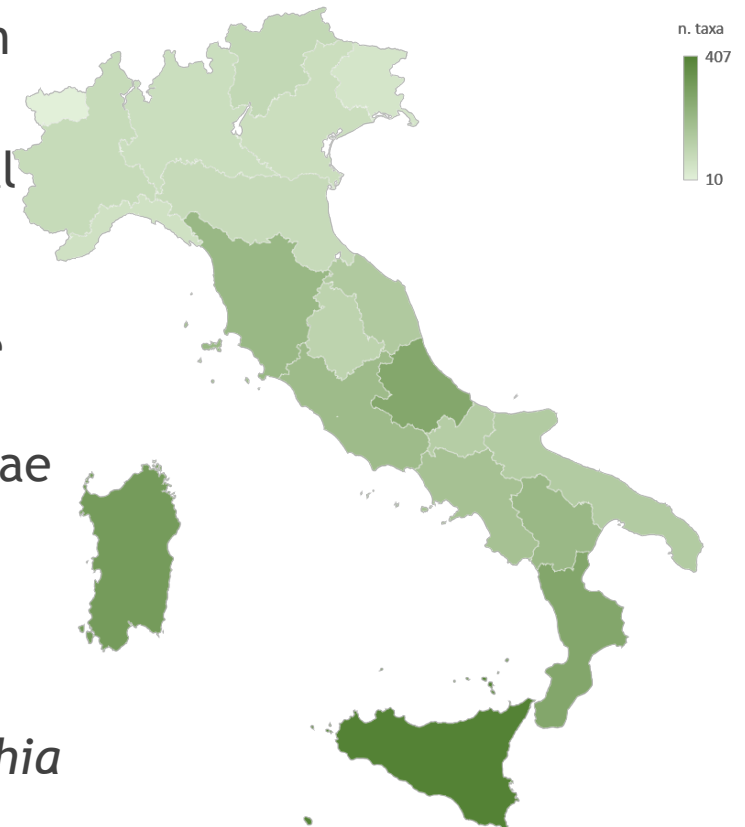
Ex situ conservation

- ✓ About **3,200 taxa** representing approx. 40% of the Italian native vascular flora
- ✓ More than **25,000 accessions** of seeds and spores preserved *ex situ*
 - ✓ Threatened species
 - ✓ Endemics
 - ✓ Crop Wild Relatives

Italian endemic flora

- The native flora of Italy includes **8,195 taxa** (Bartolucci et al., 2018). It is the highest number in Europe.
- The Italian endemics are **1,708** (20.8% of the total flora), grouped in **70 families** and **313 genera**.
 - The most represented families (>70 taxa) concerning Italian endemic taxa are: Asteraceae (582 taxa), Plumbaginaceae (117), Caryophyllaceae (97), Orchidaceae (87), Fabaceae (80), Brassicaceae (78)
 - and the genera (>30 taxa) *Hieracium* (337), *Limonium* (98), *Centaurea* (73), *Ophrys* (61), *Ranunculus* (37) and *Taraxacum* (33)
 - 4 genera are narrowly endemic to Italy: *Eokochia* (Chenopodiaceae), *Rhizobotrya* (Brassicaceae), *Petagnaea* and *Siculosciadium* (Apiaceae).

Distribution of the Italian endemic taxa





The conservation status of the Italian endemic flora

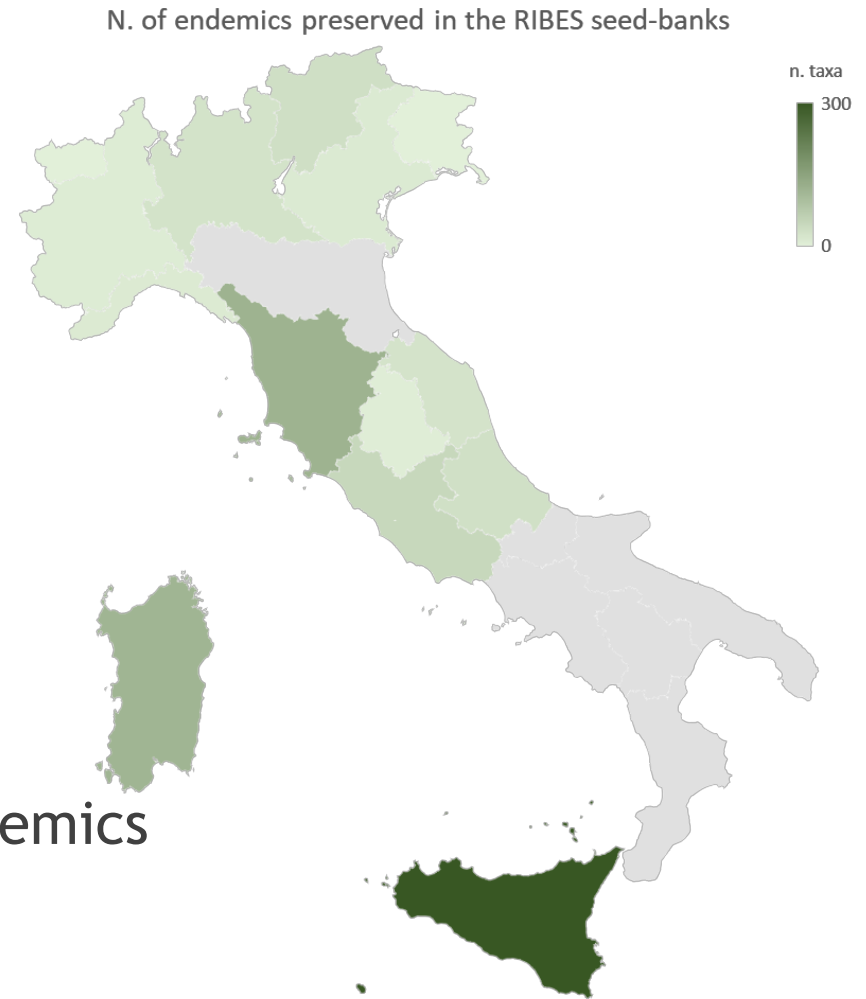
Taxa endemic to a country are key elements for setting national conservation priorities and for driving conservation strategies, since their persistence is entirely dependent on national policy.

The aim of this contribution is to provide a first updated picture of the conservation status of the Italian endemic flora presenting an assessment of the *ex situ* collections in Italy.

Endemics preserved in the RIBES seed-banks

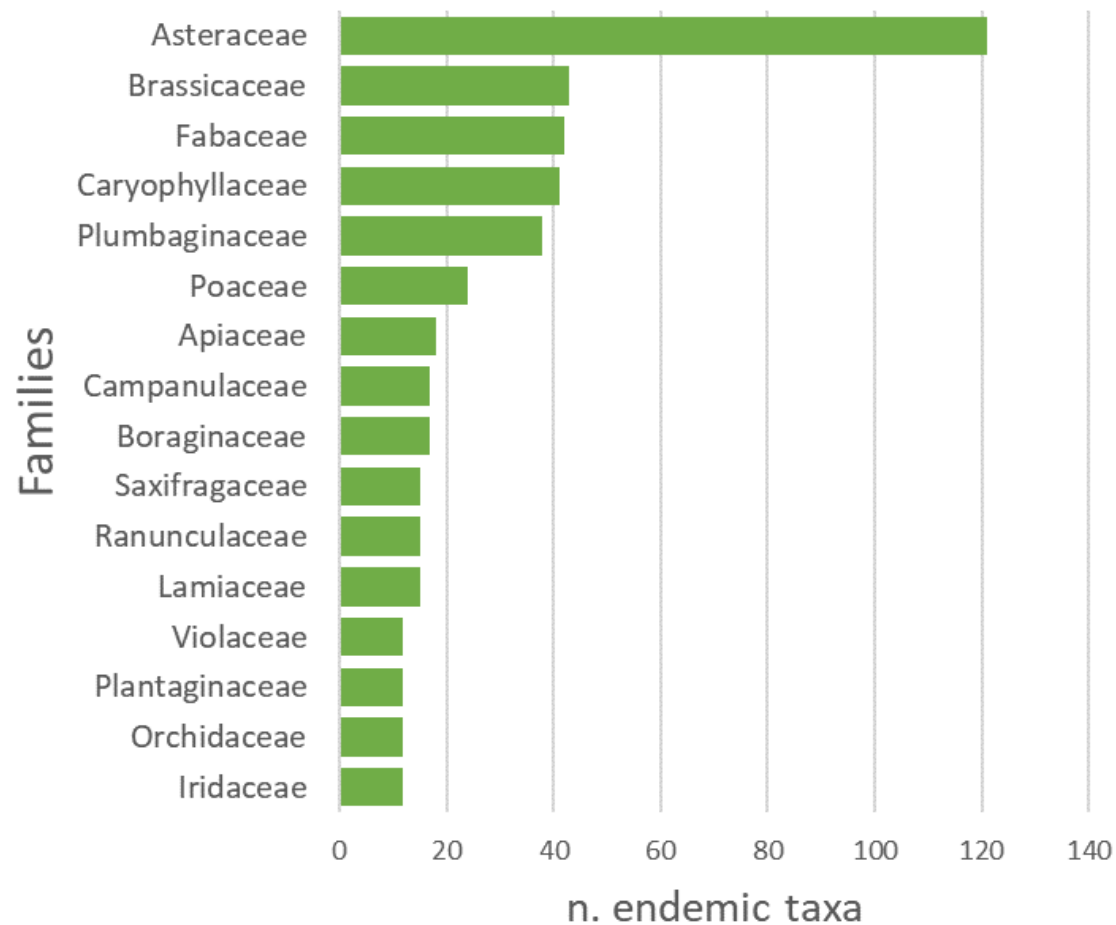
The analysis of endemic species richness in *ex situ* collections highlighted that accessions of **554 endemic taxa**, grouped in **48 families**, are preserved in the RIBES seed-banks, particularly in Sicily (300 taxa), Sardinia and Tuscany (each with >110).

- ✓ **41%** of the Italian endemics
- ✓ **67%** families

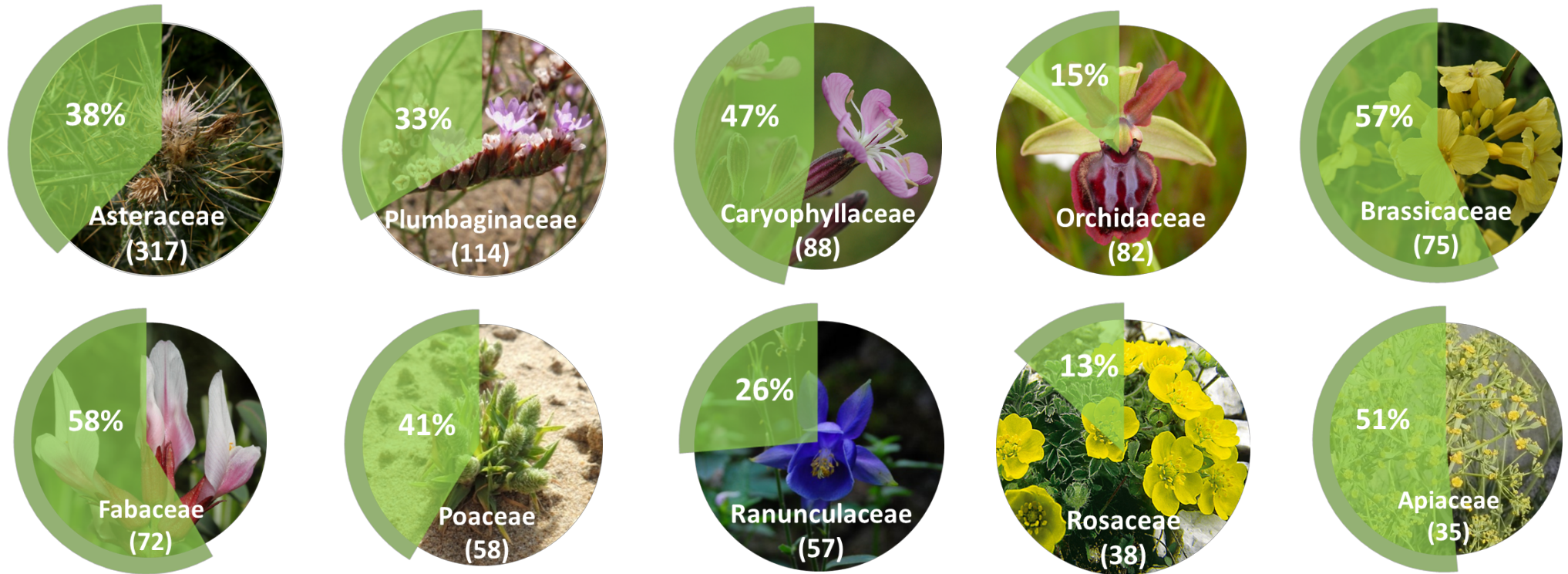


Endemics preserved in the RIBES seed-banks

Most represented families (>10 endemic taxa)
in the RIBES seed-banks



Conservation of the major families of the Italian endemic flora

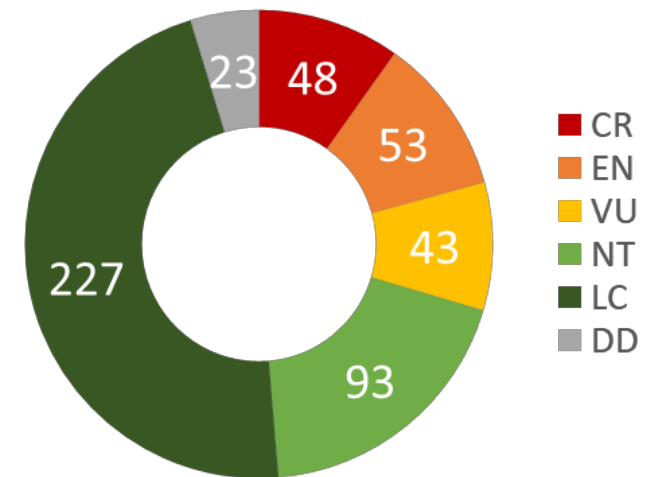


Families of the Italian endemic vascular flora with > 30 taxa (number of endemic taxa in brackets). For each family, in green the percentage of endemic species preserved in the RIBES seed-banks

Ex situ conservation of the threatened Italian endemics

In the recent Red List of the Italian endemic plants, **300 endemic taxa (22.4%)** have been assigned to a risk category (**Critically Endangered, Endangered, Vulnerable**).

If assessed against the Red List, **30%** of the endemic taxa conserved in the RIBES seed-banks result at risk (with status **CR, EN, or VU**),



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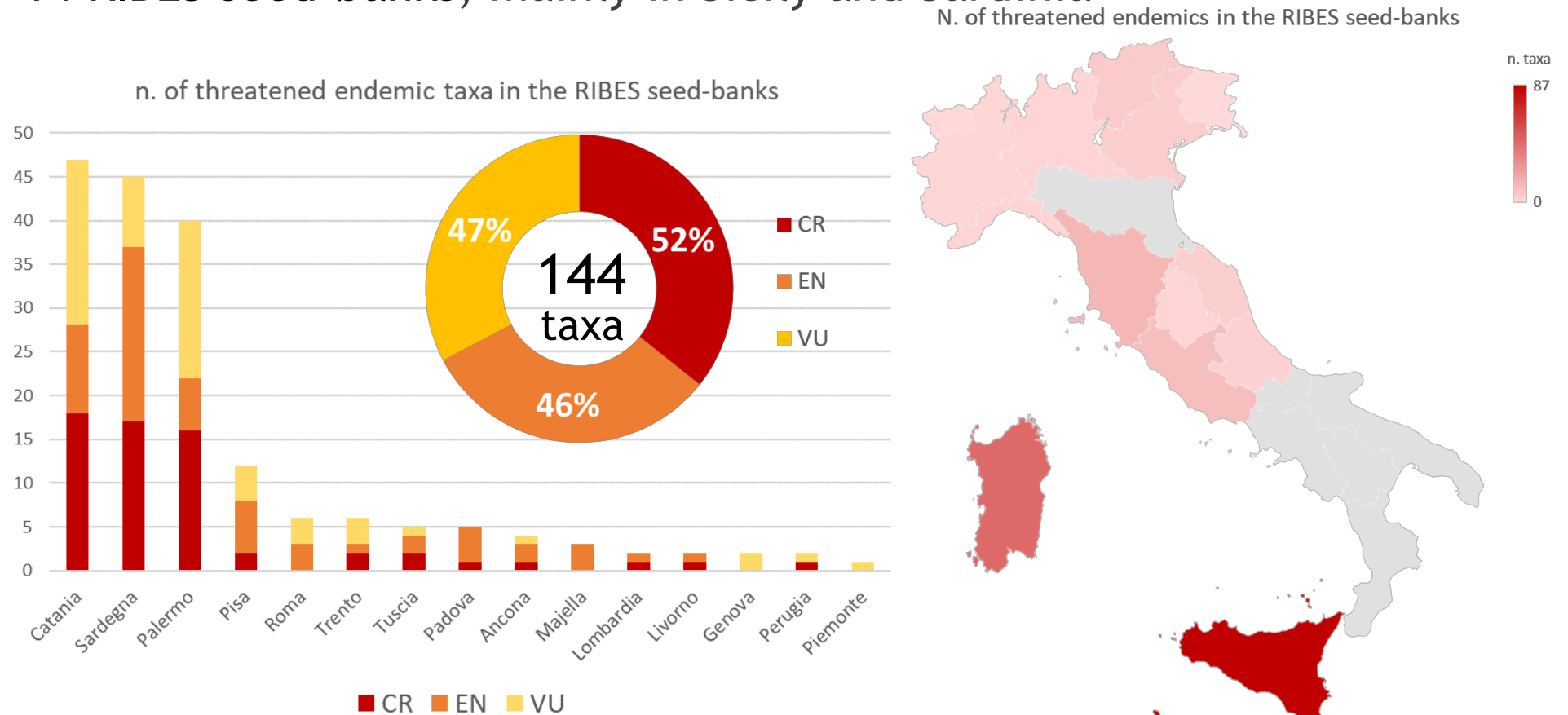
Red Listing plants under full national responsibility: Extinction risk and threats in the vascular flora endemic to Italy

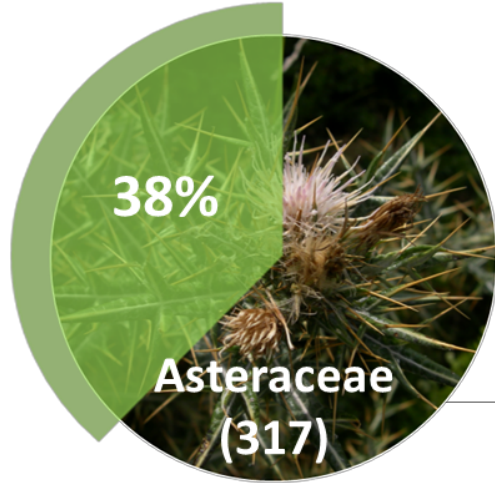
Orsenigo Simone^a, Montagnani Chiara^b, Fenu Giuseppe^c, Gargano Domenico^{d,*}, Peruzzi Lorenzo^e, Abeli Thomas^f, Alessandrini Alessandro^g, Bacchetta Gianluigi^c, Bartolucci Fabrizio^h, Bovio Maurizioⁱ, Brullo Cristian^l, Brullo Salvatore^j, Carta Angelino^c, Castello Miris^k, Cogoni Donatella^c, Conti Fabio^h, Domina Giannantonio^l, Foggi Bruno^m, Gennai Matilde^m, Gigante Danielaⁿ, Iberite Mauro^o, Lasen Cesare^p, Magrini Sara^q, Perrino Enrico V.^{r,s}, Prosser Filippo^t, Santangelo Annalisa^u, Selvaggi Alberto^v, Stinca Adriano^w, Vagge Ilda^a, Villani Mariacristina^x, Wagensommer Robert P.ⁿ, Wilhalm Thomas^y, Tartaglini Nicoletta^s, Duprè Eugenio^g, Blasi Carlo^o, Rossi Graziano^f

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Ex situ conservation of the threatened Italian endemics

48% of the Italian threatened endemic taxa (144 out of 300 taxa) in 14 RIBES seed-banks, mainly in Sicily and Sardinia

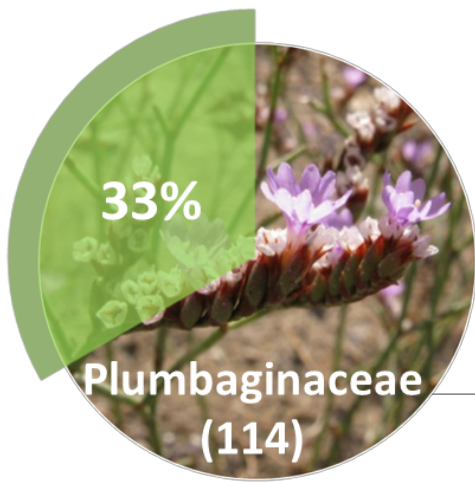




Asteraceae

- 14% threatened taxa
- **67% ex situ**
(70% CR, 60% EN, 77% VU)

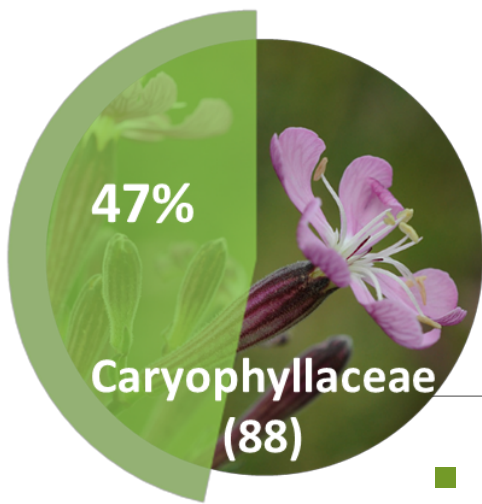




Plumbaginaceae

- 33% threatened
- 43% **ex situ** (33% CR, 56% EN, 33% VU)

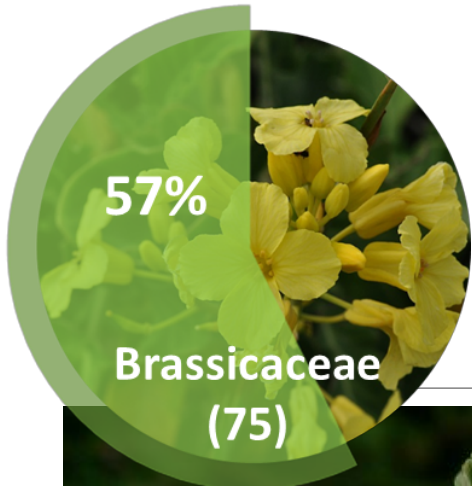




Caryophyllaceae

- 25% threatened taxa
- **59% ex situ**
(60% CR, 67% EN, 50% VU)





Brassicaceae

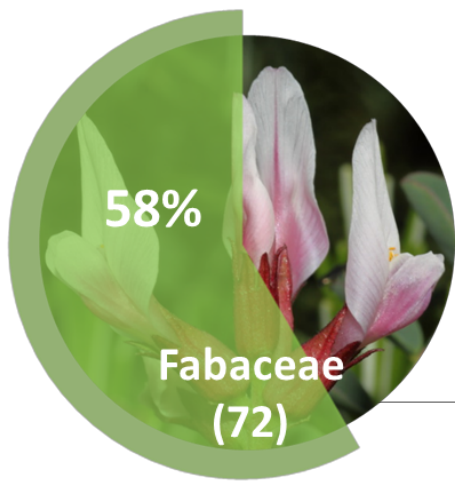
- 25% threatened taxa (19)
- 47% *ex situ*
(50% CR, 43% EN, 50% VU)



Erysimum aurantiacum
Trentino



Brassica macrocarpa
Perugia, Lombardia, Palermo, Catania



Fabaceae

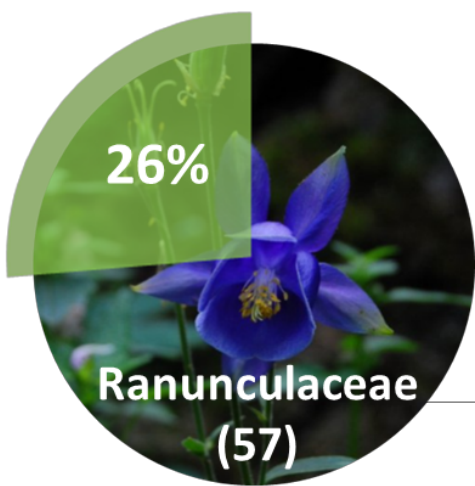


Astragalus aquilanus
BG-Majella



Astragalus maritimus
BG-Sar

- 32% threatened taxa
- **57% ex situ**
(50% CR, 63% EN, 68% VU)



Ranunculaceae

- 25% threatened taxa
- 43% **ex situ**
(50% CR, 33% EN, 50% VU)



Aquilegia barbaricina
BG-SAR



Aquilegia cremnophila
BG-SAR



Adonis distorta
Majella, Tuscia

Ex situ conservation of the threatened Italian endemics

Table 1

List of threatened taxa fully unprotected (i.e.: their AOO is completely outside protected areas) by protected area system.

	Taxa	Category	AOO (km ²)	
Sardinia →	<i>Centaurea corensis</i> Vals. & Filigh.	CR	4	
	<i>Epipactis zaupolensis</i> (Barbaro & Kreutz) Bongiorno, De Vivo & Fori	CR	4	
Sardinia →	<i>Genista bocchierii</i> Bacch., Brullo & Feoli Chiapella	CR	4	
Catania →	[<i>Limonium catanzaroi</i> Brullo	CR	4	
		<i>Limonium opulentum</i> (Lojac.) Brullo	CR	4
		<i>Limonium sibthorpiatum</i> (Guss.) Kuntze	CR	4
		<i>Limonium tauromenitanum</i> Brullo	CR	4
		<i>Malva stenopetala</i> (Coss. & Durieu ex Batt.) Soldano, Banfi & Galasso subsp. <i>plazzae</i> (Atzei) Iamónico, Bartolucci & Peruzzi	CR	24
Palermo →	<i>Rhinanthus helenae</i> Chabert	CR	4	
	<i>Salvia ceratophylloides</i> Ard.	CR	4	
	<i>Serapias nurrica</i> Corrias subsp. <i>santuingsensis</i> (Senis, M.P. Grasso & Orrù) Senis, M.P. Grasso & Orrù	CR	4	
	<i>Clinopodium raimondoi</i> Spadaro, A.S. Faqi & Mazzola	VU	4	
	<i>Dianthus vulturius</i> Guss. & Ten. subsp. <i>aspromontanus</i> Brullo, Scelsi & Spamp.	VU	4	



Conclusion

Taxa endemic to a country are key elements for setting up national conservation priorities and for driving conservation actions considering that their survival is under the full national responsibility and entirely dependent on national policy.

These results provide a key contribution toward the development of a RIBES conservation strategy at the national level, aiming at an effective *ex situ* conservation of the Italian flora, e.g. supporting the definition of a priority list for collection, banking, and duplication programmes.



Many thanks for your attention!
