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PB59

A core collection of the Italian flora for the bioprospection of precious bioactive phytochemicals

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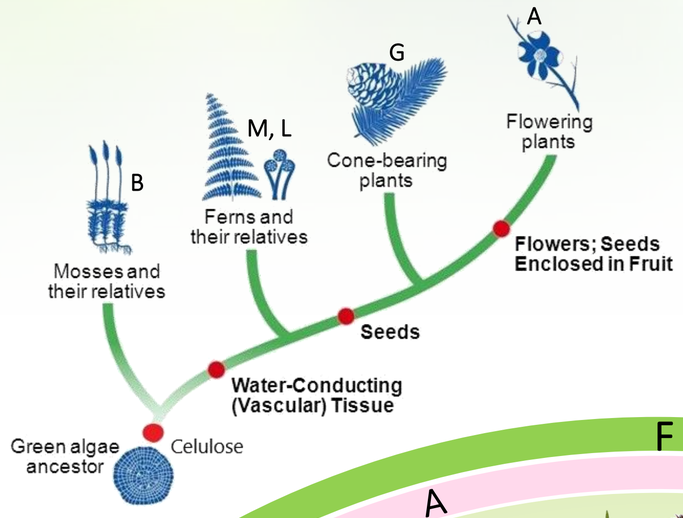
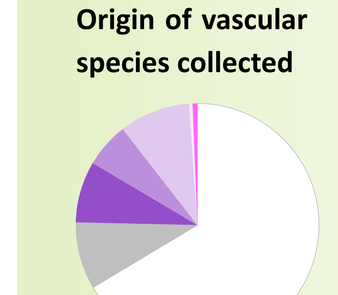
A long history of plant evolution and biochemical diversity is still waiting to be explored!

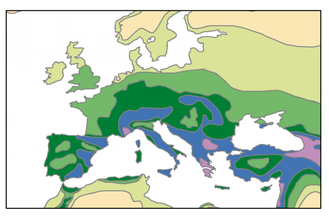
The extensive diversity in **structures**, **functions**, and **bioactivities** of **plant specialized metabolites** generated by land plants throughout their **evolution** represents a valuable resource for **bioprospecting**, *i.e.* the exploration of biodiversity for new **resources of social and commercial value** (such as drugs, nutraceuticals, bioactive natural products, etc.)





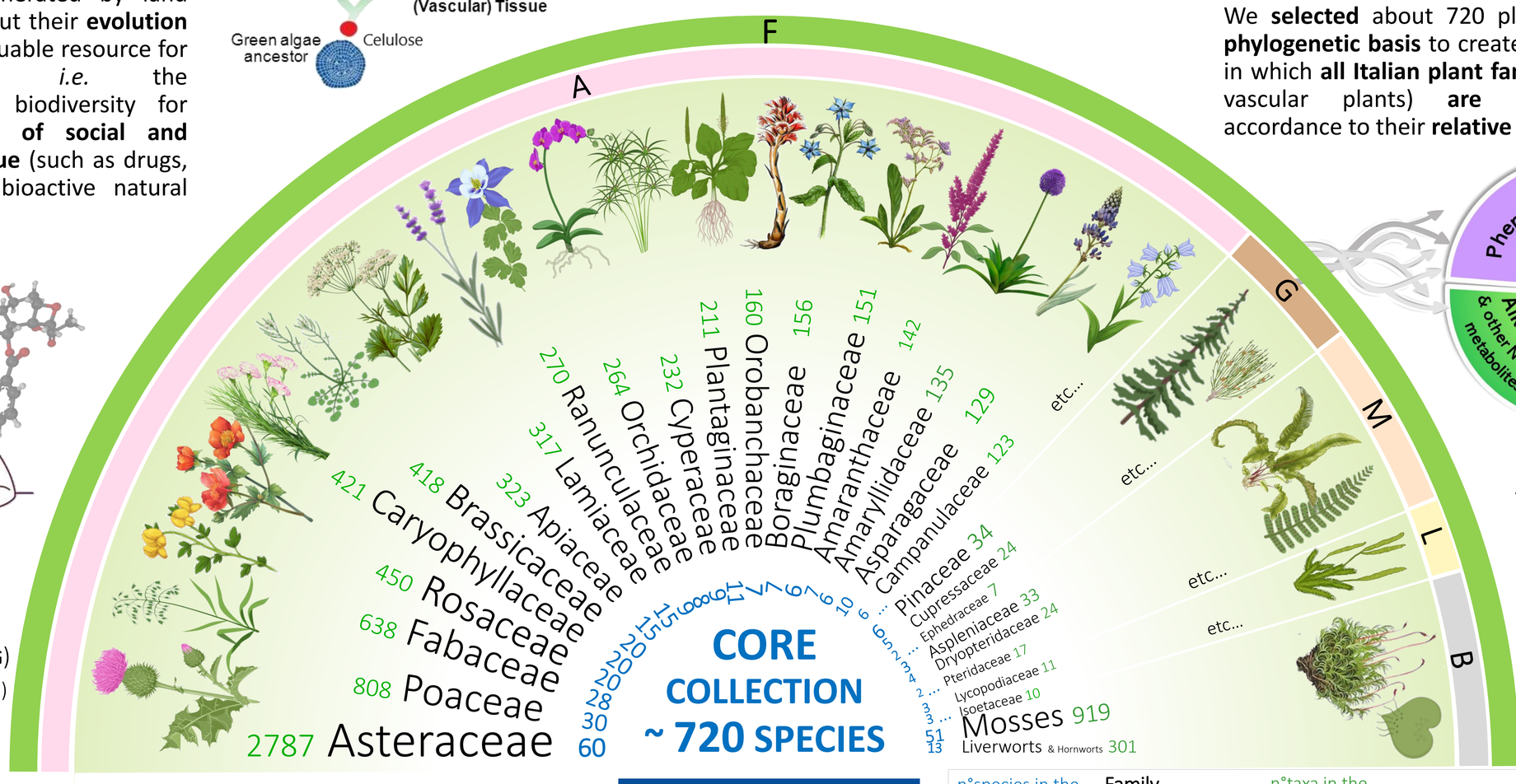
Large-scale bioprospection of the Italian flora: unleashing the phytochemical potential of land plant families

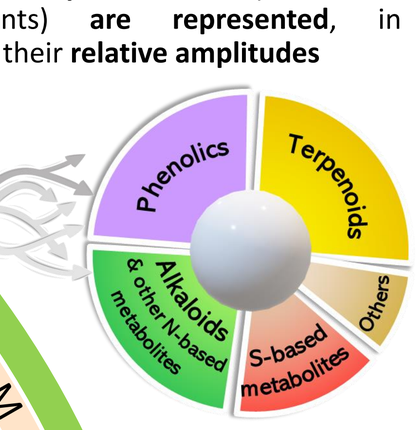
Italy is a **hotspot** of **plant biodiversity**, with more than **12000 taxa** among vascular[a,b] and non-vascular plants[c,d]



Within the frame of **NBFC Spoke 6 – Activity 2**, we set up a large-scale **bioprospection plan** to **explore** and **valorize** the phytochemical diversity expressed within the families of Italian land plants

We **selected** about 720 plant species **on a phylogenetic basis** to create a core collection in which **all Italian plant families** (at least for vascular plants) **are represented**, in accordance to their **relative amplitudes**





This approach **maximizes the chance of finding** diverse bioactive compounds from species with **different biosynthetic capabilities**

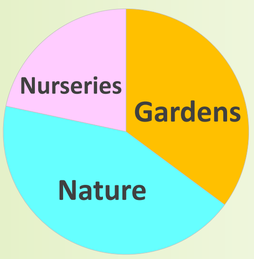
- Italian flora (F)
- Angiosperms (A)
- Gymnosperms (G)
- Monilophytes (M)
- Lycophytes (L)
- Bryophytes (B)

n°species in the core collection	Family (or Taxonomic group)	n°taxa in the Italian flora

(~7% of the Italian flora)

697 / 720 species sampled so far

ALMOST DONE

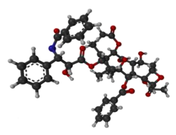


Origin of vascular species collected

native (75%)
- indigenous
- endemic

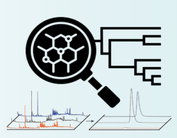
non-native (25%)
- casual
- invasive
- naturalized
- neophytes with unknown impact
- cryptogenic

Bioprospection
- Phytochemical profiling
- Bioactivity screening
- In-depth analysis
- Bioactive compounds



Untargeted metabolomics

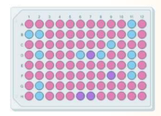
Comparative metabolomics



Characterization of plant specialized metabolites through **UPLC-HR-MS**

How do plant-specialized metabolites chart within the various **lineages of the Italian flora** and what **chemo-evolutionary dynamics** shape the **metabolome diversification** in land plants?

Check these Posters!
- **PA38** (Rosids)
- **PB84** (Asterids)
- **PB157** (Bryophytes)



Characterization of the **bioactivites** of plant extracts and phyotocomplexes though ***in vitro*** **cell-free/cell-based bioassays** and ***in vivo*** **experiments**

Check these Posters!
- **PA9**, **PA39**, **PB6** (plant enhancement & protection)
- **PA35**, **PA145**, **PB35**, **PB51**, **PB116** (prevention & treatment of non-communicable diseases)

	n°core collection / n° Italian flora		
	Species	**Genera**	**Families**
Italian flora	720 / 9692 (**7**%)	576/1933 (**30**%)	220/331 (**66**%)
Angiosperms	577/8270 (7%)	486/1508 (32%)	161/174 (92%)
Gymnosperms	17/65 (26%)	11/22 (50%)	6/6 (100%)
Monilophytes	27/112 (24%)	23/38 (61%)	16/18 (89%)
Lycophytes	9/25 (36%)	5/7 (71%)	3/3 (100%)
Bryophytes	64/1220 (5%)	51/358 (14%)	34/132 (26%)

References

(a) Portale della flora d'Italia – Portal to the flora of Italy, 2023.1. (https://dryades.units.it/floritaly/; retrieved on 21 March 2024); **(b)** Bartolucci, F., Galasso, G., Peruzzi, L., & Conti, F. (2023). Report 2021 on plant biodiversity in Italy: native and alien vascular flora. Natural History Sciences, 10(1), 51-56; **(c)** Muschi ed epatiche d'Italia - Mosses and liverworts of Italy (https://dryades.units.it/briofite/index.php; retrieved on 21 March 2024); **(d)** Aleffi, M., Cogoni, A., & Poponessi, S. (2023). An updated checklist of the bryophytes of Italy, including the Republic of San Marino and Vatican City State. Plant Biosystems-An International Journal Dealing with all Aspects of Plant Biology, 1-49

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