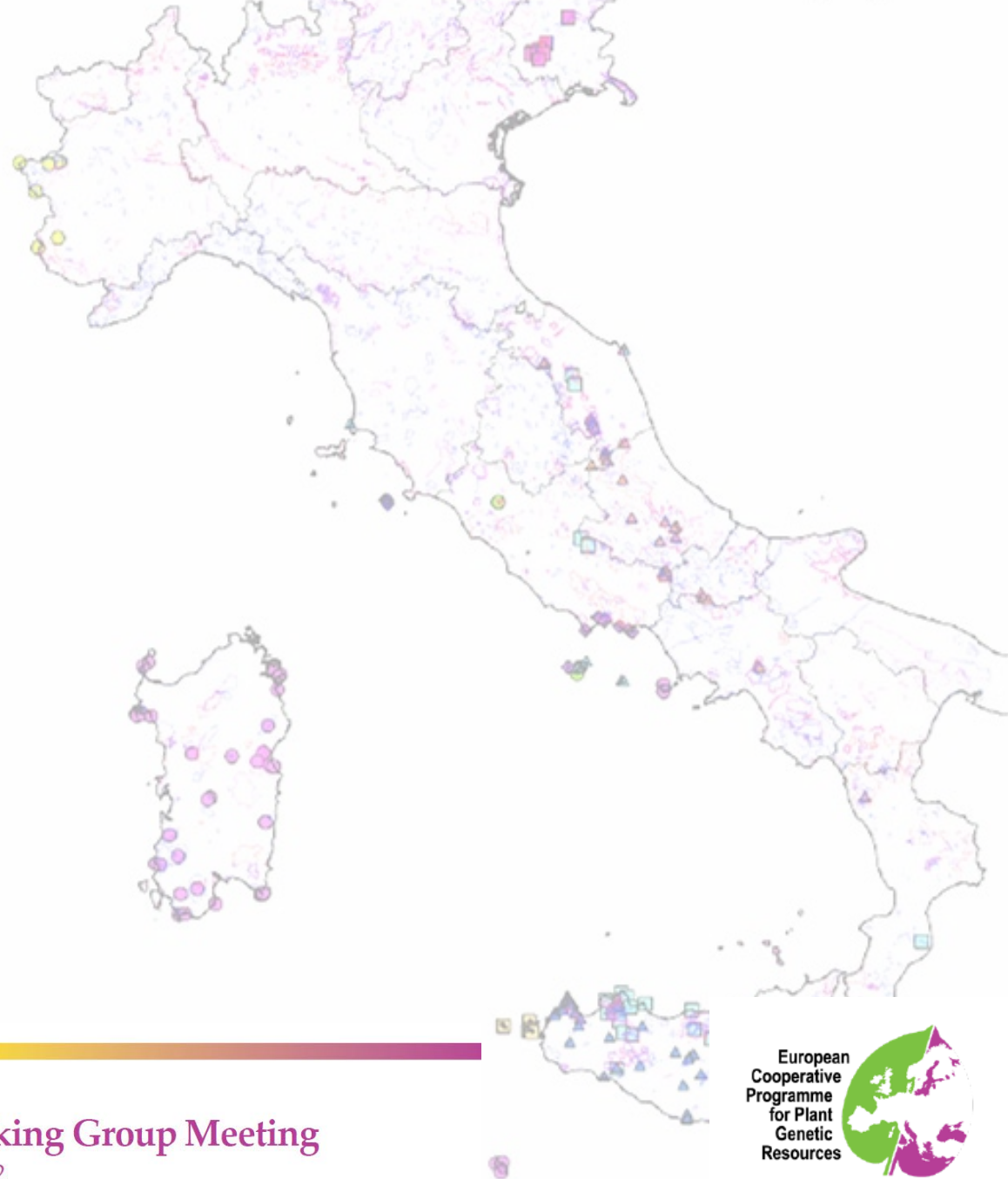


# CWR *in situ* data in EURISCO, opportunities in Italy

Lorenzo Raggi & Valeria Negri  
University of Perugia, Italy



ELGO - DIMITRA  
HELLENIC AGRICULTURAL  
ORGANIZATION - DIMITRA

Ad hoc Crop Wild Relatives Working Group Meeting

13–15 December 2022

Thessaloniki, Greece



# Project partners



1. Institute of Biosciences and Bioresources, National Research Council (IBBR-CNR) (leading partner), Bari
2. University of Perugia (UniPG), Perugia
3. Council for Agricultural Research and Economics, Research Centre for Forestry and Wood (CREA-FL), Trento

# Work plan



1. Identify priority taxa and populations
2. Organize the network of data providers
3. Collect and organize the data according to the agreed principles and data exchange format
4. Provide the data to EURISCO



## A new list and prioritization of wild plants of socioeconomic interest in Italy: toward a conservation strategy

Simona Ciancaleoni<sup>a</sup>, Lorenzo Raggi<sup>a</sup>, Giulio Barone<sup>b</sup>, Domizia Donnini<sup>a</sup>, Daniela Gigante<sup>a</sup>, Gianniantonio Domina<sup>b</sup>, and Valeria Negri<sup>a</sup>

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### ABSTRACT

Wild harvested plants (WHP) and crop wild relatives (CWR), part of the segment of natural diversity that is collectively known as 'Plant Genetic Resources', have great socioeconomic importance for humans because they are used either directly or in crop breeding. In order to lay down a solid base for constructing conservation strategies for Italy, an updated annotated list of CWR and WHP was produced for the country including information on known uses. Taxa included in the list were then prioritized using a pragmatic approach based on their value, native status, and need of protection or monitoring.

### KEYWORDS

Crop wild relatives; Italian CWR check list; CWR taxa conservation priority; biodiversity; ethnobotanical use

### Introduction

It is commonly acknowledged that the inter- and intra-specific diversity, as well as the habitat diversity of wildlife, is under threat of irremediable loss (Cardinale et al. 2012; Ceballos et al. 2015; Chase et al. 2020; Leigh et al. 2019). The Mediterranean basin is an important biodiversity hotspot with about 25,000 plant species (Cuttelod et al. 2008), of which about 13,000 are endemic (Myers et al. 2000). In particular, after the Iberian Peninsula and Balearic Islands, the Italian Peninsula, and the main Italian Islands are the European areas where the highest number of endemic plant species can be found (Bartolucci et al. 2018; Bilz et al. 2011; Castroviejo 2010). Because of their distribution and the real and potential threats to the conservation of their populations (Bilz et al. 2011), many plant species of the Mediterranean area are considered in need of protection and/or monitoring by national and international conservation policies such as the Bern Convention (Council of Europe 1979) and the Habitats Directive 92/43/EEC (European Commission 1992). The crop wild relatives (CWR) (i.e., wild plant taxa that are relatively genetically close to cultivated plants) (Maxted et al. 2006) and the wild harvested plants (WHP) (i.e., non-cultivated species, which are collected from the wild

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# Priority taxa identification

UNIPG recently published an updated annotated list of CWR and WHP for Italy

- 8,766 CWR/WHP taxa (7,334 species)

Highest conservation priority level to *taxa* belonging to 36 different genera:

- 12 taxa of *Brassica* genus
  - *Brassica villosa* -> GP2 *B. oleracea*
  - *Brassica rupestris* subsp. *hispida* -> GP2 *B. oleracea*
- 8 taxa of *Vicia* genus
  - *Vicia incisa* -> GP1B *Vicia sativa*

# Priority taxa identification



In the project, the selection of priority taxa of national and global relevance:

- IBBR-CNR: *Vicia* spp. in Apulia and Basilicata regions (Southern Italy)
- UniPG: *Brassica* spp. in Central Italy
- CREA-FL: *Lactuca alpina* in Trentino Autonomous Province

# Brassica and Vicia taxa

## A new list and prioritization of wild plants of socioeconomic interest in Italy: toward a conservation strategy

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- *Brassica baldensis*
- *Brassica glabrescens*
- *Brassica insularis*
- *Brassica macrocarpa*
- *Brassica montana*
- *Brassica procumbens*
- *Brassica rupestris* subsp. *hispida*
- *Brassica souliei*
- *Brassica souliei* subsp. *amplexicaulis*
- *Brassica trichocarpa*
- *Brassica villosa* subsp. *brevisiliqua*
- *Brassica villosa* subsp. *drepanensis*
- *Vicia consentina*
- *Vicia cusnae*
- *Vicia dalmatica*
- *Vicia giacominiiana*
- *Vicia incisa*
- *Vicia serinica*
- *Vicia sparsiflora*
- *Vicia tenuifolia* subsp. *elegans*

# In situ *B. incana* populations characterisation

Plant Systematics and Evolution (2018) 304:731–745  
https://doi.org/10.1007/s00606-018-1505-4

ORIGINAL ARTICLE



## Assessment of spatial–temporal variation in natural populations of *Brassica incana* in south Italy: implications for conservation

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### Abstract

*Brassica incana* is a secondary-gene pool wild relative of *Brassica oleracea*. Twenty-two *B. incana* populations are recorded in Italy, where the species has recently been pointed out as in priority need of conservation. While data on the spatial and temporal variation of *B. incana* Italian populations are completely lacking, this information is useful in conservation planning for this species. Three populations from the Sorrento peninsula and from the islands of Ischia and Capri, collected in 1984 and 2012, were characterised for 12 morpho-phenological and 21 genetic traits to assess their spatial–temporal variation. The populations were quite different for morpho-phenological and genetic traits. Spatial differentiation was high and easily explained by the isolation. Temporal differentiation between the Sorrento and Ischia populations was high and explained by a reduction in the population census across time, while it was not significant between the two Capri accessions as such pointing to a major effect of genetic drift. Numerical dimension is extremely relevant in evaluating conservation priorities since it has a major impact on population dynamics over time. The Sorrento and Ischia populations are under threat and urgently need conservation actions, suggesting an alarming scenario for the survival of other crop wild relative populations which are similar in census. Our data also show that, in an allogamous and self-incompatible species like *B. incana*, populations of 100–200 individuals maintain high allelic diversity. According to obtained results, natural populations of species with similar reproductive system and census can be considered at low risk of genetic erosion.

**Keywords** *Brassica incana* · Crop wild relatives · Microevolution · Plant population genetics · Spatial–temporal genetic variation

### Introduction

The C genome of *Brassica* L. genus ( $n=9$ ) consists of a polymorphic aggregate of species in which wild species and cultivated forms of *Brassica oleracea* L. are interfertile to the same degree (Kinian and Quiros 1992; von Bothmer et al. 1995). Wild relatives of *B. oleracea* L. grow on the western Atlantic and on European Mediterranean limestone seaboard cliffs from sea level of up to 1000–2000 m a. s. l.

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**Electronic supplementary material** The online version of this article (<https://doi.org/10.1007/s00606-018-1505-4>) contains supplementary material, which is available to authorized users.

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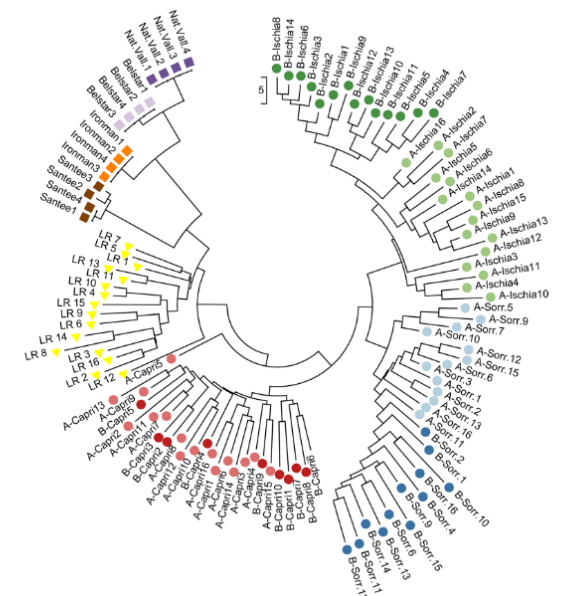
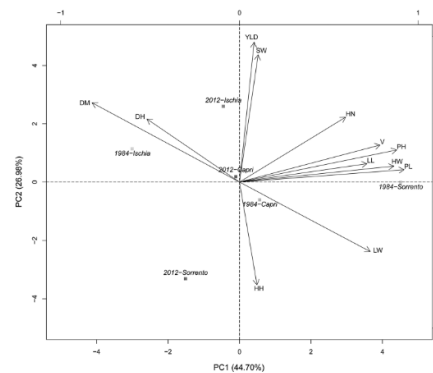
In Italy, 13 wild *Brassica* species are present and the number increases to 24 when subspecies are also considered. Among them, 15 have recently been pointed out as in priority need of conservation (Landucci et al. 2014) (Online Resource 1). In general, populations of these wild species are restricted in size and distribution because of competition with other species, the limited area of cliffs and human disturbance (Geraci et al. 2004; Landucci et al. 2014).

*Brassica incana* is a secondary-gene pool wild relative of *B. oleracea* and a tertiary-gene pool wild relative of *Brassica napus* L. and *Brassica rapa* L. (Vincent et al. 2013). It is a suffruticose plant, usually 100 cm tall with a wooden stem at the base. Its branches are herbaceous in the florescence scape only (Fig. 1a). Basal leaves usually show a “winged” petiole; the leaf lamina has a lanceolate shape and is pubescent, especially on the lower surface and along the keels. It shows a complete margin, crenated, or with asse or with two lobes in the lower half (Fig. 1b). The flowers, with yellow or white petals, are gathered in a long and narrow racemose

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## Three *Brassica incana* (GP-2 of *Brassica oleracea*) populations:

- Morpho phenological diversity
- Genetic diversity



- Alarming scenario for the survival of fragmented and small *B. incana* populations
  - Other crop wild relative populations could be in the same conditions
- Considering the inclusion on *B. incana* among the targets

# Priority taxa, population occurrences

## *In situ* occurrence and protection of crop wild relatives in Italian sites of natura 2000 network: Insights from a data-driven approach

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Aim of this work is to evaluate the *in situ* status of different crop wild relative species in Italy by analysing the geographic distribution of their populations and to suggest possible strategies to improve their future conservation. The work has been focused on different species of the *Allium*, *Beta*, *Brassica*, *Secale* and *Triticum* genera that are of priority at European and global levels for the economic importance of the related crops, the level of threat, as well as the potential for use. Geographical distribution and the overall percentage of populations occurring in Natura 2000 sites was initially analysed. In addition, due to the economic importance of the genus and species distribution in Italy, *Brassica glabrescens*, *B. insularis*, *B. macrocarpa*, *B. montana*, *B. procumbens*, *B. rupestris*, *B. villosa* were the object of additional analyses based on more detailed occurrence data, retrieved from multiple databases, and including land cover/land use and *in situ* and *ex situ* density analyses. Using information available in the Italian National Geoportal, geographical distribution data were retrieved for 1,996 *in situ* populations belonging to 60 crop wild relative species: *Allium* (43), *Brassica* (11), *Triticum* (4), *Beta* (1) and *Secale* (1). Percentages of population occurring in Natura 2000 sites are quite different when the different species are considered; this also applies to *Brassica* species in most need of protection. Results of land cover/land use analysis showed that *Brassica* populations outside Natura 2000 areas mainly occur in anthropized sites while those within Natura 2000 mainly in sites characterised by natural and seminatural conditions. Areas where genetic reserves could be instituted and that could be the target of future *Brassica* resources collection missions are also suggested. Based on a large dataset of punctual geographical distribution data of population occurrences across the territory, this research shows that, in Italy, crop wild relatives *in situ* are in a quite precarious condition especially when species in most need of protection are considered. Our data also

## UNIPG is publishing a study on CWR populations geographical distribution in Italy

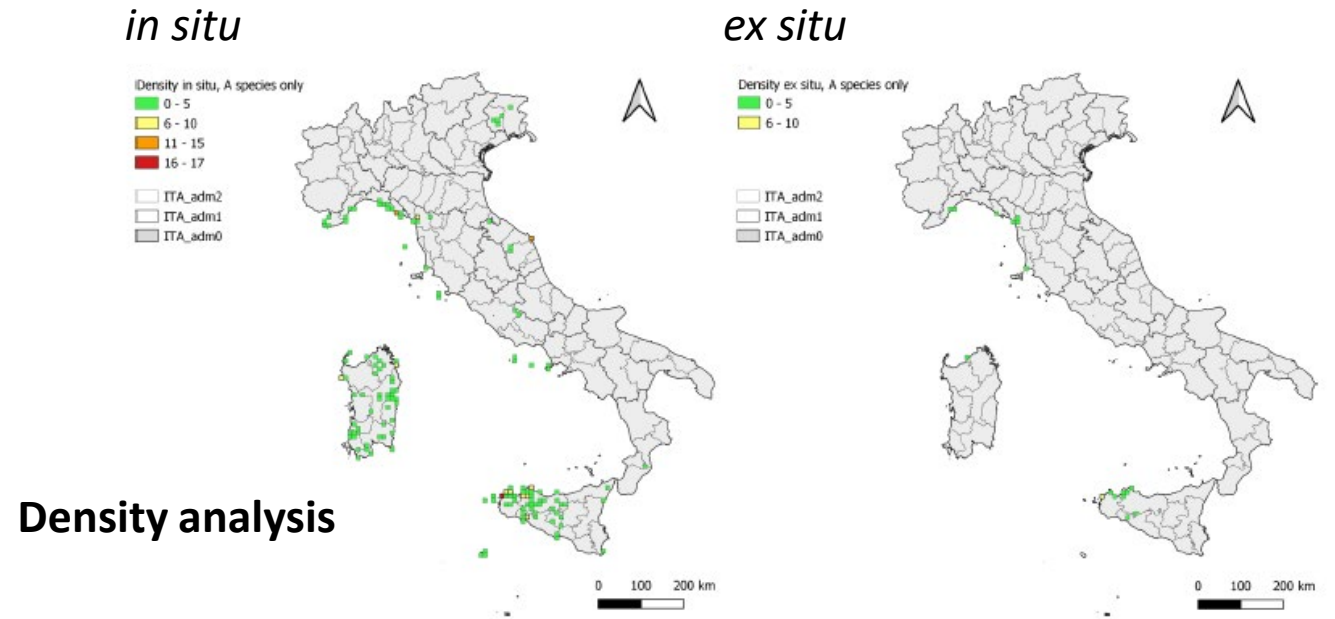
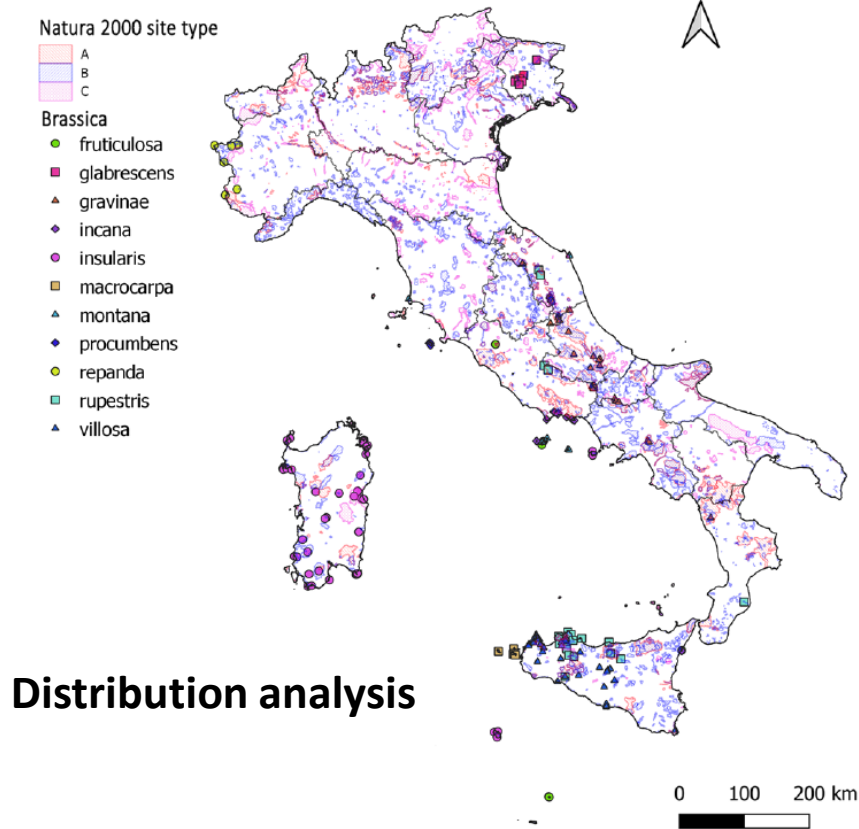
- occurrence data from multiple databases
- GIS analysis and LCLU analyses

## Results

- 1,996 *in situ* populations belonging to 60 CWR species: *Allium* (43), *Brassica* (11), *Triticum* (4), *Beta* (1) and *Secale* (1)
- Population occurring in protected areas of Natura 2000 Network identified



# Priority taxa, population occurrences



- Excellent starting point for identification of *Brassica* populations of interests
- Other data to be retrieved and included during the project
- *Modus operandi* to be applied to other genera

## 2. Preparation of the national database structure



Foreseen activities:

- Extraction and management of retrieved information from the single databases
- Compilation of the draft National Inventory of CWR required for upload to EURISCO
  - The “Principles for the Inclusion of CWR Data in EURISCO”
  - The proposed descriptors for CWR prepared within the framework of the ECPGR project ‘Extension of EURISCO for Crop Wild Relatives (CWR) *in situ* data and preparation of pilot countries’ data sets’.
- Definition of fields (descriptors) for which information can be supplied

**Possibly achieved by the end of May 2023**

# 3. Organize the network of data providers



- Italy has so far not ratified the Nagoya Protocol -> access to CWR is regulated by local and/or regional administrations responsible for the territory of interest (CBD, article 15)
- The need of a contact person for accessing the resource in situ

Project partners will build upon existing contacts with administrations for their inclusion in the network

- CNR: Apulia Region and Parco nazionale dell'Alta Murgia, Basilicata Region and Parco Nazionale dell'Appennino Lucano Val d'Agri – Lagonegrese.
- UNIPG: Umbria and possibly Marche Regions, Parco del Conero.
- CREA: Trentino Autonomous Province and Parco Naturale Adamello Brenta.

**Possibly achieved by the end of June 2023**

## 4-5. Data collection and transmission to EURISCO

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- All the information on CWR species/taxa present in Italy and related data providers collected and organized according to the CWR-NI db structure for upload into EURISCO
- Validation with the EURISCO manager team
- Information on CWR accessions present in Italy and accessible through official contacts, thanks to specific agreements, made available in EURISCO
- Distribution of the information through the catalogue

**Possibly achieved by the end of 2023**