Focus Group ‘Local plant genetic resources in view of climate change and biodiversity loss’

Madrid, Spain
27-28 November 2024

GEN4OLIVE

Concepcion Muñoz Diez

Focus Group ‘Local perennial plant genetic resources in view of climate change and biodiversity loss’ 1st meeting | Madrid, Spain
27 November 2024

GEN4OLIVE

Prof. Concepción Muñoz Díez
Agronomy Department
University of Cordoba, Spain

UNIVERSIDAD D CÓRDOBA

EXCELENCIA MARÍA DE MAEZTU 2020 - 2024

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101000427

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OLIVE TREE

- Most extensively planted fruit crop
- **11 mha** olive orchards worldwide
- 65 countries, 5 continents
- Olive oil and table olives

Olive tree
(*Olea europaea* L.)

Mediterranean diet

OLIVE GENETIC RESOURCES

Cultivated olive

×

Wild olives

Olea europaea subsp. *europaea* var. *sativa*

Clonal cultivars

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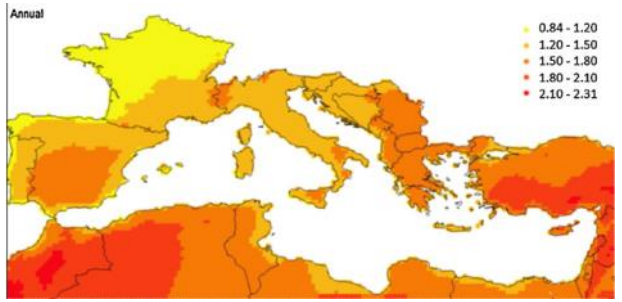
THREADS

- **Genetic Erosion**

- **Fragmentation**

- **Loss of diversity**

- **Climate change**



- **Pest and disease outbreaks**

- Wildfires

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STRATEGIES

CONSERVATION

- **Ex situ collections** in 26 countries
- **6 International Collections - IOC**

- **Poorly connected**
- **Characterization?**

- **Wild olives** not represented

BREEDING

- **Still germinal**
- **<20 new cultivars**

- **Methodological issues**. i.e. juvenile phase

- **Lack of agronomical information**

- **Public initiatives**
- **Scarce private investment**

International initiatives

Evaluate GenRes

Boost breeding

Efficient conservation

GEN4OLIVE CONSORTIUM

GEN4OLIVE

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Mobilization of Olive GenRes through pre-breeding activities ensuring information availability for end users

Call: H2020-SFS-2020-1

Topic: SFS-28-2018-2019-2020 - Genetic resources and pre-breeding communities

Duration: 1/10/2020-30/03/2025

Overall Budget: 7.535. 758 €

- **Coordinator: Prof. C. Munoz Díez**

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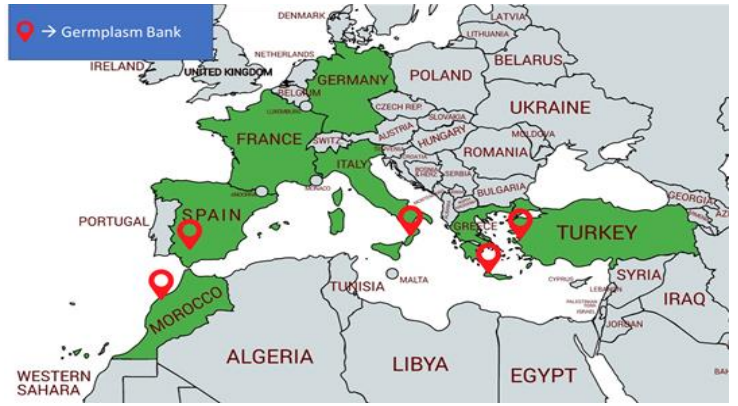
- **16 partners** - interdisciplinary and transdisciplinary
- **7 countries**: Spain, Morocco, France, Germany, Italy, Greece and Turkey
- **5 SMEs**



- **5 olive germplasm banks** (GBs): Cordoba, Marrakech, Mirto, Chania and Izmir

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GOALS: PREBREEDING

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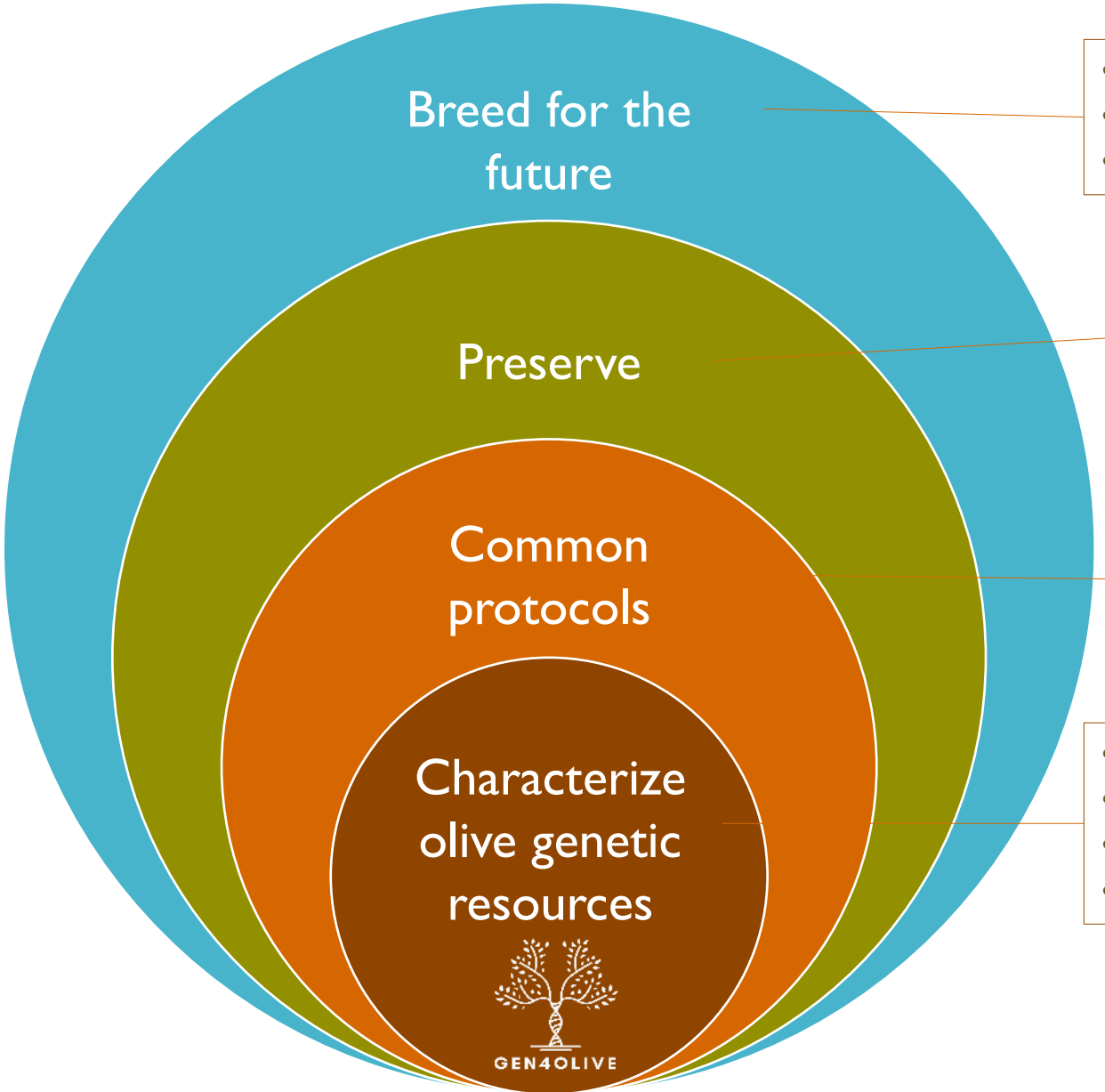

Making olive genetic resources accesible to end users

SMEs

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- Adaptation to climate change
- Resistance to pest and diseases
- Suitable for new olive growing systems

- Cooperation among Germplasm Banks
- Adoption of harmonized evaluations and conservation protocols

- Easy and reliable evaluations
- New biotechnological tools

- Resilience to climate change
- Resistance to pests and diseases
- Production and quality
- Adaptation to modern planting systems

WORKPACKAGES

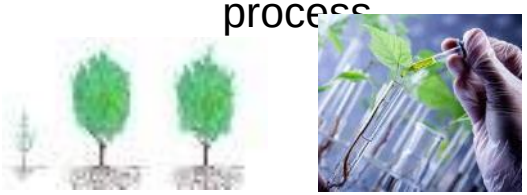
GEN4OLIVE

WP1. Definition of **common evaluation protocols** and consulting end-users' needs

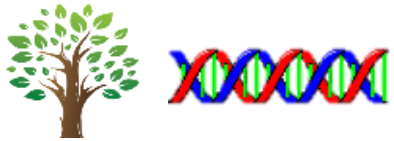
WP2. **Wild olives –** sampling, characterization and establishment of germplasm banks

WP3. **Cultivated and wild olives - evaluation of valuable agronomical traits**

WP4. **Development of molecular tools** to accelerate the breeding process



WP5. Evaluation of **Genetic X Environment** effects. **Climate change prediction**



WP6. Development of the GEN4OLIVE user-friendly interface: **database and apps**

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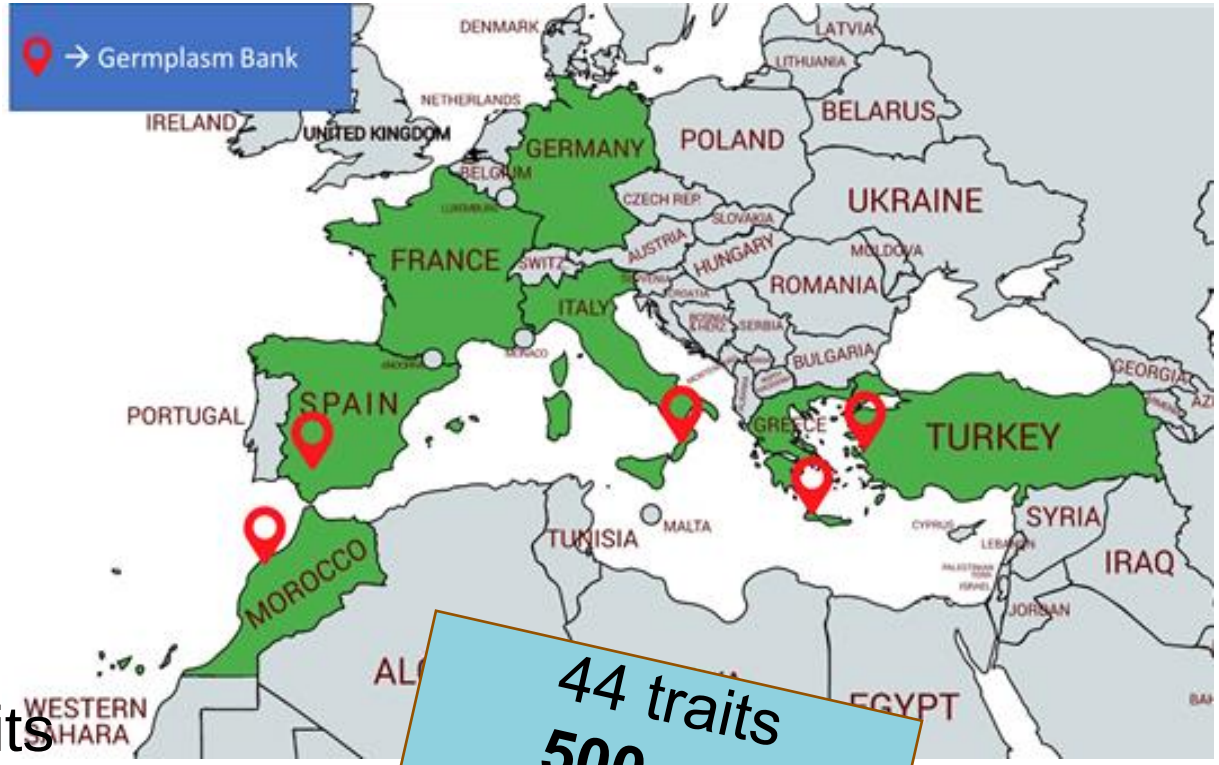
WP1. Definition of **common evaluation protocols**

WP3. Evaluation of valuable agronomical traits - Cultivated and wild olives

- Morphological and agronomical traits
- Biotic streses
- Abiotic streses

14 Protocols



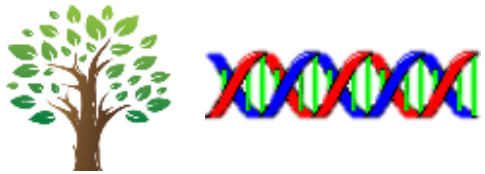
44 traits
500 cvs
2 seasons

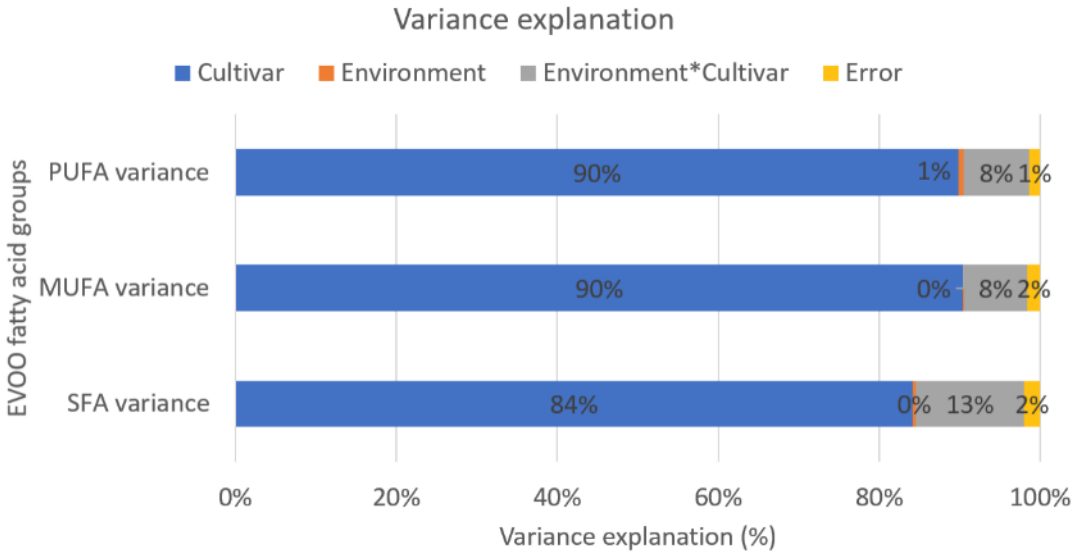
2020-2024

GOAL I: DEVELOPING COLLECTIVE PRE-BREEDING ACTIVITIES → TO CHARACTERIZE OLIVE GERMPLASM

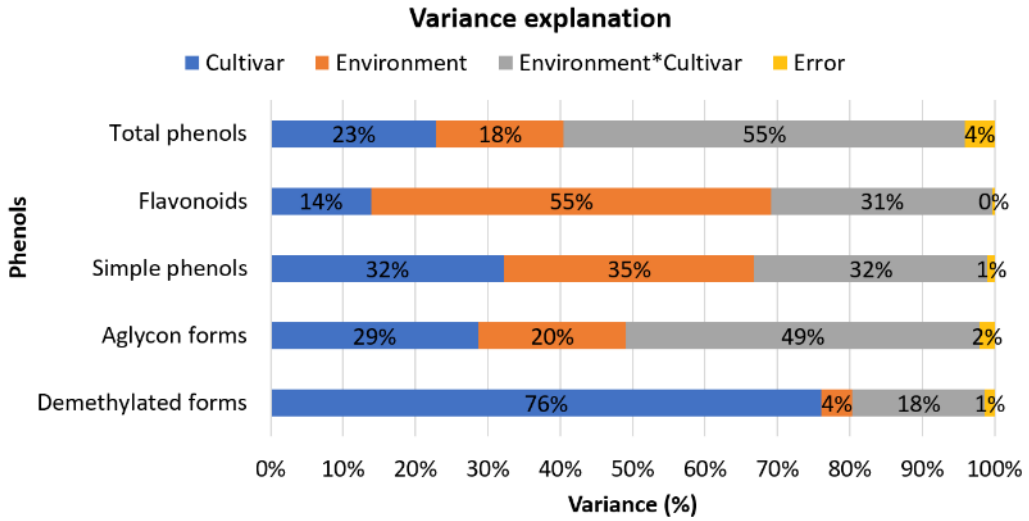
GEN4OLIVE

WP5. Evaluation of **Genetic X Environment** effects. **Climate change prediction**





- Phenotyping of adaptive traits: characterization of the adaptive and quality traits variability in a set of **30 olive shared varieties** 5 GBs
- Assessment of their **G×E interaction**.
- **Modelling** of adaptive traits for different environments and climate change scenarios



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GOAL I: DEVELOPING COLLECTIVE PRE-BREEDING ACTIVITIES → TO CHARACTERIZE OLIVE GERMPLASM

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WP1. Definition of **common evaluation protocols** and consulting end-users' needs

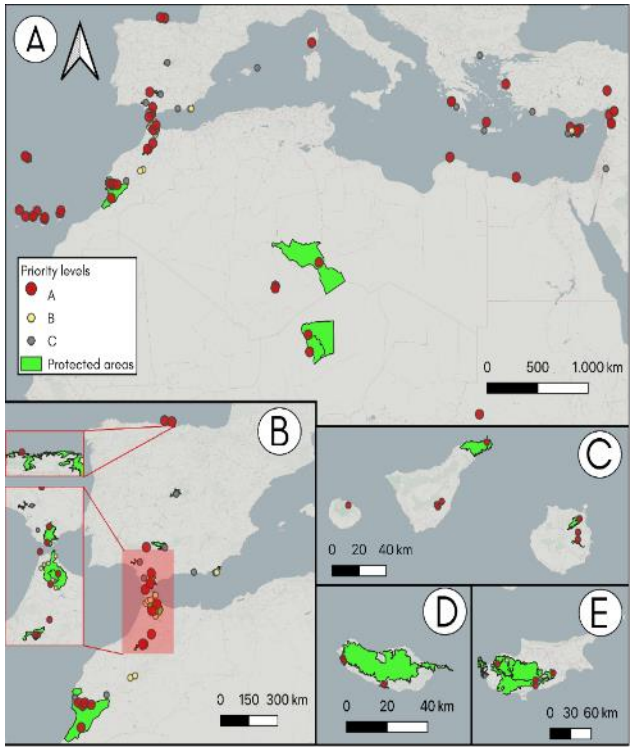
WP2. Wild olives – sampling, characterization and establishment of germplasm banks

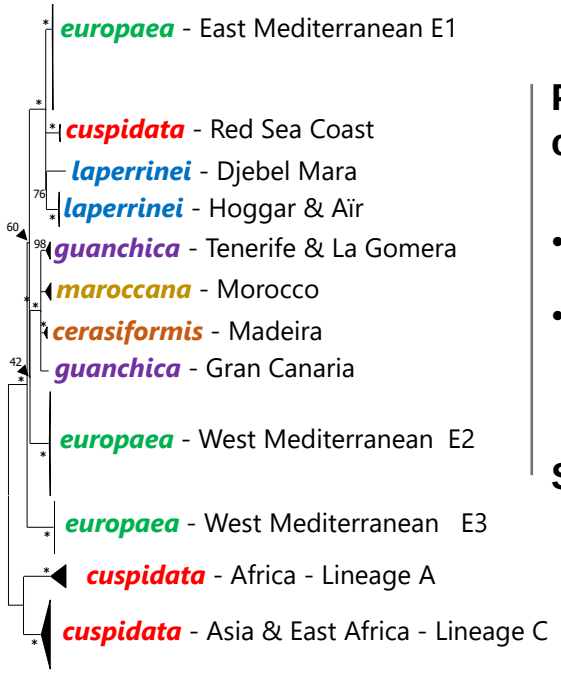
T2.1. Delimitation of the geographical areas

T2.2. Multi-scale characterization of wild olive diversity

T2.3. Establishment of reference wild olive germplasm banks

T2.4. Identification and characterization of the "lost ancient varieties"





Phenotipycal characterization

- Germination
- Biotic/Abiotic Stresses

Seed collection

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DEVELOPING AN INNOVATIVE AND USER-FRIENDLY INTERFACE TO MAKE GENETIC RESOURCES ACCESSIBLE FOR THE END USER

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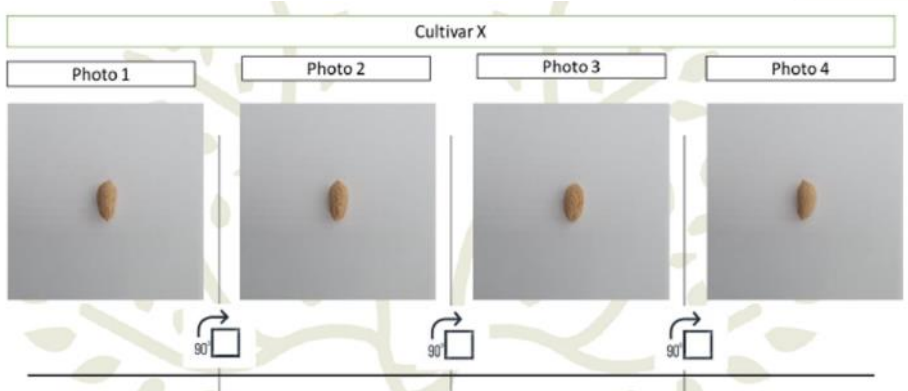
WP6. Development of the GEN4OLIVE user-friendly interface: **database and apps (SAPIENZA)**



Original papers

OliVaR: Improving olive variety recognition using deep neural networks

Hristofor Miho [a], Giullo Pagnotta [b], Dorjan Hitaj [b], Fabio De Gaspari [b], Luigi Vincenzo Mancini [b], Georgios Koubouris [c], Gianluca Godino [d], Mehmet Hakan [e], Concepción Muñoz Diez [a]

- 150.000 pictures
- Machine learning

GOAL I: DEVELOPING COLLECTIVE PRE-BREEDING ACTIVITIES → NEW BREEDING TOOLS

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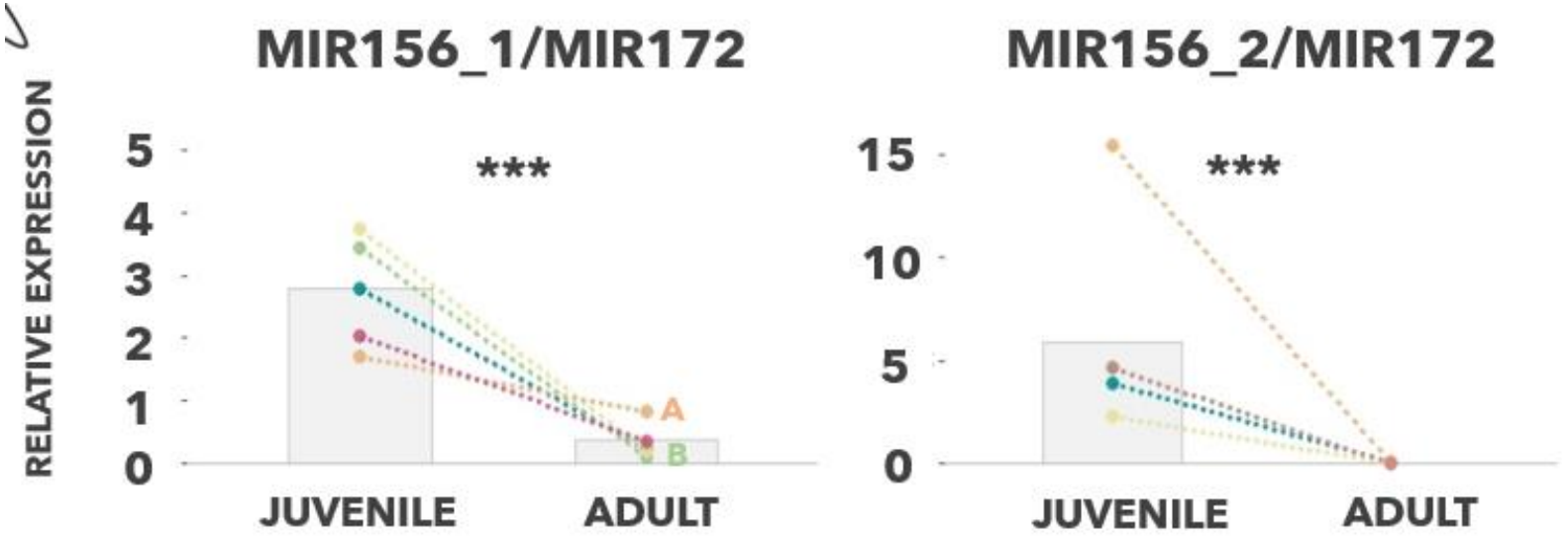
WP4. Development of molecular tools to accelerate the breeding process (UCO)

T4.2 Identification of candidate gene markers of olive juvenility phase



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GOAL III: ENGAGING THE PRIVATE SECTOR IN INNOVATION THROUGH TWO OPEN CALLS TO FACILITATE SMES' PRE-BREEDING ACTIVITIES

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WP7. Pre-breeding **specific calls for SMEs** involvement (FCTA)

- **First call for projects: December 2021**
  - Prebreeding activities
  - Enabling tecnologies for breeding
- **Second call for projects: January 2023**
  - Olive breeding plans design and validation activities

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GOAL III: ENGAGING THE PRIVATE SECTOR IN INNOVATION THROUGH TWO OPEN CALLS TO FACILITATE SMES' PRE-BREEDING ACTIVITIES

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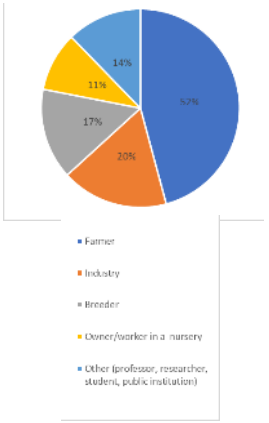
WP8. Co-creation and capacity building (FOCOS)

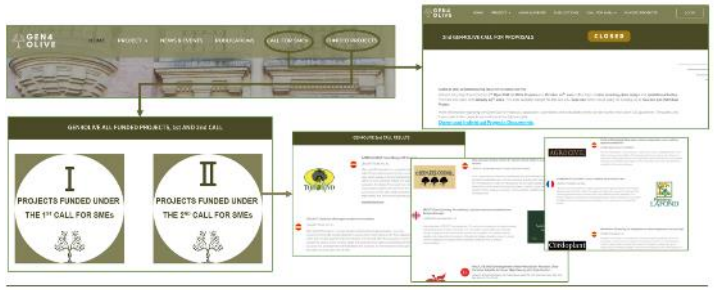
- Events for End users and stake holders engagement
- Dynamization events for GEN4OLIVE open calls:
  - **2 co-creation panels** replicated in 5 countries



- Capitalization of GEN4OLIVE commons protocols and scientific results / Best practices for breeding
- External Expert Advisory Board: IOC

WP9. Communication, dissemination and results exploitation (SCI)

- Communication: Web page, social networks and audiovisual material



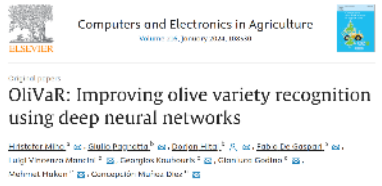
FOLLOWERS: 1640 (↑ 50%)
PUBLICATIONS: 244
IMPRESSIONS: 78.850

FOLLOWERS: 175 (↑ 56%)
PUBLICATIONS: 225
IMPRESSIONS: 49.610
INTERACTIONS: 3.598

FOLLOWERS: 766 (↑ 15 %)
TWEETS: 600
IMPRESSIONS: 186.672

YouTube SUBSCRIBERS: 49 (↑ 44,4 %*)
VIDEOS: 56
VIDEO VIEWS: 3572

- Dissemination, scientific publications, networks, results explotaitic



Oficina Española de Patentes y Marcas

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www. gen4olive.eu

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THANK YOU!!

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EU CAP Network Focus Group
‘Local plant genetic resources in view of climate change and biodiversity loss’

27-28 November 2024 | **Madrid, Spain**

All information on the Focus Group is available on the webpage:
https://eu-cap-network.ec.europa.eu/focus-group-local-perennial-plant-genetic-resources-view-climate-change-and-biodiversity-loss