European Cooperative Programme for Plant Genetic Resources
ECP/GR

EUROPEPLAND

crea
Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria

EuroPepLand – work planning

EUROPEPLAND– Implementing a trans-EUROpean PEPper LANDrace collection for resilient agriculture

31 October 2024, Almeria, Spain

Project tasks

Project start = 01 September 2024
Project end = 31 August 2026

Task 1 – Core collection development (M1-M6)

Task 2 – Phenotyping and genotyping (M6-M18)

Task 3 – Data analysis and integration (M19-M24)

Task 4 – Meetings and dissemination (M1-M24)

Task 1 – Core collection development (M1-M6)

1. All *Capsicum annuum*
2. All landraces from Europe mainland
   300 (Traditional cultivar/landrace)

mandatory

Accession Name	Accession N°	Country	Location (Region or coordinates)	Shape	Color at Maturity	Pungency	Biological status (if in EURISCO)	DOI
Papaccella	21-PT-41	Italy	Campania region	Round	Red	Sweet		
Sigaretta	21-PT-163	Italy	Calabria region	elongated	Red	Pungent		
Peperone di Senise	22-PT-101	Italy	40°08'N 16°17'E	conical	Red	Sweet		

More details in the phenotyping section

- Define the collection
- Include broad diversity in terms of provenance and main traits

Task 2 – Phenotyping and genotyping (M6-M18)

Accession Name	Accession N°	Shape	Color at Maturity	Color at Immature stage	Fruit size	Pungency
Papaccella	21-PT-41	Round	Red	Medium Green	Large	Sweet
Sigaretta	21-PT-163	elongated	Red	Medium Green	Small	Pungent
Peperone di Senise	22-PT-101	conical	Red	Light green	Intermediate	Sweet

1 Oblate
2 Circular
3 Cordate/heart-shape
4 Blocky
5 Rectangular
6 Trapezoidal
7 Conical
8 Elongated
9 Hornshaped

1 White
2 Lemon-yellow
3 Pale orange-yellow
4 Orange-yellow
5 Pale orange
6 Orange
7 Light red
8 Red
9 Dark red
10 Purple
11 Brown
12 Black

Before ripening
1 White
2 Cream
3 Light Green
4 Medium Green
5 Dark Green
6 Purple
7. Other (e.g. orange)

1 Large > 100 g
2 Intermediate 20g – 100g
3 Small < 20 g

- To perform on the EUROPEPLAND collection

Task 2 – Phenotyping and genotyping (M6-M18)

7. External immature fruit color (1. white/ 2. cream/ 3. light green/ 4. medium green/ 5. dark green/ 6. purple).

1

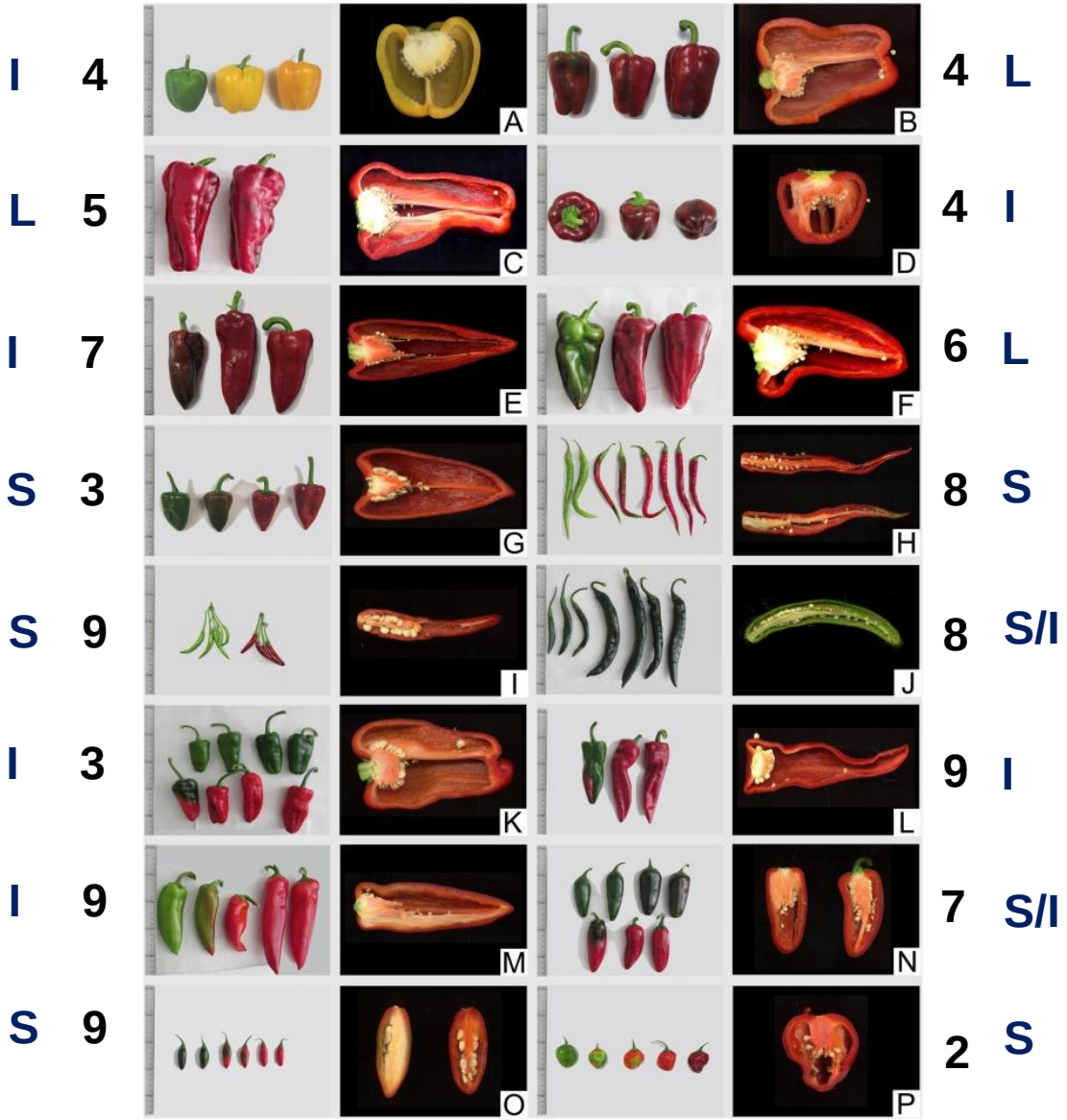
2

3

4

5

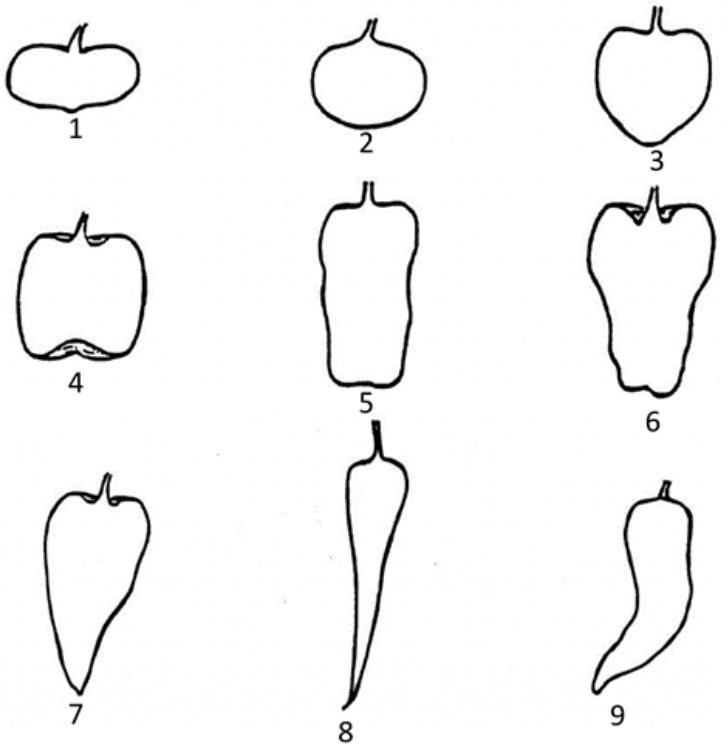
6



Dias et al., 2020 https://doi.org/10.1016/j.scienta.2020.109245

3. heart-shape

9. Fruit predominant shape (1. oblate/ 2. circular/ 3. cordate/ 4. blocky/ 5. rectangular/ 6. trapezoidal/ 7. conical/ 8. elongated/ 9. hornshaped).



L = Large
I = Intermediate
S = Small

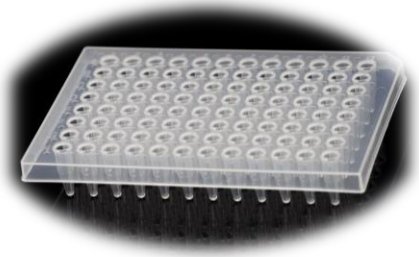
Task 2 – Phenotyping and genotyping (M6-M18)

- Two partners will perfor salt stress (CNR-IBBR) and biochemical analysis (CREA IT)
- Will focus of few accessions once the core collection has been established
- Material to be selected in the middle of next year
- Provide new information on the quality and resilience of selected genotypes (< 10)

Task 2 – Phenotyping and genotyping (M6-M18)

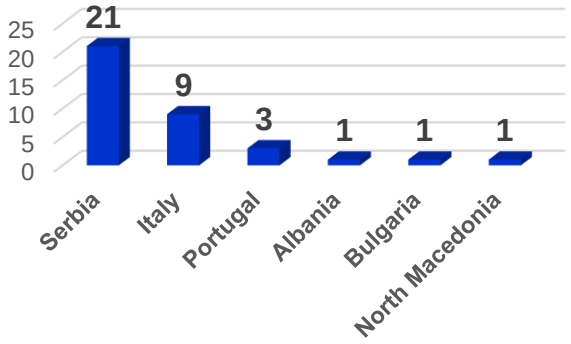
15K for DNA isolation, genotyping and phenotyping (CREA)

Position	Material	Item	Volume	Price/Plate (€)	Total (€)
10	IL_CA010_GL	10K Pepper array	1 plate	3.120,00	**3.120,00**



4 plates = 384 samples

EU-LRs genotyped from EVA

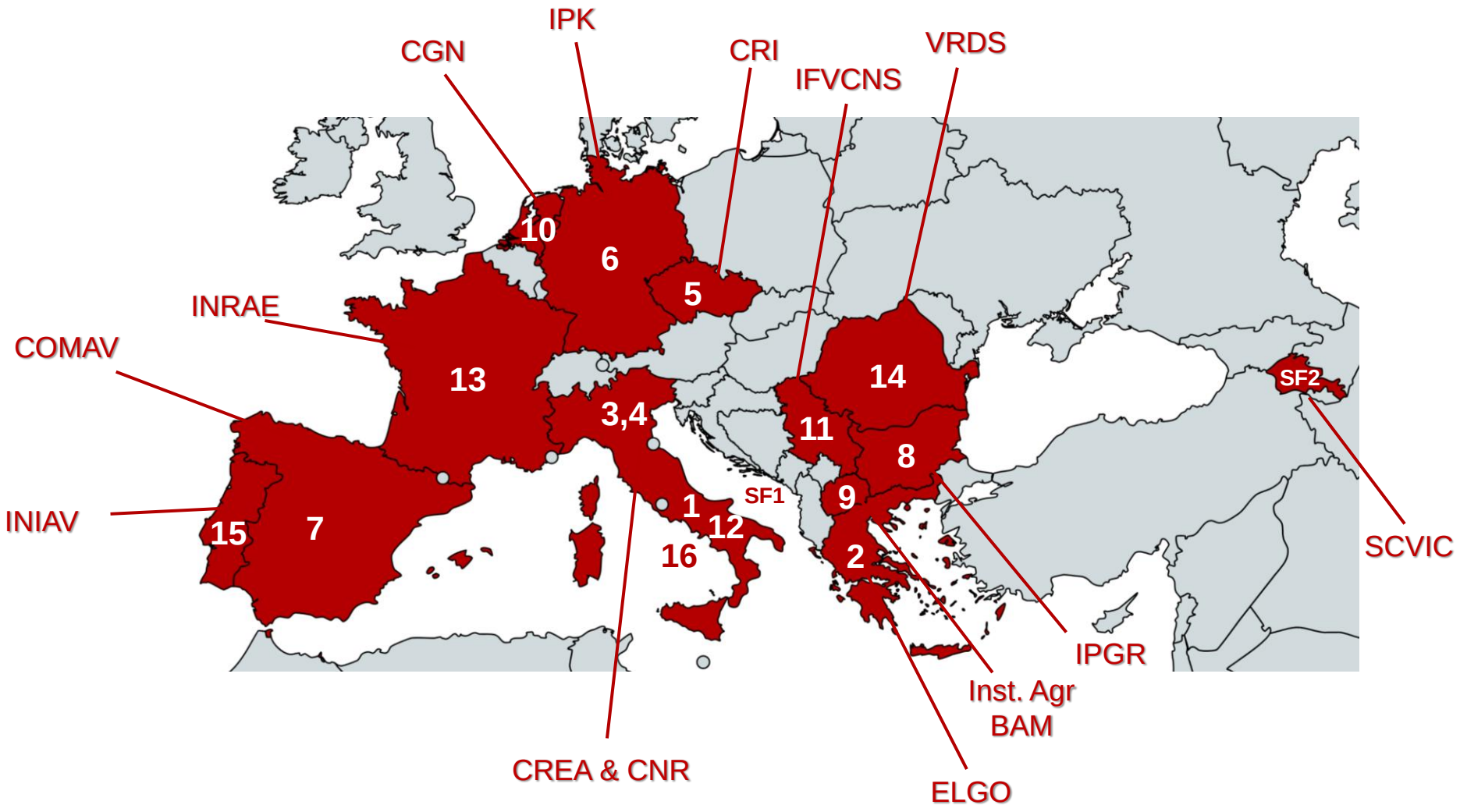


420

Core collection development

- A template will be shared among partners → **4-8 November**
- Each partner provide the list of potential material to exchange considering the availability of seeds → **End of November**
- Define the collection based on the diversity
  - Geographical (1st priority)
  - Phenotypic (2nd priority)

  → **End of Year**
- ❑ Materials providing → **First quarter of 2025**



- Balance across European regions (East, Continental, Mediterranean)

Material exchange

- Seeds are preferred to be exchanged by MTA or sMTA
- 15 seeds high germinability will be fine
- Bulk leaves from at least 3 representative plantlets

- Harvest in ice 3-4 young leaves from young plantlets (after 5-6 true leaves) -> put in eppendorf and freeze at -80 °C
- Send the tubes in dry ice to CREA

- Avoiding liophylization and shipping by regular mail
- Bad quality DNA - > genotyping error
- ❑ Only if very few seeds are available
- ❑ Shipping tubes in dry ice or in sealed vacuum bags

To finalize by March 2025

Task 3 – Data integration an analysis

DOI:

- Unique and permanent digital identifier of a (digital) object
- Metadata for the description of the object
- Name resolution by a resolver system, e.g. doi.org

Advantages:

- Quasi-standard for PGR material
- High acceptance in the scientific community
- Allows traceability when material is distributed, e.g. to another genebank
- Enables insights into the use of PGR, e.g. from publications
- Hierarchical relationships possible, e.g. for derived material (SSD line from genebank accession)

Assignment of DOIs

- Assignment via EURISCO (*to be checked*)

Each partner provide by itself or centralized

- TBD

https://www.ecpgr.org/fileadmin/templates/ecpgr.org/upload/EURISCO/EURISCO_training_2021/Day_1_03_DOIs_for_PGR.pdf

Task 3 – Data integration an analysis

- ❑ Check data quality
- ❑ Filtering SNP data
- ❑ Genomic diversity and Population STRUCTURE
- ❑ Phylogenesys
- ❑ Integration of phenotypic data
- ❑ Additional analysis (e.g. GWA, genomic regions under selection, etc)

Task 4 – Meetings and dissemination (M1-M24)

- Kick-off meeting (hybrid) – 31 October 2024
- Interim meeting next year same period
- Final meeting June-July 2026

- Any brief meeting if needed to discuss any issue

Time scale of activities

Task	Year	2024				2025												2026							
	Main activity/Month	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
T1	Core collection establishment																								
T2	Seeds/Leaf exchange																								
T2	DNA extraction																								
T2	Genotyping																								
T2	Plant grown and phenotyping																								
T3	Data integration/analysis																								
T4	Meetings																								

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Establishment of a core collection

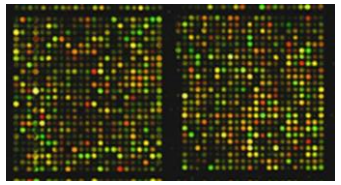
DNA isolation, plates preparation

Genotyping (Pepper Array)

High representativeness

- ✓ Multiplication
- ✓ Safety storage

- Seeds (MTA)
- Leaves



Expanding EVA Pepper genotyping information

Combine data

Inclusion into AEGIS and EURISCO

Quality, Abiotic Stress

Phenotyping (IPGRI/EVA Pepper protocol)

Open for discussion

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Points of discussion

- Germplasm selection
- Supplying plant material for genotyping
- Phenotyping activities
- Data integration in EURISCO database and DOI
- Safety storage of the EUROPEPLAND collection