WP 1: CREATION OF CORE COLLECTIONS AND SEED MULTIPLICATION

PARTNERS: NPPC, KIS, BOKU, CRI, NARDI, IFVC, WSU, MTA-ATK, IHAR, UP

INCREASING THE EFFICIENCY AND COMPETITIVENESS OF ORGANIC CROP BREEDING

Grant agreement: 771367

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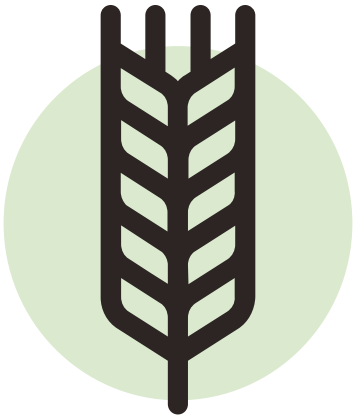
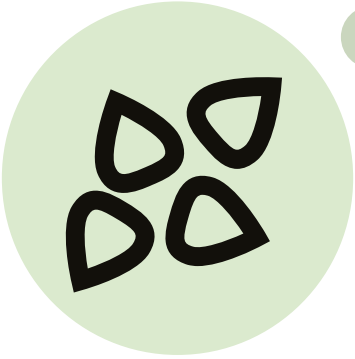
OBJECTIVES - WP1

Identify potential genetic diversity for each of the core species suited to organic production systems



Multiply seed material and creation of wheat, potato, soybean and buckwheat core collections

Facilitating further use of the genetic material studied in ECOBREED by making available genotypic and phenotypic data gathered in the project through a user-friendly information portal



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CREATION PROCEDURE OF CORE COLLECTION

IDENTIFICATION OF GENOTYPES

(collection) that will represent the biotic stress tolerance/resistance according to significant diseases and qualitative characters used in organic breeding.

DETERMINATION THE SIZE OF THE CORE COLLECTION

and decision on the number of entries per group for wheat, potato, soybean, and buckwheat. According to the project ~200 accessions.

SELECTION THE ENTRIES FROM EACH GROUP

of wheat, potato, soybean and buckwheat that will be included in the core collection. The selected entries should be those that best represent the group and best serve the function and purposes of the project aims.

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TASKS - WP1

1.1: Identification of wheat, potato, soybean and buckwheat genetic material

- (months 1-6)
- Responsible partner: NPPC
- Partners involved: KIS, BOKU, CRI, NARDI, IFVC, WSU, MTA-ATK, IHAR, UP

1.2: Multiplication of genetic resources for further evaluation

- (months 1-36)
- Responsible partner: BOKU
- Partners involved: CRI, IFVC, KIS, IHAR, SEL, PROBIO, NARDI, NPPC, GS, WSU

1.3: Establish an information portal for genotypic and phenotypic characterisation data of the core collections

- (months 49-60)
- Responsible partner: KIS
- Partners involved: CRI, IFVC, BOKU, NPPC

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LIST OF DELIVERABLES – WP1

Deliv. No.	Deliverable Title	Lead ben.	Type	Dissemination level	Due Date (in months)
D1.1	**Inventory of genetic resources for each target species**	18 - NPPC	Report	Confidential ...	✓ 6
D1.2	**Putative collection of each target species identified**	18 - NPPC	Report	Public	✓ 9
D1.3	**Distribution of species core collections among partners**	18 - NPPC	Report	Confidential ...	✓ 12
D1.4	Information portal for genetic and phenotypic characterisation data	1 - KIS	Report	Confidential ...	60
D1.5	Final publishable report on WP1	18 - NPPC	Report	Public	60

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LIST OF MILESTONES – WP1

No.	Title	Lead ben.	WP	Description	Due Date
M1	Identification of accessions and exchange of seed from genebanks, breeders and partners	NPPC	1	Availability of identified genetic material	✓ 2
M2	Selection of putative collections for each species	NPPC	1	List of accessions for putative collections	✓ 6
M3	Exchange of seed materials among partners	NPPC	1	Seed sent to partners	✓ 6
M11	Development of training materials for TASK 7.2	NPPC	7	Training material received by partners	✓ 12
M21	Multiplication of seed for phenotyping	NPPC	1, 2, 3 ...	Seed sent to partners	12
M22	Multiplication of seed for FPT and breeding activities	NPPC	1, 2, 3 ...	Seed sent to partners	36

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TASK 1.1: Identification of ... genetic material

IDENTIFICATION OF WHEAT ACCESSIONS

- ✓ **consists : obsolete cultivars, breeding lines, landraces, related species**
- ✓ **EU, national projects and national testing carried out either by breeders or within national organic trials**
- ✓ **selected wheat genotypes originate from 12 different European countries**
- ✓ **200 accessions**
- ✓ **majority of the material has its origin in Germany**
- ✓ **majority of the material (83%) represent cultivars which were released in the last two decades and are still included in either the European list or national list**
- ✓ **the rest of the material includes both landraces and old varieties as well as modern breeding lines which are at the moment subject to national organic**

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Geographic origin of the winter wheat genotypes

Country of origin	Number of genotypes
Austria	21
Croatia	3
Czech Republic	19
France	17
Germany	40
Hungary	22
Romania	20
Serbia	10
Slovakia	23
Slovenia	4
Switzerland	18
United Kingdom	3

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TASK 1.1: Identification of ... genetic material

IDENTIFICATION OF POTAT0 ACCESSIONS

The genepool can be divided into four types of germplasm:

- **modern cultivars (and old varieties) of the common potato (*Solanum tuberosum* subsp. *tuberosum*), the most cultivated potato subspecies in the world;**
- **native cultivars, including local potato cultivars occurring in the centre of diversity;**
- **wild relatives, consisting of wild tuber-bearing species and a few non tuber-producing species, occurring in the centre of diversity;**
- **other germplasm or research material; all types of genetic stocks e.g., interspecific hybrids, breeding clones, genetically enhanced stocks, etc.**

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TASK 1.1: Identification of ... genetic material

IDENTIFICATION OF POTAT0 ACCESSIONS

Accessions of potato were sought through proposals of all partners in the project: KIS, IHAR, UP, UNEW - based on their data on potato varieties

databases such as The European Cultivated Potato Database, World Catalogue of Potato Varieties, ADHB Potato Variety Database, ARVALIS database on potato varieties, SASA database on organic seed lots in Scotland produced in 2017, Data on organic seed produced in 2017 in Austria, data on organic potato varieties tested in FiBL, Switzerland (data for the last 10 years), data on organic potato varieties from Bioland, Germany, Descriptive List for Potato Bundessortenamt BSA for Potato for 2017, Breeders variety cathalogues (Netherlands: Agrico, HZPC, Meijer, Den Hartigh, Stet Holland, Agroplant; Germany: Europlant, Norika, Solana; France: Germicopa, Grocep, Bretagne Plants, Comite Nord, Austria: NOES, UK: Sarpo Potatoes Ltd, James Hutton Institute), personal contacts with other partners involved in the project

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TASK 1.1: Identification of ... genetic material

Geographic origin of the potato genotypes

Country of origin	Number of genotypes
Austria	4
Canada	2
Denmark	1
France	18
Germany	38
Hungary	5
Ireland	12
Netherlands	56
Poland	13
Slovenia	5
United Kingdom	40
USA	1

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TASK 1.1: Identification of ... genetic material

IDENTIFICATION OF BUCKWHEAT ACCESSIONS

- ✓ plant originated in China and mainly cultivated for its grain-like fruits and as a cover crop
- ✓ a related and more bitter species, Fagopyrum tataricum (L.) Gaertn.
- ✓ at present, buckwheat is still grown in many countries such as China, Russia, Ukraine, Brazil, Japan etc.
- ✓ the breeding programmes are still running in Russia, China, and Korea
- ✓ a lot of buckwheat accessions are stored in gene banks worldwide
- ✓ although buckwheat has been a traditional crop for a lot of countries within the EU (Poland, Slovakia, Slovenia, the Czech Republic, France etc.)
- ✓ however, nowadays, the knowledge of the current situation is limited
- ✓ the most problematic characters of the crop are lodging, seed shattering, and low yields

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TASK 1.1: Identification of ... genetic material

Geographic origin of the buckwheat genotypes

Country of origin	No. of genotypes	Country of origin	No, of genotypes
Albania	1	Korea	2
Australia	2	Lithuania	2
Austria	4	Mexico, Baja Norte	1
Belarus	14	Netherlands	1
Bhutan	9	People's republic of Korea	1
Canada	9	Poland	22
Czech Republic	1	Russian Federation	13
Czechoslovakia	5	Serbia	1
Denmark	1	Slovakia	3
Ethiopia	1	Slovenia	37
Former Soviet Union	23	Soviet Union	11
France	6	Sweden	3
Georgia	1	Switzerland	2
Germany	3	Tajikistan	1
Hungary	2	Ukraine	20
China	4	United States	13
India	2	unknown	19
Italy	3	USA	1
Japan	14	Zimbabwe	3
Kazachstan	2		

TASK 1.1: Identification of ... genetic material

IDENTIFICATION OF SOYBEAN ACCESSIONS

The genus Glycine includes about 20 annual and perennial species distributed primarily in Australia and Asia. The primary genepool consists of the cultivated forms of G. max, the annual wild soybean, G. soja (considered the immediate ancestor of the cultivated soybean), and a weedy species G. gracilis, with its diversification centre in China, Korea, Japan, and the Far East region of the Russian Federation.

The secondary genepool consists of the other wild species of Glycine, and the tertiary genepool is considered to be species in the legume tribe Phaseoleae.

The Institute of Crop Germplasm Resources, Chinese Academy of Agricultural Sciences (ICGR-CAAS) maintains the primary global collection with some 14 percent of the world's approximately 230,000 gene bank accessions of soybean.

179 soybean accessions are not covered under the ITPGRFA.

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TASK 1.1: Identification of ... genetic material

Geographic origin of the soybean genotypes

Country of origin	No. of accessions
USA	39
CHN	37
SRB	28
JPN	21
ROM	21
FRA	13
CAN	11
RUS	9
ITA	8
KOR	8
CRO	7
SWE	5
UKR	5

Country of origin	No. of accessions
TWN	5
BUL	4
POL	3
AUT	2
MDA	1
HUN	1
GER	1
CSK	1
URY	1
PRK	1
MAR	1
DZA	1
SUI	1
Unknown	1

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TASK 1.2: *Multiplication of GR for further evaluation*

The traits that are more important for organic farming :

- **resistance to soil pathogens and seedborne diseases;**
- **fast juvenile growth;**
- **good weed suppression;**
- **resistance to lodging in tall varieties;**
- **qualitative traits and many others.**

Revised descriptors list for wheat (*Triticum* spp.) according to IBPGR Secretariat

Descriptors list genus *TRITICUM L.* (according to NPPC-VURV)

Descriptors list for potato

Descriptors list for soybean

Descriptors list for common and tatary buckwheat according to the Buckwheat descriptors list by IPGRI 1994)

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D1.3 Distribution of species core collections among partners

- **the general process of distribution of core collection of wheat, potato, soybean, buckwheat and the multiplication of selected genotypes by project partners**

Distribution of wheat core collections among partner

- **List of wheat accessions Crete**
- **List of winter durum accessions**
- **Seed material exchanged**

WINTER WHEAT

ACC-CODE	TAXONOMY	ACCESSION NAME	COLLECTION SITE	COLLECTION DATE	STATUS

DURUM WHEAT

GEN	YEAR OF RELEASE	STATUS	ORIGINAL BREEDER	PEDIGREE	COMMENTS

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D1.3 Distribution of species core collections among partners

Distribution of potato core collections among partners

2.1 Selecting key cultivars from the core collection

2.2 Seed delivery of potato cultivars

2.3 Overview of the cultivars (origin of the cultivars, maturity, late blight resistance, PVY resistance, suitability for organic production)

L.p	ACCENAME-Cultivar	Country of origin	Breeder or representative	Description list - organic potatoes				Criteria for selection
				Type	Maturity	Resistance to P. Infestans on foliage	Resistance to PVY on foliage	

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D1.3 Distribution of species core collections among partners

Distribution of soybean core collections among partners

Generic material

ECOBREED code	Accession name	MG	Seed sample provider	Contact_email

- **Unique accession identifier in trial: automatic assign**
- **Accession name: Identifier in database, breeding material, trial, etc.**
- **Maturity group, declared in database or own data MG: maturity group, declared in database or own data**
- **Seed sample provider: Who will provide samples for all partners**
- **Contact_email: mail address of seed provider**

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D1.3 Distribution of species core collections among partners

Distribution of buckwheat core collections among partners

4.1 Selecting key cultivars from the core collection

4.2 Seed delivery of buckwheat genotypes

Phenotyping

Genotyping

P-mineralization

Allelopathic activities

	Number	Species	Name	Origin	Note	Sample size (grains)

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What in future on WP 1

Task1.2: Multiplication of genetic resources for further evaluation

- **(months 1-36)**
- **Responsible partner: BOKU**
- **Partners involved: CRI, IFVC, KIS, IHAR, SEL, PROBIO, NARDI, NPPC, GS, WSU**

Task 1.3: Establish an information portal for genotypic and phenotypic characterisation data of the core collections

- **(months 49-60)**
- **Responsible partner: KIS**
- **Partners involved: CRI, IFVC, BOKU, NPPC**

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What in future on WP 1

No.	Title	Lead ben.	WP	Description	Due Date
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M22	Multiplication of seed for FPT and breeding activities	NPPC	1, 2, 3 ...	Seed sent to partners	36

No.	Deliverable Title	Lead ben.	Type	Dissemination level	Due Date
D1.4	Information portal for genetic and phenotypic characterisationdata	1 - KIS	Report	Confidential ...	60
D1.5	Final publishable report on WP1	18 - NPPC	Report	Public	60

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Thanks

Co-author of contribution and all colleagues from: NPPC, KIS, BOKU, CRI, NARDI, IFVC, WSU, MTA-ATK, IHAR and UP

ECOBREED project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 771367.

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Thanks for your attention

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