



ECPGR Cryopreservation Working Group

1st Meeting of the ECPGR Cryopreservation Working Group

3-4 May 2023, Crop Research Institute, Prague, Czech Republic



ECPGR Cryopreservation Working Group

ECPGR Cryopreservation WG members:

18 countries

33 members



ECPGR Cryopreservation Working Group

Cryopreservation WG members

- Institute of Plant Genetic Resources of Albania, Agricultural University of Tirana, **Albania**
- Department of Biotechnology, Faculty of Natural Sciences, University of Tirana, **Albania**
- Alliance of Bioversity International and CIAT, **Belgium**
- Institute for Plant Genetic Resources, **Bulgaria**
- CRI (Crop Research Institute), **Czech Republic**
- LUKE (Natural Resources Institute), **Finland**
- INRAE National Research Institute for Agriculture, Food and Environment, **France**
- IRD, Montpellier **France**
- Institut Agro Rennes-Angers, **France**
- LEPL Scientific Research Center of Agriculture, **Georgia**
- IPK Gatersleben, **Germany**
- JKI (Julius Kühn-Institut), **Germany**
- Council for Research in Agriculture and Economics, **Italy**
- CNR (National Research Council), **Italy**
- Università di Bari, **Italy**
- Lithuanian Institute of Horticulture, **Lithuania**
- NIBIO, **Norway**
- Plant Breeding and Acclimatization Institute – National Research Institute, **Poland**
- INIAV Instituto Nacional de Investigação Agrária e Veterinária, **Portugal**
- Fruit Research Institute, **Serbia**
- University of Maribor, **Slovenia**
- CITA Centro de Investigación y Tecnología Agroalimentaria de Aragón (CITA), **Spain**
- Universidad Politécnica de Madrid, **Spain**
- IRTA, **Spain**
- CSIC Agrobiological Research Institute, **Spain**
- Aegean Agricultural Research Institute, **Türkiye**
- University of Reading, **UK**

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Discussion about the concept for a rational and efficient way to collaboratively conserve the relevant European plant genetic resources through cryopreservation
(*Chairs: M. Faltus and B. Panis*)

9:00 – 10:00 General discussion on country reports

- Strengths
- Weaknesses
- Gaps

11:00 – 11:30 *Coffee break*

11:30 – 13:00 Discussion*

13:00 – 14:00 *Lunch*

14:00 – 15:00 Group photo and visit to the genebank and cryobank

15:00 – 15:30 Discussion* (continued)

15:30 – 16:00 *Coffee break*

16:00 – 16:30 Steps needed for the elaboration of the concept, reporting to the ECPGR Steering Committee and future steps



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ACTIVITY:

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NETWORKING - other European institutes/countries to be involved?

EXPERIENCE SHARING - Need for training? If so, on what topics?

- Funding possibilities for collaboration?

STRATEGY FOR CRYOCONSERVATION

- Priority crops?
- Other applications of cryopreservation - Virus eradication - Conservation of materials with specific characteristics (totipotent cell lines, lines with specific metabolites, elite clonal breeding lines or genetic stocks) - Cryopreservation of orthodox, intermediate and/or recalcitrant seeds?
- Need for a Cryopreservation back up (cfr Svalbard seed vault)?



- sharing experience
- skills training
- setting standards



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Discussion topics:

- 1) General discussion on country reports*
- 2) Networking*
- 3) Training*
- 4) Setting standards*
- 5) Steps needed for the elaboration of the concept, reporting to the ECPGR Steering Committee and future steps*
- 6) CRYO WG project*



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Discussion topics:

1) General discussion on country reports

- Strengths, weaknesses, gaps*
- Differences in PGR conservation – country specificity in organization and support*
- Cooperation between scientists and curators*



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Discussion topics:

2) Networking

- Sharing of information – which platform, access to information – within WG, ECPGR, for everyone



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Discussion topics:

3) Training

Definition of needs:



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Discussion topics:

3) Training

Definition of needs:

Needs of curators (safety backup) vs. Needs of cryopreservation specialists (methods improvement)



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Discussion topics:

3) Training

Definition of needs:

Genotyping-by-sequencing of the European garlic collection to develop a sustainable ex situ conservation strategy (Garli-CCS) - Sixth Call, Phase X, ECPGR Grant



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ECPGR Activity Grant Scheme Proposal Form

Sixth Call – Phase X (2019-2023)

Activity Proposal

Activity	
Full title	Genotyping-by-sequencing of the European garlic collection to develop a sustainable <i>ex situ</i> conservation strategy
Acronym (or short title)	Garli-CCS (Garlic Cryopreservation & Conservation Strategy)
Duration of Activity (in months)	24 months
Start date – End date <i>Please indicate start date not earlier than 3 months after deadline of Call</i>	1 st April 2023

Applying Working Group(s)

	Working Group	Indicate name and surname of Working Group Chair
1.	Allium	Helena Stavěliková
2.	Cryopreservation	Bart Panis and Miloš Faltus
3	Documentation and Information	Stephan Weise

Activity Coordinator

Activity Coordinator	
Name and Surname	Manuela Nagel
Working Group	Allium Working Group
Nationality	German
Current position	Head of Cryo and Stress Biology Research Group
Institute	Leibniz Institute of Plant Genetics and Crop Plant Research (IPK)
Country	Germany
Telephone	+49 39482 5156
Email	Nagel@ipk-gatersleben.de

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Activity Partners (ECPGR-funded)

Please note that each partner needs to be a member of an ECPGR Working Group to be eligible for funding. For self-funded partners please use the separate box below.

Partner ID No.	Name and Surname	Institute	Country
1	Manuela Nagel	IPK	Germany
2	Līga Lepse	Institute of Horticulture	Latvia
3	Helena Stavěliková	Crop Research Institute	Czech Republic
4	Terhi Suojala-Ahlfors	Natural Resources Institute Finland (Luke)	Finland
5	Priit Põldma	Estonian University of Life Sciences	Estonia
6	Florence Esnault	INRAE	France
7	Danguolė Juškevičienė	Lithuanian Research Centre for Agriculture and Forestry (LAMMC)	Lithuania
8	Jelka Šuštar Vozlič, Mojca Škof	Agricultural Institute of Slovenia	Slovenia
9	Catherine Cook	Institute of Plant Breeding and Genetic Resources, Hellenic Agricultural Organization-Dimitra	Greece
10	Smiljana Goreta Ban	Institute of Agriculture and Tourism	Croatia
11	Isabel Gomes da Silva	Portuguese Genebank (BPGV)	Portugal
12	Marcelino de los Mozos Pascual	Regional Institute for Research and Agrifood and Forestry Development of Castilla - La Mancha (IRIAF)	Spain
13	Vincenzo Candido	Department of European and Mediterranean Cultures - DiCEM	Italy
14	Miloš Faltus	Crop Research Institute	Czech Republic
15	Mariusz Chojnowski, Denise Fu Dostatny, Anna Wawrzyniak	National Institute for Horticultural Research (INHORT)	Poland

16	Erik de Vahl	Swedish National Genebank for Vegetatively Propagated Horticultural Crops	Sweden
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Self-funded partners

Partner No.	Name and Surname	Institute	Country
1	Stephan Weise	IPK / EURISCO	Germany
2	Domingo José Rios Mesa, Desirée Afonso Morales	Center for Conservation of Agrobiodiversity of Tenerife (CCBAT)	Spain
3	María Victoria Colombo Rodríguez and Isabel Fernández Navarro	Madrid Institute for Rural, Agricultural and Food Research and Development (IMIDRA)	Spain
4	María Cristina Alcántara Rodríguez	Regional Institute for Research and Agrifood and Forestry Development of Castilla - La Mancha (IRIAF)	Spain
5	Maarten van Zonneveld	World Vegetable Center	International

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4. Cryopreservation training (October 2023 - December 2024)

WP 4.1 Partner 14 representing the CRYOPRESERVATION group will organize for the consortium members, a cryopreservation workshop in Prague. Overall, 7 participants and 2 experts from abroad will be invited to discuss procedures, provide guidance and training on garlic cryopreservation. Other partners can join the lectures online.

WP 4.2. All partners implementing cryopreservation will be involved to develop a **cryopreservation strategy** which includes thresholds for the number of shoot tips for safety duplicates, the number of replicates, locations for safety duplications and additional support by online training and meetings. The cryopreservation strategy should be considered a model for clonal plants. Therefore, a two-day virtual meeting is planned. The first day of the meeting will summarize the experiences of the workshop organizers and participants. The second day will be devoted to a discussion of the cryopreservation strategy. The number of participants will not be limited. This meeting will take place at the end of 2024.

5. Garlic conservation strategy (Whole project period)

WP 5. All partners will discuss a conservation strategy in **four online meetings** taking place in the 1., 6-7th., 12-14th and 18-20th project months and **one final face-to-face meeting at IPK in 22-24th months**. GBS data available from IPK collection will be used as the preliminary dataset for discussion of the following topics

- Determinants and thresholds for unique accessions
- Determinants and thresholds for duplicate accessions
- Prioritization of garlic accessions for cryopreservation
- Prioritization of garlic accessions for a European Core Collection
- Gap analysis and acquisition strategy

Table 1. On basis of the work carried out in WP1 to WP5, we schedule the work as follows:

	1 st y	2 nd y
WP 1.1 Sampling	█	
WP 1.2 Sequencing	█	
WP 1.3 GBS analysis		█
WP 2.1 Phenotyping		█
WP 2.2 GWAS		█
WP 3.1 Data upload		█
WP 3.2 Links to EURISCO		█
WP 4.1 Cryopreservation training		█
WP 4.2 Cryopreservation strategy		█
WP 5 Development of Garlic conservation strategy		█
Meetings	█ Online	█ Online █ Online
Publication		█ Online █ Physical

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Expected products and related ECPGR Objectives

List concrete products and results that are obtained by the Activity and the corresponding number(s) of the ECPGR Outcome(s) and/or Output(s) and/or Activities to which each product/result will contribute.

	Expected products/results	Corresponding ECPGR output, activity
1	Publicly available sequencing data of 1,800 garlic accessions	To promote use of PGRFA
2	Additional phenotypic data for ability to produce scape, bulb structure type and shape of mature bulb of 1,800 accessions	To provide passport and phenotypic information through the EURISCO catalogue
3	Identification of unique and duplicated accessions	To efficiently conserve and provide access to unique germplasm
4	GWAS analysis	To promote use of PGRFA
5	Cryopreservation training	To efficiently conserve and provide access to unique germplasm
6	Development of a cryopreservation strategy	To efficiently conserve and provide access to unique germplasm
7	Development of a garlic conservation strategy	To efficiently maintain and provide access to unique germplasm

Workplan for the proposed period of the Activity

Brief description of meetings and/or main actions of the Activity.

	Type of Action (indicate if "meeting" or "other action")
1	First Online meetings (1. Month) <ul style="list-style-type: none"> • Agreement about the planned schedule • Agreement about delivered material, protocol exchange to collect leaf material and to conduct phenotyping
	Second Online meeting (6-7 th month) <ul style="list-style-type: none"> • Preliminary data are used to discuss about threshold levels for number of unique alleles and duplicates • Identification of unique accessions and duplicates
	Third Online meeting (12-14 th month) <ul style="list-style-type: none"> • First sequencing can be used for decision making processes • Cryopreservation group will be involved to talk about first concepts
	Fourth Online meeting (22-24 th month) <ul style="list-style-type: none"> • Data publication, GWAS, and manual development • Cryopreservation group will be involved to discuss cryopreservation strategy
2	Sequencing (2 nd – 9 th month)
3	Phenotyping (April – December 2023 and April – September 2024)
4	Data upload (December 2023 and 2024)
5	Cryopreservation training (October - December 2024)
6	Meeting: Final discussion about cryopreservation and conservation strategy (April 2025)

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	Expected products/results	Corresponding ECPGR output, activity
1		
2		
3	NETWORKING + NEEDS IDENTIFICATION	=
4	GWAS analysis	To promote use of GRFA
5	Cryopreservation training	To efficiently conserve and provide access to unique germplasm
6	Development of a cryopreservation strategy	To efficiently conserve and provide access to unique germplasm
7	Development of a garlic conservation strategy	To efficiently maintain and provide access to unique germplasm

Workplan for the proposed period of the Activity

Brief description of meetings and/or main actions of the Activity.

	Type of Action (indicate if "meeting" or "other action")
	First Online meetings (1. Month)
	<p>ACCESSIONS CRYOPRESERVED</p> <p>CRYOPRESERVATION FRAMEWORK</p> <p>RECOMMENDATIONS PUBLISHED</p>
	<ul style="list-style-type: none"> • Cryopreservation group will be involved to talk about first concepts • Data publication, GWAS, and manual development • Cryopreservation group will be involved to discuss cryopreservation strategy
2	Sequencing (2 nd – 9 th month)
3	Phenotyping (April – December 2023 and April – September 2024)
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Discussion topics:

3) Training

Definition of needs:

Other needs – dormant buds cryopreservation, vitrification technics, thermal analysis,...



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Discussion topics:

4) Setting standards



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4) Setting standards

Priority crops?

Other applications of cryopreservation: o Virus eradication

Conservation of materials with specific characteristics (totipotent cell lines, lines with specific metabolites, elite clonal breeding lines or genetic stocks)

Cryopreservation of orthodox, intermediate and/or recalcitrant seeds?

Need for a Cryopreservation back up (cfr Svalbard seed vault)

Funding possibilities for collaboration?

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Discussion topics:

5) Steps needed for the elaboration of the concept, reporting to the ECPGR Steering Committee and future steps.



**Thank you for your
attention!**

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