# ECPGR Activity Grant Scheme
# Proposal Form

## Sixth Call – Phase X (2019-2023)

### Activity Proposal

| Activity | |
|---|---|
| Full title | Get Potatoes United – Collaboration Action for Updating the Virtual European Potato Collection |
| Acronym (or short title) | EURO-POTATOES |
| Duration of Activity (in months) | 18 |
| Start date – End date<br>*Please indicate start date not earlier than 3 months after deadline of Call* | 01 March 2023 |

### Applying Working Group(s)

| | Working Group | Indicate name and surname of Working Group Chair |
|---|---|---|
| 1. | Potato | Veli-Matti Rokka |
| 2. | | |
| 3. | | |
| 4. | | |
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## Activity Coordinator

| Activity Coordinator | |
|---|---|
| Name and Surname | Veli-Matti Rokka |
| Working Group | Potato |
| Nationality | Finnish |
| Current position | Senior Scientist |
| Institute | Natural Resources Institute Finland (Luke) |
| Country | Finland |
| Telephone | +358 40 4811471 |
| Email | veli-matti.rokka@luke.fi |

## 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 | Veli-Matti Rokka | Natural Resources Institute Finland (Luke) | Finland |
| 2 | Ilze Dimante | Institute of Agricultural Resources and Economis (AREI) | Latvia |
| 3 | Terje Tähtjärv/Liina Jakobson | Estonian Crop Research Institute (ECRI) | Estonia |
| 4 | Jaroslava Domkářová | Potato Research Institute Havlíčkův Brod, Ltd | Czech Republic |
| 5 | Pawel Chrominski | Nordic Genetic Resource Center (NordGen) | Sweden |
| ~~6~~ | ~~Liina Jakobson?~~ | ~~Estonian Crop Research Institute (ECRI)~~ | ~~Estonia~~ |
| 7 | Rusudan Mdivani | NGO The Center of Young Scientists Izotope | Georgia |
| 8 | Peter Dolničar | Agricultural Institute of Slovenia | Slovenia |
| 9 | Florence Esnault | French National Research Institute for Agriculture, Food and Environment (INRAE) | France |
| 10 | Zoran Jovović | University of Montenegro | Montenegro |

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|---|---|---|---|
| 11 | Zsolt Polgár | Hungarian University of Agriculture and Life Sciences, Potato Research Station | Hungary |
| 12 | Roel Hoekstra | Wageningen University & Research, Centre for Genetic Resources The Netherlands (CGN) | The Netherlands |
| 13 | Ifigeneia Mellidou | Institute of Plant Breeding & Genetic Resources | Greece |
| 14 | Marcela Gubišová | National Agricultural and Food Centre | Slovakia |
| 15 | Daniela Pacifico | Research Centre for Cereals and Industrial Crops | Italy |
| 16 | Dana Constantinovici | Suceava Genebank | Romania |
| 17 | Alex Reid (on behalf of Heather Campbell) | Science & Advice for Scottish Agriculture (SASA) | United Kingdom |
| 18 | Klaus J. Dehmer | Leibniz Institute of Plant Genetics and Crop Plant Research (IPK) | Germany |
| 19 | Hervé Gaubert | Agroscope | Switzerland |
| 20 | Dorota Michalowska | Plant Breeding and Acclimatization Institute - National Research Institute (PBAI-NRI) | Poland |

*Self-funded partners*

| Partner No. | Name and Surname | Institute | Country |
|---|---|---|---|
| 1 | Miloš Faltus, Co-Chair of the ECPGR WG Cryopreservation | Crop Research Institute | Czech Republic |
| 2 | | | |
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**Description of Activity (suggested max. 1000 words)**

*Please address the following aspects:*

– ***Background:*** Explain the context behind the choice of this Activity, e.g. why this has been prioritized or selected. If this is the continuation of a preceding Activity, please indicate how and why the new Activity will build on previous results/experiences.

Potato is the third most important food crop in terms of global consumption, and it has been highly recommended by the FAO as one of the most important food security crops for the world's growing population and for solving problems with food supply. In Europe, climate change has already reduced in 2022 the total potato production in Belgium, Netherlands, France and Germany by 7 to 11 % despite an increase in hectares of potato cultivation. The Belgian and French potato farmers were most affected by a long and unusually very dry and hot summer in 2022. Most of the potato varieties currently cultivated are not adapted to the climatic changes and variability, especially droughts. The genetic basis for the search for desirable characteristics that determine tolerance to abiotic and biotic stresses is the great diversity of potato conserved ex situ by research institutions.

There are at least 11 genebank collections of potatoes in Europe: 1) Czech Republic-CRI (Crop Research Institute) and 2) PRI (Potato Research Institute Havlíčkův Brod), 3) Estonia-ECRI (Estonian Crop Research Institute), 4) Germany-IPK (Leibniz Institute of Plant Genetics and Crop Plant Research), 5) Netherlands-CGN (Centre for Genetic Resources), 6) Nordic countries Denmark, Finland, Iceland, Norway, Sweden-NordGen (Nordic Genetic Resource Center, shared by the five Nordic countries), 7) Russian Federation-VIR (N.I. Vavilov Institute of Plant Industry), 8) Spain-Neiker-Tecnalia (Basque Institute for Agricultural Research and Development), 9) UK-CPC (Commonwealth Potato Collection), 10) Ireland – Tops Potato Center, and 11) France-

INRAE (Biological Resource Centrer BrACySol). In addition, outside of Europe, potatoes are preserved in several genetic resources collections in Asia, and Americas. The total number of long-term stored potatoes in the various genebanks in the world is almost 40,000 accessions, comprised of cultivated potato varieties, landraces and old forms, as well as wild relatives of potatoes suitable for prebreeding programmes of potato.

Potato WG had the recent ECPGR Activity Grant Project 'Identification of old potato clones having unreliable variety names by means of fingerprinting using microsatellite (SSR) markers to assist in setting up the AEGIS collection for potato cultivars', which ended in 2014. In potato, there are various data bases. EURISCO is coordinated at IPK, Germany, and ECPD (European Cultivated Potato Database) at SASA, United Kingdom. Changes of AEGIS composition are audited in EURISCO. As a result of the previous ECPGR Activity Project, only 47 potato clones originated from four countries were included into AEGIS. It was then concluded that the ECPGR member states were relatively reluctant in flagging their accessions for AEGIS. However, during the latest years, there have been several requests from ECPGR member countries to include their potato accessions into the AEGIS. This activity can now be stimulated and assisted by the Potato WG of ECPGR.

– ***Justification:*** Explain why this Activity is justified in terms of making progress towards achieving the ECPGR objectives.

The ECPGR Objective no. 1 for the current Phase X (2019-2023) is 'To efficiently conserve and provide access to unique germplasm in Europe through AEGIS and the European collection'. The Objective 1. includes the Activity 1.2.1 (Identification of new European accessions for inclusion into AEGIS), where new accessions should be flagged as part of AEGIS. The responsibilities of the Crop WGs in the Objective 1 are of 1.2.2. 'Verification of the European Collection by crops in terms of representation of the ex situ PGR diversity', the Activity 1.6.2 (Standards: agree on crop-specific genebank standards), Activity 1.8.2 (ECPGR-mediated characterization, evaluation and/or pheotyping/genotyping of AEGIS accessions), and Activity 1.8.4 (ECPGR-mediated safety duplication of AEGIS accessions). By 2030, the PGR Strategy also aims to ensure European genebanks' long-term conservation of relevant PGR along with their appropriate access. The Objective is of 'PGR diversity in European genebanks is conserved reliably and made accessible for sustainable use'. The Activities will reinforce and expand AEGIS, by establishing a certification and monitoring system, by building genebank managers' capacities and by avoiding further loss of European PGR. A well-functioning AEGIS will best position Europe to efficiently use its valuable PGR as well as to serve as a primary contributor to the global conservation effort.

Additionally, the ECPGR Strategy (2021) promotes the 'Inclusion of non-European collections into AEGIS and safety duplications outside of Europe and southern hemisphere growing cycles, offer opportunities to widen the diversity conserved within European ex situ collections. Scientific exchange and networking should be strengthened to other regions, in particular NENA (Near-East and North Africa).

– ***Rationale for the choice of partners:*** Explain why the selected partners are the most suitable to carry out the proposed Activity and briefly describe their respective roles in the Activity.

The partners preserving the public potato collections with the unique genotypes and located in countries with active potato research are the most suitable to carry the proposed activity, since they are all active in potato conservation, research, and with knowledge on genotyping. Partners with

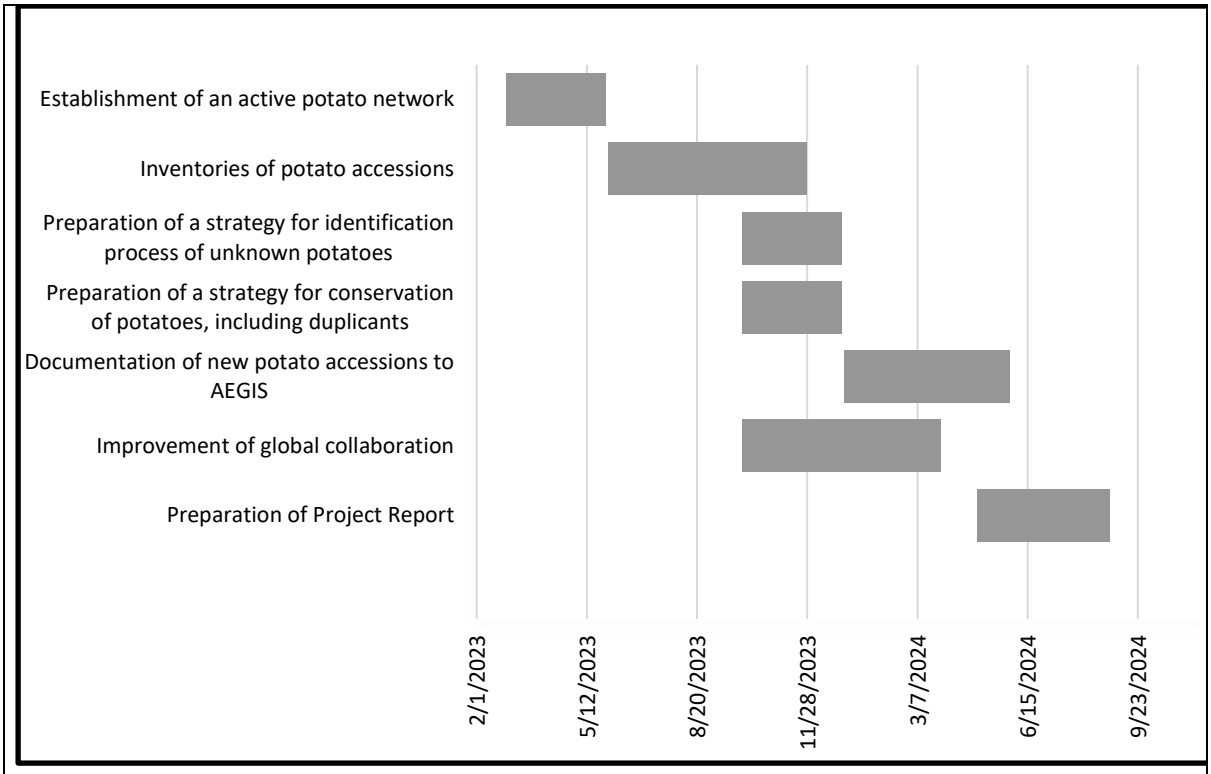
experience in recovering potato genetic resources should offer their expertise to establish guidelines for AEGIS development of potatoes.

The role of each partner would be to share data from local potato genotypes to search their unique genotypes. The standard genotyping technology should be searched for identification of duplicates, and variants. Partners will contribute to provide a list of duplications to make AEGIS system operational. Thereby standards for the genotyping and conversation of potato accessions can be updated. The information from previous potato genotyping projects will be shared to search the most standardized and up-to-date genotyping technology.

Veli-Matti Rokka is the current Chair of Potato WG, he has been a coordinator of several national and international potato and other crop-related projects. Partners from each member country will be invited to participate the project. Since, still many ECPGR member countries with essential role in potato production, have not listed their country representatives in the WG, such as Denmark and Lithuania, their national coordinators will be first contacted.

– ***Methodology or Approach:*** Explain how the partners will operate. Clearly explain who is expected to do what. Also explain the rationale of meeting (or not) as part of the Activity. Include a Gantt Chart, to illustrate the work breakdown structure of the project.

1. The potato network will get activated, silent national contact-persons of each member country contacted, national plant genetic resources coordinators contacted, and each member renominated and confirmed, when appropriate. The ECPGR web pages (https://www.ecpgr.cgiar.org/working-groups/potato) will be updated with relavant information (Chair in collaboration with national members)
2. The partners involved will provide the information about potato accessions (inventories).
3. WG Potato start-up arranged by a kick-off meeting in Finland (face-to-face meeting together with virtual joining options) for all the members.
4. Up-to-date genotyping technologies suitable for potatoes will be introduced by relevant partners. Ongoing research projects on the topic presented (workshop for members)
5. Standard fingerprinting technology for potatoes designed to prepare 'operational gene bank manual' (workshop for members)
6. AEGIS genebank information updated, and putative genotypic identities discarded (virtual joint meeting)
7. Information of long-term conservation technologies shared between partners for standardization (this includes cryopreservation) (virtual joint workshop)
8. International partners overseas contacted and welcomed to join the ECPGR activities (virtual joint meeting)




– ***Description of genetic material:*** If your Activity is focusing on genetic material, please describe in detail, as far as possible, who is providing this genetic material, its status and the number of accessions under investigation (for example: *This Activity aims at molecularly analysing / safety-duplicating / evaluating / collecting XY accessions (listed) of "Genus species", provided by genebank Z/ farmers in country W /to be collected in country P…, etc.*).

The partners would agree on to record inventory of accessions conserved in European genebanks. Status of previously unknown and not yet characterized potato materials presented (national members) and their leaf samples/DNA collected for molecular characterization. Site of characterization using standard technology to be chosen during the Project.

– ***Expected impact.*** Clearly specify the expected impact from this Activity for the respective ECPGR objective(s), compared to the current state of progress of those same objectives. Explain how the impact will be obtained.

1. Increase the number of potatoes to AEGIS by identifying and selecting the genotypes of interest
2. Propose national WG contact persons and national coordinators to include unique genotypes into AEGIS database
3. Enhance to preserve AEGIS accessions
4. Share information of AEGIS database system to other international partners outside of Europe
5. A standard for genotyping based on genebank reference materials
6. A crop-specific standard for identification and handling of safety duplications (in another European country), status of duplications (cryopreservation, True Potato Seeds)

The results obtained during the ECPGR Activity of the EURO-POTATO Project will provide the basis also for the future work of the Potato Working Group in the ECPGR Phase XI. This will be related to the inventory of the potato genetic resources conserved in various European gene banks, and with additional collaborative actions.

– ***Links with other non-ECPGR projects or individuals*****:** If applicable, clearly explain the objectives of the linked projects and the reasons for complementarity with the ECPGR Activity.

Some partners of the ECPGR Potato WG participate in **SustainPotato** project. SustainPotato is a Nordic Public-Private Partnership (PPP) project for pre-breeding, which will bring the potato breeding programs in Sweden, Denmark and Norway together with scientists from the Nordic Universities to develop and implement new genetic resources and molecular tools for effective disease resistance breeding. This initiative is expected to provide Nordic potato breeders, growers and retailers with new competitive potato cultivars and improve research into new high-throughput phenotyping and genotype methods that will be needed for future genomic-led potato breeding.

## 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 | Established active potato network for information share from potato genetic resources. | Verified information from the European potato collections and diverse databases.<br>Activity 1.2.2. 'Verification of the European Collection by crops in terms of representation of the ex situ PGR diversity' |
| 2 | Inventory lists of unique potato accessions by member countries. | Identification of new potato accessions for inclusion of AEGIS.<br>Activity 1.2.1 'Identification of new European accessions for inclusion into AEGIS'<br>Activity 1.8.4 'ECPGR-mediated safety duplication of AEGIS accessions' |
| 3 | Standards for genotyping (fingerprinting) and long-term conversation technologies in regards of information from reference potato materials. | Identification of new potato accessions for inclusion of AEGIS.<br>Activity 1.2.1 'Identification of new European accessions for inclusion into AEGIS'<br>Activity 1.6.2 'Standards: agree on crop-specific genebank standards'<br>Activity 1.8.2 'ECPGR-mediated characterization, evaluation and/or phenotyping/genotyping of AEGIS accessions' |
| 4 | Selected genetic resources as potato accessions for preparation of an additional joint project between members | Further projects designed on molecular characterization of potato gene bank collections<br>ECPGR Strategy (2021) promotes the 'Inclusion of non-European collections into AEGIS and safety duplications' |

## Workplan for the proposed period of the Activity

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

| | Type of Action<br>*(indicate if "meeting" or "other action")* |
|---|---|
| 1 | Other action: The WG Potato network gets activated. Each member country contacted, and members confirmed and renominated, when appropriate. The ECPGR web pages on Potato (https://www.ecpgr.cgiar.org/working-groups/potato) will be updated with relavant up-to-date information. |
| 2 | Meetings: Potato WG start-up by kick-off meeting, workshop, hybrid and virtual meetings |
| 3 | Other action: Request for preparation of inventories of potato genetic resources. Delivery of inventories. |
| 4 | Other action: A strategy for identification process of unknown potatoes through European standards of genotyping and appropriate reference materials. Standard for conversation of diverse potato accessions. Identification and documentation of new European Potato accessions for inclusion to AEGIS. |
| 5 | Other action: Improvement of global collaboration for potato genebank information share and material distribution. |

## Additional remarks

*Indicate any additional remark(s) that is/are important for the evaluation/implementation of the proposed Activity*

| Remarks: |
| --- |
| |

**Please send the completed form together with the budget table to the Chair of the submitting Working Group for submission of the Activity proposal**.