

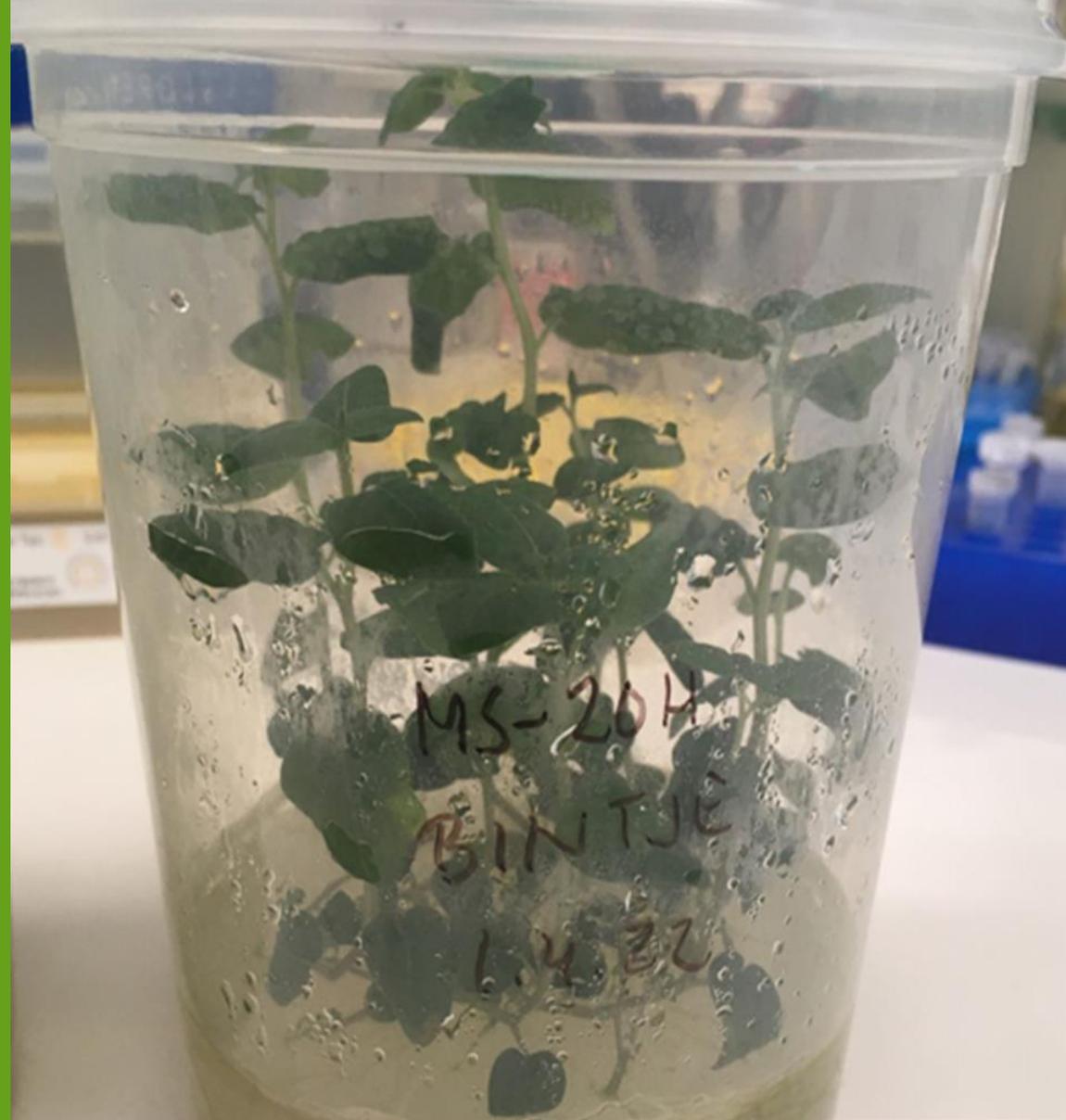


# Introduction to EURO-POTATOES project

Veli-Matti Rokka

ECPGR Potato WG meeting

Młochów, Poland 19.3.2024



# LUKE Natural Resources Institute Finland in brief



**Vision**  
A sustainable future and well-being from renewable natural resources

**Mission**  
Through research, we create value and solutions for our customers by solving local and global challenges



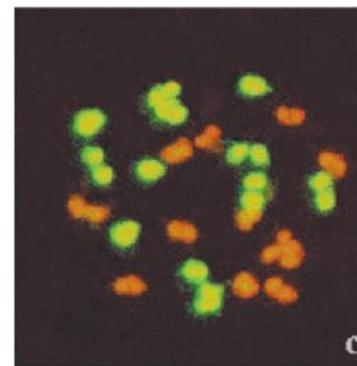
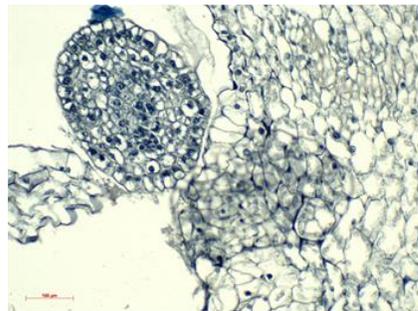
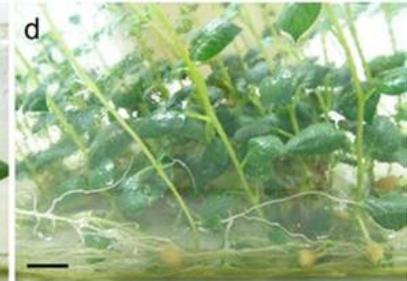
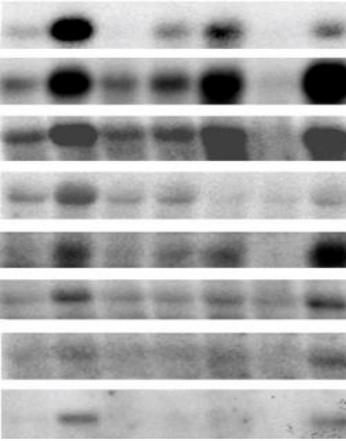
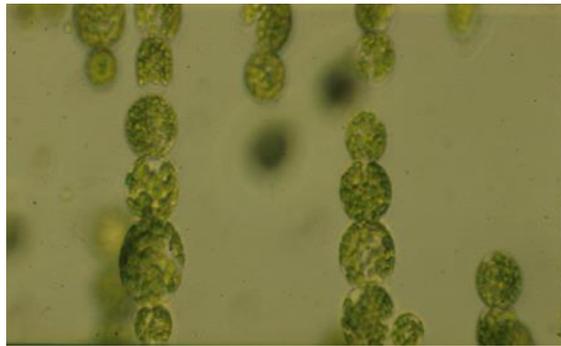
**22**  
locations

**1323**  
employees

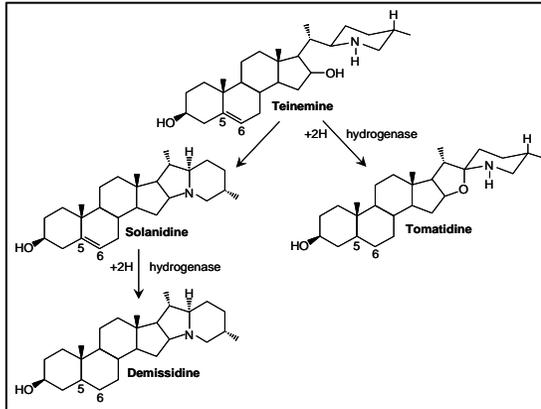
**147 M€**  
turnover

# It all started from diploid level potato breeding in 1990:

- Induction of haploids, protoplast fusions, analyses of hybrids...
- Genetic enhancement of potatoes with distantly related *Solanum* species
- Development of cloning technologies with bioreactors
- Molecular and cytological analyses



# Analyses of bioactive compounds in potatoes:



## Waste streams from potato industry:

- In Finland, potato peel waste is obtained ca. 50-70 M kg per year
- Most of the compounds with high bioactivity are located in the potato skin or in cell layers under the skin
- Utilisation of potato skin waste materials for food industry
- Industrial waste streams are used for animal feed and soil improvement, partly for bioethanol production



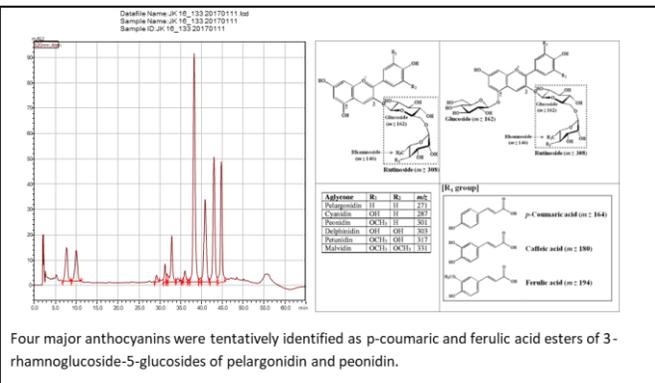
Mayan Twilight, UK

## Genetic resources of potato:

- Research focused on other cultivated potato species than *S. tuberosum* (Native Potato Species NPS)
- Materials provided from the N.I. Vavilov Institute of St. Petersburg
- Analyses of glykoalkaloids and anthocyanins

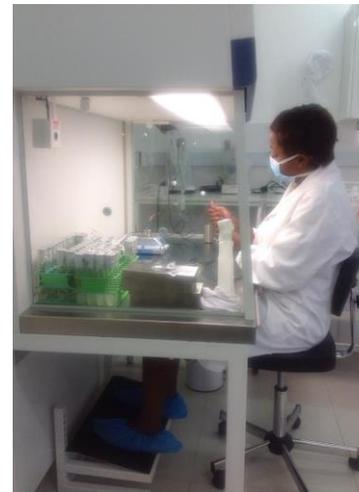


Blue Congo, Finland



# ICI Project in 2012-2015, ZAMBIA:

- Development of plant tissue culture facilities at ZARI (Zambia Agriculture Research Institute) for sustainable production of disease-free plant propagules



- Refurbishment and equipping of laboratory facilities suitable for aseptic working in Zambia
- Development of technical skills of ZARI employees in micropropagation through training periods in Finland and in Zambia
- Establishment of a large-scale multiplication technology for disease-free planting materials of root and tuber species
- Enabling the production of certified seeds in Zambia

## Development of potato cultivation in Tunisia – Towards environmentally friendly sustainable potato production, 2015-2019



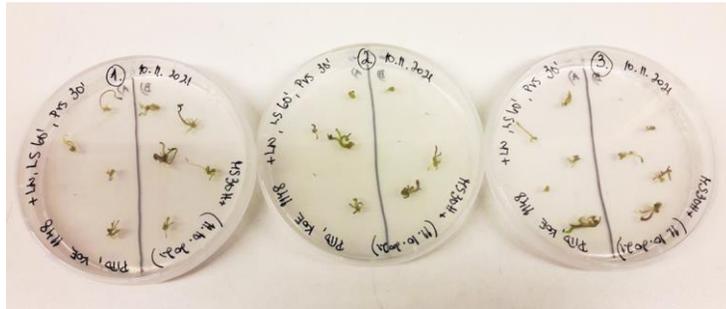
**Collaboration with ENIS  
(National Engineering  
School), University of Sfax,  
Tunisia**

**Finnish Ministry for Foreign  
Affairs**

- Improved food security in Northern Africa
- Tunisian seed potato production chain improved
- Desertification and high soil salinity levels cause problems for Tunisian potato production
- Phytopathogens and use of high amounts of chemicals decrease tuber qualities
- Analyses of health-promoting compounds (phenolic acids and anthocyanins) from Tunisian local varieties for improved nutritional value
- Capacity-building (training programs and technology development in Tunisia)

# Development of long-term conservation technologies for potato materials:

- Development of cryopreservation technologies at Luke's laboratories: learning the methods in Germany, applied for potatoes at Luke
- Cryopreservation also in a main role for future activities (Ms. Anna Nukari)
- Preservation of potatoes for future generations
- NordGen to visit Luke in April 2024 with Maltese Gene Bank





SUSTLIVES

## Project «SUSTLIVES»

### ***SUSTaining and improving local crop patrimony in Burkina Faso and Niger for better LIVES and EcoSystems***



Financé par  
l'Union européenne



#### **EU initiative DeSIRA**

Delegated Cooperation: EU – Italy  
(direct management with  
AICS Ouagadougou)



**Duration:** 4 years



**Total cost:** 6.000.000 €



**Countries:** Burkina Faso and Niger



**General objective:** Promote the transition towards **sustainable and climate change resilient agricultural and food systems** in Burkina Faso and Niger through the development of local **agro-biodiversity** to ensure food security and improve the livelihoods of rural communities



**Specific objective:** Strengthen the research and innovation capacities of "AKIS" (*Agricultural Knowledge and Innovation System*) actors in the value chains of neglected and underutilized species (NUS) in Burkina Faso and Niger



AGENCE ITALIENNE  
POUR LA COOPÉRATION  
AU DÉVELOPPEMENT



CIHEAM  
BARI  
Luke

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## Maintenance and scaling up potato growing and consumption heritage in Northern Baltic region to build up resilient communities

Project Coordinator:

**Ilze Dimante (AREI, Latvia)**

Terje Tähtjärv (METK, Estonia)

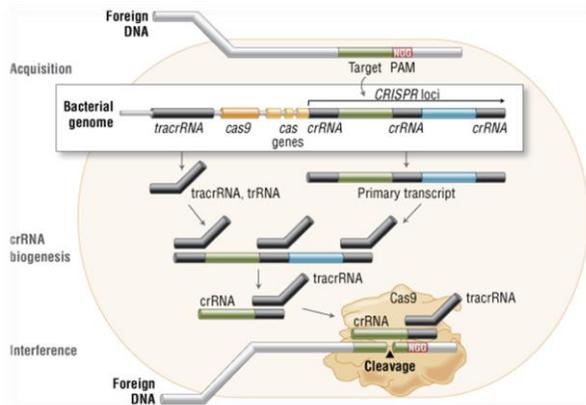
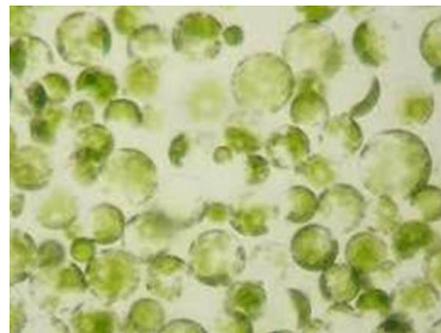
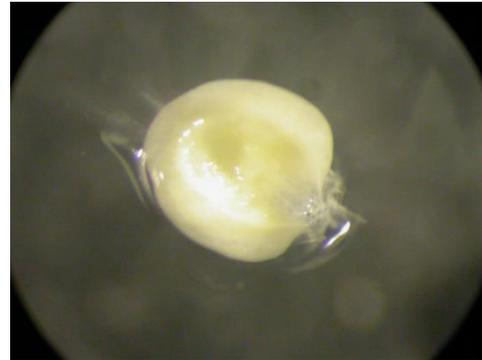
Veli-Matti Rokka (LUKE, Finland)



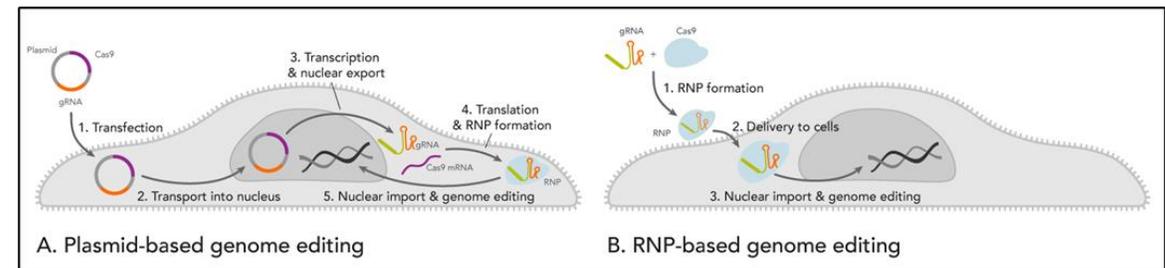
[interreg-baltic.eu/project/mainpotre-interreg-baltic-sea-region/](https://interreg-baltic.eu/project/mainpotre-interreg-baltic-sea-region/)



# Application of Gene Editing Technologies (CRISPR/Cas9) for crop plants (KASVIGENOMIMUOKKAUS):



- MMM-funded project in collaboration with the University of Helsinki.
- Induced mutagenesis to OST1 gene (stomatal closure, drought) in barley
- Target tissue: immature embryos in barley
- Next goal is potato editing using protoplast based technology



# ECPGR - European Cooperative Programme for Plant Genetic Resources

- founded in 1980 on the basis of the recommendations of the United Nations ([UNDP](#) and [FAO](#)) and the Genebank Committee of the European Association for Research on Plant Breeding ([EUCARPIA](#))
- ECPGR aims to ensure the long-term conservation and to facilitate the utilization of plant genetic resources in Europe
- ECPGR is financed by its participating countries and is coordinated by a [Secretariat](#)
- The Programme is guided by a [Steering Committee](#) (SC), consisting of the National Coordinators of the member countries. The SC nominates an [Executive Committee](#) (ExCo), which is composed of five persons (to plan and execute the ECPGR activities)
- 35 member countries in Europe



# ECPGR operates through its Working Groups:

- 20 different Crop WGs



WG Chairs meeting in Ljubljana in 2017.

- 4 thematic WGs

## Crop Working Groups (listed in alphabetic order)

- *Allium* Working Group
- *Avena* Working Group
- Barley Working Group
- Berries Working Group
- *Beta* Working Group
- Brassica Working Group
- Cucurbits Working Group
- Fibre Crops (Flax and Hemp) Working Group
- Forages Working Group
- Grain Legumes Working Group
- Leafy Vegetables Working Group
- Maize Working Group
- *Malus/Pyrus* Working Group
- Medicinal and Aromatic Plants Working Group
- **Potato Working Group**
- *Prunus* Working Group
- Solanaceae Working Group
- Umbellifer Crops Working Group
- *Vitis* Working Group
- Wheat Working Group

## Thematic Working Groups

- Crop Wild Relatives
- **Cryopreservation**
- Documentation and Information Working Group
- On-farm Conservation and Management Working Group



# ECPGR Potato WG from year 2017 onwards:



## PHASE IX (2014-2018):

- Previous chairs:

**Roel Hoekstra** (Chair for 10 years, until the end of 2014 of the Phase IX)

**Anca Baci** (Chair 2015-2016), resigned

- New chair nominated in 2017, no volunteering candidates
- Recommendation by the National Coordinator of PGRP in Finland (Dr. Elina Kiviharju)  
→ the first Chair from Finland of any of the ECPGR WGs in history 😊😊

- **Lorenzo Maggioni's advice in 2017:**

'The main tasks for the Chair in the near future will be to encourage the Group to submit an Activity proposal under the next call of the Grant Scheme, as well as to participate in the meeting of all WG Chairs and discuss of ECPGR from the point of view of the Working Groups.'

## PHASE X (2019-2023) ACTIVITIES CARRIED OUT IN POTATO WG:

- Participation in annual meetings of WG Chairs, when suitable
- Members of Potato WG contacted through emailing
- Some emails received from members concerning the WG activity, and how information of potatoes could be delivered to AEGIS
- In October 2022, a request made to a few key members of the Potato WG (largest genebanks) concerning an 'Activity Grant Scheme Proposal' → no feedback
- The Chair designed the Description of Activity, methodology, expected products, and workplan, and made a questionnaire, if the goals were doable. Due to the closing deadline, only a very few comments were received
- 'Expression of Interest' letter was included as an attachment with Proposal Draft
- Regardless of the short time given, even 15 'Expression of Interest' letters were obtained with signatures before submission deadline (**November, 15<sup>th</sup>, 2022**, and a couple just after the deadline
- From the ExCo of the ECPGR, positive feedback, a few suggestions for the budget, grant was approved in **February 14<sup>th</sup>, 2023**

ECpGR: Outcomes of the Sixth Ca x +

ecpgr.cgiar.org/grant-scheme/outcomes-of-the-calls/outcomes-of-the-sixth-call-phase-x

	Acronym	Working Group(s)	Activity Coordinator	Date of approval	Proposal	Budget table	Budget in Euro	of award
1	EURO-POTATOES	Potato	Veli-Matti Rokka	14 Feb 2023	PDF (520,9 KB)	PDF (521,1 KB)	€ 29,999.99	PDF (288,8 KB)
2	ExploDiv	Grain Legumes	Creola Brezeanu	1 Dec 2022	PDF (602,7 KB)	PDF (160,7 KB)	€ 28,600	PDF (250,8 KB)
3	forEVA	Grain Legumes	Creola Brezeanu	1 Dec 2022	PDF (738,8 KB)	PDF (114,7 KB)	€ 16,500	PDF (249,9 KB)
4	Garli-CCS	Allium; Cryopreservation; Documentation & Information	Manuela Nagel	1 Dec 2022	PDF (710,8 KB)	PDF (199,6 KB)	€ 59,997	PDF (300,5 KB)
5	INWHEATORY	On-farm Conservation & Management; Wheat	Lorenzo Raggi	1 Dec 2022	PDF (623,3 KB)	PDF (262,3 KB)	€ 28,050	PDF (324,3 KB)
6	Sylvestris	Vitis	Georgios Merkouropoulos	6 Dec 2022	PDF (844,3 KB)	PDF (197,2 KB)	€ 25,520	PDF (739,2 KB)
Total							€ 188,666.99	

# Project EURO-POTATOES 'Get Potatoes United – Collaboration Action for Updating the Virtual European Potato Collection'

- 20 countries participated the project: (Belgium, Czechia, Estonia, Finland, France, Germany, Georgia, Greece, Italy, Hungary, Latvia, Montenegro, The Netherlands, Poland, Romania, Slovakia, Slovenia, Sweden, Switzerland, and United Kingdom)
- During submission, 1 member (Miloš Faltus) willing to participate via self-funding (from Cryopreservation WG)
- In our WG meeting, self-funded attendees also from Lithuania and Norway
- Project duration was planned 18 months, the indicated closing date is: **15th of January, 2025**
- The project operates in two ECPGR Phases (started **in Phase X** until 2023, prolonged for Phase XI, which has slightly different goals)
- Two project report submissions (Phase X, and Phase XI)

# Project activities and approach:



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 relevant 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)

← **Mostly done**

← **Questionnaire?**

← **Poland 2024**

← **Poland 2024**

← **To be done, members**

# Expected products/outputs of the EURO-POTATOES project (1):

	Expected products/results	Corresponding ECPGR output, activity
1	Established active potato network for information share from potato genetic resources.	<p>Verified information from the European potato collections and diverse databases.</p> <p>Activity 1.2.2. 'Verification of the European Collection by crops in terms of representation of the ex situ PGR diversity'</p>
2	Inventory lists of unique potato accessions by member countries.	<p>Identification of new potato accessions for inclusion of AEGIS.</p> <p>Activity 1.2.1 'Identification of new European accessions for inclusion into AEGIS'</p> <p>Activity 1.8.4 'ECPGR-mediated safety duplication of AEGIS accessions'</p>

## Expected products/outputs of the EURO-POTATOES project (2):

3	Standards for genotyping (fingerprinting) and long-term conservation technologies in regards of information from reference potato materials.	<p>Identification of new potato accessions for inclusion of AEGIS.</p> <p>Activity 1.2.1 'Identification of new European accessions for inclusion into AEGIS'</p> <p>Activity 1.6.2 'Standards: agree on crop-specific genebank standards'</p> <p>Activity 1.8.2 'ECPGR-mediated characterization, evaluation and/or phenotyping/genotyping of AEGIS accessions'</p>
4	Selected genetic resources as potato accessions for preparation of an additional joint project between members	<p>Further projects designed on molecular characterization of potato gene bank collections</p> <p>ECPGR Strategy (2021) promotes the 'Inclusion of non-European collections into AEGIS and safety duplications'</p>

Thank you!

