

# Cryopreservation of PGR in Finland

ECPGR CRYO WG 3-4.5.2023

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**Current  
Cryopreservation  
activities:  
Projects, funding,  
which  
organizations are  
involved**



# Cryopreservation of PGR at Luke

- Cryopreservation of PGR is being executed under the national plant genetic resources programme (Finnish National Genetic Resources Programme for Agriculture, Forestry and Fishery, 2018) at Natural Resources Institute Finland (Luke).
- The plant accessions chosen for long-term preservation by cryopreservation are maintained in Luke cryobank in gas phase tanks at below  $-150\text{ }^{\circ}\text{C}$ .



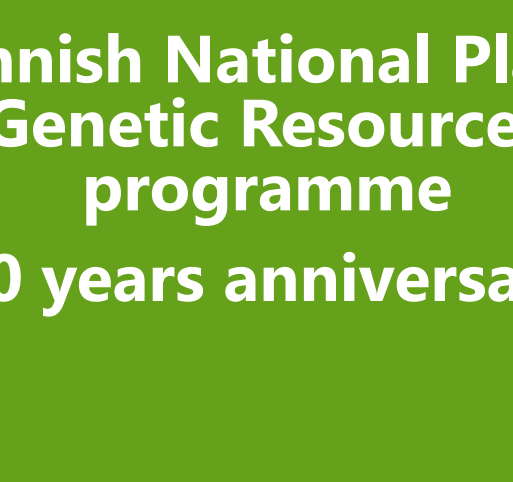
# Luke in brief



**22**  
locations

**1337**  
employees

**133 M€**  
turnover



**Finnish National Plant  
Genetic Resources  
programme  
20 years anniversary**

# Luke PGR network for long-term cryopreservation, research and protocol development and safety duplication

- Haapastensyrjä
- Jokioinen
- Suonenjoki



Cryotank at Jokioinen



Haapastensyrjä



**Approaches to cryopreservation: Crop prioritization, cryopreservation methods, plant material, acclimation, methods, recovery.**





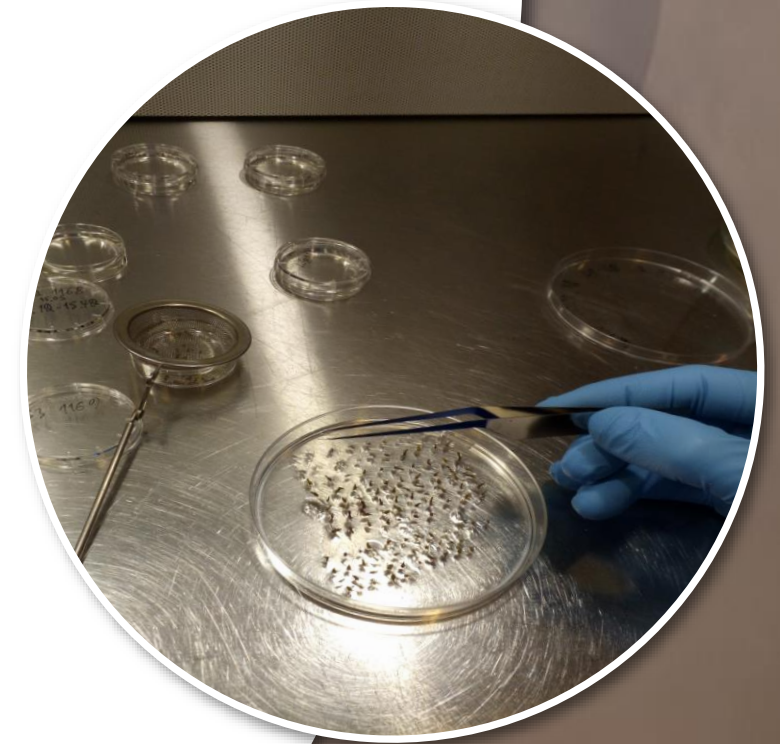
# Cryopreservation of PGR at Luke, crop prioritization

- Vegetatively propagated horticultural plants, mainly
  - *Rubus*
  - *Ribes*
  - *Fragaria*
  - *Malus*
  - *Prunus*
  - *Solanum*
  - also some ornamental plants
- On-going*
  - *Allium cepa* Aggregatum group
  - *Humulus*
  - *Ribes rubrum*
  - *Fragaria*



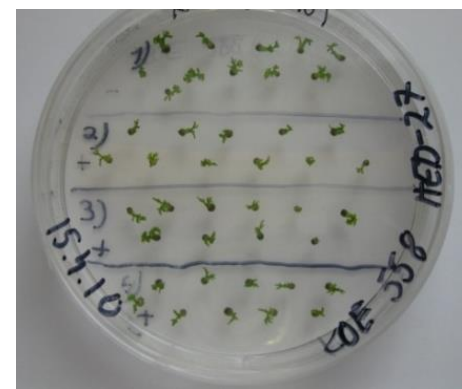
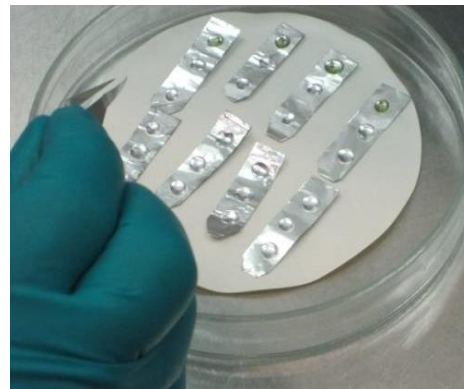
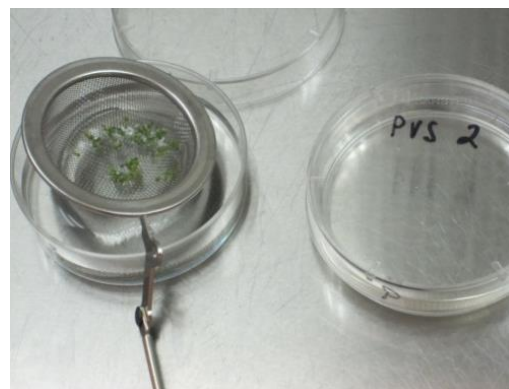
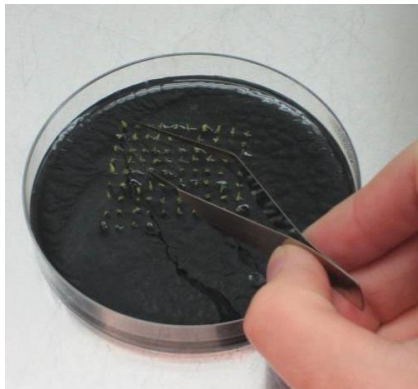
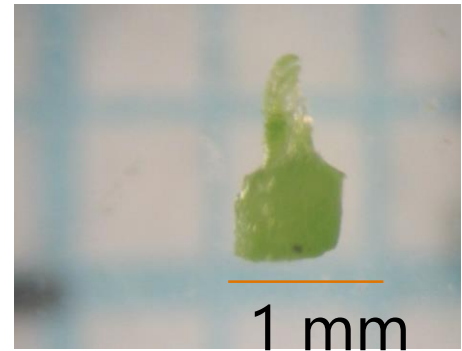
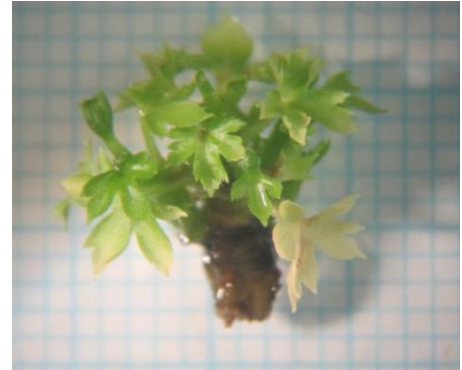
# Cryopreservation materials of PGR

- Apical or lateral buds collected from micropropagated plants
- Dormant buds collected from the field or greenhouse Ribes, Prunus, Malus...
- Pollen Rhododendron
- Seeds Rhododendron

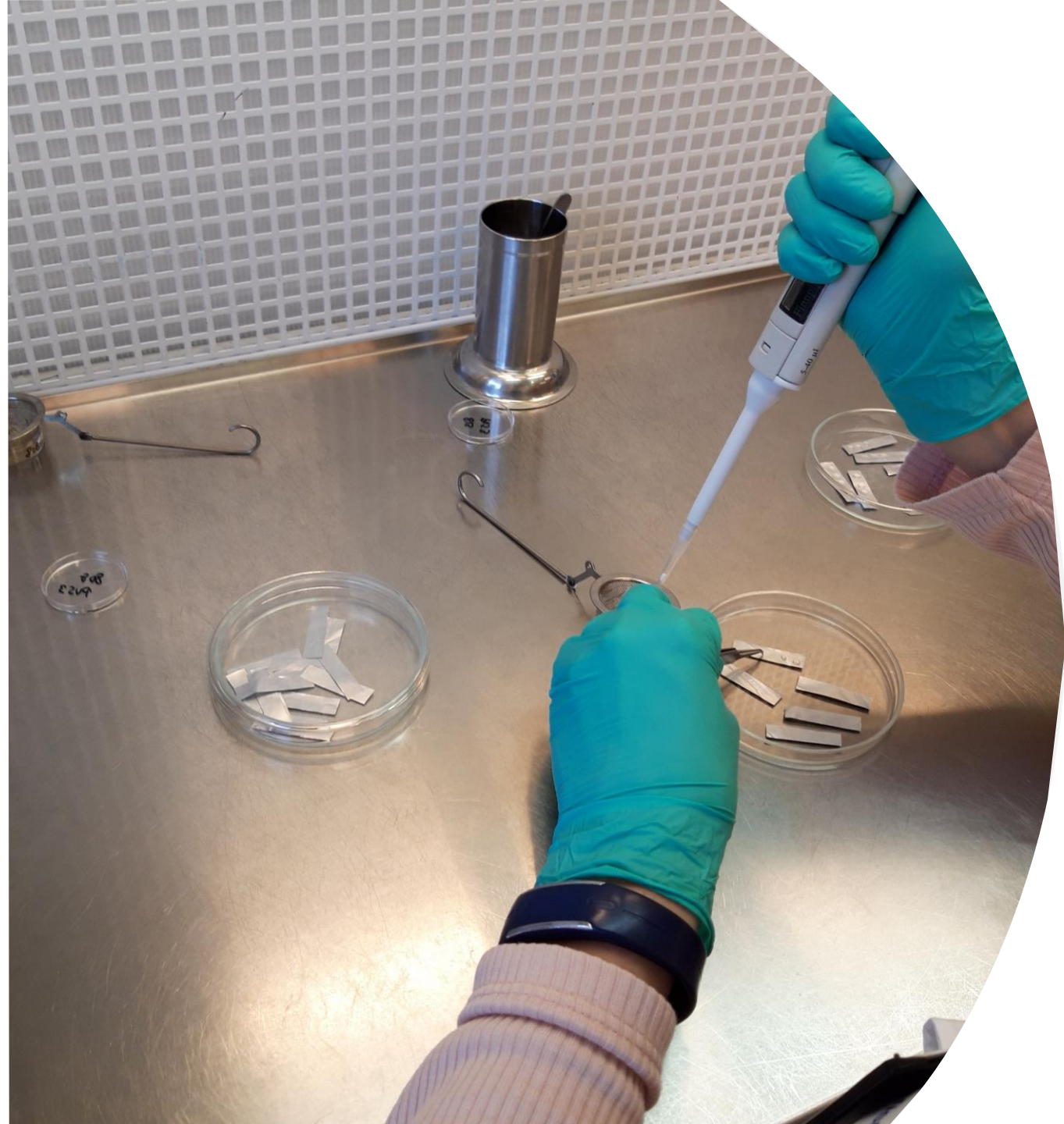


# Steps of cryopreservation

- Testing and optimising the cryopreservation **method**
- Pretreatment and freezing of the materials for **long-term preservation**
- Checking the **regeneration** of the cryopreserved lots
- Controlling the long-term cryopreservation by **thawing** control samples at fixed terms.



# Current Cryopreservation activities: Projects, funding



# GEHO KRYO project

-

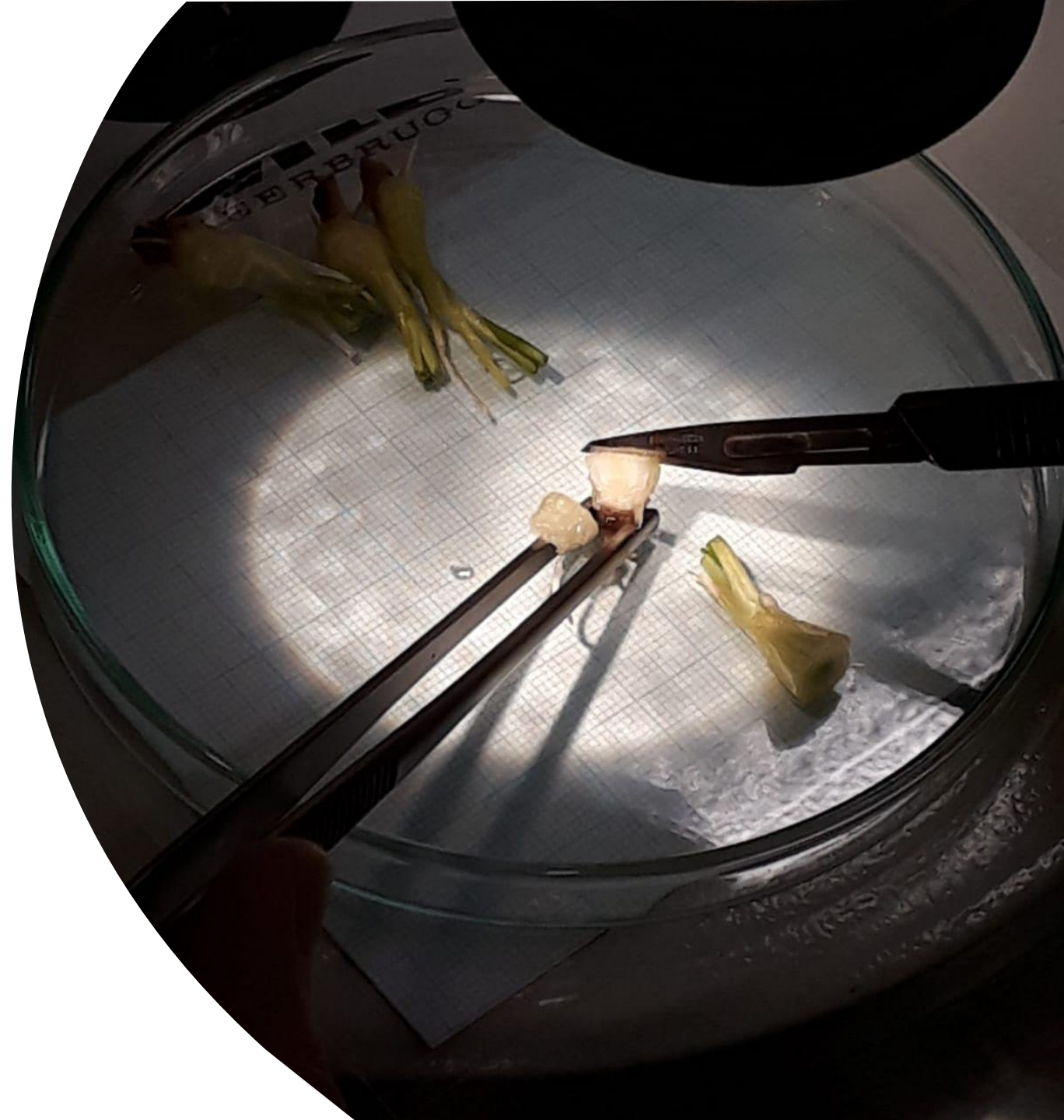
## Cryopreservation backup of the national PGR collections



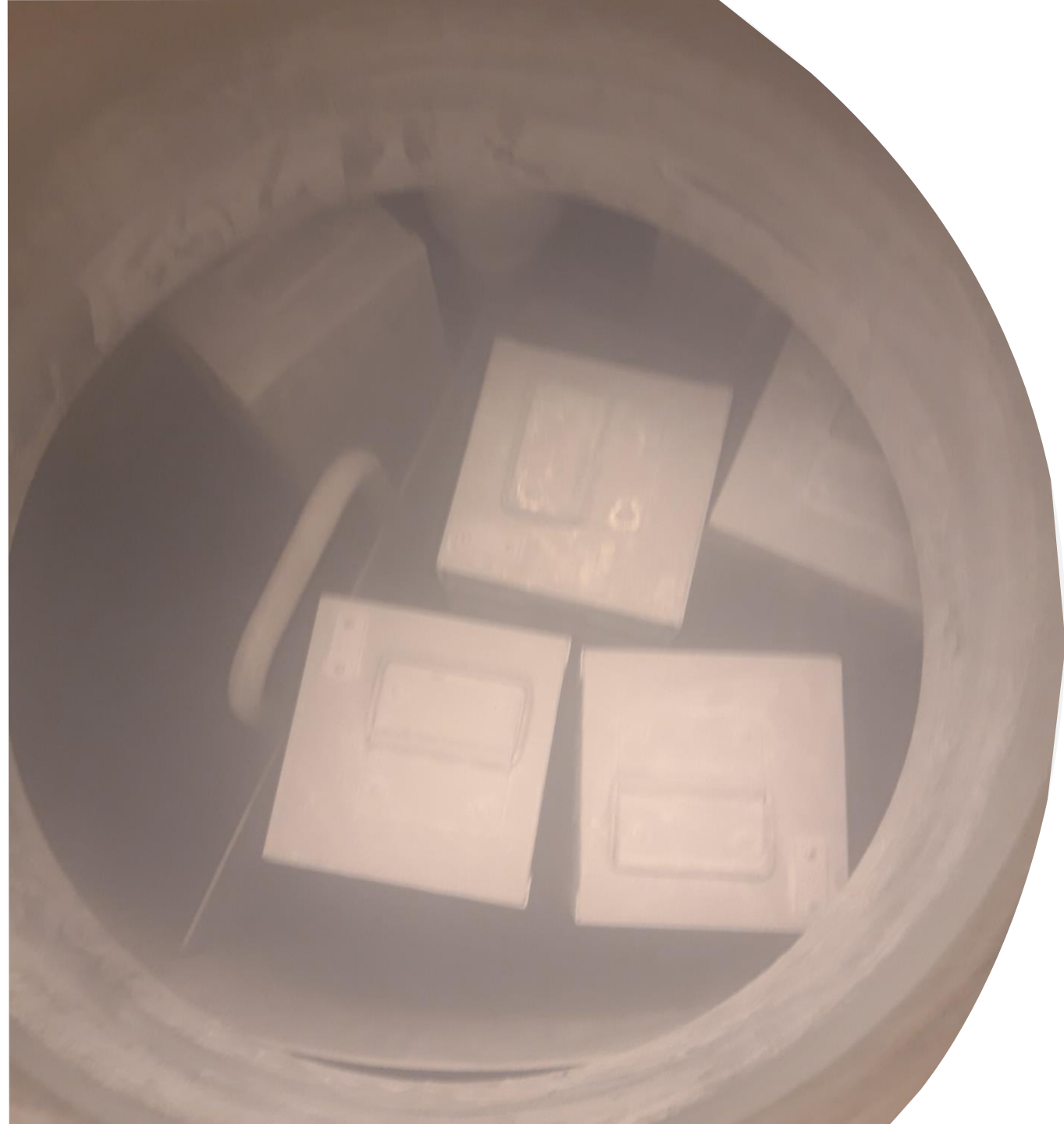
# KASVIKRYO

project

-Development of  
the plant genetic  
resources  
cryobank



**Strawberrycryo  
project**  
**- Cryopreservation  
of the pre-basic  
mother materials of  
strawberry cultivars  
in the certified  
plant production**



# Strawberry Cryopreservation

- Years 2021-2023
- pre-basic mother materials of strawberry cultivars in the certified plant production





# Strawberry Cryopreservation Aims

- Executed internally at Luke
- under the statutory services programme
- As part of the certified plant production scheme
- Mainly at Luke Haapastensyrjä
- Co-development with the National Food Authority



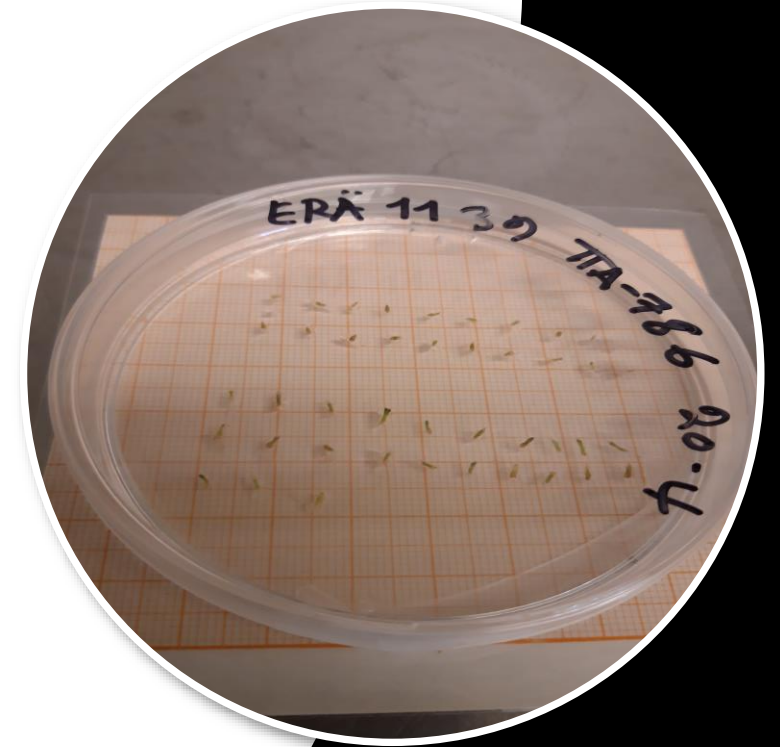
# Strawberry Cryopreservation Aims

- As the cryobanked in vitro materials will serve as the pre-basic mother materials of the certified production
- ->Enhanced safety and secured true-to-cultivar preservation of the strawberry cultivar materials
- ->Reduced expenses of repeated in vitro initiations and plant enemy and true to type testing



# Strawberry Cryopreservation Protocol

- Apical buds are excised from cold pretreated in vitro cultures
- Pretreatment on sucrose media

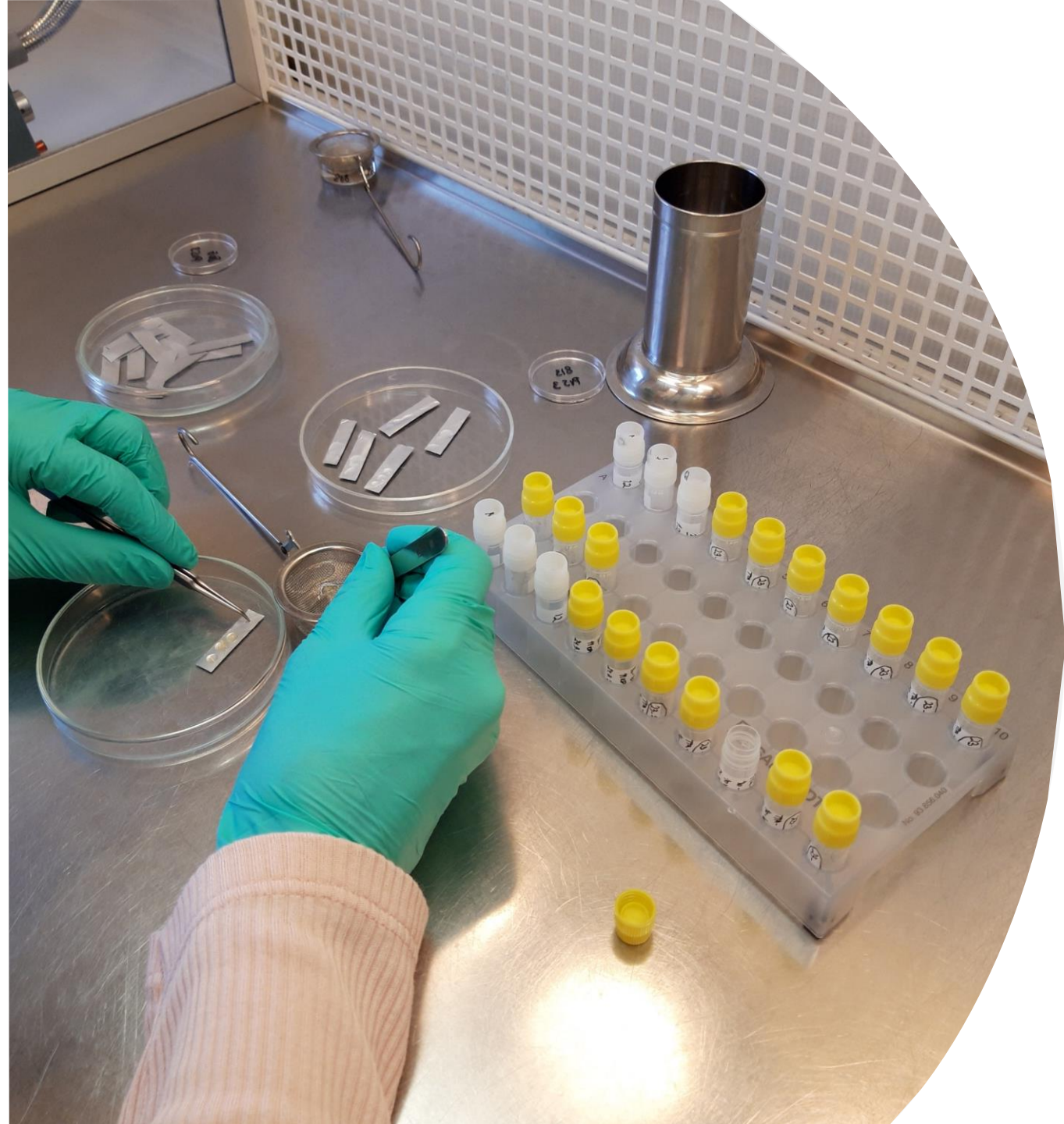


# Strawberry Cryopreservation Aims

- One of the aims of the project is that the know-how of the strawberry cryopreservation protocol developed at Luke already in 2006 is passed on to the technicians at the Haapastensyrjä laboratory
- Protocol can also be optimized.



# Constraints that are limiting cryopreservation in Finland



# Proposals/ideas for an European strategy



# Good common goals

- Bringing together experts for cryoconservation of plant genetic resources around Europe
- Sharing information about cryopreservation in European countries
  - Discussion on strategy for cryoconservation of PGR in Europe
- Discussion on strategy to broaden the routine use of cryopreservation methods

-Crobanking, genbanking, AEGIS, standards, back-ups, databases, prioritization, protocols, health status & cryotherapy, ....



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Thank you!