METK

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Operational genebank manual of the Centre of Estonian Rural Research and Knowledge (METK)

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1. Germplasm Acquisition and Accessioning

Genebanks can obtain the germplasm they want to conserve in many different ways. Conducting collecting missions is possibly the best way of acquiring germplasm material in the most reliable manner. Germplasm exchange with other genebanks is a third route to add genetic diversity to the collection. Obtaining and storing germplasm from researchers and plant breeders is another route to acquiring genetic material. Such acquisitions should be guided by a formal mandate that the genebank concludes with its host organization or government and that provides the basis for a genebank acquisition policy. The actual accessioning of acquired germplasm samples, i.e. formally including it into the collection with its unique accession number, is a complex process during which the curator has to check many aspects such as the verification of the identity of the material, the health status, the availability of pertinent information, etc. It is further understood that also legal aspects form part of this activity, e.g. was the material collected/obtained in a legal manner, and are there any restrictions on its use.

Box 1.1. Germplasm Acquisition and Accessioning

GA1 – Briefly describe any formal mandate that your genebank might have concluded with or received from your "mother organization" (e.g. institute, governmental body).

This description should include details on:

a) *which species you conserve and make available;*
b) *who decides on what your mandate is and, if different,*
c) *from whom do you receive the mandate;*
d) *the main aspects of the mandate; and*
e) *legal considerations on PGR as foreseen in national legislation.*

The *ex situ* Genebank is organized as a department of the Centre of Estonian Rural Research and Knowledge (METK) which is a research institution under the governance of the Ministry of Regional Affairs and Agriculture. The mandate of the Genebank is the collection, conservation, evaluation, characterization, documentation and utilization of plant genetic resources of agricultural crops of Estonian origin, thus providing an initial source for the future use of the genetic variation by Estonian plant breeders and researchers.

Seed-propagated material of agricultural crops (cereals, forage legumes and grasses, grain legumes, oil crops, vegetables) is conserved in the Genebank.

The *in vitro* culture collection is maintained at the Department of Plant Biotechnology.

The main tasks for the management of collections are defined in the National Programme 'Collection and Conservation of Plant Genetic Resources for Food and Agriculture' coordinated by the Council on plant breeding and genetic resources.

GA2 – Specific agreements. Does your genebank have any specific formal agreements with other genebanks regarding the conservation of specified germplasm?
This should include:

a) *whether or not your genebank has any international agreements to conserve specified germplasm on behalf of other countries,*
b) *a specific region, and/or*
c) *the world*, and
d) *which crops or genepools fall under these agreements?*

There are no international agreements to preserve germplasm on behalf of other countries.
METK has agreements signed with the Nordic Genetic Resource Centre NordGen (1997, updated in 2023) and The Royal Norwegian Ministry of Agriculture and Food (2017) regarding the preservation of safety-duplicates.

GA3 – In case your genebank has a germplasm acquisition policy, what does the policy entail?
Please specify which crops or which geographic area, if applicable.
The overall mandate of the Genebank is to conserve material of Estonian origin or adapted to Estonian climatic conditions. Besides, forage grasses and legumes collected during the joint expeditions from the Baltic-Nordic region, as well as advanced breeding material of breeders' collections of METK not actively used in breeding programmes, are preserved in the Genebank.

GA4 – How do you verify the identity of the germplasm material received (e.g. relying on the donor's information, comparing material with other accessions, involving (taxonomic) expertise, etc.)?

- Repatriated material from other genebanks – accepting donor's information.
- Material collected from natural habitats – breeders and representatives of the Genebank conduct the collecting missions and evaluate collected accessions.
- Germplasm material from breeders – tested in field nurseries and assessed in the laboratory.
- Material collected from gardeners, and farmers – relying on their information

GA5 – Describe if and how you conduct an assessment of the various quality aspects of the seeds, tissue culture or plant material received.
This description includes:

a) *quality aspects related to the correct identification of a given accession, but also*
b) *health*
c) *purity aspects of the sample/accession*), and
d) *use of a quality control system (e.g. ISO).*

Visual control of seeds; seed control and testing (estimation of viability, weight, moisture content).

GA6 – Describe whether and how the SMTA is being implemented:

a) *extent of materials covered by SMTA (crops, numbers of accessions)*
b) *ways of SMTA implementation and documentation of transfers of PGR*
c) *other aspects (e.g. monitoring, supervision).*

The SMTA has been implemented at METK since March 2011. Initially, only material of Annex1 species was distributed with an SMTA (and non-Annex1 crops with a different agreement). Since January 2013, the SMTA has been implemented for all material distributed. Information about signed SMTAs is recorded in spreadsheet files at the Genebank and reported when required.

Box 1.2. Germplasm Collecting

GC1 – Describe here the details of the strategy that you follow in implementing germplasm collecting missions.

This description should include:

a) *general aspects of planning and implementing a collecting mission,*

The collecting missions are planned for the biodiversity hotspots in Estonia, areas with high soil fertility and diversity of soil types. We target the areas which have not been recultivated for at least three decades, e.g. islets, and former restricted military areas on the coastal line.

b) *the criteria you use for priority setting;*

Samples of traditionally cultivated forage and herbage legume species, rarely minor species are collected. Among the latter, turfgrass species are preferred over the forage grasses.

c) *the actual strategy followed in sampling material from farmers' fields, from nature, etc.; and*

Primarily, we sample grasslands that have not been re-seeded for at least three decades and that are or have been subjected to grazing or cutting. This is based on the assumption that the survived plants have undergone selection for tolerance to frequent defoliation and wear, being thus more valuable from the breeding perspective.

The wild material that has evolved without any human intervention is also collected.

d) *how your germplasm acquisition policy underpins the mission*.

Accessions collected from nature form a vital source for plant breeding. Collected samples are characterised and evaluated and according to the results, the decision is made whether they will be passively stored or actively used (breeding, research projects).

GC2 – Provide any additional information on the germplasm collecting activities of your genebank, including the collaboration with others.

Joint collecting missions have been carried out in Baltic countries in collaboration with Latvian and Lithuanian colleagues.

Seed-collecting activities in Estonia of IHAR (Poland) genebank collection holders have been supervised.

2. Ensuring Security

This chapter refers to the security of the genebank structure itself (i.e. its physical security), the safety of its germplasm (i.e. the maintenance of viability) as well as the institutional and personnel security, aspects which together will ensure the long-term conservation of the entire collection.

2.1. Physical Security

To ensure the physical security of the collections, the following aspects are regarded as essential elements for achieving the objective:

Box 2.1.1. Safety Duplication (of long-term conserved germplasm)

SD1 – Please describe how your genebank implements the safety duplication of your germplasm material.
This description should include the following aspects:

a) *the type of safety duplication (e.g. black-box; no specific arrangement; other);*
Black-box

b) *the location(s) where you store your safety-duplicates (country; genebank);*
Sweden, NordGen
Norway, Svalbard Global Seed Vault

c) *whether or not you are using a formal agreement with the genebank(s) that store your duplicates?*
Yes, the Memorandum of Understanding between METK and NordGen was signed in 1997 (updated in 2023).
An agreement concerning the deposit of seeds in the Svalbard Global Seed Vault was signed in 2017

d) *whether the safety-duplicates are stored under conditions comparable to your own? Please provide details;*
Safety duplicates are stored under the same conditions: seeds packed in laminated aluminium foil bags, and stored at a temperature of -18°C

e) *do you maintain safety-duplicates from other genebanks at your genebank? If so, do you know any details of that material?*
No.

SD2 – Do you have a safety duplication policy? If so, please provide essential details.
According to the mandate of the Genebank, only accessions of Estonian origin are deposited to NordGen and Svalbard Global Seed Vault.

Box 2.1.2. Structure

SS1 – Please provide details on how your genebank building has been designed to resist natural disasters (e.g. earthquakes; flood; storm).
No danger of earthquakes or heavy storms. There is a very low probability of short-term flooding, which shall not negatively affect the collections. Evacuation of the collections shall be carried out in case of serious disaster.

SS2 – Please describe the security arrangements that you have in place to protect your genebank against burglars, fire and others.
Please include details on the following arrangements, as applicable:

a) *fences;*
b) *security doors;*
c) *alarm system;*
d) *fire detectors;*
e) *standby generator;*
f) *others (please specify*)

Alarm system by security service; temperature monitoring system in freezers with alarm to the mobile phone of staff, standby generator.

SS3 – Please provide information on any other structural security aspects that you might have in place.

Box 2.1.3. Security Equipment

SE1 – Provide details on the kind of emergency (back-up) equipment or arrangements that you have in place to ensure permanent electricity and cooling.
Aspects to consider are:

a) *"back-up" compressors for your cold rooms;*
b) *generator;*
c) *regular maintenance and trial runs;*
d) *other*).

A standby power system (generator) has been obtained.

SE2 – Describe how you monitor temperature and relative humidity in your cold stores and drying room?
Freezers: the electronic temperature monitoring system automatically delivers an alarm message to the mobile phone of the staff.

Box 2.1.4. Institutional and Personnel Security

IPS1 – Provide details on the "institutional security", in particular with respect to the provision of financial means to operate the genebank.
Aspects to consider are:

a) *timely transfer of funds from the "mother" organization to the genebank;*
b) *do you have direct access to the "mother" organization that provides the budget?*
c) *internal "security" of accessing these funds;*
d) *long-term security and stability of funding (compensation of inflation rates, avoiding variation in years)*
e) *any other observations that are relevant in this context*.

Funding is stable. The annual budget is allocated for the Genebank in the National Programme on PGRFA for a 7-year period. Funding is provided annually by the Ministry of Regional Affairs and Agriculture.

IPS2 – Describe how you secure adequate staffing of your genebank.
Staff is employed under permanent labour contracts.

Box 2.1.5. Contingency Plans

CP1 – Describe the kind of emergency or contingency plan that your genebank has in place to cope with disaster situations.
The genebank has a plan for the evacuation of collections in emergency or contingency situations.

CP2 – Provide information on the kind of training, security drills and other activities that your genebank gives to its staff to deal with emergencies, if any.
Staff is informed on how to act adequately in emergency situations.

3. Germplasm Maintenance

This chapter deals with key aspects of managing germplasm in a genebank, i.e. the maintenance of the viability, the genetic integrity, the availability of the conserved germplasm as well as the management of the corresponding information.

N.B. Sections on Cryopreserved collections and Field genebanks are not applicable for ECRI, therefore these sections have been removed from the document.

3.1. Maintenance of Viability

This section refers to the maintenance of the longevity of the seeds or of tissue cultures or living plants in storage. A high initial viability is the most important pre-condition for achieving the longest lifespan of seed accessions in storage, hence maximum efforts need to be taken to ensure that seeds to be stored have the highest possible viability. Optimum growing conditions when multiplying/regenerating the accessions, efficient management of the preparatory steps before storing the germplasm, adequate storage conditions as well as proper monitoring of the viability are critically important.

A. Seed Collections

Box 3.1.1.A. Initial seed viability

IV1 – Describe the procedures or practices that you have in place to ensure the highest possible initial viability of your seed, in particular during regeneration and post-harvest (e.g. cultivation practices, pollination aspects, use of specific equipment as shelters, storage of harvested seeds, cleaning, etc.).
Regeneration is carried out by an experienced staff of breeding departments of relevant crops of METK. In general, during regeneration also characterization is carried out following IPGRI descriptor lists, lists created by ECPGR Working Groups and descriptor lists created by other genebanks. Since the Genebank is relatively young (the first accessions are from 1999), the need for regeneration of the complete collection has not yet occurred.
Cleaning and drying of seeds is carried out promptly after harvesting.

IV2 – Describe procedures how you deal with a) dormancy and b) hard seeds?
Scarification.

IV3 – Please provide any other information on procedures that you follow to ensure the highest possible initial viability.

Box 3.1.2.A. Seed Viability Monitoring

VM1 – Describe the routine seed viability monitoring system that you use.
The monitoring system should include the following aspects:

a) *frequency of testing;*
b) *sampling method applied;*
c) *any thresholds that you use;*
d) *whether you apply different procedures for crops/species with erratic initial viability or irregular viability lifespan;*
e) *etc*.

The main procedures for seed viability testing are described in the Genebank protocol in Estonian language. ISTA standards are adopted and followed by the Genebank.
A germination test of each sample is conducted before storage and repeated after 5-15 years depending on the species; also while delivering material for characterization and evaluation.

VM2 – Please describe the information "system" that you might have in place that allows you to make more species or even accession-specific decisions when the next monitoring should take place.
The results of germination tests are recorded in the Nordic Baltic Genebank Information System GENBIS. Using the search engine, once a year accessions are selected for regeneration under the probability of viability decrease.
Upon species-specific behaviour and empirical knowledge of the decrease in germination rates, germination tests are performed.

VM3 – Please provide information on non-specific thresholds that you might use for the viability of seeds (i.e. a percentage of germination) and for the number of seeds left of accession to initiate regeneration. *In case you differentiate between self- and outbreeding species, please answer for each category separately.*
Regeneration takes place if the germination rate is below 60–75% (depending on the species).
No specific procedures are used for the regeneration of accessions for which the amount of seeds has decreased to a low level. However, this criterion will be added to the Genebank protocol.

Box 3.1.3.A. Seed Storage Conditions (for the different types of collections, i.e. short/medium- or long-term storage)

SC1 – Please provide details on temperature and relative humidity conditions of your storage and drying rooms. In case they vary from room to room, please provide details for each.
Pre-drying to the moisture content 12–14%.
Long-term storage in freezers -18°C.

SC2 – Provide details on the type of containers and the packaging procedures (and the corresponding equipment, if any) that you use.
Laminated aluminium foil bags are sealed with a dedicated sealing device. Bags are of two different sizes depending on seed size and the purpose (bulk bag and distribution bags).

SC3 – What is the range of seed moisture contents (smc) of your stored seeds of different species; what measures do you apply to keep and/or monitor the (low) moisture level? Do you treat different species differently?
The range of moisture content varies between 4–8% depending on the species.
An electronic moisture analyzer is being used to determine moisture content.

SC4 – Provide data on the total storage capacity (number of containers, number of accessions) and an estimated percentage to which extent this capacity has been filled.
Upright deep freezers (temperature -18°C) for over 4,000 accessions; two freezers are reserved for emergency cases. In case of need, new freezers are purchased and installed.

SC5 – Please include any other aspects regarding storage conditions at your genebank that you regard as important (e.g. anticipated lifespan of freezing and drying equipment and related prudent financial management)
None.

B. *In vitro* Culture Collections

Box 3.1.1.B. Initial viability

IV1 – Describe the procedures or practices that you have in place to ensure the highest possible initial viability of your plant material, in particular during culture of donor plants (e.g. cultivation practices [field, greenhouse], phytosanitary pre-treatments, like use of pesticides).
All initial material is tested for most common viruses (PVA, PVM, PVS, PVX, PVY) and PSTV (potato spindle tuber viroid) infection. No material with PSTV is admitted to the collection. In case of viral infection, the initial material is subjected to thermotherapy. This is followed by the cultivation of meristem tips. If the first thermotherapy cycle is unsuccessful, then the second step is repeated. Disease-free meristem clones are tested for quality, yield and other important characteristics.

IV2 – Describe procedures of explant isolation (organ source in the plant, manipulations) and sterilization (chemical and handling) of the explants.
After growing plants in thermotherapy conditions for approximately 6–8 weeks, the shoot tips of approximately 5cm in length with leaves cut off are placed in labelled bags and taken from the thermotherapy room to the lab rooms. The shoot tips are sterilized in 70% ethanol solution for 30sec each, washed with distilled water and soaked in sodium hypochlorite (5%) solution for 15–20 min, next the shoot tips are washed with distilled water for 3 times. Thereafter, the meristems are cultivated on a special regeneration medium. The regeneration of plants from the meristem culture is done in a growing room with the following conditions: light/dark period 16/8 hours, temperature 23^{o}C/18^{o}C, relative humidity 70%.

IV3 – Please provide any other information on procedures that you follow to ensure highest possible initial viability.
As a source for explants, only healthy material is used. The detection of 5 common viruses is done by PCR method.

Box 3.1.2.B. Viability Monitoring

VM1 – Describe the routine *in vitro* viability monitoring system that you use.
The monitoring system should include the following aspects:

a) *regular control of contamination events,*
b) *control of hyper-hydricity,*
c) *control of health state (if different from a above),*
d) *etc*.

In vitro viability visual monitoring is performed regularly during the transfer from one subculture to the other. Furthermore, visual control checks are conducted in the warm culture rooms every second week and in the cold room weekly. These checks cover visual controls for fungal or bacterial contamination. Hyperhydricity is excluded during transfers between the subcultures.

VM2 – Describe the information "system" (i.e. an "expert system") that you might have in place that allows you to make more species or even accession-specific decisions when the next monitoring should take place.
No specific system was implemented. The experience and skills of the technical staff are crucial for specific decisions.

VM3 – Please provide information on non-specific thresholds that you might use for vigour of *in vitro* cultures (i.e. multiplication rates, loss by weak growth) and for the amount of culture vessels (tubes, jars) left of an accession to initiate additional multiplication measures.
Decisions on multiplication regimes are taken under the personal experience of the responsible staff members.
Accession-specific decisions are made and recorded in the laboratory working protocols. They cannot be published as standardized recommendations.

Box 3.1.3.B. Storage Conditions (for the different types of collections i.e. short/medium- or long-term storage)

SC1 – Please provide details on light, temperature and relative humidity conditions of your culture and storage rooms, as applicable. In case they vary from room to room, please provide details for each.
In vitro culture growth room with controlled parameters: 16h temperature 22 to 24°C, light intensity 30–40µmol.m-2.s-1, humidity 70%; 8h temperature 18°C, no light. The medium-term storage room: *in vitro* plants: 5–7°C, light (10µmol.m-2.s-1), 70% humidity.

SC2 – Provide details on the type of cultivation vessels (tubes, jars plastic vessels etc.) and the transfer procedures (including the corresponding equipment, if any) that you use.
In vitro plants are maintained in glass tubes with cellulose caps. Potato meristem plants are kept in test tubes, and fruits and berries are preserved in Erlenmeyer Flasks or glass jars which are covered by Parafilm.

SC3 – Please include any other aspects regarding *in vitro* culture and storage conditions at your genebank that you regard as important.
No additional specific information could be provided.

3.2. Maintaining Genetic Integrity

Maintaining the genetic integrity of an accession can be achieved by minimizing genetic drift which may occur predominantly during the process of regeneration, due to too small numbers of individuals being planted, sub-optimal pollination and/or the introgression of alleles from other accessions or commercial crops or crop wild relatives. The following aspects are important for achieving the objectives of maintaining genetic integrity and should be briefly described. Please note that a distinction should be made between seed numbers for an accession and seed numbers for sub-samples per accession. The latter only applies if the seeds of a given accession are being stored and distributed as sub-samples. As genetically modified materials get more widely distributed and as they might have specific (legal, technical, administrative) requirements a separate box for this type of material is included.
For *in vitro* cultured and cryopreserved material, which are normally maintained as clones, genetic stability is as important as genetic integrity of the seed-stored material.

A. Seed Collections

Box 3.2.1.A. Seed Containers and Sample Size

SCSS1 – Do you document the initial number of seeds of individual accessions (either as received from collecting missions or through exchange)?
The sample weight is recorded for each accession.

SCSS2 – Please describe what kind of containers (and equipment) you use, the procedure you follow with respect to sub-sampling, seed numbers per container, etc.
Seeds are preserved in laminated aluminium foil bags. According to the species, 50–200 seeds are preserved per distribution bag (each accession 5–10 bags); at least 1,500 seeds of self-pollinating and 3,000 seeds of cross-pollinating species per bulk bag; 500–1000 seeds in each safety duplication bag.

SCSS3 – What is the number of seeds that you use as the minimum threshold per accession? Are these seed numbers of a given accession based on genetic parameters (such as reproduction biology; heterogeneous samples)? Please provide URL of your protocols if these are available online.
50–200 seeds in distribution bags; at least 1,500/3,000 seeds in bulk bags (self-pollinating/cross-pollinating species, respectively).
The Genebank protocol is available in Estonian language in writing.

SCSS4 – Please provide details on other aspects that are important in this context.

Box 3.2.2.A. Pollination Control

PC1 – Please describe the regeneration procedures that you follow for self- and outbreeding species.
Please include in your description the following aspects:

a. *any control measures to minimize or avoid cross-pollination between accessions;*
b. *the use of pollination cages for insect-pollinated species;*
c. *the use of specific pollinators for insectpollinated species;*
d. *strategies to ensure that males and females participate equally in the reproduction*).
e. *strategies to avoid any genetic drift (minimum number of plants, minimum number of plants at flowering stage before pollinators introduction, similar quantity of seeds harvested from each plant, etc.)*

Regeneration of cross-pollinated species is carried out depending on the species in isolation cabins or under isolation bags.
Isolation in space is used to reduce the eventuality of cross-pollination.

PC2 – Provide any other relevant information on procedures that you apply to control pollination of your germplasm

Box 3.2.3.A. Regeneration Environment and Procedures

RE1 – Describe the regeneration environment and conditions that you apply. If applicable, you might want to distinguish between different types of germplasm (e.g. wild relatives, landraces, modern varieties, breeding material, genetic stocks, etc.).
Consider the following aspects:

a. *In how far are the environmental conditions of the current regeneration of individual germplasm accessions comparable to the environmental conditions that existed at the original collecting or breeding site?*

Regeneration is carried out in the fields and greenhouse of METK. Most accessions are well adapted to the local natural conditions. Thus, environmental conditions are favourable for field regeneration to a majority of accessions.

b. *do you use controlled environments?*

In the greenhouse, air temperature, day length and humidity are controlled to create the most adequate conditions for growing.

c. *do you collaborate with other genebanks in Europe?*

There is no collaboration on the regeneration of accessions with the other genebanks in Europe.

d. *others.*

RE2 – Please include any other relevant points on regeneration environment.

Box 3.2.4.A. Seed Processing Procedures

SPP1 – Describe the protocol(s) that you use for threshing and seed cleaning.
Threshing and cleaning are conducted by the staff of different breeding departments using specialised machinery or manually in some cases. The quality of procedures is assessed visually. The main goal is to retain the purity of seed samples.

SPP2 – Describe the protocol(s) that you use for seed drying, including whether you use different drying procedures for different types of species.
Seeds are pre-dried in fabric bags at 18°C, 20%RH.
After cleaning, seeds are packed into paper bags and final drying is carried out in the air-tight glass jar using silica gel sachets. Depending on the species, required seed moisture content (4–8%) is achieved in four to eight weeks.

SPP3 – Please describe how you keep the time between harvesting and the actual (long-term) storage of seeds as short as possible.
The time between harvesting and final long-term storage needed to be as short as possible. Seeds are placed for drying, promptly after completing pre-drying and cleaning.

SPP4 – Please describe how and where you store (in a temporary manner) newly harvested seeds.
Please provide details on the temperature and relative humidity of the storage room/space; what type of containers do you use, if any.
Newly harvested seeds are temporarily preserved in paper bags in wooden cabinets at a temperature of about 16–18°C. Silica gel sachets are used to reduce air humidity.

SPP5 – Describe the criteria you use to decide on seed quantity per accession for the long-term storage.
In general, at least 1,500 seeds of self-pollinating and 3,000 seeds of cross-pollinating species are preserved in bulk bags and 5–10 distribution bags with 50–200 seeds per accession. If the seed amount is lower, all available seeds are packed and stored.

Box 3.2.5.A. Genetically Modified Material

GMM1 – In case you treat GMO material differently from “normal germplasm”, please provide here the details for each of the deviating procedures (and equipment).
There are no GMOs preserved by the Genebank of METK.

GMM2 – Describe the policy and procedures (if any) in your genebank, related to ensuring that distributed samples are not containing GMOs.

B. *In vitro* Culture Collections

Box 3.2.1.B. *In vitro* Culture Vessels and Sample Size

SCSS1 – Indicate if you document the initial number of explants of individual accessions when culture is initiated (from one or from more clonal donor plants).
All procedures and other relevant information are documented, including the number of plants, characteristics of the used medium and *in vitro* conditions.

SCSS2 – Please describe in general terms the type of culture vessels (as far not already done in section SC2 in Box 3.1.3.B), media and phytohormones you use as well as the procedures you follow with respect to cutting technique, callus exclusion, etc.

SCSS3 – Please indicate whether or not you use a minimum number of *in vitro* plantlets per accession.
Potato collections: a minimum of 4 plantlets per accession are preserved. In the collection of fruits and berries, up to 30–40 microplants in 3–5 vessels are preserved.

SCSS4 – Please provide details on other aspects that are important in this context.

Box 3.2.2.B. *In vitro* Culture Procedures

SPP1 – Describe the numbers of sub-clones you may cultivate per accession (assuming that this is not crop-specific).
The number of sub-clones is crop-specific.

SPP2 – Describe the sub-culture duration (if not crop-specific).
Established *in vitro* plant tissue cultures are renewed 2 to 3 times per year.

SPP3 – Describe the criteria you use to decide on *in vitro* plant quality (if not crop-specific).
In vitro cultures with visible growth abnormalities are eradicated.

3.3. Ensuring Availability

An important objective of conservation efforts is to facilitate the effective utilization of germplasm accessions by researchers, breeders and farmers. Thus, ensuring the ready availability of stored germplasm is an important principle. It refers to the ability of genebanks to supply and distribute the stored germplasm, together with any associated information, in an adequate way to users. Aspects that can affect the availability include: (a) policies, (b) seed stock, (c) health status of accessions, and (d) distribution quantity.

A. Seed Collections

Box 3.3.1.A. Ensuring Availability of Germplasm – Policy Aspects

AGP1 – Describe the germplasm distribution policy that you follow at your genebank.
You might want to consider in your response the following aspects:

a) crop/species specificity;
b) whether or not sufficient seed stock is available; who the requestor is;
c) what the purpose of the germplasm request is;
d) any restrictive conditions and/or
e) the total amount of accessions sent per request for distribution of germplasm;
f) use of a formal agreement to distribute the germplasm.

A distribution bag with 50–200 seeds per accession (depending on the seed size) is delivered upon request. All requests are processed under the terms of the SMTA of the International Treaty of PGRFA.

AGP2 – Do you have as part of your service-rendering policy aspects such as a "maximum time" between receiving a germplasm request and distribution of the germplasm?

There is no special service-rendering policy applied. Orders are fulfilled and germplasm is distributed in the shortest possible time, mostly within five working days.

AGP3 – Describe how you treat "related information" about the requested accessions that you make available to the requestor, i.e. provide details on the typical information you send out with the germplasm.

The URL link of the database is provided in the SMTA https://www.nordic-baltic-genebanks.org/ Or any information available is provided upon request.

Box 3.3.2.A. Ensuring Availability of Germplasm – Seed/Germplasm Stock Aspects

AGSS1 – Please provide details on the minimum/maximum amount of seed, plant, *in vitro* samples that you distribute (where relevant, differentiated by species groups, i.e. self-pollinating, cross-pollinating and/or whether an accession is homo- or heterogeneous).
Usually, 50–200 seeds are distributed per request. A lower number of seeds is distributed for *Pisum sativum* (50) and *Vicia faba* (30 seeds) or in case less are requested for genetic analyses. There is no differentiation by pollination type.

AGSS2 – Describe how you store the seeds/etc. of a given accession with respect to the use of single or multiple bags or containers per accession.
Seeds in single distribution bags are pre-packed and stored at -18°C in refrigerators. 5–10 distribution bags are stored per accession.

AGSS3 – Describe how you manage the availability of adequate seed/other germplasm stock per accession, including the use of an absolute lower minimum of seeds per accession as the threshold to decide to regenerate.
Accessions with lower amounts of seeds than 1,500–3,000 will be regenerated.

AGSS4 – Provide here information on any other aspects that are relevant to managing seed/other germplasm stocks.

Box 3.3.3.A. Ensuring Availability of Germplasm – Health Aspects

AGHA1 – Describe how you store seed/other germplasm with respect to germplasm health considerations, including whether you have a "policy" of storing only "disease-free" (as far as you can see or determine) accessions, at least for the quarantine pests and diseases.
No crop-specific tests are carried out. Disease and pest-free seeds are preserved.

AGHA2 – Describe how you follow plant quarantine rules and regulations when exporting germplasm abroad (especially to countries on another continent).
A phytosanitary certificate is provided on seed delivery outside EU countries.

AGHA3 – Describe if and how you distribute germplasm accompanied by a phytosanitary certificate or a "plant passport".
Instructions of the Agricultural and Food Board for germplasm distribution are followed. Upon request, a phytosanitary certificate is issued by the authorities and attached to the shipment.

AGHA4 – Provide any other relevant information on procedures that you follow with respect to germplasm health aspects.

Box 3.3.4.A. Germplasm Supply

GS1 – Describe the policy of your genebank with respect to the sample size that you use for distribution purposes, including whether you differentiate between germplasm from self- or outbreeding species, heterogeneous accessions, and possibly other aspects.
For most accessions, 100 seeds are distributed, except the crops with seeds bigger in size: *Pisum sativum*: 50 seeds, *Vicia faba*: 30 seeds.

GS2 – As GS1 above, but in case your germplasm samples do not possess the minimum viability, would you increase the number of seeds?
The number of seeds will be increased in case the seed does not possess the minimum required viability. Although no formal procedures are approved. The actual decision is made on a case-by-case basis.

GS3 – Please provide information on any other aspects related to seed supply.

B. *In vitro* Culture Collections

Box 3.3.1.B. Ensuring Availability of Germplasm – Policy Aspects

AGP1 – Describe the germplasm distribution policy that you follow at your genebank. *You might want to consider in your response the following aspects: is the user informed about the option to get provided with* in vitro *cultures and whether they are available all the time of the year, are* in vitro *samples an option or the only way to get material; who the requestor is; what the purpose of the germplasm request is; any restrictive conditions and/or the total amount of accessions sent per request for distribution of germplasm; use of a formal agreement to distribute the germplasm.*
In vitro cultures are distributed on request. Distribution for research purpose has the priority. Restrictive conditions/limitations could be applied for the distribution of germplasm to private users. SMTA is used as a formal agreement to distribute the germplasm.

AGP2 – Indicate if you have as part of your service-rendering policy aspects such as a “regular or a maximum time” between receiving a germplasm request and distribution of the germplasm?
The regular time for completing the order is not fixed because of maintenance cycle specificities. Potato *in vitro* cultures are distributed for research purposes upon mutual agreement and as a priority.

AGP3 – Describe how you treat "related information" about the requested accessions that you make available to the requestor, i.e. provide details on the typical information you send out with the germplasm.
Accession number, name, species and date acquired are provided to the requester. Potato *in vitro* cultures are also marked with meristem number.

Box 3.3.2.B. Ensuring Availability of Germplasm – Germplasm Stock Aspects

AGSS1 – Please provide details on the maximum amount of *in vitro* samples that you distribute.
The amount of *in vitro* samples distributed to orders depends on the current availability of samples and the relevant agreements.

AGSS2 – Describe how you store the samples of a given accession with respect to the use of vessels for culture and vessels for distributions (glasses of plastic bags).
Commonly the micro-plants are regenerated and distributed in glass tubes.
According to specific agreements it is also possible to request micro-plants that are planted to soil and adapted to greenhouse conditions.

AGSS3 – Describe how you manage the availability of adequate plants per accession, including the use of an absolute lowest minimum of plants per accession as the threshold to decide to regenerate.
Mostly four *in vitro* plants are maintained per sample. In case of request, new plants are regenerated from these initial plants.

AGSS4 – Provide here information on any other aspects that are relevant to manage stocks (e.g. transfer of material through greenhouse transfer phases in case a user cannot handle *in vitro* cultures).

Box 3.3.3.B. Ensuring Availability of Germplasm – Health Aspects

AGHA1 – Describe how you store germplasm with respect to germplasm health considerations, including whether you have a "policy" of storing only "disease-free" (as far as you can see or determine) accessions, at least for the quarantine pests and diseases.
A policy of storing only disease-free accessions is in force. The main attention is paid to quarantine diseases and pests.

AGHA2 – Describe how you follow plant quarantine rules and regulations when exporting germplasm abroad (especially to countries on another continent).
For the export of the requested material outside the EU, germplasm is accompanied by a phytosanitary certificate issued by the Phytosanitary authority (Plant Health Department of the Agricultural Board).

AGHA3 – Describe if and how you distribute germplasm accompanied by a phytosanitary certificate or a “plant passport”.
Instructions of the Phytosanitary authority are followed. The distributed germplasm is accompanied by a phytosanitary certificate.

AGHA4 – Provide any other relevant information on procedures that you follow with respect to germplasm health aspects.

Box 3.3.4.B. Germplasm Supply

GS1 – Describe the policy of your genebank with respect to the sample size that you use for distribution purposes.
The size of the sample depends on the demand of the requestor, but the amount of the material is negotiated on a case-by-case basis.

GS2 – Please provide details of your routine methodology of containers etc. that you use to distribute *in vitro* cultures.
Commonly, the plants are distributed in glass tubes.

GS3 – Please provide information on any other aspects related to *in vitro* plant supply.

4. Providing Information

The lack of adequate information on a given accession may well decrease the value of that accession to the user. The information on individual accessions should be as complete as possible in order to facilitate the identification of duplicates and/or to select accessions with desirable characteristics. A genebank should have a documentation system in place that allows to optimize management of the collections as well as to provide access to information about the collection to users.

Box 4.1. Genebank Documentation System

GD1 – Please provide details on the technical aspects of the genebank information management system(s) that you use.

a) On which software is the system based (i.e. Oracle, Fox Pro, MS Access, MS excel, MS Word, other?).

The data of both seed and *in vitro* collections are maintained in the data management system Nordic-Baltic Genebanks Information System GENBIS.
The database uses the international system GRIN-Global and replaces the former database system SESTO. The Nordic-Baltic Genebanks system has been active since 2021. GENBIS is curated by NordGen.

b) In case you use a manual information management system, please provide details.

c) In case your "internal" database(s) is/are different from the publicly available database(s), please provide details on both,

d) Describe which activities of the genebank are covered by the system.

Genebank data maintenance by Curator Tool, the search engine for Genebank staff; management of orders.

GD2 – Provide details on which types of data you handle in your documentation system, e.g. passport data, characterization & evaluation data, cultivar data, material distribution etc.

Passport data, inventories, taxonomic data, collecting information, seed storage (incl. safety duplication data), germination, 1,000 kernel weight, regeneration data, order wizard.

GD3 – In case your internal database(s) is/are different from the publicly available database(s), please provide details on both.

GD4 – Describe in which form you send accession-specific data (e.g. as hard copy, electronically – if the latter, please specify (in plain text) which file format, i.e. Excel, Access, others is used).

Information is sent using SMTA (hard copy). Specific information, e.g. characterization/evaluation data is provided in an Excel file upon request.

GD5 – Provide information on how technical support for development and maintenance of the documentation system is arranged
Technical support is provided by NordGen in close cooperation with USDA.

GD6 – Describe your genebank policy with respect to backing-up of the database contents, including with which frequency?
The data backup system is managed by NordGen. Information on accession and inventories is regularly backed up by local genebank specialists.

GD7 – Provide any other information on your information management system that is not covered in one of the above questions.

Box 4.2. Information Exchange

IE1 – Please describe how you make your passport data available to users (i.e. as hard copy; via the internet; other?).
Passport data are searchable and downloadable using the GENBIS Search Tool.

IE2 – Please indicate if your data is available as machine-to-machine web-services. In case it is, describe

a. what types of data (passport data, characterization & evaluation data etc) and
b. which web-service interfaces are available (i.e. GBIF IPT, BioCase, TapirLink).

IE3 – Please indicate if your data is published to EURISCO. Describe which data is published to EURISCO and at which intervals.
Passport data of all accessions are uploaded regularly to EURISCO (at least twice a year). Characterization & evaluation data are published upon new data of field trials availability. Datasets are defined by EURISCO.

IE4 – Please provide any other information on information exchange that is important for others to know.

IE5 – Describe the kind of information you distribute together with the germplasm to persons that request germplasm?
Please consider the following data types: Passport, Characterization; Evaluation, and/or Germplasm management data (e.g. viability percentage; protocols followed for routine operations; etc.
Passport data - accession number and name, botanical name and country of origin.
Available characterization and evaluation are provided upon request.
URL link to the Nordic-Baltic Genebanks Information System GENBIS.