

Centre wallon de Recherches agronomiques

Département Sciences du Vivant  
Unité 2 : Biodiversité, Amélioration des Plantes & Forêts

# Quality Manual

## Potato genebank



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## **Operational genebank manual of CRA-W – Potato Genetic resources collections**

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### **0. Date of compilation**

**Day/month/year: 30-10-2025**

### **1. Germplasm Acquisition and Accessioning**

Genebanks can obtain the germplasm they want to conserve through a number of different ways. Conducting collecting missions is possibly the best way of acquiring germplasm material in the most reliable manner but is not implemented by our Institute. 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 acquire 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 a number of 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 legal manner, are there any restrictions on its use, etc.

<b>Box 1.1. Germplasm Acquisition and Accessioning</b>

**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;*

Our genebank operates under the formal mandate established by the **Walloon Agricultural Research Centre (CRA-W)**. This mandate is essential for guiding our conservation efforts and research initiatives. We focus primarily on conserving various **potato (*Solanum tuberosum*)** germplasm material, which includes a rich diversity of old varieties, a limited number of wild relatives and breeding lines. This diversity is crucial for addressing challenges in agriculture and food security through our pre-breeding and breeding programmes.

*b) who decides on what your mandate is and, if different,*

The management team at CRA-W collaborates with various stakeholders, including governmental bodies and agricultural researchers, to determine our mandate. Their input helps shape our priorities and initiatives.

*c) from whom do you received the mandate;*

Our mandate comes directly from the **Walloon government**, which plays a significant role in supporting agricultural research and the conservation, evaluation and active use of plant genetic resources as part of its broader policy framework.

*d) the main aspects of the mandate; and*

Key aspects of our mandate include the conservation, evaluation on robustness and quality traits of genetic resources, research on improving and breeding crop varieties, virus status analysis and facilitating access to these resources for further research and breeding efforts.

*e) legal considerations on PGR as foreseen in national legislation.*

We operate within the framework of **national and regional legislations** that aligns with international agreements like the **International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)** and **Nagoya protocol**. This legal context ensures that we address the sustainable use and equitable sharing of benefits derived from our 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 genebanks fall under these agreements?*

Our genebank does not currently have formal international agreements to conserve specific germplasm on behalf of other countries or regions. However, we collaborate with various national and international research institutions and maintain working relationships that allow for the exchange of germplasm under specific conditions. This includes partnerships within Europe and occasionally with countries outside of the continent, but no formal global agreements are in place for exclusive conservation efforts.

Regarding crop focus, our genebank is primarily concerned with **potato** germplasm, in line with our accreditation by **AFSCA** (Federal Agency for the Safety of the Food Chain) for the management, introduction, and propagation of initial and propagation material for potatoes.

**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 germplasm acquisition policy of our genebank is guided by three main principles aimed at ensuring the conservation, evaluation and utilization of plant genetic resources with local potential importance, particularly for crops relevant to Belgium. Concerning potato genetic resources collection, the key components of the policy are as follows:

- 1- **Introduction, Maintenance, and Production of Virus Free (VF) Vitroplants:**  
The genebank is dedicated to the introduction, maintenance, and production of candidate vitroplants at the initial stage or propagation material aimed at supporting the seed multiplication industry for potatoes. This includes varieties that can serve as genetic donors for breeding initiatives, with an emphasis on desirable traits such as disease resistance, improved yield, and enhanced quality.
- 2- **Maintenance of Varieties from Our Selection Program:**  
Our genebank conserve Varieties that originate from our own historical and on-going selection program. While there are not many varieties originally bred in Belgium, we are committed to maintaining and developing selected varieties that meet the needs of farmers and adapt to local agricultural conditions.
- 3- **Inclusion of Widely Grown Varieties from Abroad:**  
The policy allows for the acquisition of varieties from other countries, provided they are widely cultivated in Belgium. This ensures that the genebank remains relevant to current agricultural practices and supports the needs of local farmers. The focus will be on varieties that have adapted well to the Belgian climate and agricultural systems, ensuring their potential for future cultivation.
- 4- **Inclusion of wild relatives and pre-breeding material** which possess interesting potential traits like pest & disease resistance/tolerance genes, robustness (larger capacity of adaptation to biotic and abiotic stresses, nitrogen efficiency,...), technological and agronomical interesting traits.

**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.)?

To verify the identity of the germplasm material received, we primarily rely on the donor's information. For each variety with unclear descriptions that is intended for inclusion in our collection, we send samples to an external laboratory for PCR analysis using SSR markers to confirm varietal identification. This analysis is conducted before any multiplication of the material takes place.

**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).*

a) **Correct Identification of Accessions**

Upon arrival, all incoming plant material is meticulously recorded in the "Plant Material Entry Register." This register includes essential information such as the date of entry, origin, type, quantity, and reference to accompanying documents like phytosanitary passports. Each accession is cross verified against our database to ensure correct identification. This careful documentation process is vital for tracking and managing our germplasm collections effectively.

b) **Health Assessment**

Health assessments are a critical part of our quality control process. All incoming material, particularly that from third countries, must undergo quarantine testing to detect pathogens. We utilize a preliminary screening process for common potato viruses (PLRV, PVY, PVS, PVX, PVA, and PVM). Units that pass initial tests are sent to quarantine laboratories for further testing for viruses and viroids, in accordance with established regulations (e.g., the Decree of August 10, 2005). This rigorous health evaluation procedures ensures that only healthy plant material is introduced into our collection, safeguarding against the spread of diseases.

c) **Purity Aspects**

Purity is assessed through several methods to ensure the genetic fidelity of the received samples. Each accession is visually inspected, and additional tests may be conducted to confirm genetic purity, particularly for seeds and tissue cultures. This includes verifying the morphological traits and conducting molecular analyses when necessary. For example, only one healthy clone is selected from a batch for introduction into the collection, while others are discarded, thus maintaining genetic purity and integrity.

**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).*

Basic SMTA management is in use when material is introduced our distributed from/to foreign countries. The system needs to be improved however, all documentation related to transfers of plant genetic resources is recorded in our genebank information system.

## 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,*
- b) the criteria you use for priority setting;*
- c) the actual strategy followed in sampling material from farmers' fields, from nature, etc.; and*
- d) how your germplasm acquisition policy underpins the mission.*

We are not organizing collecting missions but we are focusing on introducing varieties that may be valuable for our breeding program, along with varieties requested by farmers and plant production companies. Given that we produce microtubers and acclimatized plantlets, our germplasm collecting strategy prioritizes materials that support these production needs.

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

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## 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);*
- b) *the location(s) where you store your safety-duplicates (country; genebank);*
- c) *whether or not you are using a formal agreement with the genebank(s) that store your duplicates?*
- d) *whether the safety-duplicates are stored under conditions comparable to your own? Please provide details;*
- e) *do you maintain safety-duplicates from other genebanks at your genebank? If so, do you know any details of that material?*

Currently, we do not have safety duplication in place, but we are actively planning to establish this arrangement within the year 2026. Once implemented, the safety duplicates will be stored at another in vitro genebank located within the same research center but in a different facility and at a different geographical location. The safety duplicates will be maintained under conditions that are comparable to those of our genebank to ensure the integrity and viability of the germplasm.

At this stage, we are not maintaining safety duplicates from other genebanks.

**SD2** – Do you have a safety duplication policy? If so, please provide essential details.

Yes, on going.

#### 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).

The genebank building, constructed before 1950, was built according to the national standards of its time, making it relatively resilient against various natural disasters. The genebank collection is maintained on the second floor of the building, which eliminates any risk of flooding. Fire safety precautions are implemented through a fire protection system, and annual checks are conducted by a licensed fire installation service company.

**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).

To ensure the security of our genebank infrastructure against potential threats like burglaries and fires, we have implemented several key measures. A concierge is on duty daily after staff have left, conducting thorough checks of the building to ensure everything is secure and to report any irregularities. Additionally, smoke detectors are strategically installed throughout the facility to provide early warnings in case of a fire, enabling a swift response and minimizing risks to both personnel and the collections.

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

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### **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.

We have an industrial engineer on-site who supervises the compressors and the cold chamber. In the event of any issues, he is responsible for addressing them promptly. For more significant problems that require specialized expertise, we engage professional companies that are equipped to handle complex repairs and maintenance.

**SE2** – Describe how you monitor temperature and relative humidity in your cold stores and drying room.

We monitor the temperature and relative humidity in our cold storage room using a controlled system. If there are any issues or deviations from the set parameters, we receive an alert to address the problem promptly.

#### **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.*

The management of the genebank is financed through a budget provided by the CRA-W (Walloon Agricultural Research Center). As a formal regional public institution, the center benefits from a consistent and regular flow of funds, which ensures the operational stability of the genebank.

**IPS2** – Describe how you secure adequate staffing of your genebank.

Part of our staff has permanent work contract

#### **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.

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**CP2** – Provide information on the kind of training, security drills and other activities that your genebank gives to its staff to deal with emergency situations, if any.

Our genebank does not have a dedicated emergency team specifically within the genebank itself. However, there is a team available throughout the entire building, trained to handle emergency situations. This team participates in regular security drills, training sessions, and other activities aimed at ensuring preparedness in the event of an emergency.

These activities cover a range of scenarios, from fire safety to first aid, and are regularly updated to ensure staff are equipped with the necessary skills and knowledge to respond effectively.

### 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. Given the fact we are covering seed, *in vitro* cultures and entire plants it might well be that not all aspects are covered by one and the same genebank. In those cases it is suggested that only the applicable sections are completed. Accordingly, at the beginning of each section of this chapter you will find a “navigation box” that will help you as user of the template to complete the correct section(s).

#### 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.

##### Navigation Box on Maintaining Viability section

**Seed** – If applicable, please complete the section on Maintaining Viability for the activities related to seed genebanks (i.e. boxes 3.1.1.A – 3.1.3.A)

***In vitro* cultures** – If applicable, please complete the section on Maintaining Viability for the activities related to *in vitro* culture (i.e. boxes 3.1.1.B – 3.1.3.B)

**Cryopreservation** – If applicable, please complete the section on Maintaining Viability for the activities related to cryopreserved collections (i.e. boxes 3.1.1.C – 3.1.3.C)

**Field genebanks** – If applicable, please complete the section on Maintaining Viability for the activities related to field genebanks (i.e. boxes 3.1.1.D – 3.1.3.D)

##### A. Seed Collections **NOT APPLICABLE** for *in vitro* clonal propagated crop like potato

###### 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.).

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

**IV3** – Please provide any other information on procedures that you follow to ensure 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.*

**VM2** – Please describe the information “system” that you might have in place that allows you to make more species- or even accession-specific decisions regarding when the next monitoring should take place.

**VM3** – Please provide information on non-specific thresholds that you might use for viability of seeds (i.e. percentage of germination) and for the amount of seeds left of an accession to initiate regeneration. *In case you differentiate between self- and outbreeding species, please answer for each category separately.*

### **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.

**SC2** – Provide details on the type of containers and the packaging procedures (and the corresponding equipment, if any) that you use.

**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?

**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.

**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).

## **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).

To reduce, as far as possible, the risk of infections during the *in vitro* culture initiation phase, the potato tubers are brought from the storage room, with controlled RH and temperature, to the laboratory where they are washed and left to generate germ. No other methods to prevent infection, or disinfection of mother plants, are used.

**IV2** – Describe procedures of explant isolation (organ source in the plant, manipulations) and sterilization (chemical and handling) of the explants.

Initially, the germ nodes are detached from tubers and thoroughly washed to remove dirt. They are then cut at the internode level and sprayed with 80% ethanol for disinfection. Following this, the explants are treated with a sodium hypochlorite solution (15°) for 3 to 8 minutes, based on their size and fragility. Afterward, they undergo rinsing in three successive baths of sterile water to eliminate bleach residues. Finally, the explants are placed on sterile paper to dry and then transferred into culture tubes containing growth medium. Throughout this process, sterile techniques are employed to maintain a contamination-free environment, typically **under a laminar flow hood**.

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

As source for explants only healthy material is used.

### 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.*

Infections are relatively rare during both the initiation and late stages. Observations are conducted daily during the initiation phase, and weekly or monthly during the multiplication and conservation phases, respectively.

**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 regarding when the next monitoring should take place.

There is not a dedicated system in place. The protocol simply involves regularly checking the plantlets and recording data in an Excel file.

**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.

The morphological appearance, leaf size, shoot diameter and length, number of shoots, and the ability to regenerate minitubers are key indicators of how a variety responds to a specific culture medium.

Other factors, such as the presence or absence of necrotic leaves or signs of senescence in minitubers, can also impact the multiplication rate and regeneration capacity during subcultures. These observations help guide adjustments to optimize *in vitro* cultures

### 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 the growing room culture vessels are maintained at 20 – 22°C, with a photoperiod of 16 hours, in white fluorescent light, of about 1600 lux.

The air humidity is not controlled.

**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.

For the conservation phase a small glass tube with diameters of 2 cm are used.  
For the multiplication phase a pre-sterilized plastic cultivation vessel from the food industry are used.

**SC3** – Please include any other aspects regarding *in vitro* culture and storage conditions at your genebank that you regard as important.

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### C. Cryopreserved Collections NOT yet Applicable but in reflexion

#### Box 3.1.1.C. Initial viability

**IV1** – Describe the procedures or practices that you have in place to ensure the highest possible initial viability of your cryopreservation explant (source: *in vitro* pre-culture or directly from *in situ* explants), sterilization and explant isolation.

**IV2** – Please provide any other information on procedures that you follow to ensure highest possible initial viability (e.g. elimination of virus diseases).

#### Box 3.1.2.C. Viability Monitoring

**VM1** – Please indicate whether (and if so when and how) you perform random viability tests after the initial viability test [see also VM3 below].

**VM2** – Please describe the information “system” that you might have in place that allows you to make more species- or even accession-specific decisions.

**VM3** – Indicate for the initial regeneration control:

- a. what is the percentage of regenerated control explants relative to the total number of explants per accession;
- b. any thresholds that you use [e.g. discard the material as not storable below a certain regeneration rate of the control];
- c. whether you apply different procedures for accessions with erratic regeneration rates of the control [e.g. increase the amount of explants stored]; and
- d. what is the threshold number of remaining explants of a given accession under which you initiate regeneration for multiplication.

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

**SC1** – Please provide information on the general system used for cryopreservation (liquid nitrogen or vapour phase, automatic tank filling or filling by hand). In case they vary from tank to tank, please provide details for each.

**SC2** – Provide details on the type of cryopreservation tanks and storage system within the tank that you use.

**SC3** – Do you treat different species differently?

**SC4** – Please include any other aspects regarding storage conditions at your genebank that you regard as important.

## D. Field Genebank Collections **NOT APPLICABLE in this case**

### **Box 3.1.1.D. Initial viability**

**IV1** – Describe the procedures or practices that you have in place to ensure the highest possible quality of your planting material, in particular during the growing from donor plants (e.g. cultivation practices in the field or greenhouse], phytosanitary pre-treatments, etc.).

**IV2** – Describe any particular procedures you use (e.g. which organ of the donor plant you use to reproduce the planting material).

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

### **Box 3.1.2.D. Viability Monitoring**

**VM1** - Describe the routine field genebank monitoring system that you use.  
*The monitoring system could include the following aspects: regular control of disease or pest contamination, other types of damages to the plants, etc.*

**VM2** – Describe the information “system” that you might have in place that allows you to make more species- or even accession-specific decisions regarding when the next monitoring should take place.

**VM3** – Please provide information on non-specific thresholds that you might use for the quality of the individual plants (e.g. loss by weak growth) and for the amount of plants of an accession left in the field before additional initiating multiplication measures.

### **Box 3.1.3.D. Maintenance Conditions**

**SC1** – Please provide details on your cultural practices (e.g. cultivation practices; pruning; irrigation; protection against animals, etc.; pest and disease management; etc. applied to your field genebank material).

**SC2** – In the case of annual or sub-perennial species that cannot over-winter in the field genebank, what measures do you take?

**SC3** – Please include any other aspects regarding field genebank maintenance conditions at your genebank that you regard as important.

### 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 material gets more widely distributed and as it might have specific (legal, technical, administrative) requirements, a separate box on 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.

#### Navigation Box on Maintaining Genetic Integrity section

**Seed** – If applicable, please complete the section on Genetic Integrity for the activities related to seed genebanks (i.e. boxes 3.2.1.A – 3.2.5.A)

***In vitro* cultures** – If applicable, please complete the section on Genetic Integrity for the activities related to *in vitro* culture (i.e. boxes 3.2.1.B – 3.2.3.B)

**Cryopreservation** – If applicable, please complete the section on Genetic Integrity for the activities related to cryopreserved collections (i.e. boxes 3.2.1.C – 3.2.3.C)

**Field genebanks** – If applicable, please complete the section on Genetic Integrity for the activities related to field genebanks (i.e. boxes 3.2.1.D – 3.2.3.D)

## A. Seed Collections Not Applicable

### 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)?

**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.

**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.

**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 insect-pollinated 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.*

**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?*
- b) *do you use controlled environments?*
- c) *do you collaborate with 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.

**SPP2** – Describe the protocol(s) that you use for seed drying, including whether you use different drying procedures for different types of species.

**SPP3** – Please describe how you keep the time between harvesting and the actual (long-term) storage of seeds as short as possible.

**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.*

**SPP5** – Describe the criteria you use to decide on seed quantity per accession for the long-term storage.

### 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).

**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). Usually, two potato tubers are selected as a genetic source for the explant

The initial number of explants is documented for each accession. Typically, two potato tubers are selected as the genetic source for the explants, and multiple sprout are collected from each tuber to initiate the culture.

**SCSS2** – Please describe in general terms the type of culture vessels (as far as 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.

The culture vessels used in this procedure include **test tubes** and **culture jars**. The test tubes are typically filled with 15-25 mL of culture medium, depending on their size.

The culture vessels used are culture tubes, with the culture medium distributed depending on the tube size (15 to 25 mL). The culture medium is prepared using Murashige and Skoog (MS), which includes the essential micro and macro elements for plant growth, along with vitamins such as glycine, myo-inositol, nicotinic acid, pyridoxine HCl, and thiamine HCl. Sucrose is added at 100 g per 5 liters of medium, and agar is used as a gelling agent at 30 g per 5 liters. The pH is adjusted to 5.9 using diluted KOH or HNO<sub>3</sub>.

For explant preparation, the shoots are carefully detached from the tubers, sterilized using alcohol and bleach, and then cut at the internode level. They are immersed in successive sterile water baths to remove any residual disinfectant. After sterilization, the explants are placed in culture tubes containing the prepared MS medium. All steps are carried out in sterile conditions under a laminar flow hood to prevent contamination.

In terms of procedures, explants are cut at the internode level, and sterile shoots are placed into the culture tubes. The cultures are maintained under a light cycle of 16 hours light and 8 hours darkness at a temperature of 21°C, with light intensity ranging from 3,000 to 6,000 lux. The regeneration of a plantlet with 4 to 5 nodes typically takes around 4 weeks.

**SCSS3** – Please indicate whether or not you use a minimum number of *in vitro* plantlets per accession.

Typically, during the multiplication and conservation phases, we use 8 plantlets: 6 new and 2 old. This ensures that if any infection occurs on the new plantlets, we have a backup with two plantlets stored in tubes.

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

n.a

#### **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).

For each accession, we cultivate 6 new plantlets and 2 old plantlets permanently. For microtuber induction, we use 2 per accession.

**SPP2** – Describe the sub-culture duration (if not crop-specific).

From 4 to 6 weeks.

**SPP3** – Describe the criteria you use to decide on *in vitro* plant quality (if not crop-specific).

No bacteria/fungi/callus formation, healthy looking

#### **Box 3.2.3.B. 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).

We do not stock GMO material

### **C. Cryopreserved Collections NOT APPLICABLE**

#### **Box 3.2.1.C. Cryopreservation Containers and Sample Size**

**SCSS1** – Indicate if you document the initial number of explants of individual accessions.

**SCSS2** – Please describe what kind of cryopreservation vessels (and equipment) you use (only if they differ from the corresponding answers in previous boxes), the procedure you follow with respect to separate material containing viruses or bacteria from healthy material.

**SCSS3** – What is the number of explants that you use as the minimum threshold per accession?

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

#### **Box 3.2.2.C. Cryopreservation Procedures (as long as not crop-specific)**

**SPP1** – Describe the protocol(s) that you use for preculture and pretreatment such as cold acclimation and dehydration.

**SPP2** – Describe the protocol(s) that you use for cryopreservation proper (such as slow freezing, droplet freezing, vitrification, encapsulation, etc.).

**SPP3** – Describe the protocols that you use for regeneration (slow or fast rewarming, washing, dark periods, etc.).

**SPP4** – Describe the time span and method(s) of survival and regeneration controls.

**SPP5** – Describe the criteria you use to decide on explant quantity per accession for the long-term storage.

#### **Box 3.2.3.C. 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).

#### **D. Field Genebank Collections** NOT APPLICABLE

##### **Box 3.2.1.D. Accession Sample Size**

**SCSS1** – Indicate if you document the initial number of plants of individual accessions (either as received from collecting missions or through exchange).

**SCSS2** – Please describe what kind of procedures you follow, if any, with respect to sub-sampling and subsequent place/container/etc. of maintenance.

**SCSS3** – What is the number of plants that you use as the minimum threshold per accession? Are these plant numbers of a given accession based on genetic parameters (such as reproduction biology; heterogeneous samples)?

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

#### **Box 3.2.2.D. Multiplication**

**PC1** – Please describe the multiplication procedures that you follow for your field genebank material (both annual and perennial species)

*Please include in your description the following aspects if they would apply to your field genebank management procedures):*

- a. *any control measures to minimize or avoid cross-pollination between accessions (if applicable/relevant);*
- b. *the use of pollination cages for insect-pollinated species;*
- c. *the use of specific pollinators for insect-pollinated 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.).*

**PC2** – Provide any other relevant information on procedures that you apply to control pollination of your germplasm in case of harvesting planting material from your field genebank material.

#### **Box 3.2.3.D. Planting Material Processing Procedures**

**SPP1** – Describe the protocol(s) that you use for threshing and seed cleaning, if used as an intermediate step for the management/multiplication of your field genebank accessions.

**SPP2** – Please describe how and where you store (in a temporary manner) newly harvested planting material.

*Please provide details on the temperature and relative humidity of the storage room/space; what type of containers you use, if any, etc.*

**SPP3** – Describe the criteria you use to decide on the number of plants per accession intended for the long-term conservation.

### 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 quantité.

#### Navigation Box on Ensuring Availability

**Seed** – If applicable, please complete the section on Ensuring Availability for the activities related to seed genebanks (i.e. boxes 3.3.1.A – 3.3.4.A)

***In vitro* cultures** – If applicable, please complete the section on Ensuring Availability for the activities related to *in vitro* culture (i.e. boxes 3.3.1.B – 3.3.4.B)

**Cryopreservation** – If applicable, please complete the section on Ensuring Availability for the activities related to cryopreserved collections (i.e. boxes 3.3.1.C – 3.3.4.C)

**Field genebanks** – If applicable, please complete the section on Ensuring Availability for the activities related to field genebanks (i.e. boxes 3.3.1.D – 3.3.4.D)

#### A. Seed Collections [Not applicable](#)

##### 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.*

**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?

**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.

#### **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).

**AGSS2** – Describe how you store the seeds/other germplasm of a given accession with respect to the use of single or multiple bags or containers 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.

**AGSS4** – Provide here information on any other aspects that are relevant to manage 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.

**AGHA2** – Describe how you follow plant quarantine rules and regulations when exporting germplasm abroad (especially to countries at another continent).

**AGHA3** – Describe if and how you distribute germplasm accompanied by a phytosanitary certificate or a “plant passport”.

**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.

**GS2** – As GS1 above, but in case your germplasm samples do not possess the minimum viability, would you increase the number of seeds?

**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.*

We distribute either plantlets, microtubers, or acclimatized plantlets. Currently, we do use the SMTA (Standard Material Transfer Agreement) only with exchange of material with foreign countries. We generate Plant Passport labels attached to the material which are monitored and delivery certificates to monitor the distribution of 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.

There is no fixed time period between receiving a germplasm request and distribution. The timeline may vary depending on factors such as availability, health testing, and other logistical considerations.

**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.

We provide the following typical information: accession name, accession number, number of *in vitro* lines/plantlets, and country of origin. Other information is provided upon request from the curator.

### **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.

There is no fixed limit, but each year we distribute around 25,000 *in vitro* plantlets as sources of high quality propagation material delivered to Belgian SME private companies.

**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 or plastic bags).

Depending on the number of *in vitro* plantlets, we use either glass tubes or 250 ml plastic cultivation vessels from the food industry

**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.

Generally, 8

**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).

n.a

### **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.

In vitro material is internally tested for six viruses (PLRV, PVA, PVM, PVS, PVX, and PVY). If any viruses are detected, they are eliminated through heat treatment. Quarantine diseases are tested by external official authorities. These tests are carried out before the introduction of material into the collection, as well as after in vitro establishment and before distribution or transfer to greenhouses or fields.

**AGHA2** – Describe how you follow plant quarantine rules and regulations when exporting germplasm abroad (especially to countries at another continent).

Within the EU, we provide plant passports. For exports outside the EU, we ensure the provision of a phytosanitary certificate, along with valid health tests and, in most cases, import permits are required.

**AGHA3** – Describe if and how you distribute germplasm accompanied by a phytosanitary certificate or a “plant passport”.

See AGHA2 and AGP1

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

n.a

#### **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.

It depends on the number requested

**GS2** – Please provide details of your routine methodology of containers etc. that you use to distribute *in vitro* cultures.

Glass tube/ pre-sterilized plastic cultivation vessels from the food industry

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

n.a

#### **C. Cryopreserved Collections NOT APPLICABLE**

### **Box 3.3.1.C. Ensuring Availability of Germplasm – Policy Aspects**

**AGP1** – Describe the germplasm distribution policy that you follow at your genebank. *Cryopreserved material is for distribution in exclusive cases only – e.g. for special research, please describe your policy; 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.*

**AGP2** – Indicate if you have as part of your service-rendering policy aspects such as a “regular or maximum time” between receiving a germplasm request and distribution of the germplasm.

**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.

### **Box 3.3.2.C. Ensuring Availability of Germplasm – Germplasm Stock Aspects**

**AGSS1** - Please provide details on samples that you distribute (where relevant).

**AGSS2** – Describe how you store, for distribution, the cryopreserved material of a given accession with respect to the use of special equipment such as dry-shippers etc.

**AGSS3** – Describe how you manage the availability of adequate cryopreserved material.

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

### **Box 3.3.3.C. 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. You could also add data on separation of differently infested material in separate cryotanks, etc.

**AGHA2** – Describe how you follow plant quarantine rules and regulations when exporting germplasm abroad (especially to countries at another continent).

**AGHA3** – Describe if and how you distribute germplasm accompanied by a phytosanitary certificate or a “plant passport”.

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

#### **Box 3.3.4.C. Germplasm Supply**

**GS1** – Describe the policy of your genebank with respect to the sample size that you use for distribution purposes.

**GS2** – Please provide details of your routine methodology of containers etc. that you use to distribute cryopreserved material.

**GS3** – Please provide information on any other aspects related to cryopreserved material supply.

#### **D. Field Genebank Collections NOT APPLICABLE**

#### **Box 3.3.1.D. 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: crop/species specificity; whether or not sufficient seed stock is available; 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.*

**AGP2** – Indicate if 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.

**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.

#### **Box 3.3.2.D. Ensuring Availability of Germplasm – Seed/Germplasm Stock Aspects**

**AGSS1** - Please provide details on the minimum/maximum amount of plants or organs (cuttings, bulbs, tubers, etc.) per plant that you distribute per accession (where relevant, differentiated by species groups, i.e. annual or perennial; woody or herbaceous; other) and/or whether an accession is clonally or sexually propagated).

**AGSS2** – Describe how you manage the availability of adequate organs per accession, including the use of an absolute lower minimum of plants per accession as the threshold to decide to multiply.

**AGSS3** – Provide here information on any other aspects that are relevant to manage plant material stocks.

#### **Box 3.3.3.D. Ensuring Availability of Germplasm – Health Aspects**

**AGHA1** – Describe how you maintain field genebank (and any intermediate storage step) accessions with respect to health considerations, including whether you have a “policy” on accepting/planting only “disease-free” planting material (as far as you can see or determine) accessions, at least for the quarantine pests and diseases.

**AGHA2** – Describe how you follow plant quarantine rules and regulations when exporting germplasm abroad (especially to countries at another continent).

**AGHA3** – Describe if and how you distribute germplasm accompanied by a phytosanitary certificate or a “plant passport”.

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

#### **Box 3.3.4.D. 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 annual or perennial species, clonally or sexually propagated accessions, and possibly other aspects.

**GS2** – Please provide information on any other aspects related to seed 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?).
- 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.

We primarily use MS Excel to manage our internal information, supplemented by notebooks where we manually record all details related to each accession, including entries, exits, and all operations performed. This allows us to track each accession in a comprehensive and detailed manner. Our internal system relies on Excel for daily operations tracking, and we currently do not have a separate public database. All genebank activities, including accession management, are covered by this system, ensuring accurate and thorough monitoring.

**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, botanical determination, handling of botanical names (taxonomy), in vitro storage data, health status, true to type validation tests realized,, etc

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

We currently do not have a separate publicly available database. Our internal work database is managed using MS Excel, where we track all accession details and operations.

**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).

With short excerpt of passport data; if requested and available additional data can be provided as Excel file

**GD5** – Provide information on how technical support for development and maintenance of the documentation system is arranged.

The laboratory technician also handles technical issues related to the documentation system. If the problem cannot be resolved internally, we contact the IT team for further support

**GD6** – Describe your genebank policy with respect to backing-up of the database contents, including with which frequency.

Automatic permanent and short period back-up system

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

n.a

#### **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?).

We make our passport data available to users in hard copy format.

**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).

NO

**IE3** – Please indicate if your data is published to EURISCO. Describe which data is published to EURISCO and at which intervals.

NO – not yet.

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

n.a

**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.*

Accession number

Botanical name

Country of origin

Life form