Cost action FA1003 - GRAPENET

East-West Collaboration for Grapevine Diversity Exploration and Mobilization of Adaptive Traits for Breeding

THREE PROTOCOLS FOR GERMPLASM SUSTAINABLE CONSERVATION

Edited by Milos Faltus and Osvaldo Failla

Phytosanitary rules for grapevine (*Vitis vinifera* L.) propagation material introduction into EU for germplasm conservation and scientific purposes

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Field genebank standards for grapevines (*Vitis vinifera* L.)

and

Vitis spp. operational field genebank collections manual

BY

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PHYTOSANITARY RULES FOR GRAPEVINE (*Vitis vinifera* L.) PROPAGATION MATERIAL INTRODUCTION INTO EU FOR GERMPLASM CONSERVATION AND SCIENTIFIC PURPOSES

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Foreword

The main purpose of the present proposal is to simplify and make more consistent the regulation for grapevine (*Vitis vinifera* L.) propagation material introduction into EU for germplasm conservation, scientific purposes and breeding.

Germplasm collections should be considered with a particular attention by the phytosanitary regulations. They represent a precious source of genetic resources. Not rarely a cultivar is maintained just in one collection.

A sustainable strategy for germplasm conservation, evaluation and utilization should include firstly a wider application of diagnostic tools and disease control in the germplasm repositories. Moreover the germplasm mobilization does represent a real opportunity to reduce the risk of loosing biodiversity.

In this context the present specific protocol intend to regulate the germplasm circulation among institutions holding germplasm collections, including specific quarantine procedure management.

The present protocol is based on the FAO/IBPGR Technical Guidelines for the Safe Movement of Grapevine Germplasm (1991) taking however into account that the guideline does not include the most recent knowledge and methods currently available and used. Moreover it should be noted that:

- the Technical guidelines are very complicated, not applicable for practical and fast plant material introduction into EU because the evaluation and therapy of infected material are rather difficult, time consuming and expensive; moreover the effect of the thermotherapy may be critical on the phenotypic trueness to type and stability;
- more than one pesticide recommended by the Technical guidelines is not yet allowed;
- the therapy procedures should be used just in case of a very unique material.

Reference regulation of plant introduction into EU

The present protocol acknowledges that:

- transfer of plant material into EU is regulated by Directive 2000/29/EC;
- introduction of the grapevine plant material into EU is prohibited with exception of the material transfer for scientific purposes and breeding;
- the conditions under which plants, and plant products may be introduced into or moved within the Community for trial or scientific purposes and for work on varietal selections is regulated by Commission Directive 2008/61/EC of 17 June 2008.

Protocol for safe introduction into EU of grapevine propagation material for germplasm conservation, scientific purposes and breeding

The present protocol refers only to dormant woody cuttings.

The plant material transferred into EU should be free from EU quarantine organisms.

Mother plants evaluation in the country of origin have to be based on:

- visual assessment of disease symptoms;
- ELISA specific tests;
- PCR-based diagnostic tools – EU approved and/or available methods for pathogen detection and identification.

Based on the negative test results in detection of quarantine organisms, the plant material will be subjected to the procedure for the introduction of plant material into the EU, in accordance with in force regulations.

PROCEDURE OF THE PLANT MATERIAL INTRODUCTION INTO EU

Prerequisites before application for material introduction approval

- Approved quarantine conditions in relation to qualifications of the personnel, quarantine containment conditions of the location and facilities.

Progressive steps of the approval of plant material introduction – duties for National Plant Protection Organization of Importer Member State (IMS) or Exporter Third Country (ETC)

1. Application for introduction of plant material (IMS);

2. Approval of the planned activities concerned (IMS). The nature and objectives of the activities for which the material is to be introduced or moved shall have been examined by the responsible official body of importing Country and found to comply with the concept of trial or scientific purposes and or work on varietal selections provided for under Directive 2008/61/EC.
3. Approval of post-entry quarantine station (IMS). Quarantine site and personal should be approved by official body.
4. Field and laboratory controls on propagating materials and related mother plants (ETC);
5. Approval letter of authority for introduction of plants for trial or scientific purposes and for work on varietal selections (IMS). The responsible official body shall limit the quantity of material to an amount that is adequate for the approved activities and in any case the amount shall not exceed quantities which have been determined having regard to available quarantine containment facilities. The import permit shall be released on the basis of the approval of the activities, and on the assurance that quarantine containment conditions shall be applied during movement and detection of the material.
6. Export phytosanitary certificate (PC) issue (ETC). The PC shall indicate an additional declaration stating that "*the consignment complies with Directive 2008/61/EC*".
7. Phytosanitary inspection at the Border Inspection Point and introduction in UE, to post-entry quarantine approved station (IMS).

Specific procedures for dormant cuttings introduction

A. Pre-shipping controls

1. Field controls on mother plants at the place of origin, in appropriate timing.
2. Selection (exclusion of all symptomatic vines).
3. ELISA/PCR tests for grapevine known harmful pathogens. Analysis results should be indicated in additional statement in phytosanitary certificate.
4. Collecting woody canes.
5. Dipping in appropriate insecticide and fungicide.
6. Deliver of appropriate Phytosanitary Certificate (specific additional declaration) for each consignment.

B. Entry controls

7. Entry controls performed in approved Border Inspection Point (BIP).

C. Post-entry controls

8. Arrival in approved “Post Entry Quarantine Station”, under official control by National Plant Protection Organization (NPPO).
9. Further accurate Visual Testing (insects, mites, epiphytic bacteria and fungi);
10. Detecting, isolation and identification of epiphytic bacteria and fungi (e.g. Biolog).
11. ELISA or RT-PCR/PCR (for relevant grapevine harmful viruses and phytoplasmas).
12. Grafting on appropriate rootstock, if needed.
13. Production of rooted plants, if needed .
14. Field planting in guarded conditions including evaluation of vector’s presence.
15. Monitoring during experimental or conservation activity.

D. Additional remarks

It has to be underlined that the release of any imported propagating material for circulation and trade purposes should provide further and closer investigation about sanitary status of the materials that have to include:

16. deep sequencing (Next Generation Sequencing and BLAST) to detect any known harmful organism (HOs);
17. Pest Risk Analysis for EU, per each HO. Only for potentially HOs for EU should be provide adequate restrictions or phytosanitary measures.

ANNEXES

Tests for presence of selected pathogens by ELISA or PCR-based methods by official laboratories.

- Irrespective of the country of origin of the plant material, the testing shall use appropriate laboratory methods and, where appropriate, indicator plants for the detection of at least the following harmful organisms:
    a) Blueberry leaf mottle virus.
    b) Grapevine Flavescence dorée MLO and other grapevine yellows.
    c) Peach rosette mosaic virus.
    d) Tobacco ringspot virus.

e) Tomato ringspot virus (strain ‘yellow vein’ and other strains).
f) *Xylella fastidiosa (Well & Raju)*.
g) *Xylophilus ampelinus (Panagopoulos) Willems et al.*
h) Ajinashika disease (for ETC where the disease is known to be present).
i) Grapevine stunt (for ETC where the disease is known to be present).
j) Summer mottle (for ETC where the disease is known to be present).

- Some other pathogens do not belong to the quarantine organisms but they can negatively influence the evaluation of phenotypic traits:
  a) Grapevine fanleaf virus (GFLV).
  b) Arabis mosaic virus (ArMV).
  c) Grapevine leafroll associated virus 1 (GLRaV1).
  d) Grapevine leafroll associated virus 3 (GRLaV3).
  e) Grapevine fleck virus (GFkV).

FIELD GENEBANK STANDARDS FOR GRAPEVINES (*Vitis vinifera* L.)

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INTRODUCTION

The present document is based on "Genebank Standards for Plant Genetic Resources for Food and Agriculture" (FAO, 2014).

It represents a concise, simplified, and species-specific version of the Genebank Standards shaped for the field grapevine (*Vitis vinifera* L.) repository, to be voluntary standards in particular for institutions involved in the European *Vitis* Database (Maul *et al.* 2012).

The document is a joint output of the *Vitis* Working Group of the European Cooperative Programme for Plant Genetic Resources (ECPGR) and the Cost Action FA1003 "GRAPENET - East-West Collaboration for Grapevine Diversity Exploration and Mobilization of Adaptive Traits for Breeding".

1. STANDARDS FOR CHOICE OF LOCATION OF THE FIELD GENEBANK

1.1 The agro-ecological conditions (climate, soil) of the field genebank site should be as similar as possible to the environment where the collected plant materials were normally grown to assure the proper phenotypic expression in relation to optimal growth vs. yield balance and possibly suitable for maturation of late harvesting varieties. Risks of frost damage and water stress have to be considered too.

1.2 The site of the field genebank should be located so as to minimize risks from natural and manmade disasters and hazards.

1.3 The site of the field genebank should have a secured land tenure and should be large enough to allow for future expansion of the collection.

1.4 The site of the field genebank should be easily accessible to staff and supplies deliveries and have ideally adequate facilities for ampelographical data collection, routine chemical analyses, microvinification, propagation and quarantine.

2. STANDARDS FOR ACQUISITION OF GERMPLASM

2.1 All germplasm accessions added to the genebank should be legally acquired, with relevant technical documentation.

2.2 All material should be accompanied by at least a minimum of associated data as detailed in the FAO/IPGRI multi-crop passport descriptors.

2.3 Propagating material should be collected from healthy growing plants whenever possible, and at an adequate maturity stage to be suitable for propagation.

2.4 The period between collecting, shipping and processing and then transferring to the field genebank should be as short as possible to prevent loss and deterioration of the material.

2.5 When needed (i.e., it is not needed within the EU), samples acquired from other countries should pass through the relevant quarantine process and meet the associated requirements before being incorporated into the field collection.

3. STANDARDS FOR ESTABLISHMENT OF FIELD COLLECTIONS

3.1 The FAO Institute Code of the reference institute for the site where the accessions are maintained have to be requested and obtained.

3.2 A sufficient number of plants should be maintained to ensure the safety of the accession. The minimum number of plants per accession should be four, and in case of new introductions, at least five.

3.3 If requested, the same rootstock should be used in each collection and it should be the most suitable for the given soil conditions, as well as of the highest sanitary standard i.e., certified virus-free following the national regulation or, if not existing, at least the EU ruling (DIRECTIVE 2005/43/CE).

3.4 Reference varieties useful for comparative purposes should be included. To select the reference varieties take into consideration that eleven of the most widespread varieties in grapevine collections are the following: *Auxerois, Cabernet Sauvignon, Chardonnay blanc, Chasselas blanc, Malbec/Cot, Muscat a Petits Grains blancs, Pinot noir, Riesling weiss, Rkatsiteli, Saperavi* and *Sultanina*. Moreover a number of reference varieties is reported in the OIV list of descriptors adopted for the characterization purposes (see point 6). Among the others, the following varieties are the most referred: *Alphonse Lavallee, Barbera, Bicane, Cabernet Franc, Cabernet Sauvignon, Carignan, Chardonnay, Chasselas Blanc, Chenin Blanc, Clairette Blanche, Faberrebe, Gamay Noir, Garganega, Garnacha Tinta, Melon, Merlot, Müller Thurgau, Muscat a Petits Grains blancs , Muscat of Alexandria, Petit Verdot, Pinot Meunier , Pinot Noir, Riesling Weiss, Rkatziteli, Sauvignon* and *Trebbiano Toscano*.

3.5 A field genebank should have a clear map showing the exact location of each accession in the plot.

3.6 The appropriate planting design should be adopted taking into account:

- training system: Guyot cane-pruned with spurs and single or double cordon systems are recommended;
- plant distances: it should be sufficiently large to allow a good light availability to each plant and to favor a good vegetative vs. yielding equilibrium. 0.8-1.0 m between vines x 2.0 m between rows as minimum are recommended.

4. STANDARDS FOR FIELD MANAGEMENT

4.1 Plants and soil should be regularly monitored for pests and diseases.

4.2 Appropriate cultivation practices such as pruning, canopy management, fertilization, irrigation, and weeding should be performed to ensure satisfactory plant growth and yield.

5. STANDARDS FOR REGENERATION AND PROPAGATION

5.1 Each accession in the field collection should be regenerated when the vigor and/or plant numbers (three or less) have declined to critical levels in order to bring them to original.

5.2 True-to-type ideally healthy plant material should be used for propagation.

5.3 Information regarding plant regeneration cycles and procedures including the date, authenticity of accessions, labels and location maps should be properly documented and included in the genebank information system.

6. STANDARDS FOR CHARACTERIZATION AND IDENTIFICATION

6.1 All accessions should be characterized. Characterization will allow true-to-type identification.

6.2 For each accession, a representative number of plants should be used for characterization.

6.3 Accessions should be characterized:

- morphologically using internationally used descriptor lists (a minimum of the 48 OIV descriptors) available on the European *Vitis* Database (EVDB);
- by molecular markers using at least the nine SSR-markers (VVS2, VVMD5, VVMD7, VVMD25, VVMD27, VVMD28, VVMD32, VrZAG62, VrZAG79) following the details available on the EVDB.

6.4 Characterization is based on recording formats as provided by EVDB. Data have to be properly uploaded in EVDB.

7. STANDARDS FOR EVALUATION

7.1 Evaluation data on field genebank accessions should be obtained for traits of interest and in accordance with internationally used descriptor lists where available.

7.2 The methods/protocols, formats and measurements for evaluation should be properly documented with citations. Data storage standards should be used to guide data collection.

7.3 Evaluation trials should be replicated (in time and if possible in location) as appropriate and based on a sound statistical design.

8. STANDARDS FOR DOCUMENTATION

8.1 Passport data for all accessions should be documented using the FAO/IPGRI multi-crop passport descriptors. Data should be stored and changes updated in the EVDB. In addition accession information should also include general list, map and plot location, regeneration, characterization, evaluation, orders, distribution data and user feedback.

8.2 Field management processes and cultural practices should be recorded and documented.

9. STANDARDS FOR DISTRIBUTION

9.1 All germplasm should be distributed in compliance with national laws and relevant international treaties and conventions.

9.2 All samples should be accompanied by all relevant documents required by the donor and the recipient country.

9.3 Associated information should accompany any germplasm being distributed. The minimum information should include an itemized list, with accession identification, number and/or weights of samples, and key passport data.

10. STANDARDS FOR SECURITY AND SAFETY DUPLICATION

10.1 A genebank should employ the requisite staff to fulfill all routine responsibilities to ensure that the genebank can acquire, conserve and distribute germplasm according to the standards.

10.2 Every field genebank accession should be safety duplicated at least in one more site if necessary by defining material transfer agreement among institutions.

References

FAO. 2014. Genebank Standards for Plant Genetic Resources for Food and Agriculture. Rev. ed.

Maul E. et al. 2012 The European *Vitis* Database (www.eu-vitis.de) – a technical innovation through an online uploading and interactive modification system. Vitis 51(2), 79-85.

Rome. http://www.fao.org/agriculture/crops/thematic-sitemap/theme/seeds-pgr/gbs/en/

Vitis spp. operational field genebank collections manual

General genebank data and contacts details	
Institute name	
Address	
Reference person	
Email	
Phone	
Fax	
Internet	

0 Date of compilation

Day/month/year:

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. Germplasm exchange with other genebanks is an additional 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.

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 received the mandate;
d) the main aspects of the mandate; and
e) legal considerations on Plant Genetic Resources (PGR) as foreseen in national legislation).

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?*

GA3 -In case your genebank has a germplasm acquisition policy, what does the policy entail?.
a) please specify which crops or which geographic area, if applicable.

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.)?

GA5 – Describe if and how you conduct an assessment of the various quality aspects of 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).*

GA6 – Describe whether and how the STANDARD MATERIAL TRANSFER AGREEMENT (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)*

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*).

SE2 – Provide any additional information on the germplasm collecting activities of your genebank, including the collaboration with others.

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 growth and yielding capacity) 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?)

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

Box 2.1.2 Structure

SS1 - Please provide details on how your genebank field has been designed to resist natural disasters (e.g. earthquakes; flood; storm, fire).

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 gates;*
c) *Alarm system;*
d) *Others (please specify, e.g. field frost or hail protection)*

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

Box 2.1.3 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).*

IPS2 – Describe how you secure adequate staffing of your genebank is?

Box 2.1.4 Contingency Plans:

CP1 - Describe the kind of emergency or contingency plan that your genebank has in place to cope with disaster situations.

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.

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.

3.1 Maintenance of Viability

This section refers to the maintenance of the longevity of the plants in field. Optimum nursery conditions when multiplying the accessions, efficient management of the preparatory steps before propagation, adequate growing conditions as well as proper monitoring of the growth and yielding capacity are critically important.

Box 3.1.1. 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 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 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. 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.

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

3.2 Maintaining Genetic Integrity

Box 3.2.1 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?

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

Box 3.2.2 Multiplication
PC1 - Please describe the multiplication procedures that you follow for your field genebank material (when necessary to restore an accession).

Box 3.2.3 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.

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) health status of accessions, and (c) distribution quantity.

Box 3.3.1 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: accession specificity; whether or not sufficient wood 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 Ensuring Availability of Germplasm – Germplasm Stock Aspects

AGSS1 - Please provide details on the minimum/maximum amount of plants or cuttings per plant that you distribute per accession.

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 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 Germplasm Supply

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

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.

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.

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).

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

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

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?).

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, European

Vitis Database, *Vitis* International Variety Catalogue).

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

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.*