

Report of a Working Group on Solanaceae

First Meeting of the Working Group and
Ad hoc Meeting of the Database Managers
14-17 February 2012, Menemen, Turkey
W. van Dooijeweert, L. Maggioni, M.-C. Daunay and E. Lipman





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The European Cooperative Programme for Plant Genetic Resources (ECPGR) is a collaborative programme among most European countries aimed at contributing to national, sub-regional and regional programmes in Europe to rationally and effectively conserve *ex situ* and *in situ* Plant Genetic Resources for Food and Agriculture and increase their utilization. The Programme, which is entirely financed by the member countries, is overseen by a Steering Committee composed of National Coordinators nominated by the participating countries and a number of relevant international bodies. The Coordinating Secretariat is hosted by Bioversity International. The Programme operates through nine networks in which activities are carried out through a number of permanent working groups or through ad hoc actions. The ECPGR networks deal with either groups of crops (cereals; forages; fruit; oil and protein crops; sugar, starch and fibre crops; vegetables) or general themes related to plant genetic resources (documentation and information; *in situ* and on-farm conservation; inter-regional cooperation). Members of the working groups and other scientists from participating countries carry out an agreed workplan with their own resources as inputs in kind to the Programme.

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Cover illustration

Diversity of edible Solanaceae: special types of tomatoes, peppers, eggplants and other rarities in an exhibition at the Research Institute Schönbrunn. Courtesy of © W. Palme, Horticultural College and Research Institute, Vienna, Austria.

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AD HOC MEETING OF THE SOLANACEAE DATABASE MANAGERS

Introduction

The Solanaceae Working Group (WG) of the European Cooperative Programme for Plant Genetic Resources (ECPGR) has established six databases for the crops that form its mandate. These include three major crops (Eggplant, Pepper and Tomato) and three minor crops (*Cyphomandra*, Pepino and *Physalis*).

The ad hoc meeting of the Solanaceae Database (DB) Managers took place on 14 February 2012, prior to the meeting of the whole Solanaceae WG from 15 to 17 February.

Willem van Dooijeweert, Chair of the WG, welcomed the DB Managers and explained the objectives of the meeting.

The idea of the ad hoc meeting of DB Managers was brought up at an ad hoc meeting of the Vegetables Network Coordinating Group (18 April 2008, Wageningen, The Netherlands), as a response to the requirement of the initiative for “A European Genebank Integrated System” (AEGIS) that each WG submit lists of accessions for inclusion in the European Collection.

The meeting was seen as an opportunity for the five attending DB Managers to exchange knowledge and discuss problems related to the management of the databases and, in particular, to prepare for AEGIS. After the one-day meeting, the DB Managers would propose a common vision of the selection process of European Accessions at the WG meeting that was to follow. Ahead of their meeting, the DB Managers had compiled Excel working files containing all data of each crop, which were extracted from the European Plant Genetic Resources Catalogue (or European Internet Search Catalogue, EURISCO) and the Central Crop Databases (CCDBs).

Objectives of the meeting

- To survey the current status of the Solanaceae DBs and to highlight problems in database management;
- To draw a provisional road map for the process of selecting the European Accessions;
- To compile the list of selection criteria; and
- To test the selection process on the files of the minor Solanaceae crops.

Quality of passport data

W. van Dooijeweert introduced the topic with a PowerPoint presentation on the development of the ECPGR Tomato Database. This presentation had been made earlier at the Vegetables Network meeting in Catania, Italy, in 2009.¹ He stressed again that inadequate quality of passport data (missing, incorrect or misplaced data) was a major problem in the selection of the European Accessions.

¹ Maggioni L, Daunay MC, van Dooijeweert W, Astley D, Bas N, Branca F, Díez Niclós MJ, Geoffriau E, Keller J, Kotlińska T, Smékalová K, van Treuren R, Lipman E. 2010. Report of a Vegetables Network. Third Meeting, 10-12 November 2009, Catania, Italy. Bioersivity International, Rome, Italy.

Discussion

After the general introduction, the DB Managers reported briefly on the status of their respective databases. Before the meeting, the DB Managers had been asked to prepare an Excel file in which all data from EURISCO and the CCDBs were merged. This had been done for all six databases of the Solanaceae WG. José Vicente Valcárcel explained that while it was easy to perform a preliminary selection for minor crops, the task was more complicated for the *Capsicum* Database owing to the large number of accessions in the DB. The same problem was encountered for the Eggplant and Tomato Databases. The effectiveness of having two databases per crop—the Central Crop Database and EURISCO—was discussed. The DB Managers concluded that it would be more efficient to put more effort into EURISCO and to disinvest from the CCDBs, because AEGIS accessions will eventually need to be flagged in EURISCO. The Solanaceae DB Managers wished to inform EURISCO and the ECPGR that they favoured the expansion of EURISCO to enable the integration of characterization and evaluation (C&E) data; the current Crop DB Managers should thus be made responsible for checking that part of the EURISCO data pertaining to their crop in the CCDB. When this will be the case, the focus on CCDBs will thus be reduced.

Lerzan Aykas, Manager of the *Capsicum* Database, stated that it was very difficult to identify the responsible germplasm curators in each member country and to obtain their feedback. She had received only five replies to her request to all European pepper curators in January 2012, asking them to fill in a questionnaire. A reliable and updated database required inputs from all curators. As suggested during the discussion, the best way to proceed was to contact the National Coordinators directly.

As a significant improvement in the DBs was not possible in the short term, the identification of European Accessions should be based for the moment on existing data.

Another problem for extracting correct crop groups from EURISCO was the incomplete and heterogeneous indication of crop names. This was crucial for all Solanaceae crops.

Recommendations

- Expand EURISCO so that C&E data can be entered.
- CCDB Managers to take charge of checking their part of EURISCO and remove their focus from the CCDBs. This would also allow them to promote the standardization of crop names.
- Propose that the Steering Committee organize a meeting of the Documentation and Information (D&I) Network, where all EURISCO Focal Points and all Crop Database Managers would be invited to discuss how CCDB Managers could take charge of their part of the data in EURISCO, so that a qualitatively good database can be established for selecting the European Accessions.

Crop-specific selection criteria

The ECPGR Secretariat developed a simplified selection procedure for the European Accessions. This procedure was presented and discussed. To accelerate elaboration of crop-specific selection criteria, the Eggplant and Tomato DB Managers prepared a draft list of criteria that were used during an initial selection process on the Tomato Database. This list was discussed and adapted where necessary, so that it could be proposed at the WG meeting as “Solanaceae-specific selection criteria”.

Discussion

After agreement was reached on the process and the crop-specific selection criteria, the DB Managers made a first attempt to use them on the *Cyphomandra* and *Physalis* Databases. They came up with a list of 11 selected accessions out of 59 for *Cyphomandra*, and a list of 377 selected accessions out of 456 for *Physalis*. The DB Managers agreed to propose to the WG that the work should focus only on accessions held by countries that had signed the AEGIS Memorandum of Understanding (MoU). The finalized road map is included as Appendix II.

The DB Managers agreed that they could try to identify probable duplicates and select the Most Appropriate Accessions (MAAs) when sub-selections were sufficiently small..

Recommendations

- Start identification of European Accessions from small sub-sets for the sake of simplicity.
- Specify whether European Accessions are unique or originate from a duplicate group.

FIRST MEETING OF THE WORKING GROUP ON SOLANACEAE

Introduction

The first meeting of the Working Group on Solanaceae of the European Cooperative Programme for Plant Genetic Resources (ECPGR) was held from 15 to 17 February 2012 in Menemen, Turkey.

The Governor of Menemen, Mr Turgut Subashi, welcomed all the participants to Turkey and opened the meeting. He highlighted the importance that the Menemen area is giving to agriculture and research and that it was committed to the conservation of biodiversity in agriculture for both present and future generations. He also stressed the importance of international meetings such as this one, where all can benefit from mutual experiences, and wished all participants a fruitful and enjoyable meeting.

The Acting Director of the Aegean Agricultural Research Institute (AARI), Mr Selim Tokmak, welcomed the Working Group (WG) on behalf of the Institute. He briefly described the role of the Institute as a national genebank and breeding centre and laid emphasis on its openness to international collaboration. He wished the Group a fruitful and enjoyable meeting.

Willem van Dooijeweert, Chair of the WG, welcomed all participants and explained that this was the first regular meeting of the Solanaceae WG, which celebrated its tenth anniversary in November 2011. All previous meetings had been ad hoc meetings, held within the framework of joint initiatives. These meetings had been organized in Nijmegen, The Netherlands (2001); Skierniewice, Poland (2003); Bari, Italy (2004); Olomouc, Czech Republic (2007), and Catania, Italy (2009).

The participants were asked to introduce themselves briefly. W. van Dooijeweert presented the agenda for the coming days and explained that the focus of the meeting would be on the AEGIS topics – “Crop-specific Selection Criteria for Most Appropriate Accessions (MAAs)”, “AEGIS Quality System (AQUAS)” and “Elaborating lists of European Accessions” – and that other topics of interest to the WG would be discussed afterwards.

Update on ECPGR and AEGIS

Lorenzo Maggioni updated the participants on the status of the ECPGR programme of the ongoing Phase VIII (2009-2013). The budget of the Solanaceae WG and the planned use of this budget were presented. L. Maggioni informed the participants about the outcome of the ECPGR Independent External Review (July 2010) and explained the process followed by the Steering Committee (SC) for taking decisions in December 2012 on the future of the ECPGR, based on the “Options paper” being prepared by the ECPGR Executive Committee. The Group would have to report its progress to the SC in time for the December meeting. He cautioned that unspent funds of the WG will not be immediately available for new activities; the Secretariat would have to submit an application to the SC, requesting approval for the use of funds. Currently, unspent funds have been frozen by the SC, given that outstanding contributions from a few member countries are a major concern. L. Maggioni informed the WG that 30 countries were now members of AEGIS, and 46 genebanks had signed Associate Membership Agreements with their respective National Coordinators. He described the suggested “simplified procedure” for the selection of candidate European Accessions and outlined the main elements of the AEGIS Quality System (AQUAS). Finally, he mentioned the FP7 project proposal (Plant Gene Access) submitted in November 2011 to the European Commission (EC) for funding (€ 10 million and 34 partners).

The participants were asked to report on the status of the signing of the AEGIS MoU by their country and on the selection of material to be made available for the European Collection. The representatives gave the following information:

- Austria: The MoU will be signed soon. A small vegetable collection is held by the government genebanks. The non-governmental organization (NGO) Arche Noah holds a bigger collection, but it does not see the benefit at the moment of making the accessions available for AEGIS.
- Azerbaijan: MoUs for Associate Membership agreements were signed, but the quality of the vegetable collection is probably not suitable to make it available.
- Bulgaria: The MoU was signed, and the National Genebank will make available a part of the Solanaceae material to the European Collection. Regeneration and multiplication are a limitation.
- Estonia: The MoU was signed, and the material is available.
- France: A law has been recently approved by Parliament, which acknowledges the importance of genetic resources and sets the framework for the organization of a National Programme on plant genetic resources. A National Coordinator has not been appointed yet, but the signing of the MoU will likely follow once the necessary organizational steps have been completed.
- Georgia: The MoU was signed, and material will be made available to the European Collection.
- Germany: The MoU was signed, and the Associate Member genebanks are ready to include Solanaceae material in the European Collection.
- Hungary: The MoU was signed recently, and material will be available.
- Italy: The MoU has not yet been signed, but there is intention to do so in the near future. The Genebank of Bari is willing to sign the Associate Membership Agreement and to participate in the selection of candidate accessions.
- The Netherlands: The MoU was signed. The Centre for Genetic Resources, Wageningen (CGN) is ready to include material in the European Collection; the Radboud University is in the process of making accessions available.
- Poland: The MoU was signed, but Associate Membership agreements have not yet been signed. Material will be made available to the European Collection.
- Slovakia: The MoU was signed, and material will be made available.
- Spain: There is intention to sign, but actual signing will require a change in a national law. The Working Group member will actively participate in the selection of candidate material.
- Turkey: The MoU was signed recently. The National Coordinating institute (AARI) needs to decide which material to include in AEGIS. AARI will soon receive national support for renewing multiplication and regeneration facilities, which will help in making material available. AARI's staff agreed to assist in the selection of candidate accessions. The Associate Membership Agreement signed by AARI covers both seed-propagated and fruit tree crops that are maintained in associate institutes.

The Solanaceae Collection of the German Genebank

Ulrike Lohwasser reported on the status and mode of operation of the collections held by the Genebank Department at the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, Germany. It holds a total of 7356 Solanaceae accessions (excluding potatoes), with nearly 40% landraces and 30% advanced cultivars.

U. Lohwasser described the quality management system, which was ISO 9001 certified, and the specific protocols used for the reproduction of tomato and eggplant.

Biodiversity and UPOV descriptors are used for characterization of the material, with local adaptations. Correct taxonomic determination is given high importance. Seed is stored at -18°C, germination tests are regularly carried out to ensure germination rates above 80% for cultivated material and 50% for wild material. A herbarium collection is maintained and all the fruits are being photographed. Safety-duplicates are deposited in the Svalbard Seed Vault, Norway. The rye and umbellifer groups have adopted the concept that an MAA is an accession of an original seed lot or seed sample that is genetically as close as possible to the original population; it is true to name, held in the country of origin or introduced as material of importance for breeding and research in Europe, accompanied by passport data, and characterized morphologically or with markers.

A suggested approach is to regard wild populations, landraces, breeding material and obsolete improved varieties older than 1950 as unique material. Only the advanced improved cultivars (younger than 1950) require definition of duplicates and MAAs.

Issues of data quality for the selection of European Accessions

Quality of data in CCDBs versus EURISCO

The main objective of AEGIS is to establish a virtual collection of material held in European genebanks and institutes. This material must be a selection derived from the total number of accessions held. In this selection, accessions of European origin, or introduced germplasm that is of actual or potential importance to Europe (for breeding, research, education or for historical and cultural reasons) must be represented. Decisions on the selection of European Accessions can be made only on the basis of comprehensive, good-quality data. The Solanaceae Databases and EURISCO use the FAO/IPGRI *Multi-Crop Passport Descriptors* (MCPDs) which are well defined, but in practice the data provided do not always comply. Several DB Managers have been working with data delivered by partners and encountered problems because of these inconsistencies. Frank Menting illustrated the problems in a PowerPoint presentation. He showed that the data quality of both EURISCO and the CCDBs, as measured by a Passport Data Completeness Index (PDCI), is inadequate. He also highlighted that EURISCO and CCDBs contain wide discrepancies in the number of accessions represented. In some cases as for the Romanian accessions, EURISCO is more complete, but in cases like the French accessions, it is incomplete.

Transfer of CCDB data into EURISCO

W. van Dooijeweert compared the status of tomato accessions in the CCDB and EURISCO and showed that more than 4000 accessions that are present in the CCDB are missing from EURISCO. Noticing this general problem, the DB Managers had already prepared Excel working files in which EURISCO and CCDB data were merged. These lists could be used for selecting material for AEGIS. However, accessions selected for the European Collection need to be flagged in EURISCO. Therefore, a problem occurs when specific accessions selected as MAAs are listed only in the CCDBs and not in EURISCO, since these cannot be flagged in EURISCO. To avoid such problems, W. van Dooijeweert urged that all CCDB data also be entered into EURISCO.

Discussion

The discrepancy between the CCDBs and EURISCO must be resolved; otherwise efforts made to improve CCDB data quality will not be reflected in EURISCO. It would be ideal if EURISCO could be the only database so that all the efforts could be focused on improving data in this central source. On the other hand, EURISCO is not ready to host standardized crop-specific descriptors and therefore much information collected in the CCDBs would be lost if they were abandoned.

The Eggplant DB Manager reported that the Eggplant Database had not expanded once the EU-funded project for creating this DB had ended. Efforts should therefore be re-directed towards a database, such as EURISCO, that is functional and officially supported at European level, if it could be as effective in hosting all the required data, such as crop-specific passport or characterization data.

It was agreed that EURISCO and the CCDBs with their specific strengths and weaknesses be maintained for the present. At the same time, a message should be sent to the D&I Network to start a discussion for finding an ultimate solution, possibly towards the development of a central database (EURISCO) that can also serve the needs of crop-specific Working Groups.

Recommendations

- It is proposed that the D&I Network take up the discussion about the need to improve EURISCO in such a way that it can serve the purpose of identifying AEGIS candidate accessions. EURISCO should therefore host all the crop-specific data that are necessary to analyse the existing European collections (such as the field "Section" that is indispensable to the eggplant crop group and seed availability), as well as the standardized minimum characterization data. Such an approach should eliminate the duplication of efforts currently dedicated by DB managers and curators for improving data quality in both the CCDBs and EURISCO.
- The D&I Network is invited to seek support from the SC and obtain the budget for organizing a meeting of all National Inventory Focal Points and Crop Database Managers for a discussion on the above-mentioned proposed changes. It should also define implementation steps and a new role for CCDB Managers.
- It is proposed that CCDB Managers take charge of checking the quality of the crop-specific part of the EURISCO data. They could monitor these data for quality, consistency and gaps, and seek appropriate adjustments to be made in the original data by the data providers and consequently in the National Inventories and EURISCO.

Workplan

1. The ECPGR Coordinator will inform the Coordinator of the D&I Network of the above recommendations (**by end February 2012**) and follow up on the outcome of the proposal, keeping the WG informed when necessary.
2. Managers of the Solanaceae Databases (Eggplant, Tomato, Pepper, Pepino, *Physalis* and *Cyphomandra*) and other experts will start monitoring of their respective crop data in EURISCO, contacting data providers and suggesting appropriate adjustments. The DB Managers should update the WG Chair and ECPGR Coordinator on developments for this approach (**by September 2013**).
3. The above-mentioned responsibility is split as follows:
 - Gerard Van der Weerden: *Solanum* wild species (sub-genus *Leptostemonum*)
 - Marie-Christine Daunay: cultivated Eggplant
 - Willem van Dooijeweert: Tomato
 - Lerzan Aykas: Pepper
 - José Vicente Valcárcel and Alvaro Gil Íñigo: Pepino, *Physalis* and *Cyphomandra*.

Visit to the genebank

In the afternoon of 15 February 2012, the Group visited AARI. Presentations were made on the activities of AARI (Abdullah Inal), the specific activities of the National Plant Genetic Resources Programme and Plant Genetic Resources Department (Ayfer Tan) and the vegetable genetic resources and breeding activity (Sevgi Mutlu). The Group was shown the herbarium, fungarium and national genebank facilities.

Compilation of lists of candidate AEGIS accessions

Simplified selection procedure

When AEGIS entered into force, it became evident that the task of selecting material for the European Collection was a challenge. The original proposed procedure to reach this objective was also not clear enough, especially the starting point. Who should take the initiative: the national programmes, the Working Groups or the DB Managers? A “simplified selection procedure” was outlined by the ECPGR Secretariat to overcome these limitations, whereby the WGs would take the leading role. This simplified procedure was described to the participants.

Working Group specific selection procedures and road map

Keeping in mind the level of passport data quality, the need to merge data from EURISCO and CCDBs into one working file and the “proposed simplified selection procedure”, the DB Managers developed a specific road map for the selection process. The road map indicates steps to be taken and the selection criteria that could be adopted by the Working Group (see Appendix II, pp. 22-23). The road map was presented to the participants, and the Group agreed that it should be tested.

To illustrate the approach, a small test was conducted on the Pepino Database. As a starting point, only those accessions were analysed that were held in countries having signed the MoU and that were documented with a minimum set of passport data (at least “Species” and “Accession name” or any other important descriptor). A number of criteria were listed for selecting MAAs among duplicates. Following this procedure, 12 accessions were selected.

Discussion

The discussion focused on the opinion of the Group members regarding the proposed methodology, compared with other approaches, such as requesting the curators to prepare lists of accessions available from their own collection for inclusion into AEGIS.

Some curators said that they would be happy to analyse their own collection and identify suitable accessions for AEGIS. Others such as curators of big collections preferred the centralized procedure because of the time required to go through the large amount of data.

It was agreed that the procedure proposed by the DB Managers would be tested in parallel sessions.

The Group acknowledged that all the examples presented indicate that the low quality of the passport data and their frequent inconsistency considerably complicated the task of selection.

Recommendation

- Each curator, in collaboration with the respective National Inventory Focal Point, should strive to improve the quality and completeness of the passport data that are supplied to EURISCO.

Introduction to the parallel sessions

The development of candidate European Accession lists is a time-consuming and difficult process that involves many steps. W. van Dooijeweert explained that working in parallel groups during the meeting would allow all participants to experience the problems regularly encountered by the DB Managers. The proposed procedures and criteria can be applied to the different databases. Three groups were formed for the Eggplant, *Capsicum* and Tomato Databases. The goal of the meeting was at least to arrive at a first set of accessions to be proposed to the National Coordinators for flagging as European Accessions.

Parallel sessions

Each group worked for a short time on the selection process. After an exchange of the preliminary results in a short plenary session, the groups continued their analysis.

Plenary session – Outcome of the test analysis of the Databases

The three groups reported their experience. All of them used sub-files containing only the accessions of the countries that had signed the AEGIS MoU.

Tomato

The working file had been cleaned up beforehand to remove the artificial duplicates generated by the fusion of EURISCO and the Tomato DB. In addition to the agreed procedure, the group started by removing all accessions with a status of mutant, hybrid, etc. (MCPD 400). The list was then sorted by species name, and all accessions with no or unidentified or unclear species name were removed. The group then considered all wild species except *Lycopersicon pimpinellifolium*, given their small number of accessions, and came up with a list of 155 accessions to be proposed as AEGIS accessions. The large group of cultivated tomatoes was not analysed because the agreed procedure could not be implemented due to the very large groups of possible duplicates.

Pepper

As for tomato, the working file was cleaned up beforehand to remove the artificial duplicates generated by the merging of EURISCO data with the Pepper DB. The group focused on the accessions of only three contributors (Germany, Hungary and The Netherlands), whose accessions were known to be available in principle. The other focal area was species with a small number of accessions. Within *Capsicum annuum*, the group identified a number of duplicates, but could not find sufficient indicators in the passport data for designating MAAs. The group therefore decided to ask the curators to select MAAs and to check whether all proposed accessions were actually available. For other *Capsicum* species, which had few duplicates, most accessions were flagged as proposed AEGIS accessions.

Eggplant

The working file was the direct result of the merging of EURISCO data with the Eggplant DB. The list was sorted by species, and all accessions with no or unidentified or unclear species name were removed. Subsequent sorting by accession name, or country or any number (donor number, collector number, other number) proved to be inappropriate because too many accessions were being eliminated by the over-stringent procedure. The group could not compile the list of accessions because of additional difficulties, particularly in prioritizing the many listed species.

Discussion

The eggplant group therefore decided to adopt the strategy used for pepper: to focus on the accessions of Germany, Hungary and The Netherlands, and to request their eggplant

curators to propose the accessions for AEGIS. Choosing among duplicates was also difficult owing to the absence of defined primary criteria for the selection of MAAs. The concept of “duplicates” and the need to make (or not make) choices was also challenged.

Recommendation

The “PGR Duplicate Finder” software (see p. 14), which is under development at CGN, was brought to the attention of the participants. It was recommended for use on the Solanaceae Databases. A discussion on the preferred criteria for selecting among duplicates was postponed.

Workplan

1. The lists compiled by the sub-groups (155 wild tomatoes, 168 wild *Capsicum* species, 246 *Physalis*, 11 *Cyphomandra* and 13 pepino) will be sent by the Chair **by end September 2012** to the appropriate National Coordinators, who in turn, in consultation with the collection holders concerned, should confirm **before end 2012** whether the accessions can be flagged as part of AEGIS in EURISCO.
2. Representatives from Germany, Hungary, The Netherlands, Poland and Slovakia will send lists of candidate Solanaceae accessions to the Chair **by end May 2012**. The Chair will ensure that the lists are cross-checked for duplicates by the relevant persons and that proposals for inclusion into AEGIS are made. The Chair will then send the lists to the National Coordinators **by end September 2012**, as per point 1 above.
3. Curators of collections from the other countries are also invited to send lists of candidate accessions to the Chair **by end May 2012**. The Chair will ensure that the lists are cross-checked for duplicates by the relevant persons and that proposals for inclusion into AEGIS are made. The Chair will then send the lists to the National Coordinators **by end September 2012**, as per points 1 and 2 above.

The AEGIS Quality System (AQUAS)

Introduction

The aim of “A European Genebank Integrated System” (AEGIS) is to establish a European Collection. It will be a virtual European Genebank, maintained in accordance with agreed quality standards; its material must be freely available in accordance with the terms and conditions set out in the International Treaty on Plant Genetic Resources for Food and Agriculture (the Treaty). The Steering Committee decided to establish the AEGIS Quality System (AQUAS) as an important part of AEGIS.

W. van Dooijeweert explained the six principles of AQUAS in a PowerPoint presentation.

The draft “Template for operational genebank manuals - seed” prepared by the ECPGR Secretariat reviews the genebank management practices of each ECPGR member. The roadmap towards standards is laid in the “Workplan towards the establishment of AQUAS”. Both documents, which are available online on the AEGIS Web site (<http://aegis.cgiar.org/aquas.html>), were shown to the Group.

The intention is that Generic Standards will be adopted from the document to be finalized by the FAO in 2012. In addition, each WG is expected to develop crop-specific standards, which must be derived from the agreed operational genebank manual or the FAO document.

W. van Dooijeweert reviewed the target areas for crop-specific technical standards, which are:

- a. Collecting and acquisition
- b. Regeneration and propagation
- c. Drying and other preparatory steps
- d. Storage
- e. Seed quality and viability monitoring
- f. Distribution
- g. Characterization.

Generic operational standards

The FAO drafted the "Revised Genebank Standards for the Conservation of Orthodox Seeds". The most recent official version is from July 2011 and is still not approved (www.fao.org/docrep/meeting/022/MB179E.pdf). The ECPGR Secretariat had proposed to adopt these generic standards and verify whether these could be adequate for the WG or a more stringent standard should be adopted.

U. Lohwasser conducted the Group through an internal version dated November 2011.

Discussion

The Group agreed that genebanks and other collection holders will try to follow the FAO Genebank Standards to the extent possible. However, it was also highlighted that in many cases the standards were too strict, even for advanced genebanks.

A. Tan stated that for Solanaceae crops it was important to extract seeds in a proper way after collecting expeditions. If not, the quality of the seeds could deteriorate rapidly because of problems such as fungi. The Group thought that this recommendation was not a crop-specific standard but deserved to be mentioned as it was important. The "Standardized minimum protocol for seed regeneration and seed storage of Solanaceae", which had been published in the report of the Bari meeting² will now be updated to include this new information. The new version is included as Appendix III (pp. 24-26) and will be posted on the Solanaceae WG Web site (http://www.ecpgr.cgiar.org/networks/vegetables/solanaceae/solanaceae_wg_docs_and_info.html).

Recommendation

- The Group concluded that the FAO Genebank Standards could be adopted as they are, and that the genebanks should strive to follow them. No need was felt to develop more stringent standards.

² Daunay MC, van Dooijeweert W, Maggioni L, Lipman E, compilers. 2006. Report of a Working Group on Solanaceae. Ad hoc Meeting, held jointly with the Fifth Meeting of the EGGNET Project, 17 September 2004, Bari, Italy. International Plant Genetic Resources Institute, Rome, Italy. (Appendix II, pp. 45-47).

Working Group workplan

The latest version of the workplan (2009-2010)³ was discussed. The current status of each topic was checked and the time schedule adapted where required. Achieved topics were removed, and new ones added. A table summarizing the updated workplan until 2013 (end of Phase VIII) is given in Appendix I (pp. 19-21).

Discussion

The Austrian member, Wolfgang Palme (Horticultural College and Research Institute, Vienna), indicated that his institute was actively involved in public awareness about the importance and interest of vegetables genetic resources, including Solanaceae. Each year, he organizes successful annual courses, crop displays, exhibitions as well as interactions with chefs. A network of cooperation between farmers and researchers had also been launched recently with the aim of encouraging farmers to develop their own varieties, as part of a participatory breeding effort.

In Poland, the genebank in Skierniewice had started cooperating with a local NGO for promoting local vegetable Solanaceae genetic resources for seed production and utilization in organic farming.

In Italy, several initiatives promote the use of local genetic resources, in collaboration with regional genebanks.

The need to strengthen communication between the Solanaceae genetic resources community (ECPGR) and the community of Solanaceae geneticists and genomists (Solanaceae Genomics Network, SGN) was stressed. Modern “omic” technologies now allow genetic research to be carried out on wide sets of accessions; consequently, demand for germplasm from research groups will increase. The Solanaceae WG’s Web page already posts a link to SGN’s Web site; the Chair and Vice-Chair will ensure that the SGN Web site does the same for the ECPGR Solanaceae WG’s Web page. Participants were also encouraged to publicize, nationally and internationally, their activities on genetic resources through posters, communications at congresses, publications or any other media.

Planning for safety-duplication

Safety-duplication has always been one of the priorities of the ECPGR and therefore also for the Solanaceae WG. The status of safety-duplication has been reviewed in the past to identify collections with limited or no safety-duplication.

W. van Dooijeweert reminded the Group why safety-duplication is important and indispensable for germplasm that is added to the European Collection. Safety-duplicates must preferably be sent for long-term storage to a foreign country. The Seed Vault in Svalbard, Norway is also a suitable option for safety-duplication.

Not all material in European genebanks is safety-duplicated yet, for reasons mentioned earlier by WG members in a table summarizing the status of seed stock management, and previously published in the report of the Bari meeting.⁴ The table was updated before the meeting and shown to participants. The new version is included as Appendix IV (pp. 27-31)

³ Maggioni L, Daunay MC, van Dooijeweert W, Astley D, Bas N, Branca F, Díez Niclós MJ, Geoffriau E, Keller J, Kotlińska T, Smékalová K, van Treuren R, Lipman E. 2010. Report of a Vegetables Network. Third Meeting, 10-12 November 2009, Catania, Italy. Bioversity International, Rome, Italy. (pp. 38-39).

⁴ Daunay MC, van Dooijeweert W, Maggioni L, Lipman E, compilers. 2006. Report of a Working Group on Solanaceae. Ad hoc Meeting, held jointly with the Fifth Meeting of the EGGNET Project, 17 September 2004, Bari, Italy. International Plant Genetic Resources Institute, Rome, Italy. (Appendix I, pp. 42-44).

and will be posted on the Solanaceae WG's Web site (http://www.ecpgr.cgiar.org/networks/vegetables/solanaceae/solanaceae_wg_docs_and_info.html).

Owing to the importance of safety-duplicates, the Chair and Vice-Chair reserved a small sum of € 2920 from the WG budget; members can apply for a small amount for their safety-duplication effort. The request for these funds must be well formulated and will be evaluated by the Chair and the Secretariat. Partners were asked if they were interested in receiving help for arranging safety-duplication.

Discussion

Bulgaria and France expressed their intention to apply for the safety-duplication funds.

The Group discussed the endangered status of accessions that need urgent regeneration, as indicated in the table. Attila Simon clarified that the Hungarian material will be taken care of. Saida Sharifova confirmed that several accessions of the tomato collection in Azerbaijan need regeneration and multiplication. After verifying that the other WG members' institutions were unable to help for the regeneration of threatened material, W. van Dooijeweert suggested approaching private companies through the ECPGR Secretariat. The companies could do this work for free in exchange for a sample of the regenerated seed and providing a signature of the Standard Material Transfer Agreement (SMTA). S. Sharifova indicated that in the case of Azerbaijan, the work will be carried out by local institutions.

Workplan

- Representatives from Bulgaria and France will submit **before end 2012** a justified request for financial support for safety-duplication of Solanaceae accessions. The request will be sent to the Chair of the WG, who will in turn instruct **before end 2013** the ECPGR Secretariat to establish Letters of Agreement with institutions whose request is recognized as deserving ECPGR support.

Minimum descriptors

All Solanaceae descriptors lists are available online (http://www.ecpgr.cgiar.org/networks/vegetables/solanaceae/solanaceae_wg_docs_and_info.html).

The minimum descriptor lists for Tomato, Pepper and Eggplant were developed and approved by the WG (published April 2008).

Minimum descriptor lists for *Physalis* (July 2007), *Cyphomandra* (July 2007) and Pepino (February 2008) were also developed but were still published as "drafts" on the Web site. The drafts were shown to the participants and reviewed by the members present. W. van Dooijeweert proposed that these drafts become approved final versions. The layout has to be harmonized with that of the other accepted descriptor lists.

Discussion

José Vicente Valcárcel recommended that the descriptor list for *Cyphomandra* to be published soon by Bioversity should be cross-checked with the minimum descriptor list drafted by the WG. This suggestion was accepted.

Teresa Kotlińska remarked that differences in the minimum descriptor list for tomato, compared with the IPGRI descriptors, create problems. The Group, however, decided that it would not be possible to modify the minimum descriptors after many years of use by the Group.

Recommendations

- Convert the draft minimum descriptor lists of *Physalis* and Pepino into final versions.
- For the above publications, adopt the format used for the descriptors of the major Solanaceae crops.

Workplan

- W. van Dooijeweert will contact Elinor Lipman **by March 2012** for converting the minimum descriptor lists of *Physalis* and Pepino into final versions. The lists will follow the same format as that of the major Solanaceae crops descriptors and should be online **by April 2012**.⁵
- The *Cyphomandra* minimum descriptors drafted by the WG will be cross-checked with the forthcoming Bioversity publication and finalized.⁶

Duplicate finder (WG project)

In its original workplan at the start of Phase VIII, the WG had decided to develop a semi-automatic method for identifying MAAs among probable duplicates. A small project had been budgeted, involving the Tomato DB Managers, who would receive training from the *Avena* DB Manager, Christoph Germeier of the Federal Research Centre for Cultivated Plants, Julius Kühn Institute (JKI), Quedlinburg, Germany. C. Germeier had already developed several algorithms to identify probable duplicates. The new tools would be transferred to the other Solanaceae DB Managers during a special meeting.

However, the initiative did not continue to develop, since the alternative “PGR Duplicate Finder” Project benefited from the Grant Scheme launched by AEGIS for projects that contribute to the implementation of AEGIS. The Project is being carried out by CGN; IPK and JKI (*Avena* DB) are also involved. The budget of € 20 000 includes a contribution of € 10 000 in kind by CGN. The tools will facilitate and accelerate the process of identifying duplicates and assigning MAAs. F. Menting presented the history, concept and progress of the “PGR Duplicate Finder” project. The software will identify probable duplicates for a chosen accession and create duplicate groups for a dataset. The prototype will be tested in March 2012.

Discussion

The WG appreciated the presentation and looked forward to the possibility of using this tool, which will be made freely available on the ECPGR Web site for use by all the other WGs.

W. van Dooijeweert suggested that the budget of € 4920 planned for the development of algorithms to facilitate the identification of duplicates could still be used for a very similar purpose, namely, an ad hoc meeting in which the PGR Duplicate Finder could be used on Solanaceae Databases.

Workplan

- The Chair will plan **before the end of 2013** to organize an ad hoc meeting to use the PGR Duplicate Finder on Solanaceae Databases. He will inform the ECPGR Secretariat about participants, date and location for the meeting, which should take place before the end of 2013.

⁵ The finalisation of the lists eventually required some amendments and the document was circulated to the Working Group in May 2012 for approval before uploading. The decision was further made to use the common name “groundcherry” for all *Physalis* species, and therefore the database will be renamed “Groundcherry Database”.

⁶ On 22 March 2012, Jaime Prohens provided an update based on the most recent draft version of the Bioversity publication. He informed that the tree tomato and all its wild relatives had been transferred from genus *Cyphomandra* to *Solanum* and therefore the descriptor list should be renamed “Descriptor list for Tree Tomato”. The *Cyphomandra* Database was accordingly renamed “Tree Tomato Database” and adapted to reflect the taxonomical changes, keeping the possibility to search both on the old (*Cyphomandra*) and new (*Solanum*) names.

Conclusion

The report was presented; the recommendations and workplan for 2012-2013 (summarized in Appendix I) were adopted.

The Chair summarized the achievements of the meeting and expressed satisfaction for the good results of the practical sessions dedicated to the analysis of the databases. He also stressed the need to improve data quality and the fact that this will depend on each member's effort. He reiterated the Group's opinion that EURISCO should become the reference database, thus reducing the duplication of effort required for the CCDBs. He was satisfied that a number of accessions were identified for AEGIS and that several genebanks were ready to make more accessions available for the European Collection. The discussion on the problem of duplicates had not advanced and remains a challenge for the future. The decision to adopt the FAO Genebank Standards was a good achievement and he was pleased that all members agreed to strive towards reaching these standards. He concluded with a recommendation that all members try to implement the ECPGR WG decisions in their work and that communication between the scientific community and the public continues to be promoted.

Election of Chair and Vice-Chair

The Group expressed great satisfaction for the performance of the current Chair and Vice-Chair and re-elected them.

Closing remarks

W. van Dooijeweert thanked all the participants for their commitment. He also thanked all the staff of AARI who contributed to the excellent organization of the meeting.

Three offers (Austria, Azerbaijan and Germany) were made for hosting the next meeting and were received with appreciation by the Group.

The acting Director of AARI brought the meeting to a close by thanking all the participants and inviting all to come back to Turkey for business or leisure.

APPENDICES

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Appendix I. Workplan 2012-2013

(Updated at the first meeting of the Solanaceae Working Group in Izmir, February 2012)

	Activities	Responsibility	Deadline
Communication between Solanaceae WG members and their National Coordinator (NC)	Members report to their NC about the meeting.	All members	Continuous action
	Members remind their NC to check with national institutions about MoU associate membership.	Countries that have not signed the associate MoUs	Continuous action
Solanaceae Databases			
Duplicate finder (WG project)	Plan for the organization of an ad hoc meeting to use the PGR Duplicate Finder on Solanaceae Databases; inform the ECPGR Secretariat about participants, date and location of the meeting, which should take place before the end of 2013.	Chair	End 2013
Minimum descriptor lists	Request from the ECPGR Secretariat the conversion of the minimum descriptor lists of <i>Physalis</i> and <i>Pepino</i> into final versions.	Chair	March 2012
	Format the lists in the same way as for the descriptors of the major Solanaceae crops.	ECPGR Secretariat	April 2012
	Cross-check the <i>Cyphomandra</i> minimum descriptors drafted by the WG with the Bioversity publication, once published; finalize the descriptors.	Representative from Spain	When the Bioversity list is published
Switching from CCDBs to EURISCO	Standardize crop names, fill in crop-specific descriptors.	All members	Depending on the development of EURISCO

	Activities	Responsibility	Deadline
Planning for safety-duplication	Submit a justified request for financial support for safety-duplication of Solanaceae accessions to the Chair.	Representatives from Bulgaria and France	End 2012
	Instruct the ECPGR Secretariat to establish Letters of Agreement with institutions whose request is considered justified.	Chair	End 2013
AEGIS			
Issues of data quality for the selection of European Accessions	Inform the Coordinator of the D&I Network about proposed change of responsibilities of CCDB Managers.	ECPGR Coordinator	End February 2012
	Follow up on the outcome of the proposal, keeping the WG informed.	ECPGR Coordinator	As necessary
	Start monitoring of the respective crop data in EURISCO, contact data providers and suggest appropriate adjustments. Report to the WG Chair and ECPGR Coordinator on the experience made with this approach.	Managers of the Solanaceae Databases and other experts The above-mentioned responsibility is split as follows: <ul style="list-style-type: none"> - G. Van der Weerden: Solanum wild species (sub-genus <i>Leptostemonum</i>) - M.-C. Daunay: cultivated Eggplant - W. van Dooijeweert: Tomato - L. Aykas: Pepper - José Vicente Valcárcel and Alvaro Gil Íñigo: Pepino, <i>Physalis</i> and <i>Cyphomandra</i> 	September 2013

	Activities	Responsibility	Deadline
Compilation of lists of candidate AEGIS accessions	(1) a. Send the lists developed by the sub-groups (155 wild tomatoes, 168 wild <i>Capsicum</i> species, 246 <i>Physalis</i> , 11 <i>Cyphomandra</i> and 13 pepino) to the appropriate National Coordinators. b. In consultation with the collection holders involved, confirm whether the accessions can be flagged as part of AEGIS in EURISCO.	Chair National Coordinators	End September 2012 End 2012
	(2) a. Send lists of candidate Solanaceae accessions to the Chair. b. Ensure that the lists are cross-checked for duplicates by the relevant persons and that proposals for inclusion into AEGIS are made; send the lists to the National Coordinators as per point 1 above.	Representatives from Germany, Hungary, The Netherlands, Poland and Slovakia Chair	End May 2012 End September 2012
	(3) a. Send the lists of candidate accessions to the Chair. b. Ensure that the lists are cross-checked for duplicates by the relevant persons and that proposals for inclusion into AEGIS are made; send the lists to the National Coordinators, as per points 1 and 2 above	Curators of collections from the other countries Chair	End May 2012 End September 2012
Solanaceae genetic resources, scientific and public awareness			
Overview of NGOs per country	Check with the <i>In situ</i> and On-farm WG about NGOs in their country.	All members	Ongoing
Communication of the Solanaceae WG with the scientific community and horticulturists	Publish papers on important achievements of the Solanaceae WG or its members, e.g. in the Solanaceae Newsletter and <i>Chronica Horticulturae</i> (ISHS).	All members, coordinated by the Vice-Chair	Ongoing
Communication with the general public	Members share information by writing articles in general journals, by organizing special events.	All members	Ongoing

Appendix II. Proposed selection process and list of crop-specific selection criteria for Solanaceae

Criteria and road map for selection of unique accessions

- Split into different crops (databases)
- Assign selection per crop to the database manager supported by other persons
- Merge accessions in CCDBs and EURISCO in Excel format
- Add columns:
 - MoU signed
 - Probable AEGIS accession
 - Proposed AEGIS accession (two fields: “unique proposed” and “duplicate proposed”)
 - Approved AEGIS accession
- Sort field “MoU signed”
- Start with all accessions from countries that have signed the MoU
- Check completeness of existing passport data, minimum amount of data (at least Species, + at least Accession name **or** Collecting number **or** Donor number **or** Other number **or** Country of origin, etc.)
 - Sort species
 - * Remove accessions without species name
 - * Remove unclear species
 - * Remove hybrids
 - * Remove interspecific hybrids
- Include breeding lines when indicated
- Split into subsets (species)
- Check and correct obviously wrong genus and/or species names and group with correct taxon where possible.
 - For tomato, *Cyphomandra*: group accessions with old and new nomenclature!!!
- Start assigning MAAs in species with small numbers of accessions
 - Include only crop wild relatives for eggplant
- Identify obvious duplicate groups by sorting all relevant fields
 - Check potential duplicates with other fields

Proposed criteria for selection between duplicate accessions

- Quality of passport data
- Quality of management of holding institutes to be taken into account?
- Minimum number of regeneration cycles
- Health status (checked for seed-borne/quarantine diseases)
- Existence of characterization and evaluation data
- Whether the accession is maintained in the country where it was collected or originated
- Accession history
- Storage facilities
- Minimum germination % standards used by holder (AQUAS?)
- Monitoring germination % by holder (AQUAS?)
- Crop-specific
 - Number of seeds or weight (approximated) of the original sample
 - Number of plants used in the regeneration trials
 - Pollination method (controlled)
 - Number of fruits collected in the regeneration trials (minimum 10?) Is this criterion realistic? Do people record this information in general?

Problem: lack of data or wrong data make it impossible to select material!!!

Appendix III. Standardized minimum protocol for seed regeneration and seed storage of Solanaceae

(Revised and updated February 2012: addition of section 7.1)

This protocol provides general guidelines for successful seed regeneration and seed storage. Environmental conditions and available equipment can vary according to the partner.

1. Disinfection of seeds

- 1.1. If seed disinfection is carried out at the time of seed extraction, after seed cleaning, put the soaked seeds in a solution of sodium hypochlorite (NaClO) at 1.2 chlorometric degrees for 30 minutes; then rinse carefully and dry. This method could, however, negatively affect longevity of the seeds. Commercial bleach is available at various concentrations, expressed as "chlorometric degrees". Example: for a commercial bleach at 48 chlorometric degree, dilute it 1/40 (1 volume for 39 volumes of water) to obtain a solution at 1.2 chlorometric degrees.
- 1.2. If seed disinfection is carried out just before sowing, several methods are possible:
 - For any crop, bleach can be used against fungal, bacterial and viral contaminations. Soak the seeds in a solution of NaClO at 6 chlorometric degrees for 15 minutes, then rinse carefully and sow.
 - For pepper, seeds can be disinfected against TMV by soaking in a 10% solution of sodium triphosphate (Na₃PO₄) for 15 minutes up to a maximum of 1 hour. Thoroughly rinse the seeds with (tap) water and sow them immediately afterwards.
 - Tomato seeds can be disinfected against TMV by thermotherapy. Maintain the seeds at 80°C for 24 hours, after which they can be germinated. This treatment must not be applied to very freshly harvested seeds, but only to well dried seeds aged at least 2 months.
 - Fungicides with the active compound "mancozeb" (e.g. Titane 445) can be used against fungal diseases. Sow the seeds immediately after disinfection.

2. Identification

Plants must be labelled clearly with a unique number during the regeneration procedures to prevent mix-up of accessions. Use the same number for one accession from sowing until harvest. This can be a field number or, better, the accession number.

3. Number of plants regenerated

- 3.1. For self-pollinating species, use at least 5 plants. For heterogeneous accessions or cross-pollinating species at least 10 plants should be used to preserve genetic diversity. If possible, use more plants.
- 3.2. Try to regenerate as few times as possible because every time a heterogeneous accession or a population is regenerated, an involuntary selection is made, which

causes loss of genetic diversity. Regeneration cycles can be minimized if seeds are processed and stored under optimum conditions (long-term storage).

4. Transplanting of seedlings

From the seedlings, the requested number of plants for regeneration must be picked without making a selection, except:

- Seedlings that are not vigorous enough to grow and reproduce can be skipped.
- The very vigorous seedlings in self-pollinating species can be hybrids, so it is better to reject them.

5. Isolation

Though cultivated Solanaceae are considered a self-pollinating species, in some climatic conditions they can display a variable spontaneous outcrossing rate due to insect activity. This occurs in particular in eggplant, pepper, *Physalis* and *Cyphomandra*.

- 5.1. For self-pollinating species, to prevent accidental outcrossing, isolate each accession. This can be done by keeping accessions in an insect-free greenhouse, by isolating accessions with gauze nets, or by bagging the flowers. Vibrating the flowers or hand-pollination improves seed set.
- 5.2. For cross-pollinating species such as some wild relatives of cultivated Solanaceae, geographical isolation is possible. The minimum distance indicated between two accessions is 1 km, depending on the local conditions (climate, topography, insect population, etc.). Cross-pollinating species grown in isolated greenhouses can be pollinated by hand with a mixture of pollen from all plants of that accession.

6. Harvest

- 6.1. Harvest an equal number of comparable fruits per plant to ensure that each plant of a given accession contributes equally to the seed harvest.
- 6.2. Harvest only healthy fruits from healthy plants to obtain a good seed lot with high germinability.
- 6.3. Harvest fully ripe but not over-ripe fruits to obtain a good seed lot with high germinability. Sometimes, seeds start germinating in the fruit when it is over-ripe.
- 6.4. Harvest as many seeds as possible because this reduces the frequency of seed regeneration.

7. Seed cleaning

Seeds can be cleaned in different ways depending on the species and local facilities.

Example: Water method. Cut the fruits and remove the seeds by squashing the fruits in a bowl, or by using a spoon. Add a surplus of water and mix well. Add water and pour it off several times along with the fruit pulp. The pulp and empty seeds will float. The good seeds sink to the bottom.

A variant of this method can be used for tomato, the seeds of which are coated with gel. Instead of water, add a solution of HCl at 2% to the pulp, mix well together and leave for one hour. Rinse carefully.

- 7.1. Special attention must be given to cleaning seeds during collection expeditions. When seeds are not removed in time, fungi can start to grow, which affects seed quality.
 - Dried fruits of *Capsicum* can be stored for longer time.
 - Fresh fruits of tomato, eggplant and pepper can be stored for a few days if they are not damaged, after which time remove the seeds, clean them and dry them immediately.
 - When fresh fruits are damaged, remove, clean and dry the seeds immediately to prevent growth of fungi on the seeds.

8. Desiccation

- 8.1. Seeds must be dried as quickly as possible. Spread the seeds as much as possible and ensure there is an air current for rapid drying. If seeds are dried outside, always put them in the shade as very high temperatures can affect the germination rate of the seeds. The temperature should never exceed room temperatures.
- 8.2. After a first drying, the seeds can be packed in paper bags for further drying with silica gel or in an air-conditioned room.
- 8.3. The best way to store seeds is in airtight containers under cool conditions. Frozen seeds will keep their germinability even longer. If seeds are frozen they must first be well dried. A seed moisture content of 4-7% is good; 6% can be reached for eggplant, pepper and tomato by drying outside when the relative humidity is 30%.

9. Storage

- 9.1. Well dried samples can be stored in sealed plastic or aluminium foil bags, or in sealed tins or glass jars. In this way seeds will retain their germinability for a long time. Caution: storage in paper bags at ambient temperatures may cause rapid loss of germinability. If the moisture content of the seed is not easy to establish before storage, a small packet of silica gel put in the airtight container can ensure that the seed is sufficiently dry.
- 9.2. The best storage temperatures for long-term storage range from -15°C to -20°C and for medium-term storage from +4°C to +5°C.
- 9.3. Always have a safety-duplicate of each accession stored under good conditions in another location.

Appendix IV. Current status of seed stock management in European countries

Notes:

Shading indicates countries for which updates were received at the time of the meeting (February 2012). Countries and Institutes in **bold** are members of the WG.

The full names of institutes mentioned by their acronyms are listed in Appendix IV.

Country	Institute	Medium-term storage (working collection)	Long-term storage (base collection)	Presence of endangered accessions / Reasons	Regeneration frequency	Safety-duplication	Number of accessions				Ready to host under black box agreement	
							Cypho- <i>mandra</i>	Physalis	Pepper	Tomato		Eggplant
Armenia	Scientific Center of Vegetable and Industrial Crops, Masis	Room temperature		Yes / Old, few seeds	Frequent (1-3 / 5-7 years, depending on the age and amount of seeds)	Planned with CGN, the Netherlands	3	15	151	190	34	No
Austria	Government genebanks		Desiccation -20°C Glass flasks	No	When germination rate <60%	Not yet; arrangement with CGN, the Netherlands, is planned		10	19	12	1	No
	Arche Noah, Schiltern (NGO)	Desiccation Air-tight glass flasks	Desiccation -15°C	No	No	No			190	580	26	No
Azerbaijan	Institute of Genetic Resources, Baku	4 °C In plastic jars with ≥1000 seeds	-	Yes / Low seed quantity, old seed		No			66	93	63	No
Bulgaria	IPGR, Sadovo	+6°C No limit	-18°C 5000 seeds	Yes / Low seed quantity	Depending on germination ability	No			2073	1149	176	No
	Institute of Vegetable Crops, Maritisa								437	350		
Czech Republic	CRI, Genebank Olomouc		-18°C 50 g	No	15 years	Yes, in Slovakia			514	1604	25	

Country	Institute	Medium-term storage (working collection)	Long-term storage (base collection)	Presence of endangered accessions / Reasons	Regeneration frequency	Safety-duplication	Number of accessions				Ready to host under black box agreement	
							Cypho- <i>mandra</i>	<i>Physalis</i>	Pepper	Tomato		Eggplant
Estonia	Jõgeva Plant Breeding Institute, Jõgeva		-18°C	No		Yes, in Nordgen		20			No	
France	INRA, Montfavet	4°C 30-40% RH 500-1000 seeds or more		A few	13-20 years	Yes, with French network Tomato 60% Pepper 30% Eggplant 25%	1	9	1308 in ECPGR DB	1008 in ECPGR DB	1907, not all in ECPGR DB	No
Georgia	Institute of Farming, Mtskheta, Tserovani	4°C Seeds in jars	-18°C			2 Tomato accessions at Svalbard, Norway		15	16	15		No
Germany	IPK Genebank, Gatersleben	-18°C (all harvested seeds without base sample and safety-duplicate)	-18°C (double amount of regeneration quantity)	No	15-20 years	Yes, at Svalbard, Norway (currently, 1236 acc. of the 5 crops)	7	42	1532	4339	111	Yes, depending on capacity
Greece	ARCMT, Themi Thessaloniki	0-5°C 30% RH 5000 seeds		Yes / Old, few seeds	15 years							
Hungary	RCAT, Tápiószele	0°C 10-20 g	-20°C 10-20 g	Yes/ Low viability level and/or small quantity	When germination rate <80% of the initial rate	Partly in national base collection		17	1048	1824	42	No

Country	Institute	Medium-term storage (working collection)	Long-term storage (base collection)	Presence of endangered accessions / Reasons	Regeneration frequency	Safety-duplication	Number of accessions				Ready to host under black box agreement	
							Cypho- <i>mandra</i>	Physalis	Pepper	Tomato		Eggplant
Israel	Volcani Center, Bet Dagan	-10°C	Yes / No regeneration	No regeneration								
	Hebrew University, Jerusalem	Seeds stored at University of California, Davis (USA)	No									
Italy	IGV-CNR, Bari	0-4°C	-20°C 1-10 g	Few accessions / Old seed, few seeds or recent introduction from exploration	Not pre-fixed	Only duplicates of samples collected through joint missions with IPK-Gatersleben and the University of Tirana	192	560	53	Yes		
The Netherlands	CGN, Wageningen	Desiccation 4°C 35 seeds pre-packed	-20°C 1000 seeds (if regeneration)	No	Depending on seed viability	Yes, at HRI, United Kingdom	978	1153	483	Yes		
	Botanical Garden Nijmegen	2-4°C Silica gel Minimum 300 seeds		Few accessions / Few seeds	5-10 years		15	130	35	20	766	No
Nordic countries	NordGen, Alnarp, Sweden	-20°C	-20°C	No	When germination rate is <65% or minimum of 1000 seeds	Yes, at Svalbard, Norway						Yes, at Svalbard Norway

Country	Institute	Medium-term storage (working collection)	Long-term storage (base collection)	Presence of endangered accessions / Reasons	Regeneration frequency	Safety-duplication	Number of accessions				Ready to host under black box agreement
							Cyphomandra	Physalis	Pepper	Tomato	
Poland	National Centre for Plant Genetic Resources, IJAR, Radzików	0°C	-18°C Aluminium foil packets under vacuum	No	Depending on age and amount of seed	No	7	305	1271	18	No
Portugal	BPGV, Braga	0-5°C 40-50% RH	-20°C No humidity control	No	Last regeneration in 2000	No		114	83	1	Yes
	EAN, Oeiras	(48 acc.) +4°C Aluminium foil packets under vacuum		No	Last regeneration in 1990, there are approximately 500 seeds / accession	No		51			No
	EAN, Oeiras		(3 acc.) -16°C No humidity control	Yes/ Very few seeds	Seeds were collected in 1982 and never regenerated	No					
Romania	Research Institute for Vegetables and Flowers, Vidra	Room temperature 5-20 grams		No	When germination <50%	No	1		90	50	No
Russian Federation	VIR, St. Petersburg	10-15°C 10-14% RH 5-15 g	+4°C 6-9% RH 10-15 g	Yes / Old, few accessions, low germination ability	Working collection 3-10 years Base collection 25 years	Yes					No
Serbia	Centre for Vegetable Crops, Smederevska Palanka	8°C 5-20 g		Yes / low germination ability	10 years			352	345	44	

Country	Institute	Medium-term storage (working collection)	Long-term storage (base collection)	Presence of endangered accessions / Reasons	Regeneration frequency	Safety-duplication	Number of accessions				Ready to host under black box agreement
							Cypho- mandra	Physalis	Pepper	Tomato	
Slovak Republic	PPRC Genebank, Piešťany	+5°C Desiccation ≥1000 seeds	-18°C Desiccation ≥1000 seeds	No	Monitoring every 5 years, when viability falls	Yes, in Genebank Prague, Czech Republic 500 seeds					No
Spain	COMAV, Polytechnic University of Valencia	3°C Desiccation with silica gel 5-6% RH (200-5000 seeds)		No	Depending on seed viability	Almost all the collection is duplicated in: - Centre for Genetic Resources, Alcalá de Henares, Madrid - Vegetables Genebank, Zaragoza	57	61			No
Turkey	AARI, Izmir	Desiccation 0°C for active collection and +4°C for breeders' working samples	Desiccation -18°C	No	Depending on viability and number of seeds	Yes, at CRIFC, Ankara	850	516	265		No
Ukraine	Institute of Vegetables and Melon Crops, Kharkov		-18°C				625	2433	299		

Appendix V. Acronyms and abbreviations

AARI	Aegean Agricultural Research Institute, Izmir, Turkey
AEGIS	A European Genebank Integrated System
AQUAS	AEGIS Quality System
ARCMT	Agricultural Research Centre of Makedonia and Thrace, Thermi Thessaloniki, Greece
C&E	Characterization and evaluation
CCDB	Central Crop Database
CGIAR	Consultative Group on International Agricultural Research
CGN	Centre for Genetic Resources, the Netherlands, Wageningen
CNR	Consiglio Nazionale delle Ricerche (National Research Council), Italy
COMAV	Centro de Conservación y Mejora de la Agrodiversidad Valenciana (Institute for Conservation and Improvement of Valencian Agrodiversity), Valencia, Spain
CRI	Crop Research Institute, Prague-Ruzyne, Czech Republic
EAN	Estação Agronómica Nacional Nacional (National Agronomical Station), Oeiras, Portugal
EC	European Commission
ECPGR	European Cooperative Programme for Plant Genetic Resources
EGGNET	EGGplant Genetic Resources NETwork
EURISCO	European Internet Search Catalogue
FAO	Food and Agriculture Organization of the United Nations, Rome, Italy
IGV	Istituto di Genetica Vegetale (Institute of Plant Genetics), Bari, Italy
IHAR	Plant Breeding and Acclimatization Institute, Radzików, Poland
INRA	Institut National de la Recherche Agronomique (National Institute for Agricultural Research), France
IPGR	Institute for Plant Genetic Resources "K. Malkov", Sadovo, Plovdiv, Bulgaria
IPGRI	International Plant Genetic Resources Institute (<i>now Bioversity International</i>)
IPK	Leibniz Institute of Plant Genetics and Crop Plant Research, Gatersleben, Germany
ISHS	International Society for Horticultural Science
MAA	Most Appropriate Accession (<i>for AEGIS</i>)
MCPD	Multi-crop Passport Descriptors
MoU	Memorandum of Understanding
NC	National Coordinator
NGO	Non-governmental organization
NordGen	Nordic Genetic Resource Center, Alnarp, Sweden
PGR	Plant genetic resources
PPRC	Plant Production Research Centre, Piešťany, Slovakia
RCAT	Research Centre for Agrobotany, Tápiószéle, Hungary

SC	Steering Committee
SCVIC	Scientific Center of Vegetable and Industrial Crops, Daracert, Armenia
SGN	Solanaceae Genomics Network
SMTA	Standard Material Transfer Agreement
UPOV	Union internationale pour la protection des obtentions végétales (International Union for the Protection of New Varieties of Plants), Geneva, Switzerland
VIR	N.I. Vavilov Research Institute of Plant Industry, St. Petersburg, Russian Federation
WG	Working Group

Appendix VI. Agenda

***Ad hoc Meeting of the Solanaceae Database Managers and
First Meeting of the ECPGR Working Group on Solanaceae
14-17 February 2012, Menemen, Turkey***

Monday, 13 February

Arrival of Solanaceae Database Managers

Tuesday, 14 February – Meeting of Solanaceae Database Managers

Introduction
Discussion about data quality
Selection criteria and procedures

Arrival of other participants

Wednesday, 15 February – Meeting of the Solanaceae Working Group

- | | |
|--------------------|---|
| 8:30-9:00 | Introduction
Welcome by the Chair
Welcome by the Aegean Agricultural Research Institute
Opening speech: Assoc. Prof. Dr Masum Burak, General Director of Agricultural Research and Policies (ARP)
Self-introductions by the participants (<i>1 minute per person</i>)
Presentation of the agenda and adjustments
Solanaceae WG workplan for Phase VIII |
| 9:00-9:30 | Update on ECPGR and AEGIS (<i>Lorenzo Maggioni</i>)
Update per member on actions related to AEGIS (signature of MoU, availability of material, etc.) |
| 9:30-10:30 | MAAs
Discussion of preliminary selection criteria proposed by DB Managers and determination of final criteria
Discussion of the transfer of CCDB data into EURISCO
Quality of data in EURISCO (<i>Frank Menting</i>) |
| <i>10:30–11:00</i> | <i>Coffee break</i> |
| 11:00-12:30 | Compilation of first lists of possible AEGIS accessions (I)
Introduction (formation of subgroups)
Parallel sessions per crop |
| <i>12:30–13:30</i> | <i>Lunch</i> |
| 13:30-15:30 | Compilation of first lists of possible AEGIS accessions (II)
Plenary discussion on encountered problems
Continuation of parallel sessions per crop |

15:30-17:30 Visit to the genebank at Aegean Agricultural Research Institute

Evening Social dinner

Thursday, 16 February

8:30-10:30 Compilation of first lists of possible AEGIS accessions (III)

Plenary discussion on progress and problems

10:30 – 11:00 Coffee break

11:00–12:30 Compilation of first lists of possible AEGIS accessions (IV)

Finalization of lists in parallel sessions per crop

How to continue?

12:30–13:30 Lunch

13:30-15:30 AQUAS

Generic operational standards (FAO documents)

Standard regeneration and storage guidelines

Elaboration of crop-specific standards

15:30 – 16:00 Coffee break

16:00-18:00 Discussion and adaptation of the WG workplan

Checking and adaptation each topic of the workplan

Planning for safety-duplication of each collection under long-term conservation conditions

Status of Solanaceae WG project Phase VIII (duplicate finder)

Status of the draft minimum descriptors *Physalis* and *Cyphomandra*

Status report of new members of the WG

Remaining topics

Friday, 17 February

8:30-10:30 Presentation of the report and adoption of recommendations

10:30 – 11:00 Coffee break

11:00–12:00 Conclusions

Election of Chair and Vice-Chair

Closing remarks

12:00–13:00 Lunch

Excursion (optional)

Saturday, 18 February

Departure of participants

Appendix VII. List of participants

Ad hoc Meeting of the Solanaceae Database Managers and First Meeting of the ECPGR Working Group on Solanaceae 14-17 February 2012, Menemen, Turkey

N.B. Contact details of participants updated at the time of publication. The composition of the Working Group is subject to changes. The full list, constantly updated, is available from the Solanaceae WG's Web page (<http://www.ecpgr.cgiar.org/networks/vegetables/solanaceae.html>).

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