Minutes of the
New AEGIS final project meeting

Prague, Czech Republic, 22 May 2025

The final meeting of the New AEGIS project, funded by the German Federal Ministry of Food and Agriculture, was held at the Hotel Meritum, Prague-Ruzyne, back to back with the annual meeting of the ECPGR Genebank Managers Network, organized in collaboration with the local hosts of the Czech Agrifood Research Centre.

Presentations are available online (here).

1. Update on AEGIS and the New AEGIS project

Lorenzo Maggioni, ECPGR Secretary, welcomed all the participants, who were invited either as country contact person of the ECPGR Genebank Managers Network, or as staff of A European Genebank Integrated System (AEGIS) Associate Member institution participating in the New AEGIS project.

After an introduction on the scope, objectives and status of development of AEGIS, the specific objectives of the 'New AEGIS' project, funded by the German Federal Ministry of Food and Agriculture, were summarized together with the results obtained during its timeframe (1 September 2024–31 May 2025), with a total budget of ca. €150,000.

The project was mainly focused on improving the AEGIS quality system, i.e. advancing the quality of operation of the Associate Member genebanks. At least 20 new operational genebank manuals were developed. All manuals were analyzed by three experts and compared, offering an overview of current practices in genebanks and providing recommendations for improvement of the manuals or their compilation. Three genbanks decided to translate and publish their Standard Operational Procedures (SOPs). The Genebank Metrics tool was tested by 13 partner genebanks and a joint paper was prepared about this experience and submitted to a peer-reviewed journal. Within the project's timeframe, Hungary included over 500 accessions for the first time into AEGIS. Two crop-specifc standards were developed by the Berries and Maize Working Groups. Nine reciprocal visits of genebanks were carried out by three peer-review groups, each consisting of three countries. As part of the project, also phenotypic data for more than 2,300 accessions were provided to EURISCO from six countries. Project results and opportunities for future follow-up were discussed in this final meeting.

2. The blueprint for a certification system

Theo van Hintum reminded the participants about the status quo of the genebank system in Europe, with 423 collections and over 2M accessions. These genebanks' objectives are very similar, i.e. conserving plant genetic resources (PGR) for future generations and supporting their use for current users. However, a lot of redundancies and missed opportunities exist. Despite past efforts to promote a rational system of regional genebanks or crop genebanks, the reality is that many small genebanks have been created, possibly below the critical mass for efficient operation, while often uncritical acquisitions resulted in too large collections. In the current situation, although some important genebanks are well organized, it is generally unclear how well PGR are conserved, and their accessibility to users is generally poor.

To improve the situation, it is proposed that genebanks of various sizes, with various expertise, in various environments, collaborate and together conserve PGR for the future and make it available for current users.

To collaborate effectively, genebanks need to be able to rely on each other. Therefore, we need to build stronger coordination and political lobbying and implement a genebank certification system. Its blueprint has already been created (as part of the EU-funded project PRO-GRACE) and is ready to be implemented. Capacity building will be needed to help genebanks create a quality management system and reach the required operational standards.

The required elements of a certification system consist of quality management systems with SOPs and a reporting/monitoring system in place. The SOPs need to meet standards; therefore, agreed standards (such as the FAO Genebank Standards with crop-specific specifications) are needed. An authority needs to check and approve the SOPs. Compliance needs to be confirmed independently by a monitoring/certifying authority. The costs for individual genebanks need to be kept low.

It is also one of the objectives of the ECPGR PGR Strategy for Europe to establish a certification system that is economically sustainable and accessible to genebanks and collection holders.

A certification system was designed as part of PRO-GRACE. However, in the absence of a Research Infrastructure, ECPGR can proceed by strengthening AEGIS and identifying genebanks, inventorying operating procedures and improving transparency of genebanks. The genebanks need to take steps toward quality management, supported by targeted capacity building. At the same time, an international organization (perhaps the Crop Trust) could set up the certification system, define procedures and minimal standards.

In summary, the possibility of setting up a certification is within reach, although some tools still need to be created and the political support is possibly not complete yet.

3. The Genebank Metrics tool tested and validated

Genebank Metrics, presented by Th. van Hintum, are a tool attempting to standardize the communication of the genebank through monitoring of its operations. It is a very useful tool for various reporting purposes and provides a relatively easy way to calculate operational parameters. Initially, it requires the development of a script but, assuming that the documentation of operations is efficiently organized, then all the metrics can easily be calculated. The Genebank Metrics show the status of the collection and the activity of the genebank. Various categories of measurements are considered: size and composition of the collection; data and documentation; conservation; availability and distribution. The metrics can either describe the status at a certain moment, or the activity in a certain period. The metrics are based on concepts and SOPs.

The basis concept for all calculations is the 'accession', which is maintained according to the protocols. The 'base sample' is used to conserve the accession, and germination should be monitored on this sample. The SOPs define elements such as the 'number of accessions that need a germination test'. CGN developed a draft list of Genebank Metrics, of which ten are mandatory. The New AEGIS project enabled testing the Genebank Metrics by 13 genebanks with their own data and by the Global Crop Diversity Trust. The list itself was tested, as well as feedback was provided on the usefulness of the tool, clarity of metric definitions and important metrics missing. Eventually, amendments were made, the list was finalized and a manuscript paper was prepared and submitted to the *Plant Genetic Resources* journal. This tool was generally found very useful, the definition of several metrics was refined to better fit different genebank operations, supplementary materials were added to help with the metrics

calculations and a few metrics were added. The list that will be published will be the first version, serving as a basis for further discussion about concepts (e.g. 'accession') and protocols (e.g. 'viability monitoring'). This first list, which is *ex situ* seed oriented, will then likely evolve and can be adapted to other conservation methods (e.g. *in vitro*, cryo and on farm). Hopefully, it will be largely adopted and become the standard for reporting to FAO and others.

4. Safety duplication policy and options

The AEGIS Safety duplication policy was presented by L. Maggioni. Approved by the ECPGR Steering Committee in 2013, the policy is based on the standards for safety duplication outlined by the FAO Genebank Standards (2014). The main principle is that conscious duplication of accessions for their safety in another genebank is an internationally recognized and recommended approach.

The policy includes guidelines for the implementations of the articles of the AEGIS Memorandum of Understanding, whereby each European Accession will have an identified safety-duplicate stored under the same or better conditions than the original (Art. 8 a) x)), and each AEGIS Associate Member should ensure as soon as possible safety-duplication of their European Accessions in agreed conditions, under black-box arrangements as appropriate, at another Associate Member genebank, possibly in a different country, and/or at the Svalbard Global Seed Vault (Art. 9 d) v)). The meaning of a black-box arrangement is explained and optional models (non-mandatory) for formal safety-duplication agreements are provided on the AEGIS website. While formal agreements and black-box arrangements are not obligatory, it is always necessary to indicate the safety-duplication location by filling in the EURISCO descriptors DUPLSITE and DUPLINSTNAME. Based on data taken from EURISCO (May 2025), 64,559 AEGIS accessions (i.e. 54%) have a safety duplication site. Of these, 89% are duplicated in a different country, 70% are duplicated in Svalbard and 61% are duplicated only in Svalbard.

In the following discussion, Lise Lykke Steffensen, former director of NordGen, Sweden, clarified that the current policy at Svalbard is that only material that is already safety-duplicated elsewhere is accepted. Questions were raised about whether it would be desirable that Svalbard could accept primary duplicates, considering the difficulty of arranging one duplicate, let alone two. However, L.L. Steffensen advised that this rule should not be challenged, especially by the European region, since also developing countries are requested to send secondary duplicates to Svalbard.

5. Analysis of genebank manuals

Also on behalf of colleagues Silvia Străjeru (BRGV) and Erik Wijnker (CGN), Petra Engel (CREA) presented from remote the genebank manuals review, which was carried out by the three experts. Between November 2024 and May 2025, the experts carried out the task of analyzing existing and newly prepared manuals. Genebank manuals are instruments to provide transparency of operations, facilitate collaboration, build trust among genebank holders and germplasm users, encourage genebank managers to document and evaluate their practices, fostering continuous improvement and they are used as a guidance document for genebank reviews. They can be considered a starting point towards establishing a Quality Management System for genebanks under the AEGIS framework.

The tasks of the manual reviewers were assessing the quality of the manuals (were all questions answered logically, clearly, completely, relevantly?) as well as whether the template structure and questions supported the clarity of answers. The purpose was not of assessing the quality of genebank operations and procedures. Thirty-two manuals from 18 countries

were analyzed (Albania, Austria, Bulgaria, Czech Republic, Estonia, Georgia, Germany, Italy, Latvia, Netherlands, Poland, Romania, Serbia, Slovakia, Spain, Sweden, Switzerland and United Kingdom).

As a result of the analysis, it was noted that the level of completeness of the manuals was variable and the reason for incomplete answers is often due to the complexity of some questions requesting many details. Also, navigation boxes in Section 3 make reading difficult and some questions are similar in different sub-sections and thus redundant.

Looking at the answers, sometimes only keywords are given, omitting context or references are too vague, and explanatory web links are missing or lead to local language documents. Some respondents give excessively exhaustive answers, which makes reading tedious.

Recommendations for improvement of the manual template:

- Make sure all questions are answered (reminding about the "N/A" option)
- Re-organize section 3 according to conservation technique rather than splitting it into different topics
- Encourage consistent use of data: for quantitative data (e.g. storage capacity, seed viability thresholds), provide a standard format or table for respondents to fill in, ensuring consistency across responses.
- Eliminate redundant sub-questions: sub-questions often repeat the main question or overlap with other sub-questions, leading to redundancy in the answers.

Recommendations to respondents for improvement of their manuals:

- Update old manuals
- Answer separately to subquestions a, b, c in compound questions.
- Indicate 'not applicable' instead of leaving questions unanswered
- A reference to internal documents is not an informative answer. Rather summarize the main aspects, and provide a URL if possible
- Update your manual after peer review or using our feedback

In the discussion that followed, the advice of the experts was generally appreciated and the compilers of the manuals expressed the wish to receive specific recommendations related to their manuals. An update of the template was also considered useful, provided this would remain compatible with the original template, so that it could be easy to transfer the answers from the old to the new template, without losing information.

6. Standard Operational Procedures (SOPs) made public

A case study from the Plant Genetic Resources Bank (BRGV), Suceava, Romania was provided by Silvia Străjeru. SOPs are standardized guidelines for plant genetic resource conservation, helping to ensure consistency of operations and compliance with international standards. The Romanian genebank translated into English seven selected SOPs, covering core activities (i.e. seed conservation, *in vitro* conservation, field conservation, regeneration/multiplication, viability testing and the collection of genetic material from cultivated and wild flora). The detailed Romanian documents were synthesized into concise English documents, ensuring adherence to international terminology and standards. This operation was considered to have positive outcomes related to national, regional and global collaboration, facilitating knowledge sharing and adoption of best practices and enhancing partnerships with international institutions. It also supports research and education, providing resources for training students, researchers and conservationists worldwide. Finally, this step will also increase the visibility of the genebank.

Preparation and translation of SOPs by the Plant Germplasm Bank of the University of Pavia is also underway, as explained by Graziano Rossi. This exercise is considered very useful with the perspective of improving standards and ensuring transparency vis-à-vis the public funder; it also serves to better educate students, collaborators and regular staff. A few methodologies and documents have been already finalized (related to collecting, curation and storage), others are in preparation (germination, multiplication and collecting).

7. Reciprocal genebank visits

Dagmar Janovská reported about the genebank peer visits organized by the group composed of the Czech Republic, Georgia and Romania, involving also her colleagues Ludmila Papoušková and Vojtěch Holubec (CZE), Tamar Jinjikhadze and Levan Ujmajuridze (GEO), and Silvia Strajeru (ROU). A short description was given of the three genebanks visited.

The Suceava Genebank (SVGB) was recommended to develop a long-term financial strategy to ensure sustainable funding and reduce reliance on short-term projects; broaden safety duplication through formal agreements with regional and international genebanks beyond Svalbard; improve regeneration plans for open-pollinated crops; clarify seed request limits based on purpose and availability; and publish the distribution policy online, listing all conserved PGRFA.

The LEPL Scientific Research Center of Agriculture (SRCA), Tbilisi, was recommended to: establish a financial strategy that addresses inflation, project gaps, and ensures long-term sustainability; develop a formal contingency plan to maintain operations during emergencies; create a national PGRFA programme to define priorities, roles, secure funding and meet international commitments and to prioritise collection of key crops (e.g. wheat, maize, beans), especially local landraces, but conserving all crops before they are lost, storing and later regenerating them; ensure critical accessions are duplicated in a second genebank and adopt a formal safety duplication policy; implement seed viability protocols with clear thresholds, SOPs, and invest in drying and storage capacity; invest in emergency backup systems (e.g. generator, compressors) to secure storage during power outages; set a minimum seed quantity per accession to conserve diversity, as per international standards; define seed distribution limits for both minimum and maximum quantities per request; test seed viability regularly and design a system to flag accessions that require regeneration; improve documentation systems by digitizing vegetative collections, publishing data to EURISCO, standardizing procedures, and considering GRIN-Global or similar platforms.

The genebank at the Czech Agrifood Research Center, Prague, was recommended to: secure stable long-term funding to manage large collections and complex operations, reducing project dependence; use vacuum-sealed aluminium bags for base and safety duplicate storage; fully implement the barcode system for active use; and strengthen viability testing by investing in staff training and facility upgrades.

Dainis Ruņģis reported about the genebank peer visits organized by the group composed of Latvia, the Netherlands and Portugal, involving also his colleagues Agnese Gailīte (LTV), Erik Wijnker and Theo van Hintum (NLD) and Ana Maria Barata (PRT). A short description was given of the three genebanks visited, including their Strengths, Weaknesses, Opportunities and Threats.

It was observed that BPGV, Braga, Portugal, with its current facilities, available valuable genetic resources and current motivated and knowledgeable staff, has the potential to become one of the most important genebanks in Europe. The main challenge lies in achieving a “steady state” in basic genebank operations like regeneration, viability testing and seed distribution,

which need to be supported by sufficient capacity (and funding). This may require more autonomy by the genebank management, some difficult decisions regarding the composition of the collection and the quality management to realign and anchor procedures to international standards.

At CGN, Wageningen, The Netherlands, the genebank staff are very motivated and focused on conservation for future generations and immediate access to material. This strict prioritization of genebank activities can guide other genebanks, however in many cases this may be hampered by insufficient autonomy in terms of decision-making and setting of priorities (as well as funding).

At GRC, LSFRI Silava, Salaspils, Latvia, the safety duplication of the entire collection is crucial. Expanding genebank staff should be considered, since at the moment the genebank functioning relies significantly on in-kind contributions of partner organizations. Nevertheless, the genebank may not be far from reaching a "steady state". Efficiency may be increased by rationalizing the collection.

Staff and management in all visited genebanks are motivated and knowledgeable. All the visited genebanks have to deal with legacy issues (e.g. rationalization of collections, documentation in paper archives, storage in glass jars etc.). Discussions were stimulating regarding the definition of the collections, the creation of an archive, the need to share protocols, the concept of "steady state", the scope of reviews and the concept of Genetic Resource Centre.

8. Final discussion with capacity building needs and opportunities for future projects

Standard Operational Procedures (SOPs)

Several genebanks have developed or wish to develop their SOPs. Publication of SOPs is acknowledged to be useful for increasing transparency of operations and reciprocal trust, and also to share different experiences and inspire improvement of operations. It was mentioned that it could be useful to have models and a structure or a template that could be followed to fill in the different SOPs. CGIAR also has a template for SOPs that we may consider re-adapting.

- *M. Boczkowska, Poland, informed the group that she could volunteer to coordinate the preparation of templates for genebank SOPs as part of her Thesis preparation for her Master's Degree in Business Administration. The offer was appreciated by many in the group who offered support and collaboration to help in this task.*

Genebank peer reviews

This exercise has in all cases exposed the genebank curators to different perspectives and a useful comparison of different approaches. Overall, the reviews were considered a good instrument to enable quick learning and capacity building.

It was considered that the right size of a review team is a small size, with the travelling teams composed of a maximum of two delegates. The small size of the team enables the establishment of an intimate and trusted group and confidential talks. Reviews organized in groups of three were confirmed to offer the most suitable number of genebanks for this exercise, with at least one of them having previous expertise in genebank reviews. A larger number of genebanks for the same review would make it too difficult to find suitable dates for travel and would involve too much time for the experts. It was also suggested that an external expert could be useful to help in the preparation for a peer review.

Genebank metrics tool

It was acknowledged that the tool provided by CGN is very useful for keeping quantitative track of all the operations taking place in the genebank and offers a snapshot of the situation of the collection at any moment, by the push of a button. It is an excellent tool to monitor operations, plan requirements (germination tests, regenerations, safety duplications, etc.) and o report to donors or public agencies. At the same time, it was felt that not every genebank has an information system that is sufficiently advanced to host the tool. The preparation of the necessary script is not trivial and thus some instructions guiding in the necessary steps to install the metrics tool in various information systems would be useful.

Identified gaps and needs

Assuming the case that new funds could be raised by the Secretariat to be spent for AEGIS genebank capacity building, or by consortia organized around calls for proposals to the EC, a few specific items requiring support were identified (specific countries' needs are mentioned below, but the lists are non-exhaustive):

- *Only a few SOPs are currently available online. There was a demand for more examples being made available, since they are considered useful for reciprocal comparison. The process of systematically compiling and publishing SOPs was encouraged. Also the organization of specific 'hackathons', i.e. short events bringing interested people together to learn and improve upon specific operations (i.e. viability monitoring, germination testing, drying procedures, etc.) were proposed.*
- *Some genebanks are lacking a suitable documentation system or it is not working well and external advice to implement improvements could be desirable.*
- *Establishment of a Quality Management System may need guidance and instructions. It would be useful to prepare an outline of the steps and components required to set it up.*
- *Regeneration can be a problem in several genebanks, especially when many different crops need to be regenerated at the same time, due to loss of germination or lack of seeds. Genebanks in Austria, Montenegro, Poland, Serbia and Slovenia might benefit from external support.*
- *Flagging of AEGIS accessions can meet different obstacles in various countries. For example, safety-duplication can be a limiting factor in Austria and Latvia and external support would be beneficial. Also, the definition of what should be considered unique is not always clear and further advice would be useful.*
- *The genebank peer review exercise was largely appreciated. Other genebanks would likely volunteer to get involved in new trios (i.e. University of Madeira, Portugal), but also the regular repetition of the same exercise after three years by the same genebanks was considered a recommendable option by Austria and Latvia. Guidelines to implement the review system already exist, but need to be made more visible and handy online.*

Potential sources of funding

- The option of submitting a proposal to the EC for a COST initiative was considered suitable to provide funds for meetings of the Genebank Managers Network and for capacity-building efforts. The Open Call 2025 is open (here). The deadline for submissions is 21 October 2025 at 12:00. It was highlighted that a COST action needs to contribute to the scientific, technological, economic, cultural or societal knowledge advancement and development of Europe and thus propose an innovative idea on a

specific challenge leading to scientific or technological breakthrough. Building Quality Management Systems or a Peer Review System were proposed as suitable challenges.
    - *M. Boczkowska offered to lead the coordination of a proposal involving at least seven countries.*
- Horizon calls for proposals should be monitored, considering that genebank activities might fit within the scope of biodiversity-related topics.
- OECD events call for proposals to organize parallel sessions should be monitored, with the intention of informing policymakers or the industry about the PGR Strategy for Europe. This could be an opportunity for the countries leading the GRACE initiative or similar.
- The ECPGR Grant Scheme was suggested as a potential source of funds for small collaborative projects with a budget in the range of €30,000. Calls for proposals are usually launched in September/October each year. Within its scope and under primary priority are the topics of 'Supporting countries to identify and include material into AEGIS including regeneration and safety-duplication', the 'Implementation of a genebank review system' and the 'Implementation of a genebank certification system'. Proposals should be supported by at least one Working Group Chair.
- A reproposition of a specific project in support of AEGIS, funded by Germany or by a different ECPGR country remains a possibility that might emerge again in the near future.

List of participants:

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