New-AEGIS Peer Review Report

Genebank reviewed: “Mihai Cristea” Plant Genetic Resources Bank (BRGV), Suceava, Romania

Date: 9 – 11 April 2025

Participants BRGV: Silvia Strajeru, Dana Constantinovici, Diana Batîr Rusu, Dan Șandru, Dumitru Blaga, Camelia Golea, Denisa Petrescu, Paula Greculeac, Ioana Leti, Domnica Plăcintă, Danela Murariu, Florin Tanasă, Cezar Ciobăniței

Reviewers: Tamar Jinjikhadze, Ludmila Papoušková, Dagmar Janovská

Background

The New AEGIS project is a collaborative European initiative coordinated by the European Cooperative Programme for Plant Genetic Resources (ECPGR). It aims to revitalize and strengthen the AEGIS system (A European Genebank Integrated System) by improving the quality and efficiency of genebank operations across participating countries. The project promotes the implementation of the AEGIS Quality System (AQUAS), supports the development of standardized procedures, and encourages the sharing of challenges and genetic resources among European genebanks. Peer reviews of national genebanks are a central component of the project, providing mutual learning opportunities, capacity building, and constructive recommendations for further development to enhance alignment with international standards and ensure the long-term conservation and accessibility of plant genetic resources in Europe.

This report summarizes the findings and observations from the peer review visit to the Romanian Genebank (“Mihai Cristea” Plant Genetic Resources Bank (BRGV)), conducted within the framework of this project. Key reference material was the Genebank Manual (March 2025) provided by the host institution.

Visit organization

The Romanian genebank, officially named the “Mihai Cristea” Plant Genetic Resources Bank, functions under the authority of the “Gheorghe Ionescu-Sisesti” Academy of Agricultural and Forestry Sciences in Romania, located in Suceava. Silvia Strajeru, the director of the genebank, first welcomed all participants and presented the basic activities and information about the genebank. She also introduced the entire peer review agenda. Then, a tour of the genebank and other areas necessary for the handling and storage of plant genetic resources was followed. The individual activities were presented by the responsible staff. Most of the activities were presented using PowerPoint. Unfortunately, the field trials could not be visited due to the weather conditions.

Organisation, Management and Funding

The genebank is under the administrative and scientific management of the “Gheorghe Ionescu-Sisesti” Academy of Agricultural and Forestry Sciences, based in Bucharest. The genebank was founded in 1990 and has since developed into a national focal point for PGRFA conservation activities.

The genebank has a statutory mandate to collect, conserve, evaluate and distribute seed-propagated plant genetic resources. This mandate is rooted in Romanian legislation, in particular in Law no.

45/2009 and Government Decision no. 112/2018, which define the responsibilities of the Academy and its research institutions. As such, the genebank has clear institutional legitimacy and is recognized at the national level as the guardian of Romania's plant genetic heritage.

Its collections currently comprise over 25,000 accessions, including 19,037 unique genotypes, covering 597 taxa from 454 species and 44 botanical families. The most important conserved crops include maize, common bean, and wheat, with more than 11,000 accessions of these three species alone. In addition to cultivated varieties, the genebank prioritizes traditional landraces and crop wild relatives, many of which are threatened by the spread of modern agriculture and rural depopulation.

The genebank also plays a key role in international frameworks. It serves as Romania's national focal point for the implementation of the International Treaty (ITPGRFA) and uses the SMTA for the distribution of Annex I and non-Annex I material. However, it does not currently participate in any formal international safety duplication or regional conservation agreements.

The genebank's operating budget is mainly covered by allocations from the national budget, which are managed by the host Academy. Funding is generally stable and is used to support core activities, including staff salaries, infrastructure maintenance and conservation activities. Additional funding is acquired through competitive national and international research projects that complement the institution's activities, particularly in areas such as collection missions, characterization and infrastructure modernization.

The genebank has an organizational structure with 25 positions, of which 23 are currently filled. The staff are employed on the basis of individual, permanent contracts and their tasks cover the entire spectrum of genebank activities, including conservation, laboratory analysis, documentation and administration. The institution has also implemented a quality management system certified to EN ISO 9001:2015 and applies the SR 13572:2016 standards to support innovation management.

Recommendation 1 - Develop a long-term financial strategy for investment would help to ensure sustainability of funding by incorporating inflation forecasts and reducing reliance on short-term project-related revenues.

Recommendation 2 - Expand safety duplication agreements by establishing formal agreements beyond Svalbard to duplicate critical accessions with regional or international genebanks.

Germplasm management

The Romanian genebank manages an extensive and diverse collection of plant genetic resources through a comprehensive and well-structured approach. The acquisition of germplasm takes place through three main channels: targeted collection missions within Romania, exchanges with domestic and international partners and repatriation of accessions of Romanian origin from foreign institutions. Particular emphasis is placed on the acquisition and safeguarding of local landraces, obsolete cultivars and crop wild relatives (CWR), which are considered particularly susceptible to genetic erosion and are often underrepresented in existing collections.

The genebank applies a systematic protocol for the accessioning of newly acquired material. The identity and quality of externally acquired accessions are checked against the donor's records. In the case of collection missions, samples collected in the wild are taxonomically verified during the first multiplication cycle, either in the field or in controlled environments such as greenhouses. All incoming biological material is subjected to rigorous phytosanitary control and only healthy, true-to-type samples are included in the permanent collection. These steps are supported by an ISO-certified quality management system.

The accessions are conserved in three main strategies: seed storage, in vitro culture and field genebank conservation. For orthodox seeds, regeneration and post-harvest handling are optimised to maintain viability. The seeds are harvested at physiological maturity and undergo a two-stage drying process. This process ensures that the moisture content of the seeds is reduced to 5–6% before packaging. Active collections are stored at +4°C in vacuum-sealed aluminium foil bags, while the base collection is stored at –20°C. Viability is routinely tested every five years in the case of active and every ten years in the case of base collections with controlled germination protocols according to ISTA rules. The BIOGEN database tracks germination results and triggers regeneration when necessary.

In vitro culture activities are primarily focussed on *Solanum tuberosum* (potato) and *Allium sativum* (garlic), with facilities and protocols for isolation of sterile meristems, propagation and preservation under slow-growing conditions. The infrastructure includes fully equipped laboratories, laminar flow boxes, growth chambers and a dedicated preservation cell maintained at 6–10°C. While the lack of formal virus indexing is a limitation, the use of meristem culture techniques provides *de facto* phytosanitary protection by reducing the exposure of plantlets to pathogens.

Genetic integrity is actively maintained through multiple control measures. Regeneration protocols vary depending on the breeding system of each species. For cross-pollinated crops such as maize, regeneration includes spatial or mechanical isolation and manual pollination techniques to prevent genetic drift. The use of insect-proof cages and bumblebees (*Bombus terrestris*) is standard for entomophilous crops, while wind-pollinated species are treated with vibration techniques or artificial isolation. Seed quantities per accession are calculated according to reproductive biology, with minimum thresholds ranging from 1,000 to 15,000 seeds depending on crop species, pollination and conservation status.

Recommendation 3 – the regeneration strategy for the open-pollinated crops should be enhanced

Documentation and information

The Suceava Genebank uses a dedicated digital information system called BIOGEN, which serves as the main platform for managing and documenting all aspects of its germplasm collections. This internal database records passport data, viability test results, storage conditions and the regeneration history of seed accessions. It also facilitates the selection of material for viability monitoring and guides the regeneration plan through algorithmic queries based on thresholds and test intervals.

Genebank has initiated a new project to modernize and streamline the work of its researchers by replacing the current BIOGEN software with a new application called GeneDataBank. This new system is built entirely on Open-Source technologies, utilizing a relational database (PostgreSQL) and a Java-based back end. Access to the application will be provided via a web browser, making it user-friendly and widely accessible.

The genebank systematically collects data during collection missions using standardized passport descriptors. In addition to basic information such as taxonomy, origin and collection location, the genebank also records local knowledge through structured descriptors and on-farm questionnaires. This documentation is particularly valuable for landraces where the link between the cultural heritage and the genotype is of great importance.

The information system is integrated into the daily work processes, particularly in seed conservation. Prior to each viability test, the BIOGEN database creates prioritized accession lists based on the year of the last test and the germination performance. These lists guide laboratory staff in sample selection, while subsequent test results are entered into the system for tracking and long-term evaluation.

Although BIOGEN is robust at an institutional level, it is not currently linked to international catalogues such as EURISCO, nor does the genebank participate in automated data exchange with other PGRFA information systems. The lack of online publication of data represents a missed opportunity for international visibility and potential collaboration.

For distributed accessions, passport data and evaluation results (if available) are shared with recipients. Researchers and breeders receive comprehensive datasets, while material distributed to individuals (e.g. for on-farm conservation of landraces) is accompanied by simplified labels that include accession number, origin, scientific and local names.

The documentation of *in vitro* and field collections is less well developed than that of seed accessions. Although internal Excel records are used to track meristem numbers, subculture intervals and the status of accessions, these are not fully integrated into the main BIOGEN database. Monitoring of vegetative accessions is largely based on expert judgement and observation rather than a centralized information system.

Recommendation 4 - There is no fixed limit on the number of seeds requested and provided; quantity depends on the purpose and stock.

Conclusion

The Romanian genebank is a well-established institution with a clear mission and strong national relevance. Its team has a high level of expertise and technical competence in the field of seed and in vitro conservation. The genebank operates within a robust legal and institutional framework, supported by qualified staff, certified procedures and a genuine commitment to the conservation of Romania's plant genetic heritage.

However, even though the foundation is solid, there are still some areas where improvements are needed in order to adapt to the leading international standards. Improving documentation systems, expanding international collaboration, and investing in research infrastructure would take the genebank's position from good to exemplary. With targeted development, the Romanian genebank has the potential to become a regional leader in the conservation of plant genetic resources.