

## New-AEGIS Genebank Peer Review

Genebank reviewed: “Banco Português de Germoplasma Vegetal” (BPGV), INIAV, Braga Portugal.

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### BACKGROUND

The "Reinforcement of the AEGIS Quality System and EURISCO Data Coverage" (New AEGIS) project aims to enhance the European Genebank Integrated System (AEGIS) and improve the accessibility of plant genetic resource (PGR) data through the EURISCO database. This initiative aligns with the priorities of the European Cooperative Programme for Plant Genetic Resources (ECPGR), focusing on the sustainable conservation of unique European germplasm and the efficient sharing of related data. As part of the AEGIS quality system (AQUAS), peer reviews are conducted to ensure transparency, promote mutual support, and provide valuable feedback on genebank practices. These reviews foster continuous improvement, ensuring that genebanks uphold high operational standards and contribute to a robust, accessible European Collection. Reciprocal peer reviews are carried out by groups of three genebanks, and this report is the result of a review conducted by a group including the Latvian Genetic Resource Centre, the Centre for Genetic Resources in the Netherlands, and the Banco Português de Germoplasma Vegetal in Braga, Portugal.

### VISIT ORGANISATION

The first visit in this peer review cycle was organized by INIAV and took place at the Banco Português de Germoplasma Vegetal (BPGV) in Braga, Portugal. BPGV is the national gene bank responsible for conserving plant genetic resources in the country. Established in 1977, it now houses over 47,000 samples from 150 species and 90 genera, including cereals, aromatic and medicinal plants, fibers, forages, pastures, and horticultural crops.

The current director, Ana Maria Barata, provided an Operational Genebank Manual based on the AEGIS template, which served as a helpful starting point. Reviewers arranged their own travel to a hotel in Braga, after which Ana Maria Barata provided transport to and from the Institute.

The visit began with an introduction by Ana Maria Barata, who explained the organizational structure and funding basis of the Genebank. Following the introduction, the review focused on visiting various areas within the BPGV building, such as the documentation room, the *in-vitro* laboratory, the seed testing laboratory, the molecular lab, the seed-cleaning lab, the drying chambers, the cold rooms and the cryo-lab. These visits offered plenty of opportunities to engage

with staff and gain valuable insights into the operations of the BPGV. The morning of the second day was dedicated to a detailed explanation of the BPGV's documentation system (GRIN-Global). The review concluded with a presentation by the reviewers, who shared their observations and recommendations with the BPGV staff.

## REVIEW

The conserved Portuguese plant genetic diversity has a large potential to contribute to world food supply, and is an important source of germplasm for breeding and research. The current collection appears to cover most of this diversity as far as landraces are concerned.

The BPGV is a well-organized genebank, with good facilities and qualified and enthusiastic staff.

### *Organization, management and funding*

The plant genetic diversity conserved at the BPGV is significant, yet the international use of its genebank material remains low.

One of the key observations is that the annual funding only covers staff salaries and utilities. As a result, basic genebank functions, such as the regeneration and characterization of accessions, rely on irregular project funding. This funding often prioritizes the evaluation of accessions over regeneration, creating challenges for the Genebank and a mismatch in desired fund allocation. Additionally, the director does not have financial autonomy, which limits the flexibility to reallocate funds or hire new staff. This funding mechanism restricts the genebank's ability to manage resources effectively.

The building that houses the BPGV, as well as the surrounding fields used for regeneration and characterization, are provided at no additional financial cost. However, without proper financial flexibility, the genebank's capacity to carry out essential tasks is constrained.

**Recommendation 1:** Increase the stability and volume of funding for core activities, such as safety backup, regeneration, viability monitoring and providing access to resources.

**Recommendation 2:** Separate research activities from genebank operations in both administration and budgeting to allow transparency about the budget actually spent on the core responsibility of the Genebank: plant genetic resources conservation and distribution.

Looking ahead, continuity and long-term stability are critical for the BPGV. The director is set to leave within the next year, and it is essential to identify a suitable replacement to ensure the continued operation and growth of the genebank. Difficult choices lie ahead, and only a successor who understands the unique challenges and capabilities of the BPGV will be able to navigate these issues effectively. Ensuring a smooth transition and good succession planning for the director role is crucial.

**Recommendation 3:** Develop a long-term policy to help the genebank reach a "steady state". This policy should ensure the capacity to perform the core task of the Genebank, supported by stable funding for essential genebank functions.

### *The genetic resource collection*

The BPGV holds a large number of samples, but the actual size of the functional collection, in terms of accessions that are properly managed, securely conserved and ready for distribution, is not immediately clear. According to the provided information, the BPGV has 47,000 seed accessions, of which 30,000 are properly documented in GRIN-Global and uploaded to EURISCO, the remaining are being processed. The BPGV estimates that around 70% of the accessions (approximately 21,000) are potentially available for distribution, but only 2,000 of these are safety-duplicated in the Svalbard Global Seed Vault (SGSV).

**Recommendation 4:** Prioritize accessions by identifying those that are properly managed (viable and with sufficient quantity for distribution). The remaining accessions could be classified as "candidates" and added to the functional collection over time.

**Recommendation 5:** The low proportion of the collection that is safety-duplicated is a significant vulnerability. Safety duplication to Svalbard or other collaborating genebanks should be prioritized.

The capacity for germination testing is limited to 600 accessions per year, which is similar to the capacity for regeneration. This is insufficient to achieve a "steady state" for the collection.

**Recommendation 6:** Reevaluate the viability testing protocols with the objective of increasing the number of samples tested per year. Consider what specific information is needed and how it can be effectively determined.

The regeneration process should maintain genetic integrity. Currently, in some cases only 20 plants per accession are used in regeneration, which is on the low side for preserving genetic integrity.

**Recommendation 7:** Increase the capacity for viability testing and regeneration by reallocating existing funds or securing additional funding.

Despite the large and important diversity conserved at the BPGV, the international use of its genebank material remains low, much lower than would be expected given the importance and potential impact on research and breeding. Currently, all material is listed as "non-available" in GRIN-Global, which likely contributes to a low request rate for the materials. As a result, the genebank's international visibility and status remain limited.

While the management of the collection is based on a solid foundation in terms of organization and facilities, there is room for improving the quality assurance processes. This will increase the efficiency and efficacy of the processes and make the Genebank 'future proof'.

**Recommendation 8:** Work towards improving the documentation and transparency of protocols by implementing a quality management system.

### *Documentation and information*

The BPGV uses the GRIN-Global (GG) database and was one of the first genebanks in Europe to adopt it. While all curators use GG for sample management, they may not be familiar with all its features and functions. The BPGV lacks dedicated IT support, but INIAV provides efficient technical assistance, allowing issues to be resolved quickly.

**Recommendation 10:** Optimize the use of GRIN-Global functions for collection management and providing access and/or develop a decision support tools based on the data stored in the database.

The BPGV also maintains a large and important paper archive, especially regarding the origin and legal status of accessions, but this archive is vulnerable.

**Recommendation 11:** Consider digitizing and annotating the paper archive.

## CONCLUSION

With the current facilities, the available valuable genetic resources, the current motivated and knowledgeable staff BPGV has the potential for becoming one of the more important genebanks in Europe. The main challenge lies in achieving a “steady state” in genebank operations in which basic operations like regeneration, viability testing and seed distribution are supported by sufficient capacity (and funding). Such may require more autonomy to the Genebank management, some difficult decisions regarding the composition of the collection and quality management to anchor the procedures and realign them to international standards.

## ACKNOWLEDGEMENT

The reviewers would like to thank the BPGV staff for their availability and their willingness to present the genebank’s activities in a positive and open way. The reviewers experienced a welcoming environment and appreciated the warm hospitality.