



## **AGENT Project – Genebank Review**

Place: Plant Breeding and Acclimatization Institute – National Research Institute (IHAR-PIB), Radzików, Poland

Date: October 21 - 23, 2024

Participants IHAR: Maja Boczkowska

Reviewers: Beate Schierscher-Viret (AGROSCOPE), Patrizia Vaccino (CREA-CI)

### **Background**

Within the AGENT project a new approach is tested to review the operations of European genebanks (GB) and guide their improvement through a system of reciprocal visits and support. The blueprint of a GB monitoring system, as adopted by the European Genebank Integrated System (AEGIS), will be tested by focusing on the European collection holders of wheat and barley cooperating within AGENT. This will serve as an example for wider use within the European network. Curators of 11 GBs will visit each other's facilities and evaluate the efficiency of operations based on jointly prepared protocols. Reports will offer recommendations for improvement and will be used to approach suitable funding agencies for targeted capacity building. In the fourth cycle the genebanks of CREA-CI (Italy), WBF Agroscope (Switzerland) and IHAR (Poland) are involved.

### **Visit/Organization**

The third genebank visit, scheduled for the fourth cycle peer review, took place in Radzików at the Polish National Genebank, National Center for Plant Genetic Resources (IHAR-PIB). Maja Boczkowska, Genebank Manager, introduced us to the staff and gave us a tour of the facilities, laboratories, and field trials. She also provided us with the Genebank Manual. The Director of Scientific Affairs gave us an overview of the Institute's structure.

### **Organisation, Management and Funding**

IHAR was established in 1951 to focus on plant breeding, genetic improvement, and the acclimatization of crops to Poland's diverse agricultural conditions. Over the decades, the need to preserve genetic diversity became increasingly important, not only for breeding but also for safeguarding agricultural sustainability and responding to environmental and climate changes. The concept of a centralized gene bank for plant genetic resources was first proposed in the 1970s and 1980s. This was a period when there was a growing global awareness of the issue of genetic erosion and the loss of agricultural biodiversity. Poland, with its long history of agriculture and its role in preserving native crop varieties, recognized the importance of establishing a gene bank to safeguard its plant genetic resources for future generations.

In the late 1980s, the National Center for Plant Genetic Resources was formally established at IHAR-PIB to act as the national gene bank. Its mission is to collect, conserve, document and utilize plant genetic resources, with a particular focus on crops of economic importance to Polish agriculture, as well as their wild relatives.

The National Center for Plant Genetic Resources is a scientific department of the Plant Breeding and

Acclimatization Institute – National Research Institute. The long-term storage, herbarium and field trials are based in Radzików, while the Botanic Garden is located in Bydgoszcz. The gene bank employs a total of 34 people, all of whom are in permanent positions. There are ten staff members based in the BG in Bydgoszcz and 24 based in Radzików. In total, the team comprises nine scientists and 25 technical staff members. There are currently vacancies at the gene bank, but there are some issues with fulfilling these roles. The salaries on offer are not competitive, and the location, which is some distance from the city centre and not easily accessible from Warsaw, is a disadvantage.

The budget of GB is financed by the Ministry of Agriculture and Rural Development, with additional support from the Ministry of Science and Higher Education and various national and international projects. On an annual basis, the Ministry of Agriculture is engaged in a contractual agreement, with costs outlined within the budget by the GB manager. The budget from MS comprises three-year projects, which cover maintenance costs and certain materials. The MS makes annual calls for proposals.

#### **Recommendation 1**

*It would be advisable to consider an increase in salaries and to request improved public transportation in order to enhance the appeal to younger individuals.*

#### **Recommendation 2**

*It is recommended that funding be provided on a stable and annually increased basis.*

### **Germplasm Management**

The NCPGR currently preserves approximately 90,523 accessions, with 84,293 stored as seed samples in the active collection. The Polish GB houses a total of 358 genera and 1,054 species. The base collection comprises 27,083 accessions, with approximately 11,000 having safety duplicates stored in the Svalbard Global Seed Vault. The active collection is stored in vacuum-sealed jars, each containing a desiccant agent. The active collection is stored in five chambers at a temperature of +1°C. The base collection is stored in a single chamber at -18 °C. The seeds are stored in three layers of vacuum-sealed aluminium foil bags. Each container is labelled with a barcode, accession number, name of the accession and species. The barcode is linked to the GB database, EGISET, which provides information about the location of each accession within the chambers. Each chamber of the base collection is equipped with two independent refrigeration systems, ensuring that 100% of the cooling demand is met. The active collection is served by a single central installation, with double coolers in each chamber. The facility is equipped with a diesel-powered generator that provides backup power for up to 24 hours. The installations are subject to regular inspection. A security system is in place to control access to all GB facilities. The cooling system was not designed to withstand prolonged periods of high temperatures, which has resulted in challenges maintaining a consistent, low temperature in the active collection chambers. Therefore, technical assistance from Constance is required.

The viability of seeds is tested upon their introduction to GB (new and regenerated seeds) in accordance with ISTA procedures. Thereafter, testing is conducted on a regular basis, every five to ten years, depending on the species-specific longevity (three repetitions, 25 seeds each). Accessions are regenerated in the event that the germination level drops below 80% (with the exception of weeds, CWR and forage grasses).

All GB procedures are documented and standard operating procedures (SOPs) are available in Polish. Each collection of crops is managed by a specialist curator. The curators are drawn from both internal and external sources. Internal curators are drawn from the GB staff and IHAR staff, while external curators are specialists from universities or other institutes.

### **Recommendation 3**

*It is strongly recommended that modern cooling systems be implemented in the long-term storage chambers.*

### **Documentation**

The GB have a customized documentation system, EGISET, which contains passport and evaluation data based on MSSQL Server. Furthermore, the system is utilized for GB storage and herbarium purposes. Furthermore, the system is integrated with an online ordering portal accessible via the webpage [www.wyszukiwarka.ihar.edu.pl](http://www.wyszukiwarka.ihar.edu.pl). The system also includes a taxonomic dictionary and a dictionary of descriptive terms for C&E. Two individuals are tasked with maintaining the documentation system. It is the responsibility of the curators of the collection to verify and update the passport and C&E data. GB reports can be generated at the collection level for all passport and C&E data.

On an annual basis, the database manager updates the data to EURISCO directly, while the National Focal Point (Ministry of Agriculture) facilitates the transfer of data to FAO. We are currently implementing the use of Digital Object Identifiers (DOIs). All information pertaining to GB accession is publicly available. Accessions free from third-party rights are available to order via the ordering webpage. Accessions from Annex I are covered by MLS, and all accessions are provided following automatic acceptance of SMTA.

### **Recommendation 4**

*It is recommended that all accessions be assigned to Digital Object Identifiers (DOIs).*

### **Recommendation 5**

*We recommend that the documentation of the accessions be strengthened and expanded, including the addition of photos and more passport data for all crop varieties.*

### **Plant Health**

In field trials, pesticides are only applied in response to disease or pest infestations. During the regeneration process, visual inspections of the plants and seeds are conducted to ensure their health and quality. In order to comply with international plant health standards, seed shipments outside the EU are accompanied by a phytosanitary certificate.

### **Final conclusion**

In conclusion, while the NCPGR plays a pivotal role in safeguarding Poland's agricultural biodiversity, the peer review identifies critical areas for investment and improvement to maintain its international standing and ensure its long-term operational resilience. By enhancing remuneration, modernizing infrastructure and expanding documentation, the genebank will be able to not only overcome current challenges but also establish itself as a leading institution in plant genetic resource conservation in

Europe. It is worth noting that GB is well organized, and that the quality of its operational procedures is high. The facilities are well designed, but urgent attention is required with regard to replacing the cooling system. The management, viability testing, and other processes are carried out by dedicated, qualified staff members.

### **Final remarks**

In conclusion, all recommendations given here could be realized if adequate additional funds are provided.

October 23rd, 2024

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