



## **AGENT Project – Genebank Review**

Genebank Reviewed: Institute of Plant Genetic Resources “Konstatin Malkov”

Date: October 6-7, 2022

Participants IPGR: Katya Uzundzalieva, Gergana Desheva, Nikolaya Velcheva, other staff members

Reviewers: Luis Guasch, Isaura Martín (CRF-INIA, Spain), Theo van Hintum (CGN, WR, The Netherlands)

### **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 first cycle the genebanks of CRI (Czech Republic), NPPC (Slovakia) and IPK (Germany) are involved, in the second INIA (Spain), IPGR (Bulgaria) and WR (The Netherlands). This report reports on the third review in the second cycle: that of the Institute of Plant Genetic Resources “Konstatin Malkov” in Sadovo, close to Plovdiv, Bulgaria.

### **Visit/Organization**

The third visit in the second cycle was organized by Katya Uzundzhalieva, Director of the Institute of Plant Genetic Resources (IPGR) “Konstatin Malkov”. She and Gergana Desheva provided a draft of the IPGR Operation Manual, including also information in the checklist of Appendix 2. The Manual gave the reviewers an excellent opportunity to prepare the visit as it describes the organization and procedures of the genebank.

Accommodation and flights were arranged by the reviewers. The genebank staff organized transportations between airport, hotel and genebank, as well as all the details to facilitate an optimal review work.

Based on an agenda for the two-day review, all aspects of the genebank could be reviewed and discussed. Katya Uzundzhalieva gave a comprehensive presentation of the IPGR organization and funding, Gergana Desheva explained the different procedures of the genebank and Nikolaya Velcheva the documentation system.

The reviewers visited the seed desiccation and storage chambers, and the viability testing and packaging facilities, and had the opportunity to talk with the staff involved. The visit to the IPGR museum gave us the opportunity to have a look at 140 years of history of the Center. Legume and cereals processing facilities were also visited, including specific seed threshing and cleaning machines. A plant/seed pathology expert showed the group one experiment to test disease resistance on beans and how they perform standardized seed health analysis on regenerated

accessions. The documentation system and the first version of the new documentation platform were also presented.

The IPGR operation Manual was reviewed to obtain further information or to clarify some aspects when necessary. At the end of the second day, the reviewers discussed and presented a first draft of their impressions of the genebank.

### **Outcome of the Review**

The first outcome of the review was the exchange of different approaches to conserve and use the PGRFA. The presentation of the IPGR showed that the activities carried out at the very beginning of the genebank were aimed at recovering an important part of the samples stored at the former Institute of Genetic. Since then, the collections have been enriched with new germplasm from different geographical origins and with repatriated material. In recent years, the collection and preservation of Bulgarian PGR had the highest priority for both crop wild relatives and endangered landraces.

The different crops or crop groups in the IPGR Genebank are managed by different curators. The curators are also linked to the breeders of the IPGR Breeding Department. As a result of the breeding activities, the Institute has some crop varieties in the market, some licensed and others directly supplied/sold to the farmers.

Due to the composition of the collections - base, exchange and working collections - the panel asked for clarification, especially regarding the responsibilities of the genebank on working collections.

In addition to this general outcome, a number of observations were made, some of which can be translated into recommendations. These will be presented per topic.

### Funding

IPGR has a relatively large staff (comparing with their equivalents in Europe) consisting of 38 dedicated and able people (16 PhD, 12 BSc and 10 technical support staff). Also the facilities in terms of buildings and land seem to be sufficient for the dimension of the genebank. The people are well trained and their professionalism allows the genebank to function even with scarce resources. Thus, the only thing lacking is the funds to properly use these resources, i.e., the costs for maintenance of the buildings, new equipment, electricity and other consumables need to be raised by the Government - Agricultural Academy. Selling land production or creating and selling varieties can contribute, but will not generate sufficient funds for the required investments for renewing facilities. The installation of a power generator, for use in case of emergency, is urgently needed. Also solar panels would assure power supply and reduce the CO<sub>2</sub> food print of the Institute. Also, a new desiccation chamber needs to be constructed and the situation regarding the use of Freon gas (ref Regulation EC, 2037/2000) in the cold chambers needs to be addressed.

### **Recommendation 1**

Assure funds for proper maintenance and exploitation of the personal and physical infrastructure. There are some critical issues that have to be solved as soon as possible such assuring power supply by installing a power generation in case of emergency and solar power supply. It is necessary to make external insulation of the building in the fastest way. Besides, a relatively small annual investment would allow increasing the output considerably.

### Staff management

The staff is working professionally and effectively. They are involved in exchange programs abroad, such as the peer reviews, or staff exchanges within the Agent project, exchanges using ERASMUS and collaborative networking activities through their participation in many ECPGR working groups. However, it seems that there is no structure for sharing experiences internally nor discussing issues of common concern on a regular basis. Having more exchange of ideas and experiences could improve the feeling of common responsibility and solidarity.

### **Recommendation 2**

Organize regular (possibly two-weekly) meetings of senior operational staff to present and discuss activities, upcoming funding opportunities, participation in meetings, etc.

### Collection management

IPGR is conserving various collections: the base, the exchange and a working collection. This complicates the management and protocols unnecessarily, as the situation is relatively simple: the genebank should manage a collection that needs to be conserved in perpetuity (incl. full safety backup) and made available. The working collection should be outside the scope, i.e., only be the responsibility of the relevant curators. The exchange collection should be considered a subset of the collection and it has to increase substantially, it is not understandable to be just 5% of the base collection.

The coverage of Bulgarian material could still be improved, especially for those landraces that are currently cultivated but not yet collected, as they are under great threat of genetic erosion due to climate change.

### **Recommendation 3**

Define better the status, and associated management of (parts of) the collection, resulting in a collection that should be conserved and available for distribution.

### **Recommendation 4**

Actively expand the part of the collection that can be distributed to users by checking the seed quantity stored and the status of all material in collection regarding the (legal) possibility to distribute.

### **Recommendation 5**

Make safety duplication of all material in the collection the highest priority. Taking a sample for safety duplication should be made part of the procedure of seed handling after every regeneration.

### Seed management

Although IPGR is very well equipped in terms of storage space, the storage facilities at  $-18^{\circ}\text{C}$  are nearly full and the material prepared for distribution is stored at  $+6^{\circ}\text{C}$ . Both issues could be improved relatively easily. Installation of standing freezers for the material prepared for distribution to users would allow the storage of all material at  $-18^{\circ}\text{C}$ . They could also be used for storage of small quantities of 'original material' for future reference. The storage conditions of the working collections can be improved without increasing too much the workload, just changing the open plastic boxes with closed boxes with silica gel inside - to maintain low moisture- that can be replaced easily if the indicator turns.

The current -18°C storage room is very large and by re-examining the necessity of the large quantity of material stored there now could free up space considerably. This excessive amount of seed at base collection can be used to extent the exchange collection in separate bags every time a bag is opened.

#### **Recommendation 6**

Standardize the storage conditions to -18°C, also for material prepared for distribution to users. The installation of standing freezers in the current +6°C room could be a good, easy and fast solution.

#### **Recommendation 7**

Consider establishing a lower ceiling to the amount of seeds to be stored of one accession to avoid unnecessary use of space in the -18°C storage room.

#### Documentation system

Much of the important documentation (seed inventories, germination testing results, characterization data, etc.) is currently stored in Access and Excel files on different computers. This is undesirable because of the danger of accidentally loosing information and difficulties of access. Therefore a new documentation system, as is being prepared, is highly necessary. However, the time that the implementation of this new system is likely to take is too long and requires action to improve the current situation. This might encompass making an inventory of existing information (Excel files and other sources), starting the standardization, creating a data dictionary and assuring proper back-up.

Regarding the creation of the new system, the review panel have concerns that this system might not create the functionality needed by this genebanks, and therefore the exchange of ideas with the developing organization needs to be intensified.

Information in EURISCO should be updated to assure that the material represented actually exists in the collection.

#### **Recommendation 8**

Install a new documentation system covering all vital information and functions of the genebank. Assure proper functionality of the new system by intensifying the interaction between the IPGR and the organization responsible for the development.

#### **Recommendation 9**

Aim at digitizing the approval procedures. This will improve the accountability of the ones responsible for the various steps in the procedures.

#### Quality assurance and improvement

The current staff is professional and committed, however their knowledge and experience is largely undocumented. Working towards proper quality management is of importance to better document the procedures in Standard Operating Procedures, or similar documents. This will not only increase the transparency, allowing discussion and improvement of the protocols, but will also allow easier succession of staff members.

Documentation of the procedures might result in an assessment of the effectiveness of procedures such as those for germination testing (should it be done before or after drying?) and regeneration (are the crops with partial cross-pollination appropriately isolated?).

### **Recommendation 10**

Aim at documenting the procedures for all vital processes of the management of the collection. This will allow higher transparency, and thus improvement of the procedures.

### **Final conclusion**

The Institute of Plant Genetic Resources “Konstatin Malkov” in Sadovo is a strong organization and good genebank, with well-educated and dedicated staff. It only needs to take a few steps, most prominently the assurance of stable and proper funding and the development and adoption of a proper documentation system, to becoming a first class genebank, ready for European certification, once this is introduced.

### **Final remarks**

The reviewers were impressed by the excellent preparation, positive atmosphere and complete transparency presented by the hosts. As a result the discussions were open and fruitful. This was very much appreciated.

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The reviewers: Luis Guasch, Isaura Martín and Theo van Hintum