



Report of the Peer Review of the CGN Genebank

(March 6th to 8th 2019, Wageningen, The Netherlands)

Introduction

To assure sufficient food supply to the growing world's population, Plant Genetic Resources (PGR) need to be conserved and made available to crop research, plant breeding and farmers, now and in the future. The UN Sustainable Development Goal (SDG) 2.5 recognises this in calling for the maintenance of genetic diversity.

But the task of conserving and providing access to PGR is huge, and no single genebank or country can do it alone. Instead, it is a Global Effort in which different actors have to contribute. Many research institutions related to plant breeding started genebanks, and most countries have a national genebank or network of genebanks often in connection with national breeding programmes. To be considered part of the Global Effort a genebank should have adopted two principles: 1 – the material should be properly conserved and 2 – the material should be accessible.

Within Europe, genebanks are supported to implement these principles by the European Cooperative Programme for Plant Genetic Resources (ECPGR) and more specifically its initiative AEGIS, that tries to create a network of collections and facilities that together optimally conserves PGR in Europe and make it available to users. To streamline the conservation activities in Europe over different domains (plant, animal and forest) ECPGR cooperates in the EU GenRes Bridge project, that also looks for ways to support GR conservation, either by policies or protocols.

In the framework of ECPGR/AEGIS, and with the support of Genres Bridge, a system of peer review has been set up aiming at improving the quality of European genebanks by simply having the experts of these genebanks visit each other in their genebanks, giving full transparency about the facilities and protocols, and having discussions about these.

A pilot of these Genebank Peer Reviews is being organised in the first half of 2019, involving the genebanks of COMAV (Valencia, Spain), IHAR (Radzikow, Poland) and WUR-CGN (Wageningen), focussing on the seed collections.

The second of the reviews was held from 6th to 8th March in Wageningen, The Netherlands.

Organisation

The review was organised by Theo van Hintum (Cluster leader CGN Plant Genetic Resources), who arranged accommodation, meeting rooms, local transportation and everything else to allow the review to function optimally. He also provided the AEGIS Genebank Manual for the CGN Genebank (based on the template prepared by AEGIS). The Manual proved an excellent starting point for the review.

On Wednesday March 6th María José Díez and José Vicente Valcárcel (respectively the director and curator of the COMAV genebank, Valencia, Spain) and the genebank manager Wieslaw Podyma (IHAR genebank, Radzikow, Poland) arrived, and the review took place on Wednesday evening 6th, Thursday 7th and the morning of Friday 8th. During these days the reviewers visited the genebank facilities, heard presentations and talked to CGN staff members. At the end of Friday morning, the reviewers presented and discussed their first impressions to the host (Theo van Hintum) and the director of CGN (Dr. Sipke Joost Hiemstra).

Observations, conclusions and recommendations

Organisation

The Centre for Genetic Resources, the Netherlands (CGN) is part of Wageningen University & Research. CGN conducts, on behalf of the Dutch government (Ministry of Agriculture, Nature and Food Quality (LNV)), statutory research tasks associated with the conservation of genetic diversity of species that are important for agriculture and forestry (PGR, AnGR and FGR tasks).

The CGN-PGR operates financially on the base of 5-year programmes, and forms separate business unit in WUR-Wageningen Plant Research. Statutory tasks are funded by Ministry LNV, also basic knowledge research are funded by Ministry LNV. CGN-PRG also participates in additional projects funded by EU, companies etc.

The CGN Genebank is an organisation with dedicated and professional staff members (8.16 fte permanent and 1.38 fte temporary) conserving an important PGR collection (23056 accessions). The staff is responsible for main professional activities of CGN-PGR. The average age of permanent staff is c. 56, and succession planning is needed.

All other required technology and facilities are rented from WUR (eg. greenhouse facilities are provided by the WUR organization 'Unifarm').

Recommendation 1: Possibilities for expansion of staff of the genebank should be sought to better be able to meet future challenges.

CGN Quality Management System

CGN has adopted a Quality Management System (QMS) according to NEN-EN-ISO9001:2015, and most of its operations have been certified by DNV GL. This requires annual external and internal audits.

CGN experienced that introducing a quality management system leads to a considerable improvement of the efficiency. Procedures are discussed and improved when possible. During the introduction of the quality management system CGN identified several critical processes without proper protocols, that had never been discussed, never been validated. Also, a quality management system makes it easier to introduce new staff or to inform colleagues and guests about procedures.

The CGN quality manual contains sections on management, organization, staff and about ways to analyse and improve the genebank procedures.

The quality manual also describes the actual technical procedures. In the manual there is detailed information about the plant genebank, concerning acquisition and regeneration of seed material as well as the actual seed management (ordering, distributing, germination testing, etc.).

Recommendation 2: Guidelines and procedures of regeneration and management have been established for each crop. English version would be very useful for other genebanks.

Long-term storage

Based on many years own experience and analysis of costs of maintaining resources, CGN has decided to store active and base collections in optimal long term storage conditions. All material is conserved at optimal -20°C and 15% relative humidity (corresponding to 6-8% moisture content in the seeds) to decrease number cycles of regeneration.

CGN maintains 25 crop collections with 23,056 accessions, originating from more than 100 countries, but focus is given on vegetable crops and potato. The size of the collections, apart from the attention to quality, is partly limited by the available storage area.

Recommendation 3: The storage facility should be increased. Size CGN-PGR doesn't correspond to importance of PGR in the Netherlands.

Collection Management

CGN collections are managed by a head curator and several crop curators.

All CGN material is duplicated in colleague genebank (99%) and triplicated in Svalbard 'Global Seed Vault' (81%).

Regeneration is largely based on cooperation with companies. Cooperation with companies allows to have the collection in good conditions and available for users. Own facilities are used for regeneration of difficult materials. Planning of regeneration is done on the basis of availability of seeds and viability. The entire collections is characterized based on descriptors based on those published by IPGRI. Characterization and evaluation is made largely in collaboration with seed companies.

All materials get initial germination tests. Monitoring tests start after 25 years and thereafter every 20 years (barley and wheat) or 10 years (all other crops).

Access and Distribution

The visibility of the material maintained in CGN is very good. Everything is available for every serious user via web-interface. Hobby growers are discouraged because producing and handling seeds is very expensive. Also farmers cannot be served directly. CGN's information is not appropriate for making selections and seed samples of 100 seeds are too small for farmers. All request are taken seriously but requests of over 50 accessions are questioned by curators, and usually the potential users are happy with help in selecting. Large screening programmes are supported provided the information is shared with CGN.

The collection is used considerably, over the last 10 years a total of more than 59000 samples were distributed (43% in the Netherlands). Top 5 crops, 66% of distributed samples, are Capsicum 10093 samples (16.9%), lettuce 9296 samples (15.5%), cabbage 8745 samples (14.7%), spinach 6103 samples (10.2%), wheat 5179 samples (8.7%).

The material is checked by professional phytosanitary service during multiplication process and prior to storage.

Recommendation 4: Other permanent ways of providing access to hobbyists and farmers to PGR should be considered.

Documentation

The current documentation system GENIS is pragmatically designed to store all required data. All information is available for on-line search and ordering via web www.wur.nl/cgn. All activities and information about the genebank is easily visualized in the system.

CGN is creating new user interfaces by implementing analytical and visualization tools, such as the “core selector” tool or niche modelling for Crop Wild Relatives.

Policy Development

CGN has a significant role in international genetic resources debate on policy, strategy and operation, especially in the IT-PGRFA Working Group for the MLS. It has a relevant position in the IT-PGRFA Scientific Advisory Committee for the Global Information System, and takes part of the Advisory Committees of EURISCO and GeneSys.

Final conclusion

The CGN Genebank has a well organised operation, floating on the permanent, critical analysis of tasks and high commitment of its staff members. The CGN is going to further improve services to current and future users of PGR with conservation activities (*ex situ* and *in situ*), user-oriented services, methodological and strategic research, and policy support. The CGN is going to develop its skills in the field of use of genebank-sequencing (and other omics) data and in biometry and bioinformatics.

The human and space capacity are too small to ensure needs of Dutch users and worldwide users. Some investments into facilities and in human capacities would be appropriate.

Final remarks

The reviewers were positively impressed by the transparency given by the hosts during the review; all information was shared, everybody spoke openly. This was very much appreciated, as was the general hospitality and positive atmosphere during the visit.

April 30th, 2019

Wieslaw Podyma, María José Díez and José Vicente Valcárcel