



NEWSLETTER ISSUE # 2

We are proud to present the second edition of the AGENT newsletter. Since the first edition of this newsletter in March 2021 all partners in the AGENT project made good progress towards the project's aims. The collaborative work in the consortium was advanced by the first Progress Meeting, which was held on-line in May 2021 and by the 2nd General Assembly Meeting on 18th November 2021, where progress achieved in the different work packages of the project were presented and outlines for the next steps have been discussed. Also, meetings of the different working-groups took place, both on-line and in-person (see report on Thinkathon below as an example). Moreover, the AGENT project is initiating joint activities with other European GenRes projects financed under the same topic (SFS-28-2019). One of these activities is the joint presentation of projects in a webinar hosted by the DivSeek International Network (see below). We hope you will enjoy the newsletter!

[Visit the project's website](#)

Project Meetings



A General Assembly meeting took place as a video call on 18th November 2021. Project Partners informed each other about the status of tasks and current development in the project. The project is overall making good progress. The next General Assembly Meeting is scheduled to take place in spring 2022. Exact date and place are currently determined. We hope to meet in person then!

Joint DivSeek webinar of six GenRes sister projects

AGENT has got six sister projects funded in the same call entitled “Horizon 2020 GENRES projects –Joining forces for genetic resources and biodiversity management.” In a joint webinar hosted by the DivSeek International Network, project leads of [BreedingValue](#), [Gen4Olive](#), [GenResBridge](#), [FORGENIUS](#), [HARNESSTOM](#) and AGENT introduced the aims, scopes and outputs of their projects.

Dr. Nils Stein



IPK-Gatersleben, Germany

Genebank genomics to bridge the gap from genome information to educated utilization of genetic diversity hosted in Genebanks.
DivSeek International Network – September 8, 2020



Watch the webinar

Gene banks on the way to becoming Big Data centres - concept and value of the bridging collections

Jochen Reif (IPK, Germany) and Vojtech Holubec (CRI, Czech Republic)

The enormous potential of Big Data has already been demonstrated in areas such as financial services and telecommunications. Recently, the first results have been published showing the potential of Big Data for plant genetic research as well. A major bottleneck identified in these studies is well-curated phenotypic data from large and diverse plant populations.

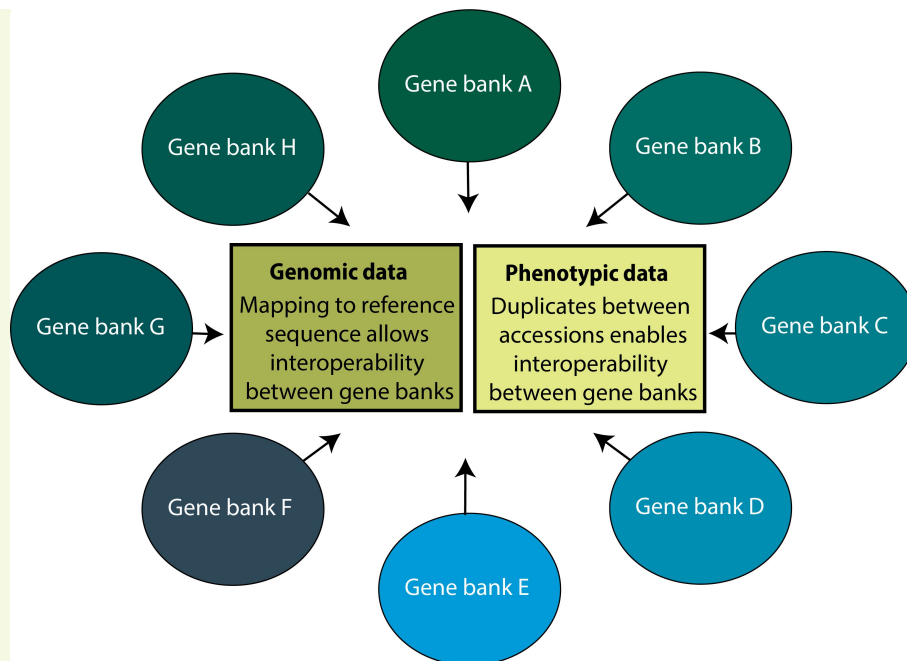
Gene banks have tremendous diversity that is characterized at the genomic level for entire collections. In addition, phenotypic information is collected for decades during each regeneration cycle, and recently approaches have been developed to curate and analyse this imbalanced data in individual gene banks. In this way, genomic and phenotypic data from up to 10,000 accessions of barley and wheat have already been processed and used to analyse the genetic architecture of important agronomic traits. A promising next step is the integration of data from different gene banks across Europe to pave the way for a new volume of Big Data in plant genetics.

Combining genomic data that have been and are being collected in different gene banks is feasible without too many hurdles thanks to the excellent reference sequence of wheat (Fig. 1).

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Concept of bridging collections to enable interoperability between phenotypic data of different gene banks.

However, enabling this interoperability for phenotypic data collected in different gene banks is still in its infancy. In the AGENT project, we will extend this bottleneck by generating and using information about duplicates between gene bank collections. To this end, genomic data will be applied and genetically the same cultivars/materials will be identified to serve as a bridge between phenotypic data from different gene banks, thus ensuring interoperability (Concept of bridging genotype; Fig. 1). If the AGENT consortium succeeds in doing this, we can make an important contribution to unlocking Big Data for plant genetics on the model crops wheat and barley. Of course, we also need to understand the interactions between genotypes and environment for individual traits. But we are also working on this, incorporating meteorological data and collaborative experiments across gene banks. More on this in the next newsletter.



In conversation with..... Dr Vojtěch Holubec

Vojtěch Holubec is a researcher with the AGENT partner institution Vyzkumny ustav rostlinne Vyroby (Crop Research Institute, CRI) in Prague, Czech Republic

Please introduce yourself.

I have worked at the Czech genebank since 1985 – quite a long time and it's the only job I have had since finishing university! – and so I am strongly connected to the genebank and our activities. I was the head of the genebank for six years until two years ago. I am head of the Board for plant genetic resources in the Czech Republic that unites members of the “National programme for conservation of plant genetic resource and agrobiodiversity” that unites crop curator from 12 cooperating institutes. Towards abroad I am a National Coordinator for plant genetic resources. The national coordinators from most European countries are members of the ECPGR Steering committee and communicate things from ECPGR to the National Board. I was also elected to the Executive Committee of ECPGR, for four years, and we are engaged in proposing strategic plans, currently working on EU PGR conservation strategy and evaluate ECPGR projects proposed by working groups, prepare meetings, presentations etc.

Could you tell us a bit more about where you work?

Our genebank is just one department of the Crop Research Institute (CRI), which is a huge institute with 370 employees and it covers all subjects of agriculture research. We belong to the Division of Genetics and Plant Breeding, and there are two other sections: Plant Medicine and Agroecology. The genebank is just a department, but we are quite a large department and we also do research. We are engaged in national and international projects. This is not our only Horizon project and we have also worked on European framework projects in the past, we have worked on 4 projects, so we are not newcomers.



What are your research interests (within and outside of AGENT)?

I came to the genebank because I always wanted to work with wild plants such as crop wild relatives. Therefore, I look for solving agrobotanical tasks in various crops and collections, not only cereals, but also wild fruits, I am also engaged in Asiatic Floras. Each of researchers at the genebank are collection curators for some crop and I am responsible for Triticeae wild relatives, so “wild wheats” in general, for in situ and on farm conservation. I am engaged in evaluation of collections together with colleagues in other specialised departments here at CRI.

For instance, I collaborate with the Molecular Department and with Breeding Methods Department (disease and pest resistance). For some years I worked on an inventory of historical materials, comparing Lists of Registered Cultivars and other historical sources from 1941 to 2000. We collected available data on landraces and obsolete cultivars and compared them with our national documentation system GRIN Czech and looked at what was not included, forgotten or lost and what was saved from that time. A lot of ancient data improved our documentation system. I like that AGENT fits to my orientation, especially with regards to the historical data, which forms part of WP3 in AGENT



What is your role in AGENT?

I am leading WP3, within which task 3.1 deals with historical data and this fits exactly with my previous work. We published a Catalogue of Czech landraces and cultivars bred since the beginning of breeding up to 2000. Of course, I am also engaged in leading other tasks. I collaborate with curators for wheat (Jiří Hermuth) and a curator for barley (Zdeněk Nesvadba and Marta Zavřelová)- and I coordinate their activities. They do the experimental part, such as the standard check trials in task 3.2 and the preparation of Precision collections. I collaborate closely with documentation manager Ludmila Papoušková. In AGENT and in my other activities, I collaborate with my colleagues, for instance in molecular breeding I work with Leona Leišová-Svobodová, who is also deputy Team Leader for CRI in AGENT. In her department is a colleague, Pavel Svoboda, molecular biologist, but also very good in bioinformatics and I can rely on his excellent treatment of data. For the next two years, we will also collaborate with the Breeding Methods Department, where we have experts on disease resistance (Alena Hanzalová and Jana Palicová), who will manage the evaluation of the Precision collection in the infection field and in the greenhouse.



Photos show field trials at the Crop Research Institute (Výzkumný ústav rostlinné výroby, v.v.i.) in Prague

What do you hope we will achieve with AGENT?

I believe that working in the AGENT project will help us to increase our phenotyping data and initiate activating of historical data and interconnect our databases with relevant European wheat and barley databases. I explained my colleagues, curators, that AGENT is great for our Genebank and for them - the collections will be improved, enriched with genotyping data, nearly forgotten raw historical data will be activated for use, I consider all this very useful and promising for the future development of Genebank and our National Programme. Hopefully we will also collect good data that we can publish in good journals and share with other scientists. Publication activity is for us in the research institution an important part of our evaluation.

Thank you very much for this conversation!

Short report: AGENT Thinkathon on Data Management and Data Flow

Matthias Lange (IPK, Germany) and Matthijs Brouwer (WR, Netherlands)

AGENT partner STICHTING WAGENINGEN RESEARCH, as part of Wageningen University, hosted a thinkathon on September 27-29, 2021, to align the work of Work Package 5 (“Development of standards and technology for data interoperability”) and Work Package 6 (“GenRes data infrastructure”) regarding the development of standards and technologies for data interoperability and the establishment of a data infrastructure. Experts from AGENT and associated EU projects, such as INCREASE or FONDUE, met in a first face-to-face meeting after the Corona-related lockdown at Wageningen University. Other partners were able to join via videoconference.



In a very productive atmosphere, issues concerning the implementation of standards for phenotypic and genotypic data, their adoption in the agent database infrastructure as well as the implementation of the AGENT data portal were agreed upon and implementations were defined. This included the draft of a specification of a file format for the interoperable storage of variation data, the definition of details of the AGENT data flow as well as the discussion of data visualization and access methods to be used in the AGENT data portal. The collaboratively developed concepts and specifications were incorporated into the AGENT data flow specifications. Furthermore, a stepwise approach was decided on how data and analysis methods can be made available in containers for on-premise or cloud applications and how the data collected in the AGENT project can be made available for enhanced interactive access in the developed AGENT web portal and deposited in the long term via the European Data Repositories EVA, ENA and EURISCO.

Communication and dissemination activities

Recent publications

We are pleased to present here the current scientific publications from the consortium.

- Gonzales, M. Y., Zhao, Y., Jiang, Y., Stein, N., Habekuss, A., Reif, J. C., Schulthess, A. W. (2021). Genomic prediction models trained with historical records enable populating the German ex situ genebank bio-digital resource center of barley (*Hordeum* sp.) with information on resistances to soilborne barley mosaic viruses. *Theoretical and Applied Genetics* 134, 2181-2196. <https://doi.org/10.1007/s00122-021-03815-0>
- Cristina Mihaela Marinciu, Gabriela Șerban, Indira Galit, Vasile Mandea (2021). Genetic Diversity regarding grain size and shape of common winter wheat. *Scientific Papers. Series A. Agronomy*, Vol. LXIV, No. 1, http://agronomyjournal.usamv.ro/pdf/2021/issue_1/Art58.pdf
- Sharma, Shivali, Albert W. Schulthess, Filippo M. Bassi, Ekaterina D. Badaeva, Kerstin Neumann, Andreas Graner, Hakan Özkan, Peter Werner, Helmut Knüpfper, and Benjamin Kilian. 2021. "Introducing Beneficial Alleles from Plant Genetic Resources into the Wheat Germplasm" *Biology* 10, no. 10: 982. <https://doi.org/10.3390/biology10100982>

News from related European projects

30th November 2021

A Meeting officially launching the **Genetic Resource Strategy for Europe** will take place in Brussels on 30th November 2021. The website of our partner-project GenResBridge gives more information and a [link](#) to register for online attendance. There is also a [webinar](#) available which informs about the structure and content of the Genetic Resource Strategy for Europe.

13th to 15th December 2021

Final Workshop of Project G2P- SOL on „Multi-omics-based management of plant genetic resources“
The aim of the workshop is to present the multi-omic resource generated by G2P-SOL, as well as discuss the path forward with external experts in the field of genetic resources



Find more information and the link to registration here: Phenome-Networks - [G2P-SOL](#) Final Workshop

G2P-SOL

Upcoming Events

16th to 17th December 2021

At the Symposium on Physiology and Breeding of Cereals in Pamplona (Spain) Magdalena Ruiz from AGENT-partner Instituto Nacional de Investigacion y Tecnologia Agraria y Alimentaria (INIA) will be presenting a poster on "Understanding the diversity hosted in genebanks for meeting the challenges imposed by global change"
More information about the symposium can be found [here](#).

4th to 6th April.2022

AGBT 2022 Agriculture, San Diego, California
Nils Stein will include the AGENT project in his talk at this international meeting. Find more information about the meeting and a link for registration [here](#).

16th to 20th May 2022

OECD Barcodes to Bushels, Gatersleben, Germany
This conference will take place at the AGENT coordinator's institution, IPK. Find more information under this [link](#).

3rd to 7th July 2022

[13th International Barley Genetics Symposium](#)
In Riga, Latvia

11th to 14th September 2022

[2nd International Wheat Congress](#)
In Beijing, China

EURICE GmbH
Heinrich-Hertz Allee 1
66386 St. Ingbert
agent.newsletter@eurice.eu



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