



NEWSLETTER ISSUE 1

Launched in May 2020, the EU-funded Activated GENEbank NeTwork (AGENT) project aims to unlock the full potential of the biological material stored in gene banks around the globe by introducing a new international standard and an open digital infrastructure for the management of plant genetic resources. Targeting a better integration of existing genetic material into modern breeding programmes, the project will make an important contribution to global food security and the adaptation of staple food crops to changing climatic conditions worldwide.

The AGENT project focuses on wheat and barley because of their global importance as staple food crops, as well as because existing data sets for these plant species are already quite extensive. While the AGENT goals will first be implemented for wheat and barley, the high importance of sustainability and appreciation of the FAIR principles will enable us to design solutions which can subsequently be applied to equivalent data sets for any crop species.

Over the next five years, the [19 project partners](#) from 16 different countries will receive EUR 7 million funding from the European Union's Horizon 2020 framework programme.

[Visit the project's website](#)

Watch our animated clip introducing AGENT



[Watch the clip](#)

In conversation with... Prof Dr. Jochen Reif from the lead partner, IPK

Please introduce yourself and IPK.

I am the head of the department of breeding research of the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK) in Gatersleben, Germany. The IPK is one of the world's leading international institutions in the field of plant genetics and crop science. Its research programme and services contribute materially to conserving, exploring and exploiting crop diversity. Its research goals are driven by the need to ensure an efficient and sustainable supply of food, energy and raw materials, thereby addressing a major global ecological challenge. For this research we can rely on the largest genebank in the EU27.



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

I am interested in expanding the quantitative genetic toolbox to dissect the genetic architecture and predict complex traits considering different genetic effects. Moreover, I study how to design novel 'omics'-based pre-breeding strategies leveraging the valorization of wheat genetic resources.

What is IPK's role in AGENT?

The IPK is coordinating the project and we contribute basically to all work packages of the AGENT project.



What is your role in AGENT and what have you been working on recently?

In order to establish a virtual pan-European gene bank, it is necessary to combine existing datasets with genomic and phenotypic data generated within AGENT. To this end, we contribute to the smooth transfer of a self-developed strategy for the analysis of historical phenotypic datasets, but this time not within, but between gene banks. Furthermore, we want to explore the potential to populate the virtual pan-European gene bank with data relevant for (pre)breeding and research by using the toolbox of genome-wide predictions.



First results of our research performed in the frame of the AGENT project using barley data sets are very promising and resulted already in a peer-reviewed publication. A second manuscript is close to acceptance. Last but not least, I try to support the coordinator with my expertise in quantitative genetics, including the design and analyses of the large-scale experiments.

What does a typical workday look like for you and what's the most exciting or rewarding part of your job?

The typical workday starts early in the morning with ~1h of manuscript writing. After that, we meet for an internal discussion within my research group to discuss the progress in the different research areas. Then comes the day-to-day business like designing new and coordinating ongoing research projects, administration, teaching, etc. The most exciting thing about my job is the constant interaction with young people, whom I get to accompany for a short but very intense part of their lives. Furthermore, what fascinates me

about my job is that I can tackle new areas of research through interdisciplinary interaction.

What do you hope we will achieve with AGENT?

My dream is that AGENT will develop a draft for a virtual pan-European gene bank that is heavily used in breeding and research.



Upcoming events

Webinar - Plant Data Management for Phenotyping data

The AGENT project is organising a webinar on Plant Data Management for Phenotyping data **from 10.30am-12pm (CET) on 2nd April 2021**.

The Minimal Information About Plant Phenotyping Experiment, MIAPPE (www.miappe.org), has been designed by ELIXIR, EMPHASIS and Bioversity international to guide plant scientists in the management of experimental data and to facilitate integration with genotyping data. The webinar will give an overview of the current practices and methods for plant phenotyping data standardization, and how to deal with the variability and heterogeneity inherent to research and breeding data sets.

Registration is mandatory via the link below.

[Register here](#)

News from project partners

AGENT features in CREA's innovation week

The project partner Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria - Centro di Ricerca Cerealicoltura e Colture Industriali (CREA-CI) produced a short video describing the project as part of CREA's 'innovation week'.

The video is in Italian. An English translation is provided by following the link below.



[Translation provided in English](#)

Announcing the new IPK Blast Service

One goal of the AGENT project is to investigate the diversity of the plant genetic resources, i.e. the accessions in the involved gene banks. To achieve this goal, sequence patterns, i.e. the genetic information, are determined in

the project. The diversity can be determined or quantified by comparing it against a reference, e.g. a known genome. However, not only a single genome reference sequence is stored on the IPK's Galaxy Web Server, but currently the genomes of 20 very different barley genotypes are available. The differences refer to the composition of the genome (e.g. which genes are present), their phenotypes and their origin (from which region of the world do these genotypes originate). Users are therefore able to compare their candidates against a total of 20 different genotypes using the Galaxy Web service and to study diversity.

Galaxy Analyze Data Workflow Visualize Shared Data Help Login

Tools IPK Galaxy Blast Suite

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BARLEY

Blast barley genomes
Blast barley pan-genome

WHEAT

Blast wheat genomes
Blast wheat pan-genome

RYE

Blast rye genomes

Workflows

All workflows

Welcome

Webblast Galaxy as part of the IPK Crop Analysis Tools Suite (CATS) offers access to genomic references published by IPK and collaborative projects. It replaces the late viroblast application.

INTERNATIONAL BARLEY SEQUENCING CONSORTIUM **10+ GENOME PROJECT** **IRGSC International Rye Genome Sequencing Consortium**

Galaxy is an open source, web-based platform for data intensive biomedical research. If you are new to Galaxy start [here](#) or consult our help resources.

Latest News and Updates

29 Jan 2021 **Barley cv. morex v3 reference**
Morex V3 pseudomolecules and gene models are available for BLAST now.

01 Dec 2020 **Wheat pan genome data**
Wheat assemblies and gene models from Wheat10+ project are available now.

[Visit the IPK Blast Service](#)

Communication and dissemination activities

Publications

Despite the project still being in its early stages, there has already been one AGENT publication in a scientific journal:

- Jiang, Y., Weise, S., Graner, A. & Reif, J. C. (2021). **Using Genome-Wide Predictions to Assess the Phenotypic Variation of a Barley (*Hordeum sp.*) Gene Bank Collection for Important Agronomic Traits and Passport Information.** *Frontiers in Plant Science* 11, 1-12. doi: 10.3389/fpls.2020.604781.

[Read article](#)

Conferences and webinars

8th September 2020

Nils Stein (IPK) provided insights into AGENT by contributing to the DivSeek Webinar series with his session entitled 'Genebank genomics to bridge the gap from genome information to educated utilization of genetic diversity hosted in Genebanks'.

[View webinar](#)

6th October 2020

The INIA team presented the objectives of the AGENT project to the National Association of plant breeders (ANOVE) and cereal researchers at an online conference.

8th March 2021

Sandra Goritschnig (IPGRI) will give a keynote presentation on the topic of 'Exploring underutilized genetic resources' at the EUCARPIA/LIVESEED online conference, 'Breeding and seed sector innovations for organic food systems'.

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