WHEAT WG REPORT FOR PHASE X (2019-2023)

Submitted to the 17th Steering Committee Meeting, Oeiras, Portugal, May/June 2023
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1. CONTRIBUTION TO ECPGR OBJECTIVES

1.1. Achievements and success stories

- **To efficiently conserve and provide access to unique germplasm in Europe through AEGIS and the European Collection**

- **To provide passport and phenotypic information of actively conserved European PGRFA diversity *ex situ* and *in situ* through the EURISCO catalogue**

- **To improve *in situ* conservation and use of crop wild relatives**
  Crop wild relatives have been evaluated in numerous field trials. Phenotyping with regard to the resistance level against fungal diseases, partially yield and physiological characteristics such as plant length, days to heading, winter hardiness and lodging could be done. This makes it possible to select the most suitable resources for a specific location. After successful genotyping, it will be possible to use crop wild relatives for marker-assisted breeding.

- **To promote on-farm conservation and management of European PGRFA diversity**
  Participation as Chair of the Wheat Working Group and scientist at Julius Kuehn-Institute (JKI; Germany) in INWHEATORY in order to increase the knowledge of wheat landraces still present on-farm. Participation in BIDifferent in order to analyze the genetic diversity, and to cultivate Binkel accessions from different European regions.
  Proposal 'LOCAL SEED: Promotion of on-farm Conservation of Wheat Genetic Resources Diversity´ together with the Greek Gene Bank (Ioannis Mylonas)

- **To promote use of PGRFA**
  The project BiDifferent includes the determination of five post-harvest parameters, which are related to baking quality. Selection based on these parameters can result in direct use of PGRFA.

1.2. Gaps or constraints identified

Complications when sending seeds, problems with customs for shipments outside the EU.
Poor communication when the JKI sent the seeds late.

2. GRANT SCHEME ACTIVITIES, WG MEETINGS AND EVA ACTIVITIES

- **Grant Scheme proposals (submitted:3; approved:2 (November 2021 and December 2022))**
  - Chances for the conservation and re-cultivation of central european club wheat (Binkel) through a nutritional and genetic differentiation towards other wheat species (BiDifferent) (in collaboration with the On-farm conservation and management WG; 5th call)
  - Inventorying wheat on-farm diversity (INWHEATORY) (in collaboration with the On-farm conservation and management WG 6th call)

- **Total number of partners involved: 22 from 14 countries**
  - ECPGR-funded: 16 from 12 countries
  - Self-funded: 8 from 3 countries

- **Meetings held**
  - BiDifferent kick-off meeting, 14-15 July 2022, Innsbruck, Austria
  - Workshop 'Training on identification of botanical varieties in Triticum species' (Activity Phase IX) 17-19 September 2019, Piešťany, Slovakia

  European Evaluation Network (EVA) – Wheat and Barley Network:
    - 1st Annual project meeting, 5 May 2020, online
    - 2nd Annual project meeting, 21 October 2021, online
    - 3rd Annual project meeting, 17-18 November 2022, Freising, Germany

- **Reports and related data**
  Overview of characteristics Triticum species - Emmanuelle Escarnot and Noor Bas (Training in Triticum Species Activity, Phase IX) (2020)
  Report of 1st EVA Wheat and Barley project meeting, 5 May 2020
  Report of 2nd EVA Wheat and Barley project meeting, 21 October 2021
  Report of 3rd EVA Wheat and Barley project meeting, 17-18 November 2022

- **Funds mobilized** [shared with On-farm WG]
  - ECPGR granted funds: € 65,230
  - Inputs in-kind declared in Grant activities: € 6,300

3. OTHER ACTIVITIES (CROSS-WORKING GROUP ACTIVITIES, LINKS WITH OTHER NETWORKS, INTERNATIONAL PROJECTS AND INITIATIVES)

- **Cross-Working Group activities**: Joint project application with On-farm Conservation and Management Working Group, cooperation in the project INWEHEATORY, genotyping of Binkel accessions within the project BiDifferent.

- **Others:** Joint evaluation of field trials with breeders for the central and northern zones. Analysis of genotypic data, detection of genome-wide associations, selection of the best accessions with regard to specific traits, and search for solutions for a comparable evaluation for the north, middle and south zones. A pipeline for evaluation is being developed.

4. WORKING GROUP DOCUMENTS AND PUBLICATIONS

- Balfourier F, Bouchet S, Robert S, De Oliveira R, Rimbert H, Kitt J, Choulet F, International Wheat Genome Sequencing Consortium, BreedWheat Consortium, Paux E. 2019. Worldwide phylogeography and history of wheat genetic diversity. Science Advances 5: eaav0536. DOI:10.1126/sciadv.aav0536

5. EXPECTED ADDITIONAL ACHIEVEMENTS AND FUTURE ACTIVITIES THAT COULD CONTRIBUTE TO THE IMPLEMENTATION OF THE PGR STRATEGY FOR EUROPE

After the evaluation of PGR from genebanks in different environments, for every trait best accessions shall be selected. This selection will be supported by GWAS so that information about loci, linked to increased levels of resistance, quality or yield can be detected. Allele-specific markers for every trait shall be available for different regions. Based on the best-identified genotypes, segregating populations can be used in order to determine the genetic background of positive characteristics of the accessions. Furthermore, from genetic resources, unknown genes, which are not used in elite material can be identified.