BARLEY 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
  - 15,667 accessions in the AEGIS collection for *Hordeum*
  - 141,266 accessions of *Hordeum* are registered in EURISCO
  - 116,768 *Hordeum vulgare* and 6,179 *Hordeum spontaneum*

- 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
  - No information from WG members on this topic

- To promote on-farm conservation and management of European PGRFA diversity
  - 2,177 accession assigned as field collection in EURISCO

- To promote use of PGRFA
  - The Working Group members actively promote the use of PGR

1.2. Gaps or constraints identified

- No information from WG members on this topic

2. GRANT SCHEME ACTIVITIES, WG MEETINGS AND EVA ACTIVITIES

- **Grant Scheme proposals (submitted:0; approved:0)**

- **Total number of partners involved in Grant scheme: n/a**
  - ECPGR-funded: 0
  - Self-funded: n/a

- **Meetings held**
  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

- Webinar, EURISCO-EVA project database for data management, 20 January 2023

- **Reports and related data**
  Barley C&E Data Final Activity Report (2019)
  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**
  - ECPGR granted funds: 0
  - Inputs in-kind declared in Grant activities: 0

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

- **Cross-Working Group activities**: none

- **Others:** none

4. WORKING GROUP DOCUMENTS AND PUBLICATIONS

RELEVANT PUBLICATIONS REPORTED BY WG MEMBERS

Cyprus

- Omirou M., Fasoula D., Stylianou M., Zorpas A., Ioannides M.I. (2023) N-source determines barley productivity, nutrient accumulation, and grain quality in Cyprus rainfed agricultural systems. Int. J. Environ. Res. Public Health 20, 3943. doi: 10.3390/ijerph20053943
- Fasoula D., Ioannides M.I., Omirou M. (2020) Phenotyping and Plant Breeding: Overcoming the barriers. Frontiers in Plant Sciences doi: 10.3389/fpls.2019.01713
- Omirou M., Anastopoulos I., Fasoula D., Ioannides M.I. (2020) The effect of chemical and organic N inputs on N2O emission from rainfed crops in Eastern Mediterranean. J Environ Manage doi: 10.1016/j.jenvman.2020.110755

Czech Republic

- Zavrelova M, Psota V, Matusinsky P, Musilova M, Némethova M (2021) Evaluation of malting quality of spring barley genetic resources from different regions of origin. Kvasny Prumysl 67(1): 392-402
- Dreiseitl A, Zavrelova M (2022) Non-Authenticity of Spring Barley Genotypes Revealed in Gene Bank Accessions. Plants, 11: 3059
- Mikyska A, Psota V, Bojnanska K, Ondrejovic M, Musilova M, Bezdickova A, Zavrelova M (2022) Old but still good – Comparison of malting and brewing characteristics of current and historical malting barley varieties. Kvasny Prumysl 68(6): 663-673

Germany

- Neumann K, Schulthess A W, Bassi F M, Dhanagond S, Khlestkina E, Börner A, Graner A, Kilian B: Genomic approaches to using diversity for the adaptation of modern varieties of wheat and barley to climate change. In: Ghamkhar K, Williams W, Brown A H D (Eds.): Plant

Genetic Resources for the 21st Century. The OMICS Era. New York: Apple Academic Press (2023) ISBN 9781774910825, 47-78. https://dx.doi.org/10.1201/9781003302957

- Rehman Arif M A, Afzal I, Börner A: Genetic aspects and molecular causes of seed longevity in plants - a review. Plants 11 (2022) 598. https://dx.doi.org/10.3390/plants11050598
- Martinelli T, Gavazzi F, Mascheretti I, Panzeri D, Börner A, Lauria M: Evaluation of seedbank propagated seeds as a resource for the study of environmentally induced transgenerational epigenetic variability: a case study of barley. Crop Sci. 61 (2021) 1241-1253. https://dx.doi.org/10.1002/csc2.20351
- Sayed M A, Tarawneh R, Youssef H M, Pillen K, Börner A: Detection and verification of QTL for salinity tolerance at germination and seedling stages using wild barley introgression lines. Plants 10 (2021) 2246. https://dx.doi.org/10.3390/plants10112246
- Milner S G, Jost M, Taketa S, Mazón E R, Himmelbach A, Oppermann M, Weise S, Knüpffer H, Basterrechea M, König P, Schüler D, Sharma R, Pasam R K, Rutten T, Guo G, Xu D, Zhang J, Herren G, Müller T, Krattinger S G, Keller B, Jiang Y, González M Y, Zhao Y, Habekuß A, Färber S, Ordon F, Lange M, Börner A, Graner A, Reif J C, Scholz U, Mascher M, Stein N: Genebank genomics highlights the diversity of a global barley collection. Nat. Genet. 51 (2019) 319-326. https://doi.org/10.1038/s41588-018-0266-x
- Jiang Y, Weise S, Graner A and Reif JC. 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. *Front. Plant Sci.* 11:604781. doi: 10.3389/fpls.2020.604781

Sweden

- Hagenblad J, Abbey-Lee R, Bashford L, Vanhala T, Leino MW (2023) The introduction history of naked barley (Hordeum vulgare var. nudum) into Fennoscandia. Accepted for publication in Vegetation History and Archaeobotany.
- Hagenblad J & Leino MW (2022). Chevalier barley: The influence of a world-leading malting variety. Crop science 62(1), 235-246.
- Hagenblad J, Vanhala T, Madhavan S, Leino MW (2022). Protein content and HvNAM alleles in Nordic barley (Hordeum vulgare) during a century of breeding. Hereditas, 159(1), 1-13.
- Larsson MN, Leino MW, Hagenblad J*(2021). Genetic diversity in 19th century barley (Hordeum vulgare) reflects differing agricultural practices and seed trade in Jämtland, Sweden. Diversity, 13: 315.
- Forsberg NEG, Leino MW, Hagenblad J (2019). Population structure in landrace barley (Hordeum vulgare L.) during the late 19th century crop failures in Fennoscandia. Heredity 123: 733–745.
- Hagenblad J, Leino MW, Afonso GH, Morales DA (2019). Morphological and genetic characterization of barley (Hordeum vulgare L.) landraces in the Canary Islands. Genetic Resources and Crop Evolution, 66: 465-480.

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

- HORIZON-RIA “Promoting a Plant Genetic Resource Community for Europe (PRO-GRACE)”