

## **Request for additional budget and extension of the project “Implementation of the ECPGR European Evaluation Network (EVA) on wheat/barley and vegetable crops (carrot, lettuce and pepper)” GenR 2019-2**

During the first in person meetings of the EVA networks in 2022, project partners have expressed concern about the lack of dedicated funding for effective analysis of the data generated in the multilocation field evaluations and genotyping. While the data has been produced mostly through in kind contributions of project partners, it has become clear that the complexity of the data will require some efforts to produce tangible results that can be exploited by both public and private partners. Furthermore, since evaluations in some networks are still planned within the current workplans for 2023 and 2024 a project extension is requested until 31 December 2024 with a budget increase of 98 464 EUR to ensure the generated data is extensively analysed and exploited.

### **1. Background**

The Development and implementation of a European Evaluation network (EVA) has been included as an objective of the ECPGR for Phase X (2019-2023), with the intention to promote the use of PGRFA and generate standardized evaluation data of genebank accessions and landraces for inclusion in the EURISCO database.

During several workshops, funded by the German Federal Ministry for Food and Agriculture (project GenR 2018-3), the EVA network projects were developed and formalized into a project proposal which was accepted for funding in June 2019.

With project GenR 2019-2, the German Federal Ministry for Food and Agriculture is supporting the implementation of ECPGR-driven European Evaluation Networks (EVA) on wheat, barley, carrot, lettuce and pepper. After a successful meeting of the ECPGR Maize WG in December 2019, an extension of the project was requested and granted to establish a maize network and also to incorporate existing data on wheat, barley and maize into EURISCO.

The project applies a public-private partnership approach involving genebank managers, public and private breeders, fostering partnerships and strengthening the link between conservation and use of PGRFA.

A no-cost extension of the project until November 2023 along with adjustments in the use of funds requested and granted with earlier budget revisions (submitted in September 2020, February 2021 and March 2022) have enabled effective progress of the project.

After several seasons of data collection in multilocation trials in the field, laboratory and greenhouse, the focus of the networks is shifting towards data analysis. Within the crop networks private and public partners are jointly developing suitable approaches for data management and analysis, taking into account the priorities of partners and with the goal to generate results and outputs relevant for the breeding company partners (e.g. identification of interesting breeding materials or genetic markers) and public research

institutes (scientific publications). In general, research staff from public sector partners are mainly involved in data analysis activities. Since it is increasingly difficult for research institutes to contribute in-kind staff time for data analysis, we propose to compensate their efforts through dedicated budget funds. Given that some network trials are still ongoing in 2023 (for Pepper, Maize and Wheat and Barley), an extension of the project until December 2024 would be welcomed to enable the data analysis of the current networks to be finalized, and results effectively disseminated and exploited.

The EURISCO-EVA intranet has so far collected data from more than 180 trials, and the database is steadily growing. The user interface and database functionalities are now being tested by partners, who have already expressed interest in possible extensions to the database. Addition of a genotyping SNP viewer could provide better linkage between the phenotypic and genotypic data generated in the project. The implementation of such an extension would use DivBrowse<sup>1</sup>, a stand-alone web application developed by IPK researchers and could be conducted and hosted by IPK. It would follow a pilot feature that has been generated for the Horizon project AGENT, which uses a data management platform modeled on the EURISCO-EVA intranet, and would start with wheat and barley, extending to other crops where possible.

Communication and outreach are important aspects of the EVA project. During the EUROSEEDS congresses in 2021 and 2022 the project has been promoted to the private sector and involvement of the EVA coordinator in the advisory board of the Horizon project BRESOV has created interest to establish new EVA networks on additional crops. As part of our communication strategy we wish to produce a short promotional video that can be used to inform the general public and reach additional stakeholders who could contribute to the EVA initiative in the future.

To coordinate the above additional activities within the EVA project in 2024, an additional contribution to the staff costs of the ECPGR secretariat are requested.

### **Objectives of the extended project**

- a) Facilitate analysis of evaluation data generated in all EVA networks
- b) Implement a genotyping SNP viewer for the different crops evaluated in the EVA network where possible
- c) Prepare a promotional video on EVA for public outreach

## **2. Activities**

Activities will be carried out during 2023 and 2024, completing the currently planned evaluation cycles. (also see attached updated chronogram of activities).

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<sup>1</sup> <https://doi.org/10.1101/2022.09.22.509016>

In more detail, the following activities will be carried out:

- i. Statistical analysis of phenotypic and genotypic data, as per agreed approach in each crop network, such as:
  - a. Basic statistical analyses of phenotypic data
  - b. Analysis of location and year effects within the datasets
  - c. Analysis of genetic diversity within crop sets
  - d. Linkage of genetic and phenotypic data through GWAS, where possible
  - e. Identification of potential markers that can be used in breeding
  - f. Preparation of scientific papers within the different consortia
- ii. Implementation of a SNP viewer for genotyping data for EVA accessions, including the following necessary preparatory steps:
  - a. Registration of genotyping samples
  - b. Analysis of variants and mapping to genome reference
  - c. Curation of datasets and creation of vcf files recording the SNP variants present in the different accessions
  - d. Implementation of an instance of DivBrowse for each crop species hosted by IPK or other partner
- iii. Preparation of a promotional video for EVA

### **3. Expected outcomes**

- a) Evaluation data for all crops are effectively analyzed, resulting in tangible output for public and private partners (e.g. potential markers and scientific publications)
- b) Genotyping data of suitable EVA crops are visualized in a SNP viewer, accessible to project partners during the embargo period and to the general public thereafter.
- c) Preparation of promotional video clips for EVA

**4. Updated chronogram of activities (including the proposed extension period in 2024):**

Activity	2019		2020				2021				2022				2023				2024						
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
Obtain signature of EVA-Letter of Commitment by partners	■																								
Extend list of partners	■																								
Annual meetings			■																						
Signature of Consortium Agreements				■																					
Agreement on traits to be evaluated		■				■				■				■											
Selection of genebank accessions	■			■					■					■											
Dispatch of agreed accessions with SMTA to the multiplier institutes	■			■					■					■											
Multiplication of accessions by multipliers		■																							
Lab screening for diseases (vegetables)	■				carrot/lettuce						pepper														
Dispatch of multiplied accessions from multipliers to evaluators with SMTA				■						■						■									
Design of the evaluation experiments		■			■						■					■									
Agreement on evaluation protocols		■			■						■					■									
Definition of genotyping methodology and selection of commercial provider	■			■																					
Analysis of database requirements by EURISCO staff	■																								
Provision of special EURISCO-EVA functionalities			■																						
Carry out evaluation in multiple locations with same accessions			■																						
Deposit of evaluation data based on agreed standard exchange formats from all evaluation sites to central repository (EURISCO-EVA)							■																		
Carry out the genotyping of selected accessions				■																					
	2019		2020				2021				2022				2023				2024						



5. Outline of additional Budget for EVA project for 2023 and 2024.

Budget item	Budget 2023	Budget 2024	Total Budget EUR	Remarks
Data analysis	40.000,00	20.000,00	60.000,00	Budget dedicated to cover data analysis activities of the different networks, according to needs and availability. Covers staff time for research institutes involved. Budget also covers implementation of a SNP viewer as a stand-alone web extension to the EURISCO-EVA intranet.
Staff costs at ECPGR Secretariat		20.000,00	20.000,00	covers EVA coordinator at 30% for 12 months
Communication	5.000,00		5.000,00	preparation of short promotional video on EVA
<b>Subtotal</b>	45.000,00	40.000,00	85.000,00	
Overheads (15.84%)	7.128,00	6.336,00	13.464,00	
<b>Total</b>	<b>52.128,00</b>	<b>46.336,00</b>	<b>98.464,00</b>	

## 6. Total Budget of the EVA Project divided for the periods Dec 2019, Jan-Dec 2020-2024:

Budget item	Budget 2019	Budget 2020	Budget 2021	Budget 2022	Budget 2023	Budget under revision 2023	Budget under revision 2024	Total Budget EUR	Total NEW Budget EUR
Multiplication and distribution of maize accessions		4.590,00	9.096,44	15.000,00	10.000,00	10.000,00		38.686,44	38.686,44
Multiplication and distribution of wheat and barley accessions	20.000,00	15.000,00	5.000,00					40.000,00	40.000,00
Multiplication and distribution of vegetable accessions		1.072,33	1.417,80	600,00				3.090,13	3.090,13
Lab tests vegetables (carrot & pepper)	1.500,00	3.000,00	10.440,00	9.560,00				24.500,00	24.500,00
Multilocation trials vegetables (carrot)		9.200,00	4.300,00					13.500,00	13.500,00
Genotyping wheat/barley		36.613,20	35.040,00	9.054,88				80.708,08	80.708,08
Genotyping vegetables		10.000,00	39.755,00	2.245,00				52.000,00	52.000,00
Genotyping maize		23.750,00	7.938,00	17.062,00				48.750,00	48.750,00
Travel funds wheat/barley				24.500,00				24.500,00	24.500,00
Travel funds vegetables				26.500,00				26.500,00	26.500,00
Travel funds maize			610,45	9.389,55	20.000,00	20.000,00		30.000,00	30.000,00
Provision of data from past evaluation of wheat/barley accessions to EURISCO		18.500,00						18.500,00	18.500,00
Provision of data from past evaluation of maize core collection accessions to EURISCO		18.500,00						18.500,00	18.500,00
Technical coordination/ Staff costs at ECPGR Secretariat	24.912,00	59.047,00	55.374,00	35.667,00	35.000,00	35.000,00	20.000,00	210.000,00	230.000,00
Upgrade of EURISCO		36.653,02	60.824,23	42.522,75				140.000,00	140.000,00

Budget item	Budget 2019	Budget 2020	Budget 2021	Budget 2022	Budget 2023	Budget under revision 2023	Budget under revision 2024	Total Budget EUR	Total NEW Budget EUR
<b>Data analysis</b>						40.000,00	20.000,00		60.000,00
<b>Communication</b>		10.515,35				5.000,00		10.515,35	15.515,35
<b>Subtotal</b>	46.412,00	246.440,90	229.795,92	192.101,18	65.000,00	110.000,00	40.000,00	779.750,00	864.750,00
<b>Overheads (15.84%)</b>	7.351,66	39.036,24	36.399,67	30.428,83	10.296,00	17.424,00	6.336,00	123.512,40	136.976,40
<b>Total</b>	53.763,66	285.477,14	266.195,59	222.530,01	75.296,00	127.424,00	46.336,00	903.262,40	1.001.726,40