



ECPGR Activity Grant Scheme Proposal Form

Fourth Call – Phase X (2019-2023)

Activity Proposal

Activity	
Full title	Exploitation of Cucurbita local germplasm for sustainable agriculture
Acronym (or short title)	Cucurbitlocal
Duration of Activity (in months)	24
Start date – End date <i>Please indicate start date not earlier than 3 months after deadline of Call</i>	02-15-2021 to 01-15-2023

Applying Working Group(s)

	Working Group	Indicate name and surname of Working Group Chair
1.	Cucurbits working group	Maria Ercolano
2.		
3.		
4.		

Activity Coordinator

Activity Coordinator	
Name and Surname	Maria Ercolano
Working Group	Cucurbits working group
Nationality	Italian
Current position	Associate Professor
Institute	University of Naples Federico II
Country	Italy
Telephone	*390812539431
Email	ercolano@unina.it

**ECPGR Activity Grant Scheme
Proposal Form**

Fourth Call – Phase X (2019-2023)

Activity Partners (ECPGR-funded)

Please note that each partner needs to be a member of an ECPGR Working Group to be eligible for funding. For self-funded partners please use the separate box below.

Partner ID No.	Name and Surname	Institute	Country
1	Maria Ercolano	University of Naples Federico II	Italy
2	Ulrike Lohwasser	<u>Leibniz-Institute of Plant Genetics and Crop Plant Research (IPK)</u>	Germany
3	Dan Mihai Giurca	Suceava Genebank	Romania
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Self-funded partners

Partner No.	Name and Surname	Institute	Country
1	María Belén Picó Sirvent	Polytechnic University of Valencia (UPV)	Spain
2	Hela Chikh Rouhou	Regional Research Centre on Horticulture and Organic Agriculture	Tunisia
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**ECPGR Activity Grant Scheme
Proposal Form**

Fourth Call – Phase X (2019-2023)

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Description of Activity (suggested max. 1000 words)

Please address the following aspects:

– Background:

Food production has successfully increased overall yield overcoming many biophysical limitations, albeit it has also been a destructive force for the environment. Genetic resources contain a vast reservoir of genes to foster the breeding of new cultivars suitable for low input conditions. Conservation of local germplasm is crucial to maintain the extant natural genetic diversity of the *Cucurbita* species and to provide novel traits for the cultivation of crops in sustainable agri-food systems. This project aims to rationalize the conservation of *Cucurbita* local landraces stored in major European genebanks (IPK, UPV, SvG), and/or in Regional community in Spain, Italy and Tunisia to make them available for growers through AEGIS network or other European Initiatives.

– Justification:

The proposed project aims to increase the collaboration among ECPGR Cucurbits working group members and to improve European and Regional genetic resources conservation and use. The rationally and effectively conservation and management of PGR in European Collections as well as the addition of passport and phenotypic information through the EURISCO catalogue can provide access to unique germplasm. Therefore, the revision and the valorization of *Cucurbita* local genetic germplasm conducted through this project will facilitate the sustainable use of the *Cucurbita* resources, an important goal of ECPGR phase X program. Moreover, this pilot project can be extended overall in Europe also to other Cucurbit crops.

– Rationale for the choice of partners:

The partners of project are members of WG Cucurbits involved in collection, maintenance and characterization of cucurbits spp. in the respective countries. Partners from Germany, Spain and Romania belonging to Gene Bank repositories can provide detail information on the status of collections and *Cucurbita* spp. most representative accession lists. The partners of Italy, Spain and Tunisia are involved in several projects of germplasm characterization for organic and/ or low-input agriculture and can select local accessions and make field trials for optimizing the use of biological and chemical/physical resources. The exploiting of genetic variation and improved crop management practices will result in a combined strategy for more sustainable production.

The University of Naples possess a collection of 15 *C. pepo* local landraces and other can be found in regional repositories. The group has expertise in germplasm assessment for agricultural important traits and all the infrastructures necessary for crops characterization. The IPK has long experience in *Cucurbita* accessions conservation and management. The Suceava Gene Bank in Romania, keeps a large number of *Cucurbita* accessions. The group has a long experience in the conservation, management and multiplication of genetic resources of *Cucurbita* spp., and possess field, and all condition for their characterization. The UPV gene bank holds the largest collection of Spanish landraces of the main *Cucurbita* crops (*C. pepo*, *C. maxima*, *C. moschata*, and *C. ficifolia*), adapted both to the variable agroclimatic conditions of the Iberian Peninsula and to the tropical agroclimate of the Canary island that acted as a bridge between America and Europe for the diffusion of this American

**ECPGR Activity Grant Scheme
Proposal Form**

Fourth Call – Phase X (2019-2023)

genus. The group has a long experience in the conservation, management, multiplication and characterization of genetic resources of *Cucurbita spp.*
The Regional Research Centre on Horticulture and Organic Agriculture (Chott-Mariem, Tunisia) possess field, greenhouse and laboratory infrastructure for Cucurbit characterization

– Methodology or Approach:

An inventory of the existing local genetic resources with the available passport data in European collections (IPK, UPV, SvG) will build up. It will be integrated with a list of local varieties available in Italy and Tunisia, compiled using different sources of information. The Cucurbitlocal inventory will be revised to be valorized through the project according to their diversity and potential for adaptation to diverse agroclimatic and stressful conditions, based on taxonomy, origin, collecting site features and other passport data. A phenotypic characterization will be conducted in all countries based on consensus in morphological/physiological primary descriptors (including basic vine, flowering fruit data), defined by ECPGR Cucurbits Working Group. This effort will be also valuable for regenerating accessions and for identifying duplicates together with passport data. A revision of local germplasm available at IPK, UPV, SvG will be performed and up to 10 accessions will be select for further characterizations. Experimental trials with low inputs management system on a subset of accessions will be conducted in Italy and Tunisia to identify varieties and landraces suitable for the environmental conditions of areas tested. All data will be shared in databases and catalogues with farmers and other end users to enhance the use of these materials in the local farming systems and made available at EURISCO repository.

The specific goals of project are:

- Construction of a genetic resources inventory of Local *Cucurbita* accessions, (all partners)
- Monitoring primary traits of at least of 60 *Cucurbita* local accessions both available at National Gene banks (Germany, Spain, Romania) and in regional collections (Italy and Tunisia)
- Agronomic evaluation of select accessions in low input crop management systems (Italy and Tunisia)
- Selection of *Cucurbita* local accessions for inclusion in AEGIS and/or for promoting their use (all partners)
- Organization of two virtual meetings to define the workflow of project (kick-off meeting) and to discuss results obtained (final meeting) and a mix middle-term virtual and *de visu* meeting to check the status of research activity and to better focus future activities (all partners)

YEAR	2021												2022												2023
Activity	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1
Meetings and reports																									
Revision of collections																									
Field characterization																									
Selection of Accessions																									

– Description of genetic material:

The genetic material used in this project will be provided by European Gene banks and National or Regional collections. IPK has around 850 cucurbit acc. which are available with sufficient seed amount. Spain: 100 accession of each species (pepo, maxima and moschata and 30 of ficifolia), previously selected to represent the diversity of the whole collection,

**ECPGR Activity Grant Scheme
Proposal Form**

Fourth Call – Phase X (2019-2023)

around 800 accessions). Suceava Gene Bank have 10 accessions of *Cucurbita pepo* germplasm and 10 accessions of *Cucurbita maxima* germplasm which will be multiplied and characterized, highlighting the main characteristics of the two-representative species. Tunisia have a collection of 20 accessions of *Cucurbita* germplasm, that needs to be deeply characterized. Italy a collection of 15 local *C.pepo* landraces, partially characterized for morphological traits. The activity proposed aims to rationalize the conservation of local Cucurbita genetic resources and to promote their sustainable use through a morphological and agronomic characterization. This effort will be also valuable for identifying duplicates and to revise descriptors.

**ECPGR Activity Grant Scheme
Proposal Form**

Fourth Call – Phase X (2019-2023)

– *Expected impact.*

The most interesting accessions stored in European collections selected in this project will be checked and made more accessible to researches and growers. The morphological and agronomic characterization of the genetic material performed in this proposal will highlight important traits useful for crops cultivation under low-input conditions. The effort will be also helpful for identifying duplicates and to revise descriptors. The data obtained will promote the visibility of the genetic resources selected and the conservation and sustainable use by stakeholder communities.

– *Links with other non-ECPGR projects or individuals:*

The project is linked PON- BioABC (Project for regional sustain agriculture, that aims to implement and secure the knowledge on local PRG (2019-2023), ensuring their multiplication, conservation and characterization (Italy) and It also complementary to the project Seleccion de Variedades Tradicionales y Desarrollo de Nuevas Variedades de Cucurbitaceas Adaptadas a la Produccion Ecologica. (PROMETEO/2017/078). (01/11/17 - 01/11/21). Investigación competitiva proyectos. GENERALITAT VALENCIANA. Picó Sirvent, María Belén (Spain). In addition, I will take input form projects related to local genetic resources utilization such as InnoLuteus; German Ministry of Food and Agriculture (BMEL); 2019-2022: Improving cultivation of yellow lupin (*Lupinus luteus*) in Germany and LinSel; German Ministry of Food and Agriculture (BMEL); 2019-2022: Selection of lentil (*Lens culinaris*) genotypes for further breeding

**ECPGR Activity Grant Scheme
Proposal Form**

Fourth Call – Phase X (2019-2023)

Expected products and related ECPGR Objectives

List concrete products and results that are obtained by the Activity and the corresponding number(s) of the ECPGR Outcome(s) and/or Output(s) and/or Activities to which each product/result will contribute.

	Expected products/results	Corresponding ECPGR output, activity
1	Survey of gene banks Cucurbita local landraces and varieties data	Output 1 Revision of crop data and descriptors
2	Phenotypic characterization of local germplasm	Output 2 Identification of new accessions for inclusion into AEGIS or suitable for further characterization
3	Agronomic evaluation of select accessions in low-input conditions	Output 3 Identification of landraces or varieties suitable for sustainable agriculture
4	Project virtual and <i>de visu</i> meeting	Output 4 Meeting Reports

Workplan for the proposed period of the Activity

Brief description of meetings and/or main actions of the Activity.

	Type of Action (indicate if “meeting” or “other action”)
1	<p>Meeting:</p> <p>At kick-off virtual meeting will be organized using available platforms (Microsoft Teams, Zoom, Cisco etc.) to set up project activities.</p> <p>A mix virtual <i>de visu</i> meeting, open to all Cucurbit working group members through available platforms (Microsoft Teams, Zoom, Cisco etc.), will be organize in September/October 2020 (Valencia, Spain) to discuss the following subjects:</p> <ul style="list-style-type: none"> • Status of Cucurbita local germplasm in the National banks • Information on accession surveys conducted • Revision of Cucurbita descriptors • Selection of AEGIS accessions

**ECPGR Activity Grant Scheme
Proposal Form**

Fourth Call – Phase X (2019-2023)

	<ul style="list-style-type: none"> Next activities planning <p>A final virtual meeting, open to all Cucurbits working group members, through available platforms (Microsoft Teams, Zoom, Cisco etc.), to discuss results obtained and promote future collaborations among partners on Cucurbita germplasm characterization and sustainable use</p>
2	<p>Other action:</p> <p>Survey of Partner collections to select <i>Cucurbita</i> local accessions to further evaluations</p>
3	<p>Other action:</p> <p>Primary characterization and regeneration of accessions for AEGIS and exchange among partners</p>
4	<p>Other action:</p> <p>Agronomic evaluation of a set of local accessions under low input conditions</p>
5	<p>Other action:</p> <p>Selection of <i>Cucurbita</i> local accessions for inclusion in AEGIS and/or for promoting their use</p>

Additional remarks

Indicate any additional remark(s) that is/are important for the evaluation/implementation of the proposed Activity

<p>Remarks:</p> <p>The conservation of genetic resources is a very time consuming and costly task. The procedures and the roles of conservation are not well harmonized among European countries and it is very difficult enter in dialogue with Cucurbits working group members to strengthen collaboration. In order, to make use to unique germplasm stored in the European Collections, we would like to simplify the access and material exchange among partners. Therefore, we are building up a motivated group for promoting the sustainable use of Cucurbita resources combining different strategies, hoping to extend our methodology and results to other Cucurbits working group members.</p>

**ECPGR Activity Grant Scheme
Proposal Form**

Fourth Call – Phase X (2019-2023)

**Please send the completed form together with the budget table to the
Chair of the submitting Working Group for submission of the Activity proposal.**