



ECPGR Activity Grant Scheme Proposal Form

Fourth Call

Activity Proposal

Activity	
Full title	Common ECPGR protocols and tools available for Characterisation & Evaluation of <i>Malus/Pyrus</i> genetic resources
Acronym (or short title)	Pomefruit - C&E
Duration of Activity (in months)	24
Starting date	February 2017

Applying Working Group(s)

	Working Group	Indicate name and surname of Working Group Chair
1.	<i>Malus/Pyrus</i>	LATEUR Marc
2.		
3.		
4.		

Activity Coordinator

Activity Coordinator	
Name and Surname	LATEUR Marc
Nationality	Belgium
Current position	Head of Research Unit Plant Breeding & Biodiversity
Institute	CRA-W
Country	Belgium
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Activity Partners

Please note that each partner needs to be a member of a Working Group's Pool of Experts to be eligible.

A maximum of 12 funded partners can be listed. For self-funded partners please use the separate box below.

Partner ID No.	Name and Surname	Institute	Country
	<u>Objective 1</u>		
1	Guyader Arnaud (apple & pear)	INRA/Agrocampus-ouest/Université d'Angers) Centre Angers-Nantes	France
2	Höfer Monika (Co-coordinator pear descriptors - apple & pear)	Julius Kühn-Institute, Institute for Breeding Research on Fruit Crops	Germany
4	Bergamaschi Mauro (apple & pear)	CRA-FRF Unità di Ricerca per la Frutticoltura, Forlì	Italy
5	Lateur Marc (Coordinator of the project and of Objective 1 - apple & pear)	Centre Wallon de Recherches Agronomiques (CRA-W), Gembloux	Belgium
6	Kaldmäe Hedi/ Volens Kristine (Apple)	Estonian University of Life Sciences, Polli Horticultural Research Centre	Estonia
7	Røen Dag (apple & pear)	Njøs næringsutvikling AS	Norway
8	Ordidge Matthew (Co-coordinator apple descriptors - apple & pear)	University of Reading	UK
9	Kajkut Zeljković Mirela (apple & pear)	University of Banja Luka, Genetic Resources Institute	Bosnia and Herzegovina
10	Sotiropoulos Thomas (pear)	Agricultural Research Centre of Northern Greece, Pomology Institute	Greece
11	Paprštein František (apple & pear)	Výzkumný a šlechtitelský ústav ovocnářský Holovousy s.r.o.	Czech Republic
	<u>Objective 2</u>		
12	Kellerhals Markus	Agroscope, Wädenswil	Switzerland
1	Durel Charles-Éric (Coordinator of Objective 2) - Denancé Caroline	INRA/Agrocampus-ouest/Université d'Angers) Centre Angers-Nantes	France
2	Flachkowsky Henryk	Julius Kühn-Institute, Institute for Breeding Research on Fruit Crops	Germany
3	Gunars Lacis + Objective 1 (Apple)	Latvia State Institute of Fruit-Growing, Dobbele	Latvia
5	Mingeot Dominique / Lateur Marc	Centre Wallon de Recherches Agronomiques (CRA-W), Gembloux	Belgium
8	Ordidge Matthew (Co-coordinator of Objective 2)	University of Reading	UK

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Self-funded partners

Partner No.	Name and Surname	Institute	Country
13	Inger Hjalmarsson – Objective 1 (apple & pear) and Gustavsson Larisa – Objective 2	Swedish University of Agricultural Sciences (SLU), Alnarp	Sweden
14	Ms Ildikó Király/Mr Zsolt Szaní – Objective 1 (Corresponding partners) (apple & pear)	Kecskemét College	Hungary
15	Nikola MIčić – Objective 1 (apple & pear)	University of Banja Luka, Faculty of Agriculture	Bosnia and Herzegovina
16	Gordana Đurić – Objective 1 (apple & pear)	University of Banja Luka, Genetic Resources Institute	Bosnia and Herzegovina
17	Kruczyńska Dorota – Objective 1 (apple & pear)	Research Institute of Horticulture, Skierniewice	Poland
18	Dapena De La Fuente Enrique – Objective 1 (Apple)	Programa de Investigación de Fruticultura , Area de Cultivos Hortofrutícolas y forestales, SERIDA	Spain
19	Jorge Urrestarazu Vidart - Objective 2	Universidad Pública de Navarra	Spain
20	Carlos Miranda Jiménez – Objective 1 (apple & pear)	Universidad Pública de Navarra	Spain
21	Carka Frida – Objective 1 (pear)	Agricultural University of Tirana, Gene Bank of Albania	Albania
22	Gregor Osterc – Objective 1 (apple & pear)	University of Ljubljana, Biotechnical Faculty	Slovenia

Description of Activity

Please address the following aspects:

– *Background:* Explain the context behind the choice of this Activity, e.g. why this has been prioritized or selected. If this is the continuation of a preceding Activity, please indicate how and why the new Activity will build on previous results/experiences

– *Justification:* Explain why this Activity is justified in terms of making progress towards achieving the ECPGR objectives

– *Methodology or Approach:* Explain how the partners will operate. What are the respective roles and synergies they can add? Explain the rationale of meeting (or not) as part of the Activity.

– *Expected impact.* Clearly specify the expected impact from this Activity for the respective ECPGR objective(s), compared to the current state of progress of those same objectives. Explain how the impact will be obtained.

– *Links with other non-ECPGR projects or individuals:* If applicable, clearly explain the objectives of the linked projects and the reasons for complementarity with the ECPGR Activity.

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Describe the Activity - (max. 1000 words):

Appropriate characterisation and evaluation (C & E) of agronomic traits in fruit collections is fundamental to improved better management and utilization of our genetic resources. Agreed methods, protocols and tools need continuously to be adapted to such objectives. During our last meeting of the WG a half day *ad hoc* meeting on *Malus/Pyrus* phenotypic descriptors was organized and the importance of a finalized agreed document, detailing phenotypic descriptors was highlighted; the use of harmonized molecular markers for improvement our collections by e.g., tracking errors and redundancy within and between collections was also highlighted. Since the meeting, within the framework of different projects, both documents “Methods and descriptor lists for the Characterization and Evaluation of pear and apple biodiversity” were improved but, due to the previous way of working inside the WG, the group has never been able to achieve the goal of producing a final ECPGR adopted version. In a similar context, several European apple collections have already been, or are currently genotyped with SSR markers inside the framework of national or European projects (e.g. “FruitBreedomics”). For pear, some work has been done to a lesser extent (e.g. 140 cvs in the ECPGR EcoHisPy project) and several papers have already published results of SSR genotyped collections. Although a number of these have aligned with previous ECPGR recommendations, considerable work is still required to adjust these and other datasets in a coordinated way. With the view to build a common tool for comparing such data across already genotyped collections, further standardization work needs still to be done concerning the harmonizing of SSR marker data in order to store them in EURISCO as a centralized open access place.

The project aims thus two complementary objectives with activities that are planned over a 24 months period: (i) The first objective is to finalize and implement the ECPGR adopted “Characterization and Evaluation descriptors for apple and pear biodiversity”; (ii) The second objective is to harmonize SSR data across already genotyped collections of European pear in order to make them available for users and EURISCO.

Such C & E harmonized protocols and methods are critical for enhancement of our activities in such a way that ECPGR *Outcomes 1 and 2* will be achieved: (i) AEGIS is operational – More accessions in AEGIS are characterized and evaluated, (ii) Quantity and quality of data in EURISCO have been increased. Co-ordinated C & E activities are also essential for strengthening relationships with wider potential user communities (Outcome 5).

Objective 1 - Inside our WG Workplan the proposed goal was clearly defined as first priority, and was nearly achieved for apple, as well as being partially achieved inside the EcoHisPy project within the last ECPGR grant scheme, but work still needs to be done before it can be finalized. The main objective is to finalize and edit in electronic format “ECPGR methods and descriptor lists for the Characterization and Evaluation of apple & pear genetic resources” documents.

For each crop a ‘coordinator’ and a ‘co-coordinator’ are defined to ensure that efforts are coordinated in a timely manner. Electronic coordination meetings will be organized by co-coordinators at least each trimester. The work plan proposed is as follows: (i) Circulate the last version of ECPGR *Malus* and *Pyrus* descriptors to partners and crop experts asking them to revise the document and return their comments by Mid-M2; (ii) Compiling comments and suggestions, sending back the new compiled version by mid-M3; (iii) Organizing at the same location, two days experts meeting at end M3, one day per crop for finalizing the

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document. During the meeting, a common characterization and evaluation test will be planned for studying the applicability/reproducibility of assessments of selected traits applied on a limited set of common cultivars ; (iv) Implementation of the ring test during M4 to M10 and encoding data in standardized file; encoded documents sent to coordinators/co-coordinators by mid-M11; (v) Analyzing data and compiling a report by mid-M13-14; and circulating for comment; (vi) Adopting the final version of ECPGR “Methods and descriptor lists for apple & pear” that will be sent by the end M14 to the ECPGR Secretariat for final editing in electronic format. Dissemination of such document on ECPGR and WG member’s web-sites (M15); (vii) Finalization of the report by M15.

Objective 2 – Objective 2 will be coordinated by C.E. Durel (INRA) who already coordinated similar work on apple (*Urrestarazu et al., 2016*) with the help of Matthew Ordidge as Co-coordinator. The proposed workplan is as follows: (i) contact scientists who have already published or produced pear SSR data within ECPGR countries (M1); (ii) establish an ECPGR collaborative agreement favoring the sharing of SSR data while guaranteeing preliminary publication by the data owners (M3); (iii) collect SSR and passport data of the genotyped European pear accessions from partners having signed the agreement (M6); (iv) collect leaf samples in the various genotyped collections for limited additional SSR genotyping at one place (INRA) necessary for the correct SSR alleles adjustment (M6); (v) harmonize/adjust all data over the collections and identify redundancy, putative synonyms and mutants or errors that will be further checked in each collection (M18); (vi) prepare an SSR data file ready to be uploaded into the EURISCO database (M21) and made available through an online searchable function to be developed (in kind) as an update to the ECPGR *Malus/Pyrus* DB’s; (vii) finalize and submit for publication a genetic diversity and structure analysis of European pear (M23), and finally (viii) write a synthetic report for ECPGR (M24). Moreover, as a by-product, a subset of 8 most discriminant SSR markers associated in “multiplex” will be selected and recommended for further new quick identification/distinction of new collections (M18). For apple, as the work done previously by INRA Angers of harmonizing SSR’s marker data is already mostly finished for several thousands of European accessions belonging to ten different collections, an apple SSR data file ready to be uploaded will also be prepared and encoded into the EURISCO database (M12) as well as being made available through the ECPGR *Malus* DB tool.

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 outcome, output, activity
1	“ECPGR Methods and descriptor lists for the Characterization and Evaluation of apple & pear genetic resources” finalized, approved and widely disseminated through ECPGR and partners channels. A scientific paper will be submitted before M24 on the results of the study of the phenotypic diversity of European apple and pear genetic resources based on	<ul style="list-style-type: none"> • OUTCOME 1 – Descriptors are officially adopted by WG and being implemented for collecting C & E data. • OUTCOME 5 – Important methods and descriptors are available for wider potential user’s communities – Results are communicated to the scientific community.

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	common characterization and evaluation test.	
2	ECPGR Collaboration agreement for sharing SSR's data is defined and signed by partners	<ul style="list-style-type: none"> OUTCOME 5 – Important data are available for wider potential user's communities
3	Harmonized set of SSR marker data of apple and pear genetic resources are stored in a database and offered in open access on ECPGR website and encoded in EURISCO.	<ul style="list-style-type: none"> OUTCOMES 1 & 2 – Descriptors are officially adopted by WG and being implemented for collecting SSR characterization data that are encoded in EURISCO. OUTCOME 5 – Important data are available for wider potential user's communities
4	A scientific paper will be published on the results of the study of genetic diversity of European pear genetic resources	<ul style="list-style-type: none"> OUTCOME 5 – Important results from our European pear genetic diversity study will be available for wider potential users' communities

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	<i>Other Action1 - Objective 1:</i> As described above, between M1 and M3 work will be done by exchanging documents, comments and compiling such information for producing a work document that will be finalized during an expert meeting.
2	<i>Meeting1 - Objective 1 :</i> at the end of M3 a two days expert meeting will be organized in Belgium for discussing and finalizing documents as "ECPGR Methods and descriptor lists for the Characterization and Evaluation" for both of apple & pear genetic resources.
3	<i>Other Action2 - Objective 1:</i> During M4 to M10, implementation and common application of such methods and descriptors on common set of cultivars and encoding of data in standardized files. Compilation of data and adapting method and/or descriptors in line with problems encountered (M13). Adopting final version by the WG, editing documents in electronic version and make it available on the ECPGR and EURISCO websites (M15).
4	<i>Other Action1 - Objective 2:</i> Establish an ECPGR collaborative agreement for sharing pear SSR's data among European partners (M3). Collect pear SSR data (associated with passport data) from different countries which are either already published or shared

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	with the community by partners who have signed the agreement on this matter (M6).
5	<i>Other Action2 - Objective 2:</i> Harmonization and adjustment of SSR allele sizes over the various sources of data; circulating the harmonized data set among members for collecting comments on putative accession denomination errors, synonyms/homonyms situations and question marks (M18); finalization of common multiplexes of discriminant SSR proposed for characterization of new collections (M21). Encoding all standardized pear data ready to use for diffusion in EURISCO (M21) and doing the same with already standardized apple data. Submit a paper on the European pear genetic diversity and structuration and final report (M24).

Additional remarks

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

Remarks:
<p>The project is proposed on a 24 month duration structure with the view to combine two parts with complementary objectives. Workplan defines that the first objective of the project will mainly be developed during the first year while the second objective will stretch over the 2 years, first involving participants who already have SSR data during the first year (at least seven European Institutes – FR, BE, UK, CH, SP, DE, SE – have already accepted to share their data) and hopefully enlarging to more participants during the second year. Close link with ECPGR Secretariat will be necessary for editing the WG adopted version of the descriptors and with EURISCO for encoding harmonized and standardized apple and pear SSR data into the Database.</p> <p>Since the two objectives need specific expertise's dealing either on phenotypic assessments (Objective 1) or on genotypic ones (Objective 2), the project needs therefore to involve a bit larger number of partners in order to achieve our objectives. This is also an added value of the project to combine such expertises in a multidisciplinary approach.</p> <p>As some Institutes partners have larger scope of expertise expressed in different scientists, one unique Partner ID No has been given for each Institute despite the fact that different persons will be involved in both objectives of the project.</p>

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