New Horizon 2020 project G2P-SOL: A global research alliance to preserve and revive the genetic resources of Solanaceous crops

- *New € 6.9 million initiative funded by the European Commission to focus on the and characterisation of global potato, tomato, pepper and eggplant genetic resources*
- *Bati Akdeniz Agricultural Research Institute participates in global research alliance of major European and International germplasm repositories*

Potato, tomato, pepper and eggplant together make up 66% of the horticultural crop production in Europe, and potato alone is the staple food for over 800 million people worldwide. These four crops belong to the Solanaceae family, and their centres of biodiversity are in South America (tomato and potato), Central America (pepper), Africa and South-East Asia (eggplant). Their transfer to Europe in historical times has considerably narrowed down their genetic diversity, making them more susceptible to climate change and emerging pests. The "great potato famine" which occurred in Ireland in the 19th century due to the appearance of the pathogen *Phytophthora infestans* is a tragic example of the possible consequences of such susceptibility.

G2P-SOL is a global research alliance grouping 19 full and 20 associated partners from 4 continents. The project is funded by the EC Horizon 2020 programme with a total budget of €6.9 million and will run from March 2016 to February 2021. It aims at bringing into full fruition the seeds from tens of thousands of genetic accessions of these four crops that are stored in "genebanks" worldwide. Understanding and utilizing this genetic diversity is key to the sustainability of agriculture in the face of changing environment and the appearance of new pests. This is presently hampered by the scarce information which is publicly available on the accessions and on the extent of the duplications between different collections.

"Genetic diversity is most efficiently preserved when the germplasm is well-characterized, widely available and employed in agricultural practice. Thus, scientists, breeders and farmers need to become familiar with the tools used to preserve, catalogue and assess the germplasm, using publicly accessible information on its diversity and associating it with phenotypes and agronomic traits", Prof. Giovanni Giuliano from ENEA and coordinator of G2P-SOL explains the underpinning concept of the project.

G2P-SOL will first generate a "genetic blueprint" of the accessions stored in genebanks worldwide and catalogue the available genetic diversity and the extent of the duplication. Based on this catalogue, G2P-SOL will generate "core collections", composed of a manageable number of representative accessions for each species, which will be extensively characterized in order to understand the characters and genes stored in the global gene pools. This information will be made accessible, through an open access platform to end-users (breeders, farmers associations), enabling them to focus their work on the most promising groups of accessions. The exchange of genetic materials within and outside the project will adhere to the provisions of the International Treaty on Plant Genetic Resources for Food and Agriculture and of the Nagoya Protocol on Access and Benefit Sharing.

In scope of this project, BATEM will take part on the identification of core collection including tomato, pepper and eggplant species and breeding studies on resistance against some important biotic stress. Additionally it will act on phenotypic and genotypic data analysis, pre-breeding and germplasm enhancement and training activities.

In summary, G2P-SOL will advance science and education in the following areas: 1) defining and maintaining genetic pools for crop improvement; 2) generation and analysis of phenomic and genomic data and their linkage with genebanks; 3) pre-breeding and germplasm enhancement; 4)

training, workshops and public outreach. By setting up a unified information platform, the G2P-SOL gateway, and the characterization of a large subset of worldwide germplasm, the value of such germplasm collections will tremendously increase.

The partners in *G2P-SOL* at a glance:

Bulgaria

- Maritsa Vegetable Crops Research Institute

France

- Institut National de la Recherche Agronomique

Germany

- European Research and Project Office GmbH
- Leibniz Institut fuer Pflanzengenetik und Kulturpflanzenforschung

Israel

- The Agricultural Research Organisation of Israel – The Volcani Centre
- The Hebrew University of Jerusalem
- Phenome Networks Ltd.

Italy

- Agenzia Nazionale Per Le Nuove Tecnologie, L'Energia e lo Sviluppo Economico Sostenibile
- Blumen Group Spa
- Consiglio per la ricerca e la sperimentazione in agricoltura e l'analisi dell'economia agraria
- Consorzio Sativa
- Università degli Studi di Torino

Netherlands

- Wageningen University - Stichting Dienst Landbouwkundig Onderzoek

Peru

- Centro Internacional de la Papa

Poland

- Instytut Hodowli i Aklimatyzacji Roślin - Państwowy Instytut Badawczy

Spain

- Universidad Politécnica de Valencia

Taiwan

- AVRDC - The World Vegetable Center

Turkey

- Ministry of Food, Agriculture and Livestock – Bati Akdeniz Agricultural Research Institute

UK

- The James Hutton Institute

Project details

Name: G2P-SOL – Linking genetic resources, genomes and phenotypes of Solanaceous crops
Start date: 2016-03-01
Duration: 60 months
Budget: 6,891,265.00 €
Coordination: Agenzia Nazionale Per Le Nuove Tecnologie, L'Energia e lo Sviluppo Economico Sostenibile

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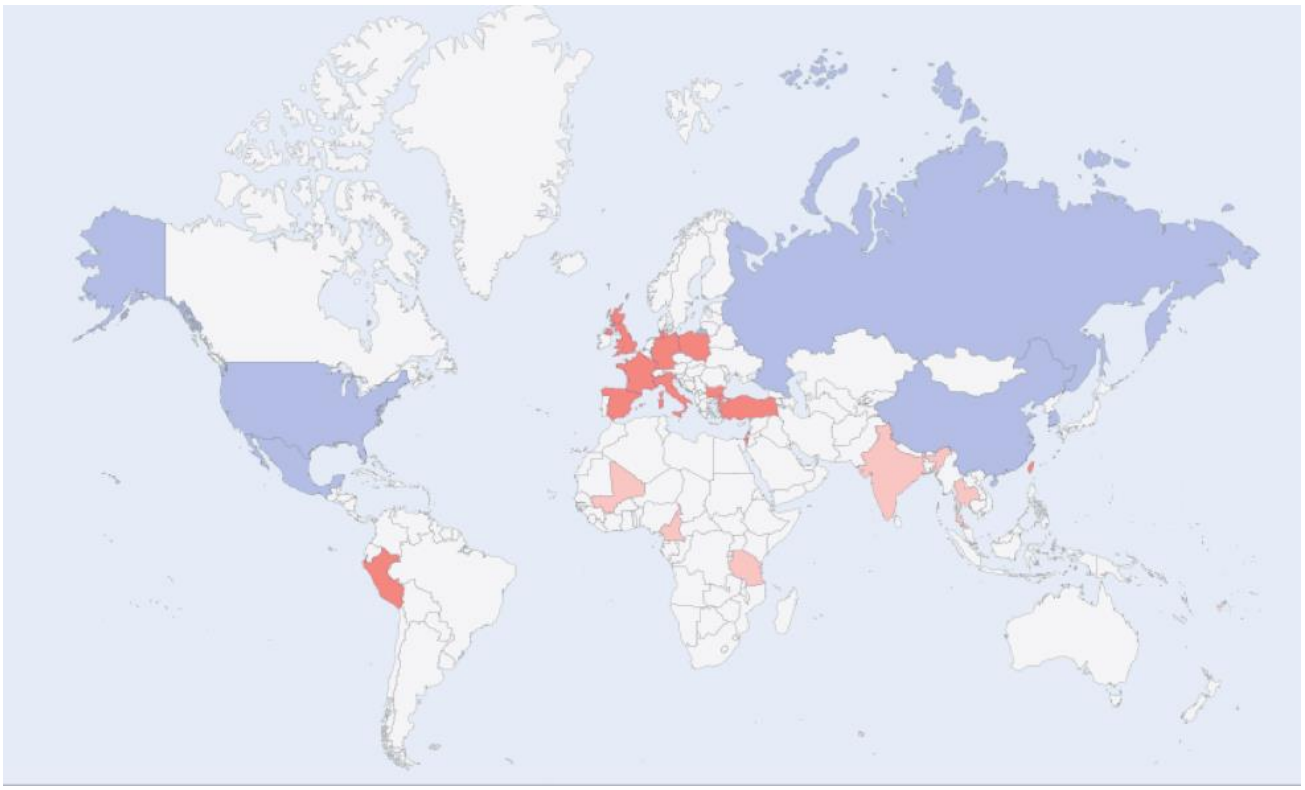

The G2P-SOL global research alliance. Dark red: full partners. Light red: full partner outstations. Blue: associated partners.