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Single Primer Enrichment Genotyping Highlights the Worldwide Population Structure of Tomato and Eggplant Germplasm.

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Barchi L, Acquadro A, Portis E, Lanteri S, Alonso D, Gramazio P, Vilanova S, Diez MJ, Prohens J, Salinier J, Lefebvre V, Pasev G, Grozeva S, Boyaci HF, Unlu A, Toppino L, Bassolino L, Rotino GL, Boerner A, Brandt R, Stein N, Finkers R, Bovy A, Schafleitner R, Scaglione D, Di Centa E, Pinosio S, Aprea G, Ferrante P, Giuliano G. **2019**. Single Primer Enrichment Genotyping Highlights the Worldwide Population Structure of Tomato and Eggplant Germplasm. *XXVII Plant and Animal Genome Conference*, January 12-16, 2019, San Diego, CA, (USA). W983. [Communication orale invitée + Résumé]

Barchi L (Orateur),

Abstract

W983 Single Primer Enrichment Genotyping Highlights the Worldwide Population Structure of Tomato and Eggplant Germplasm **Lorenzo Barchi¹**, **Alberto Acquadro¹**, **Ezio Portis¹**, **Sergio Lanteri¹**, **Davis Alonso²**, **Pietro Gramazio²**, **Santiago Vilanova²**, **Maria José Díez²**, **Jaime Prohens²**, **Jeremy Salinier³**, **Veronique Lefebvre³**, **Gancho Pasev⁴**, **Stanislava Grozeva⁴**, **Hatice Filiz Boyacı⁵**, **Abdullah Unlu⁵**, **Laura Toppino⁶**, **Laura Bassolino⁶**, **Giuseppe Leonardo Rotino⁶**, **Andreas Boerner⁷**, **Ronny Brandt⁸**, **Nils Stein⁹**, **Richard Finkers¹⁰**, **Arnaud G. Bovy¹⁰**, **Roland Schafleitner¹¹**, **Davide Scaglione¹²**, **Eleonora Di Centa¹²**, **Sara Pinosio¹²**, **Giuseppe Aprea¹³**, **Paola Ferrante¹³** and **Giovanni Giuliano¹³**, (1)DISAFA, Plant Genetics and Breeding, University of Torino, Grugliasco, Italy, (2)COMAV-UPV, Valencia, Spain, (3)INRA, UR1052 GAFL, Montfavet, France, (4)Maritsa Vegetable Crops Research Institute (MVCRI), Plovdiv, Bulgaria, (5)Bati Akdeniz Agricultural Research Institute (BATEM), Antalya, Turkey, (6)CREA-GB, Montanaso Lombardo, Italy, (7)Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Stadt Seeland, Germany, (8)Max Planck Institute, Stadt Seeland, Germany, (9)Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, Germany, (10)Wageningen University & Research, Plant Breeding, Wageningen, Netherlands, (11)World Vegetable Center, Tainan, Taiwan, (12)IGA Technology Services, Udine, Italy, (13)ENEA, Rome, Italy

G2P-SOL (<http://www.g2p-sol.eu>) is an EU-funded project, bringing together the main European and international genebanks hosting germplasm of the four major Solanaceous crops: potato, tomato, pepper and eggplant. 23,900 tomato and 5,900 eggplant accessions, including wild relatives of both crops, have been inventoried within the project.

To gain information about population structure of the collections, the novel Single Primer Enrichment Technology (SPET, US Patent 9,650,628) developed by NuGEN was used for genotyping. An SNP/indel panel was developed by assaying 14k probes for tomato and 11k for eggplant, evenly distributed in the gene-rich regions, and selecting the 5k best performing probes for each species.

DNA samples were prepared by the genebanks using pre-tested protocols, and genotyping partners (ENEA for tomato and University of Torino for eggplant) performed QC and sample normalization. Genotyping and sequencing was performed by IGA Technology Services. Reads were aligned to the eggplant and tomato reference genomes using BWA-MEM and SNP calling was performed using GATK-4.0.

We report on the assessment of the genetic relationships in a wide set of tomato and eggplant accessions maintained in genebanks as well as the extent of duplications and possible mis-

classifications. The results suggest that SPET genotyping is a reliable, high-throughput, low cost technology for genetic fingerprinting of crops, with a high degree of cross-transferability to their wild relatives. SPET-based higher density genotyping is being developed to characterize the core collections developed in G2P-SOL for GWAS analyses.

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