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

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### ► To cite this version:

Lorenzo Barchi, Alberto Acquadro, Ezio Portis, Sergio Lanteri, David Alonso, et al.. Single Primer Enrichment Genotyping Highlights the Worldwide Population Structure of Tomato and Eggplant Germplasm.. XXVII Plant and Animal Genome Conference, Jan 2019, San Diego (CA), United States. hal-03551688

**HAL Id: hal-03551688**

**<https://hal.inrae.fr/hal-03551688>**

Submitted on 1 Feb 2022

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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]

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## Abstract

**W983 Single Primer Enrichment Genotyping Highlights the Worldwide Population Structure of Tomato and Eggplant Germplasm** **Lorenzo Barchi<sup>1</sup>**, **Alberto Acquadro<sup>1</sup>**, **Ezio Portis<sup>1</sup>**, **Sergio Lanteri<sup>1</sup>**, **Davis Alonso<sup>2</sup>**, **Pietro Gramazio<sup>2</sup>**, **Santiago Vilanova<sup>2</sup>**, **Maria José Díez<sup>2</sup>**, **Jaime Prohens<sup>2</sup>**, **Jeremy Salinier<sup>3</sup>**, **Veronique Lefebvre<sup>3</sup>**, **Gancho Pasev<sup>4</sup>**, **Stanislava Grozeva<sup>4</sup>**, **Hatice Filiz Boyacı<sup>5</sup>**, **Abdullah Unlu<sup>5</sup>**, **Laura Toppino<sup>6</sup>**, **Laura Bassolino<sup>6</sup>**, **Giuseppe Leonardo Rotino<sup>6</sup>**, **Andreas Boerner<sup>7</sup>**, **Ronny Brandt<sup>8</sup>**, **Nils Stein<sup>9</sup>**, **Richard Finkers<sup>10</sup>**, **Arnaud G. Bovy<sup>10</sup>**, **Roland Schafleitner<sup>11</sup>**, **Davide Scaglione<sup>12</sup>**, **Eleonora Di Centa<sup>12</sup>**, **Sara Pinosio<sup>12</sup>**, **Giuseppe Aprea<sup>13</sup>**, **Paola Ferrante<sup>13</sup>** and **Giovanni Giuliano<sup>13</sup>**, (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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