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Population structure of tomato and eggplant germplasm based on single primer enrichment genotyping

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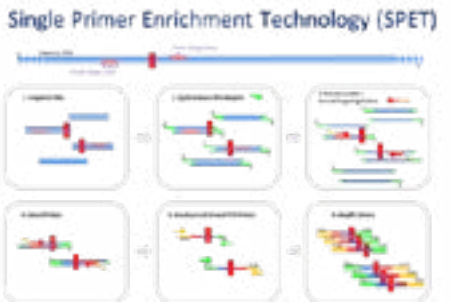
G2P-SOL (www.g2p-sol.eu) is an EU-funded project, bringing together the main European and international gene banks hosting germplasm of the four major Solanaceous crops: potato, tomato, pepper and eggplant. Up to 23,900 tomato and 5,900 eggplant accessions, including wild relatives of both crops, have been inventoried. The Single Primer Enrichment Technology (SPET, US Patent 9,650,628), developed by NuGEN, was applied to assess the genetic relationships in set of 422 and 400 entries of eggplant and tomato primary, secondary and tertiary gene pools respectively. As shown below, the streamlined SPET workflow consists of four main steps: fragmentation of genomic DNA, end repair to generate blunt ends, adaptor ligation, and final repair to produce the library. 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. An SNP/indel panel was developed by assaying the 5k best performing probes designed both on coding region and the introns/UTRs genome space. By applying stringent criteria a whole of 22,821 and 8,546 polymorphic sites were identified in eggplant a tomato gene pools respectively. FastSTRUCTURE56 and PCA outputs provided information on the diversity of the accessions in study and made it possible to identify duplications and mis-classifications. The obtained 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.



Biography

Sergio Lanteri is currently working as full professor in 'Genetics and Plant Breeding' at the DISAFA, University of Turin, Italy. He received his Master's Degree in Agricultural Science from the University of Torino, and his PhD in 'Plant Biology' from the University of Milan (Italy). As Post-PhD fellow, he worked at the Plant Science Laboratories, University of Reading (UK) and at the Plant Research International; Wageningen (NL).He is an Associate Editor of the Journal Frontiers in Plant Science.

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