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Association mapping for drought tolerance and fruit yield in cultivated and related species of tomato (*Solanum* spp.)

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Nomato is an important commercial vegetable crop. However, tomato is affected by both biotic and abiotic stresses, most L importantly; the increasing occurrence of drought worldwide has highlighted the need for development of drought tolerant genotypes in tomato. Identification and selection of genotypes with improved drought tolerance will play an important role in developing tomato genotypes with better yield. The aim of this study was to investigate the effects of drought stress on fruit yield through physiological traits related to drought tolerance viz., SPAD chlorophyll Meter Reading (SCMR), Specific Leaf Area (SLA), Relative water content (RWC) and leaf rolling (LR) and also establish marker association with physiological and fruit yield traits. One hundred (100) germplasm accessions of six cultivated tomato and related species along with three check varieties were evaluated during summer 2014 and 2015 under well watered and water stress condition (stress was imposed on 60th day after transplanting for a period of 20 days). Population structure was determined using model based method by structure, Neighbor-joining method, O-matrix population structure and Delta K analysis and all of them separated population into four clusters. Marker-trait associations are established using 145 published SSR markers with syntenic Linkage Disequilibrium (LD) values (r2=0.09) which depicted that some markers detected as most powerful due to high R2 value. Marker SSR 52 associated with SCMR and TGS 2002 for fruit yield per plant and clusters per plant in lycopersicum species. The markers SSR 14 and LELEUZIP for LR, LEet 004 for plant height, fruit yield per plant and LR in cherry species. The marker SSR 593 for days to 50% flowering, SSR 27 for days to first fruit set, SSR 218 for stem girth, TGS 0412 for clusters per plant, SSR 128 for fruits per plant, SSR 599 and SSR 593 for fruit yield in all the spp. This study demonstrated that association mapping in cultivated and related species can enhance the information from QTL studies towards the implementation of marker-assisted selection. From the present study five germplasm accessions namely LA 2976, WIR 13708, EC 676809, EC 677123 and EC 771596 were identified as top drought tolerant genotypes which may be used as parents in hybridization program to develop drought tolerant and high yielding varieties in tomato.

Biography

D L Savithramma has completed her PhD from University of Agricultural Sciences, Bangalore, India and Post-doctoral studies as a Biotechnology National Associate from Indian Institute of Science, Bangalore, India. She is a Professor and University Head of Genetics and Plant Breeding at University of Agricultural Sciences, Bangalore, India. She has guided 13 PhD students and 30 Master's students in Genetics and Plant Breeding. She has published more than 70 papers in reputed journals and has released eight varieties in vegetable cowpea, seed cowpea, peanut and *Chrysanthemum*.

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