Simple Sequence Repeat (SSR) Marker based Genetic Diversity and Population Structure Analysis in Eggplant (Solanum melongena L.)

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Abstract—*Eggplant or brinjal is one of the most important solanaceous vegetable crops in India and in other parts of the world. The present study was undertaken to evaluate genetic diversity and population structure of eggplant collected from different parts of India using SSR markers. A total of 60 genotypes representing 51 cultivated varieties and nine wild relatives were genotyped by 20 SSR markers at Division of Vegetable Science, IARI, New Delhi, India. Both dendrogramconstruction and PCA was done using the software NTSYSpc version 2.2.Bayesian-based model cluster analysis was done to understand the population structure and the number of clusters in the data set using the software STRUCTURE version 2.3.4. A total of 15 polymorphic SSR markers amplified 46 alleles and the number of alleles per loci ranged from 2 to 6 with an average of 3.06 allele per locus. UPGMA clustering showed that cluster I from bottom predominantly consisted of 4 wild species (S. viarum, S. khasianum,S. sisymbrifolium and S. xanthocarpum) with small round fruits with hard pulp and the member of this group were less domesticated. The cluster II further divided into IIA (S. macrocarpum,S. integrifolium, S. aethiopicum and S. insanum) while the cluster IIB comprised genotypes that have been cultivated extensively along with its progenitor. The PCA plot separated all the accessions into two major clusters. The population structure analysis classified genotypes into 6 sub-populations, with 16genotypes (26.66%) found in population 1, 12 genotypes (20%) in population 2, 11 genotypes (18.33%) in population 3, 5 genotypes (8.33%) in population 4, 12 genotypes (20%) in population 5 and 4 genotypes (6.66%) in population 6. Therefore, prior knowledge of the structure of the genetic diversity within collection of the genotype may be of great help to make decisions on breeding strategies and to use in future breeding programs of eggplant.*