



Molecular analysis of drought tolerance in guava based on in vitro PEG evaluation

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Abstract:

Forty landraces of guava were subjected to drought tolerance evaluation based on in vitro polyethylene glycol (PEG) treatment. Nodal stem segments with lateral buds were used as explant. Five concentrations (i.e. 0, 4, 6, 8 and 10%) of PEG were tested, among which the optimum concentration for screening was determined as 8%. Analysis of variance showed highly significant variation among the tested landraces, concentrations of PEG and the interaction between them in the percentage of response (%R), number of shoot per explant (NSE) and drought susceptibility index. The average percentage of reduction due to PEG treatment was 48.30 and 52.57% for the %R and NSE, respectively. Heritability and genetic advance were increased due to drought stress for %R, while they were decreased for NSE, indicating that %R was more related to drought stress than NSE. The molecular analysis of the highest and lowest responsive landraces was performed using sequence related amplified polymorphism (SRAP) and inter-simple sequence repeats (ISSR). Both markers were effective in discriminating the tested landraces and completely separated them into two clusters related to %R under PEG. ISSR showed a higher percentage of polymorphism, polymorphic information content and diversity index compared with SRAP. However, SRAP was more effective than ISSR in showing a higher primer resolving power and a number of unique specific bands for drought tolerance and susceptibility. Drought in vitro evaluation method established here is effective, inexpensive and manageable in genotype screening for drought tolerance in guava and could be used in other woody plant species.

Keywords:

Psidium guajava, Water stress, SRAP, ISSR, in vitro selection

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