Identification of tomato inbred lines for heat tolerance through agronomic and physiological approaches

ABSTRACT

Eighteen tomato inbred lines were evaluated for tolerance against heat under field condition. Eight inbred lines were found promising in respect to flower and fruit setting. Ten inbred lines did not set fruit due to showing sensitivity to heat. Inbred line C11 produced the maximum number of 20.8 fruits per plant and fruit yield of 581 g per plant. Inbred line C51 produced 553 g fruit per plant. The highest individual fruit weight of 65.7 g was produced by WP10 with only 180 g fruit yield per plant. Three inbred lines, C41, C51 and C71 had more than 5% total soluble solid. Membrane thermostability (MT) test of eighteen inbred lines was accomplished with a view to evaluate heat tolerance under elevated temperature of 55℃. The result of MT test revealed that some of the inbred lines had the longer heat killing time and hence those genotypes were considered as heat tolerant among the collection. Three inbred lines, C51, C71 and HT019 took maximum of 240 minutes to cause 50% injury, which indicated that these inbred lies could be considered as useful breeding materials in developing heat tolerant tomato varieties. Six inbred lines namely C11, C41, HT020, HT021, WP10 and VRT004 also had tolerance against elevated temperature for 210 minutes to cause 50% injury. These nine inbred lines, due to having longer time to cause 50% injury level against elevated temperature, can also be selected for utilization in tomato breeding program to develop heat tolerant varieties.

Keyword: Cell membrane; Flowering; Fruit setting; High temperature; Tomato; Yield