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Stability analysis of yield and fruit quality in inbred lines of cherry tomato

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Abstract

The main aim of cherry tomato breeding is to improve stability in yield and to achieve a variety that has good consumption quality. For this purpose, a study of 12 cherry tomato genotypes (11 inbred lines and 1 commercial) was evaluated for yield and fruit quality across three environments, dry season of 2017 and 2018, at Khon Kaen (KKU1 and KKU2) and dry season 2019 at Chiang Mai (CMU). A randomised complete block design with three replications was used in each experiment. Weather data including air temperature and relative humidity and individual fruit weight, fresh yield per plant and total soluble solid data was measured. The CMU environment produced the highest average fruit weight and fruit yield while cherry tomato fruit grown under KKU1 and CMU contained TSS content higher than those grown under KKU2. From combined analysis showed significant differences among genotypes, environments, and genotype-by-environment interactions for all characteristics studied. A large proportion of variation in fruit number, fruit weight, yield, and TSS (52.6 %, 74.0 %, 55.4 and 58.6 % respectively) was influenced by genotype. This indicates that our varieties were highly different in plant growth habits, leaf, inflorescence, and fruit sizes. Therefore, genotypes had more effect on all traits studied than other sources of variation. Genotype IL9 had medium yield and high TSS but was sensitive to environmental changes, and therefore suitable for specific location adaptation. While genotype IL3 had high yield and TSS and was more stable to environmental changes with regression coefficients on yield and TSS of $b=0.74$ and 0.97 respectively. Therefore, IL3 was considered suitable for various environments.

Keywords: Cherry tomato, environment, genotype, interaction, stability