

Morpho–physiological characterization of tomato (*Solanum lycopersicum* L.) F1 hybrids and their parents for heat tolerance

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Tomato (*Solanum lycopersicum*) is a cash crop for farmers globally and a significant source of nutrition for consumers, making them an essential part of the human diet. Tomato production is currently affected by several abiotic factors such as high temperatures due to global climate change. The most viable option to adapt climate change is to breed varieties resilient to future climate change. Therefore, this study was planned to assess the heat tolerance of eight tomato F1 hybrids and their parents (six) with commercial checks (Platinum F1 and KC-1) under local conditions. Under poly tunnel and open field conditions tomato entries were exposed to high temperature regimes at 28 - 40°C and 27 - 35°C respectively. Under experiment 01 Platinum F1 recorded the highest yield per plant (1454.6 ± 35.0 g) and there was no significant difference ($p>0.05$) with TOH 22 (840.5 ± 196.2 g), TOH 18 (1106.1 ± 90.8 g) and TOH 21 (1143.0 ± 131.9 g). However, KC-1 recorded 516.0 ± 123.6 g/plant. The highest total number of fruits was recorded by TOH 21 (38.3 ± 4.6) while TOH 18 (84.9 ± 3.0 g) showed the highest single fruit weight. According to the pollen viability and relative water content TOH 18, TOH 21, TOH 22 and TOH 20 seemed to have heat-tolerant characters. Overall F1 hybrids of TOH 18, TOH 21, TOH 22, and TOH 20 showed the best performance under both environments. Thus, these results would be useful for breeders to identify and develop new heat tolerance varieties for local conditions.

Keywords: *F1 hybrids, Heat tolerance, Tomato, Local conditions*