

## SCREENING OF SWEET PEPPER FOR HIGH TEMPERATURE TOLERANCE

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Long-term increase in temperature and short episodes of extremely high temperature are detrimental for pollen vigour, which influence pollen germination and tube growth; thus result low fruit set. This study was designed to determine the effect of increasing temperature on pollen germination and pollen tube length of Sweet pepper (*Capsicum annuum*) using cumulative temperature response index (CTRI) and to identify the most suitable time of the day for pollen collection using pollen viability. Pollens were collected from five locally available accessions (i.e. ACC-01 to 05), which were grown inside a polytunnel in a completely randomized design. At peak flowering, pollens were collected following the standard protocol. First, the viability was assessed by collecting pollens from one hour intervals starting from 7.00 am till 11.00 am. Pollens collected at 9-10 am recorded the highest viability (~70%), thus it was used for the main study. Pollens were subjected into *in-vitro* temperature regimes of 15, 25, 30, 32, 35, 40 °C. Pollen germination and tube lengths were recorded for all accessions after incubation for 24 hours at respective temperature regimes. Accessions differed significantly ( $p < 0.05$ ) for *in-vitro* pollen germination percentage and pollen tube length with mean values of 28.44% and 102.90  $\mu\text{m}$  respectively. ACC-05 illustrated the highest pollen germination (77.3%) and tube length (661.0  $\mu\text{m}$ ). The mean cardinal temperatures ( $T_{\min}$ ,  $T_{\text{opt}}$ ,  $T_{\max}$ ) were 10.91, 27.05 and 56.40 °C for pollen germination and 15, 27.9 & 57.9 °C for tube length. The highest  $T_{\text{opt}}$  for germination was 29°C (ACC-05) and the  $T_{\text{opt}}$  for tube length was 30.8°C (ACC-05). The CTRI was used as the criterion for sorting for high temperature tolerance that was calculated for each accession separately. ACC-5 was noted as an intermediate tolerant accession and rest were identified as sensitive. ACC-2 and ACC-4 showed an unexpectedly extreme high  $T_{\max}$  that may due to high temperature tolerance, however calculation of CTRI became unrealistic. Accessions resulted high  $T_{\text{opt}}$  and  $T_{\max}$  were concluded as high temperature tolerant. Pollen germination percentage and pollen tubes length are useful indicators for screening for high temperature tolerance.

**Keywords:** Cardinal temperatures, Cumulative temperature response index, High temperature tolerance, Pollen viability, Sweet pepper