Rice is our most important staple food crop. It is grown in diverse agroclimatic zones from temperate through subtropical to tropical, with temperature being the principle limiting factor to cultivation: critical limits range from 12 to 20°C in cool zones to 34 to 38°C in warmer ones. Productivity is affected as these extremes are approached. According to the Intergovernmental Panel on Climate Change, mean global surface temperature is expected to increase by 0.6 to 4°C by 2100 with an increase in temperature variability and, importantly for grain production, more frequent extreme events. Moreover, increasing demand for rice is pushing rice production into a wider range of environments.

Cereal grain yields are particularly sensitive to even brief periods of extreme temperature if they coincide with vulnerable stages of early reproductive development. Critical high-temperature thresholds in rice vary among cultivars from around 35 to 38.5°C while low-temperature critical thresholds vary from 12 to 20°C.

In the January–February 2015 issue of Crop Science, researchers studied the temporal sensitivity of two japonica rice cultivars of contrasting origin and duration (Gleva and Taipei 309, early- and late-maturing cultivars from Spain and Taiwan, respectively) to short-term low- and high-temperature stress throughout reproductive development from before anthesis through harvest maturity. The researchers used a reciprocal-transfer experimental design and assessed not only by seed set and yield, but also seed viability. In traditional reciprocal-transfer designs, plants are moved for a set period both ways between two regimes and then returned, at the end of the period, to their original

Temporal Sensitivity of Rice Seed Quality Development to Short-Term Extreme Temperature


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