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Effect of heat stress on flower and fruit set in tomato

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Effects of global warming on agricultural productivity indicate that high temperature (HT) will have detrimental effects in many developing countries. In tropical and subtropical regions heat stress may become a major limiting factor for crop production.Heat stress is a major abiotic factor that limits tomato production during the summer season. It has been reported that heat stress can occur at temperatures just a few degrees above optimal. Such moderately elevated temperature stress may lead to an impairment of pollen and antherdevelopment,which contributes to decreased fruit set in tomato. This environmental factor influences various physiologicalprocesses such as photosynthetic activities, transpirationas well as vegetative growth and reproductive development.Pollen release and germination ability under high temperature reveals to be the most important factors determining the fruit set ability and could be used in breeding programs aiming for better fruit set under high temperatures. However,increase in 2-4^{O}C optimal temperature adversely affects gamete development and inhibits the ability of pollinated flowers into seeded fruits and thus reduced crops yields. Under high temperature number of pollen grains, fruit set percentage and fruits fresh weight produced by the heat tolerant cultivars were higher than those produced by the heat sensitive ones. HT tolerant tomato genotypes provide valuable tool for improving new cultivars. The selection of crops or species tolerant to HT stress would be the best and the easiest strategy for increasing fruit set at HT in tomato, which is most adoptive under heat stress conditions of climate change scenario.

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