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Abstract

High temperature (HT) at meiosis stage is one of most important environment constraint affecting spikelet fertility and rice yield. In this paper, the effects of HT exposure at meiosis stage on the ROS (reactive oxygen species) accumulation, various superoxide dismutase (SOD, EC1.15.1.11) isozymes in developing anther, and its relationship with HT-induced decline in pollen viability and floret fertility were investigated by using four rice cultivars differing in heat tolerance under well-controlled climatic condition. Results showed that HT exposure significantly increased ROS level and malondialdehyde (MDA) content in rice anther, and this occurrence was strongly responsible for the HT-induced decline in pollen viability and harmful effect of HT adversity on floret fertility. However, the increased extent of ROS concentration in rice anther under HT exposure was greatly variable, depending on both the intensity and duration of HT exposure and different rice cultivars used. The SOD and CAT activities of HT-sensitive cultivars decreased more profoundly than those of HT-tolerant cultivars under the same HT regimes. Among various types of SOD enzymes, Cu/Zn–SODa expressed highly in rice anther and responded