Effects of Chilling Stress on Photosynthetic Rate and Chlorophyll Fluorescence Parameter in Seedlings of Two Rice Cultivars Differing in Cold Tolerance [PDF]

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摘 要：A cold-tolerant cultivar, Xiangnuo 1, and a cold-sensitive cultivar, IR50, were used to study the influence of chilling on photosynthetic rate and chlorophyll fluorescence parameters in rice seedlings. The photosynthetic rates declined dramatically during chilling, and decreased by 48.7% and 67.5% in Xiangnuo 1 and IR50 seedlings, respectively, after being subjected to chilling treatment for two days. Chlorophyll fluorescence measurements showed that relatively higher qP and qNP in Xiangnuo 1 were maintained to dissipate the redundant excitation energy and protect the reaction centers from chill injury; accordingly, redundant excitation energy accumulated less in the reaction centers, and antenna systems were less injured by chilling in Xiangnuo 1. On the contrary, in IR50, qP and qNP declined rapidly while Ex increased, as the chilling persisted. This result indicated that the reaction centers and antenna systems in IR50 were damaged severely by chilling, which led to the lower photosynthetic rate.

关键词：chilling; rice; photosynthetic rate; chlorophyll fluorescence analysis

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