

[P3] Abiotic Stress for Crop Production

Thu. Sep 9, 2021 12:15 PM - 2:00 PM Room 3 (Poster) (Abiotic Stress for Crop Production)

12:15 PM - 1:00 PM

[P3-39] Effects of Jasmonic Acids on Rice Flower Opening Time and Fertility under High Temperature Conditions

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Global warming is a serious problem that may increase heat-induced floret sterility (HIFS) in rice, thereby reducing its yield. Flower opening in the early morning helps avoid HIFS. In this study, the effects of two kinds of jasmonic acids (methyl jasmonate [MeJA] and prohydrojasmon [PDJ]) on flower opening time (FOT) and fertility were examined. The rice panicles (cultivar 'Hinohikari') grown in a greenhouse for heat treatment in Kagoshima Prefecture were subjected to 4 or 0.4 mM MeJA and PDJ at 0900 during the heading stage. By taking photographs of the panicles at 10-min intervals, FOT was determined. The percentage of anther dehiscence at the basal part, number of pollinated pollen grains, and fertility percentage on the treatment day were also examined. The maximum air temperature in the greenhouse was over 36°C, high enough to induce HIFS. The application of 4 mM MeJA advanced FOT by more than 3 hours, whereas the application of 0.4 mM MeJA and 4 and 0.4 mM PDJ did not. Both kinds of jasmonic acids did not affect fertility percentage, number of pollinated pollen grains, and percentage of anther dehiscence, however. In conclusion, MeJA advanced FOT under high temperature, whereas PDJ did not. Moreover, MeJA did not reduce sterility through advancing FOT. Although jasmonic acids are thought to be related to fertility and pollen maturation, the effects of MeJA in avoiding HIFS through an artificial advancement of FOT were offset by some harmful effects of premature flowering on pollen physiological processes that induced mature pollen grain reduction.