

[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

[P3-09] Diurnal Changes in Chloroplast Positioning and Photosynthesis in Finger Millet

*Nominated for Presentation Awards

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Finger millet is an important cereal crop cultivated in the arid and semi-arid regions and often experiences high-intensity light during the day. Mesophyll (M) chloroplasts in finger millet are known to aggregate to the bundle sheath side when leaves are constantly irradiated with extremely high-intensity light. This aggregative movement of M chloroplasts is also observed in the natural environment, but whether a natural light regime is effective in inducing the response remains unclear. Abscissic acid is reported to trigger not only the aggregative movement but also stomatal closure, but photosynthetic responses accompanying the aggregative movement also remain unknown. We investigated changes in chloroplast positioning and photosynthetic traits under diurnal patterns of light, mimicking the natural light environment. M chloroplasts showed the aggregative movement with increasing light intensity whether it frequently fluctuated or not, and kept their aggregative positions in the early afternoon. With decreasing light intensity, M chloroplasts returned to the random position in the evening. These results suggest that M chloroplasts often rearrange their intracellular positions during the daytime and the chloroplast aggregative movement can be induced by a natural regime of light. The chloroplast aggregative movement was observed with increasing stomatal conductance, suggesting that stomatal closure seems not crucial to trigger the chloroplast response.