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Effect of different water levels on the photosynthetic pigments of crops

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Abstract

An excess soil water condition is one of the major problems for the field crops growing in paddy fields because of their poor drainage and less availability for oxygen uptake which leads to adversely affect the photosynthesis. Therefore, the current study was undertaken with aim to investigate the effects groundwater level on the photosynthetic response of soy bean (Urum), red bean (Arari), sesame (Geonbaek), perilla (Dayu) after the transplanting to the lysimeter to investigate the plant-water relation and their effect on photosynthesis. The chlorophyll content of the crops according to the humid conditions of the soy bean, sesame and the perilla was found to be 5%, 6.89 % and 13.7% higher than that of the groundwater treated at 40cm, respectively. On the other hand, the chlorophyll content of adzuki bean decreased 6.6% from the groundwater level of 40cm, and the sorghum decreased by 5.7%. As a result of investigating the F_v / F_m value of groundwater, the adzuki bean at 20cm above groundwater was lower than that of groundwater by 40cm immediately before flowering. The F_v / F_m value of soy bean and sesame at 40cm above groundwater were lowered by flowering under groundwater 20 cm and F_v / F_m value of sorghum is increased at 40 cm treatment immediately before flowering while the F_v / F_m values of the perilla had no significant difference in comparison to those at 20 cm and 40 cm of groundwater. In the case of chlorophyll fluorescence reaction, it is known that the when the absolute value is closer to 0.82, the stress is considered less. As a result of comparing the numerical values of the crops, it was found that the sorghum was the most stressed followed by adzuki bean and sesame, while the soy beans and perilla was found on the average, as they received less stress.

Keywords: Water stress, Moisture resistance, Cultivation Physiology, Photosynthesis

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