

PA-17

Silicon Application Enhances Photosynthesis Related Factors in Soybean under Salinity Condition.

Se-Hun Kim¹, Yong Suk Chung², Chae-In Na³, Yoonha Kim^{1*}

¹School of Applied Biosciences, Kyungpook National University, Daegu 41566, South

²Department of Plant Resources and Environment, Jeju National University, Jeju 63243, Republic of Korea

³Department of Agronomy, Gyeongsang National University, Jinju 52828, South Korea

[Introduction]

Silicon (Si) has been known as one of the major elements for plant growth and development of plants. Furthermore, Si induces resistance against various abiotic stress especially salinity stress condition. Thus, we carried out an experiment to identify Si effect on mitigation of salinity stress in soybean plant.

[Materials and Methods]

We used 'Daewon' (*Glycine max* L.) cultivar. Seeds were sown into plastic trays and were grown at the chamber for two weeks. When soybean plants reached to VC stage, we transferred uniform sized soybean seedling into a container box, containing Hoagland solution. Our experiment constituted 4 different treatments i.e. (i) Control (ii) 2.0 mM Si (iii) 2.0 mM Si + 100 mM NaCl and (iv) 100 mM NaCl. Each treatment comprised three replications, while each replication constituted 10 soybean plants (n=10). The second trifoliate leaf (fully expanded leaves) from the top was used for data analysis.

[Results and Discussion]

According to our results, net photosynthesis and related factors was dramatically decreased in NaCl treatments in comparison with that of control. In comparison between alone NaCl and NaCl with Si treatment, however, most photosynthetic factors showed less reduction than only NaCl treatment. Same pattern was detected in all time points. Photosynthesis is the most important process in plants for producing energy source to complete successful their life cycle. For this reason, photosynthesis related factors such as transpiration, stomata conductance and concentration of CO₂ have been broadly used for prediction of photosynthesis. The gaseous gas exchange accompany transpiration thus enabling plants to regulate the temperature. We measured the canopy temperature in order to predict transpiration efficiency after solo or combined Si and NaCl treatment. We found that canopy temperature appears to be strongly related to stomal regulation. The stoma exerts major control on canopy transpiration, which is closely linked to the assimilation of carbon by leaves.

[Acknowledgement]

This research was supported by the Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (2017R1D1A3B03030917)

*Corresponding author: Tel. +82-53-950-5710, E-mail, kyh1229@knu.ac.kr