

Comparison of Evaluation of Flooding Tolerance in Soybean under Upland and Paddy Soil Conditions

Sanjeev Kumar Dhungana¹, Hong-Sik Kim^{1*}, Beom-Kyu Kang¹, Jeong-Hyun Seo¹, Hyun-Tae Kim¹, Sang-Ouk Shin¹, Chang-Hwan Park¹, Do-Yeon Kwak¹

¹Department of Southern Area Crop Science, National Institute of Crop Science, R.D.A., Miryang 50424, Republic of Korea

[Introduction]

In order to manage the rice production in Korea, a large proportion of paddy fields are converted into the fields for upland crops. Since the paddy fields are normally developed to limit water drainage, production of upland crops might be influenced by the soil type. The objective of this study was to investigate the effect of flooding on growth of tolerant and susceptible soybean cultivars under upland and paddy soil conditions.

[Materials and Methods]

Three tolerant ('Geumkangkong', 'Sohokong', and 'Pangsakong') and three susceptible ('Sodamkong', 'Socheongkong', and 'Nogchaekong') soybean cultivars were used. Plants were grown in pots under normal condition until V1 to V2 stage and then were kept flooded (3-5cm water level from soil surface) for 14 days. Some of the plants for individual cultivars were harvested after flooding treatment to measure dry weight, and the others were left for next 14 days after drainage to observe their recovery capacity.

[Results and Discussion]

Chlorophyll content was significantly ($p<0.05$) affected by the tolerance level of soybean cultivars and soil types during flooding as well as flood recovery period. The interaction between soybean genotypes and soil types was also significant ($p<0.05$) for chlorophyll content during the flooding period. This indicates that tolerance level of soybean cultivars represented by chlorophyll content may be changed with different soil types. Similar trends were also observed in plant height and dry weight for soybean genotypes and soil types except for their non-significant interactions. Flooding tolerance index (FTI) was calculated as an average value of the ratios of chlorophyll content, height, and dry weight of plants under flooding versus normally irrigated conditions. The FTI value was highest in 'Sodamkong' (0.853) and lowest in 'Sohokong' (0.772) under upland soil condition, whereas the value was highest in 'Pangsakong' (0.838) and lowest in 'Sodamkong' (0.731) under paddy soil condition. Our results suggest that properties of soil need to be considered for evaluation of flooding tolerance in soybean.

[Acknowledgements]

This research was supported by the RDA Agenda Project(No. PJ01186801).

*Corresponding author: Tel. +82-55-350-1226, E-mail, kimhongs@korea.kr