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Effect of Drought Stress on Morpho-Physiological Attributes of Adzuki Bean (*Vigna angularis*)

Rupesh Tayade¹, Mohammad Shafiqul¹, Waleed Khan¹, Amit Ghimire¹, Liny Lay¹, Yoonha Kim^{1*}

¹Department of Applied Biosciences, Kyungpook National University, Korea

[Introduction]

Adverse weather conditions are becoming more common due to climate change. Drought stress is one of the important abiotic stresses, which causes yield loss in the majority of plant species. Adzuki bean is a widely cultivated legume crop, and it is very important to understand how drought stress affects plants at the early growth stage. In this study, we investigated the effect of drought stress on morpho-physiological growth attributes where the plants were exposed to 10 days of drought stress in the growth chamber. The goal of this study was to access the drought effect on attributes of the Korean adzuki bean and establish drought screening for adzuki bean genotypes. This study can be further explored for developing the drought-resistant adzuki bean which can withstand adverse conditions and produce a higher yield.

[Materials and Methods]

The experiment was carried out in controlled environmental conditions inside the growth chamber. The photoperiod was set to 14 hours of daytime with a temperature of $28^{\circ}\text{C} \pm 2^{\circ}\text{C}$. The seeds were sown in pots of size 13.0 cm (diameter)*10.5(height). All the plants after emergence were grown under well-watered conditions for 10 days until they reached the vegetative (V2) stage. After then the plants were divided into two sets; control and drought treatment. The control plants were regularly watered for the next 10 days whereas the drought-exposed plants were not watered for the next 10 days. Different morpho-physiological characters; fresh plant weight, dry weight, root weight, shoot weight, plant height, soil moisture content and total chlorophyll content were measured by the respective means. The experiment was conducted with four replications.

[Results and Discussion]

The morpho-physiological characteristics of adzuki beans in response to drought stress were quantified in this study. Except for the total chlorophyll content all the other parameters were significantly higher in the controlled plants compared to the drought-stressed plants at $p \leq 0.001$ level. There was a significant decrease in the plant attributes like fresh plant weight, dry plant weight, root weight and plant height in the drought-stressed plants in comparison to the controlled plants at $p \leq 0.001$ level. Likewise, moisture content was also significantly reduced in drought-stressed plants compared to the controlled plants at $p \leq 0.001$ level. However, the plant's chlorophyll content was slightly higher in the drought-stressed plants than in the controlled plants although it was statistically non-significant. Specifically, plant height showed severe alteration due to the drought stress which may ultimately further affect the plant yield. More studies should be focused on investigating the rehydration of plants and checking the plant attributes till the seed maturity stage.

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*Corresponding author: E-mail, kyh1229@knu.ac.kr Tel. 053-950-5710