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Studies on Stomatal Characteristics of Korean Wheat Cultivars for Improvement of drought ToleranceSeong-Wook Kang¹, Ji-Yoon Han¹, Jae Buhm Chun², Chang Hyun Choi², Seong-Woo Cho^{1*}¹Department of Smart Agro-Industry, Gyeongsang National University, Jinju, 52725, Korea²National Institute of Crop Science, Rural Development Administration, Wanju 55365, Korea**[Introduction]**

Drought tolerance is defined as the ability of a plant to live, grow, and reproduce satisfactorily with limited water supply or under periodic conditions of water deficit. Research in the molecular aspects of drought tolerance has tended to focus on plant survival at the expense of yield. Drought tolerance relates on transpiration that affected by stomata. Hence, we studied stomatal characteristics of Korean wheat cultivars to improve drought tolerance in Korean wheat breeding program.

[Materials and Methods]

Flag leaves of 35 Korean wheat cultivars were used to evaluate stomatal characteristics. Nail polisher was applied on the adaxial and abaxial epidermis of flag leaves and dried for three minutes. Adhesive tape was applied on both epidermis of flag leaves again to make imprints of the leaves, the thin imprints (area approximately 25 mm × 17 mm) were peeled off from the leaf surface and immediately mounted on a glass slide (75 mm × 25 mm). Confocal microscope was used to observe stomatal characteristics. Statistical analysis was performed by using the R as a statistic program (<http://www.R-project.org/>).

[Results and Discussion]

In adaxial and abaxial epidermis of flag leaves, the distance of each stoma was significantly different. Abaxial epidermis had more compact stomata density than adaxial epidermis. In adaxial epidermis, Alchan-, Ol-, Tapdong-, and Hojoong-mil had the highest compactness of stomatal density (SD) among 35 Korean wheat cultivars. Aperture length (APL) and width (APW) were the longest in Namhea- and Johan-mil, respectively. Guard cell length (GCL) and width (GCW) were the longest in Jopoom- and Dabun-mil, respectively. In abaxial epidermis, SD of Tapdong- and Hojoong-mil had the highest compactness. APL of Goso-mil and APW of Saekeumkang were the longest. GCL of Namhea-mil was the longest, and GCW of Sooan- and Sinmichal-mil was the longest. There was no correlation between flag leaf width and stomatal characteristics among Korean wheat cultivars. In adaxial epidermis, Korean wheat cultivars showed that GCL is positively correlated with APL ($r = 0.916^{***}$) and negatively correlated with SD ($r = -0.340^*$). In abaxial epidermis, Korean wheat cultivars showed that GCL is positively correlated with APL ($r = 0.714^{***}$) and negatively correlated with APW ($r = -0.484^{**}$). Also, APL is negatively correlated with SD ($r = -0.429^*$).

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