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## Japanese journal of crop science

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## ■ Japanese journal of crop science

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[\[ Full-text PDF \(1259K\) \]](#) [\[ References \]](#)**Wheat Cultivar Differences in Photosynthetic Response to Low Soil Water Potentials : I. Maintenance of photosynthesis and leaf water potential**

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**Abstract:**

Although many studies have shown cultivar differences in photosynthetic response to water deficit, the understanding of detailed mechanisms is not sufficient. We examined the mechanisms of water stress-resistance in terms of photosynthetic performance under low soil water potential ( $\Psi_{\text{soil}}$ ) with sixteen cultivars of wheat (*Triticum aestivum* L.) from different habitats, which had shown different drought resistance on a grain yield basis. Cultivar differences in photosynthetic maintenance in response to decrease of  $\Psi_{\text{soil}}$  (water stress resistance), were found at ail seedling, booting, and grain filling stages. Cultivars with high drought resistance based on grain yield also showed high water stress resistance in photosynthetic performance. Water stress resistance ( $R_{\text{ws}}$ ) was caused more by tolerance ( $T_{\text{ws}}$ , maintenance ability of photosynthesis in response to decrease of leaf water potential,  $\Psi_{\text{L}}$ ) in some cultivars, which maintained relatively high photosynthesis ( $P_{\text{N}}$ ) in spite of decreases in  $\Psi_{\text{L}}$ , while it was caused more by water stress avoidance ( $A_{\text{ws}}$ , maintenance ability of  $\Psi_{\text{L}}$  in response to decreases in  $\Psi_{\text{soil}}$ ) in other cultivars, which showed a relatively high  $P_{\text{N}}$  by maintaining a relatively high  $\Psi_{\text{L}}$  under the same low  $\Psi_{\text{soil}}$ . However, there was a positive correlation between  $R_{\text{ws}}$  and  $T_{\text{ws}}$  or between  $R_{\text{ws}}$  and  $A_{\text{ws}}$ . It is suggested that avoidance and tolerance usually occur simultaneously in adaptation to low  $\Psi_{\text{soil}}$ , although water stress resistant cultivars varied in the water stress resistance mechanism.

**Keywords:**Drought avoidance, Drought resistance, Drought tolerance, Photosynthesis, *Triticum aestivum*, Water stress, Wheat[\[ Full-text PDF \(1259K\) \]](#) [\[ References \]](#)

