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Select Theme	: Systems physiology
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Keyword 3	:
Title of Entry	: Evaluation of root and shoot traits of rice KDML105 wildtype and gamma ray irradiation-induced mutant lines under water deficit conditions
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Rice is one of Thailand's crucial crops. Among different cultivars, Khao Dawk Mali 105 (KDML105) is the most commonly grown because of its quality including aroma flavor, high cooking quality and high commercial value. However, the productivity of KDML105 is often limited by water deficit which tends to be worsen by climate change. In this study, we investigated root and shoot traits of KDML105 wildtype and gamma ray irradiation-induced mutant lines, including MT1, MT2 and MT3. Plants were grown in a root box system for 63 days with or without irrigation. We found water deficit decreased average shoot mass and crown root number by 49.58% and 80.40%, respectively. Among plant lines, MT2 had the least reduction in shoot mass (21.20%) and crown root number (60.94%). In addition, KDML105 wild-type significantly decreased lateral root branching by 34.28% while all mutant lines maintained root branching under water deficit conditions. Interestingly, MT2 significantly increased lateral root length by 48.91% under water deficit conditions. Further physiological evaluations revealed that MT2 had better water use efficiency by having 3.17-fold higher bleeding rate and 1.3-fold lower evapotranspiration rate than wildtype under water deficit conditions. In addition, chlorophyll a content in MT2 was significantly increased by 57.52% when imposed water deficit leading to maintained photosynthetic rate in water deficit condition. We concluded that enhanced lateral root branching in MT2 could be a key trait for improved water use efficiency under water deficit.

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