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Assessing the level of cold tolerance in parental rice cultivars at different growth stages

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Cold tolerance of rice is important for temperate countries as well as for sub-tropical high-elevated regions as considerable proportion of rice yield loss is reported annually in those regions of the world. In this study, *Indica* rice cultivar Hokuriku142 (bred at Hokuriku Agricultural research station) and a *japonica* rice cultivar, Hyogokithanishiki, were used to evaluate the level of cold tolerance at germination stage, post germination stage and seedling stage. Two parental rice cultivars were evaluated for the level of cold tolerance at germination, post-germination and seedling stage. For each experiment 10 replicates were arranged and for each replicate 20-40 seeds were used. At germination stage cold stress was applied at 20^0C and 15^0C and the number of germinated seeds was counted. To evaluate the post germination stage cold tolerance 4-day germinated seeds were kept at 4^0C for 1-12 days and gained hypocotyls length was measured after a 4-day recovery period. To assess the seedling stage cold tolerance 1-week-old seedlings were kept at 4^0C four 1-7 days and green plant height as measured after a 5-day recovery period. Data was analyzed by ANOVA and in each stage Hyogokithanishiki showed higher degree of cold tolerance than Hokuriku. Identification of such significant differences in two parental rice cultivars and development of reliable methods to exploit such differences will open a window to exploit genetical base of the stress regulation of rice using a tool such as QTL analysis in a population derived by these two parents.

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