

## ***Echinochloa* response to osmotic stress induced by PEG and salt**

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### **[Introduction]**

*Echinochloa* species is distributed around the world and regarded as one of the most problematic weeds because of its high competitiveness against crop and ecological adaptability. In Korea, two *Echinochloa* species, *E. oryzicola* (2n=4X) and *E. crus-galli* (2n = 6X), are known to inhabit crop lands. Interestingly, each *Echinochloa* species inhabits a different habitat: *E. oryzicola* inhabit flooded paddy fields, while *E. crus-galli* mainly inhabits upland area, particularly *E. crus-galli* var. *praticola*. It is assumed that the difference in the habitat of the two *Echinochloa* species may be related to its adaptability to osmotic stress. Therefore, this study was conducted to investigate the adaptability of *Echinochloa* species collected from different habitats to osmotic stress.

### **[Materials and Methods]**

Osmotic stress was induced by PEG and salt. Plant response to each osmotic stress was investigated at various growth stages of the *Echinochloa* species including germination (petri-dish assay), seedling emergence (growth pouch assay), and early juvenile plant growth (pot assay).

### **[Results and Discussions]**

At germination stage, the ability and rate of germination in each *Echinochloa* species decreased with increasing PEG and salt concentration. At seedling emergence, *Echinochloa* species showed stress response in its shoot and root growths with increasing stress level. Interestingly, R/S (root/shoot) ratio was greater in *Echinochloa crus-galli* var. *praticola* than in *E. oryzicola*, suggesting that greater R/S ratio of upland adapting *Echinochloa crus-galli* is related to its adaptation to dry upland condition. At juvenile plant growth stage, *Echinochloa* showed similar response to osmotic stress. In conclusion, our results demonstrate that the different adaptability of *Echinochloa* to osmotic stress enables *Echinochloa* species widely distribute at various crop lands with different water regimes. We are now under molecular investigation to uncover molecular mechanism of ecological adaptive diversity in *Echinochloa* species.

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