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Unidirectional Na⁺ influx under different growth stages of *Puccinellia tenuiflora* and wheat

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Key words: isotope (²²Na⁺) tracing technique, unidirectional Na⁺ influx, growth stage, halophyte, glycophyte

Introduction Restricting unidirectional Na⁺ influx into root was an important way to reduce the net accumulation of Na⁺. However, there was no report regarding whether the unidirectional Na⁺ influx was affected by the growth stage. Consequently, it was hard to compare the influxes between/among different growth stages or species. This study was focused on this problem. Thus, Gramineous halophyte *P. tenuiflora* and glycophyte wheat were chosen, for testing the unidirectional Na⁺ influxes of seedlings at the 2 leaf, 3 leaf and 4 leaf stages in 25 and 100 mM NaCl treatments.

Materials and methods Seedlings of *P. tenuiflora* and wheat were germinated and then cultured in modified Hoagland's nutrient solution, and subsequently NaCl treated for 7 days after reaching the 2, 3 and 4 leaf stage. Seedlings were harvested and weighed. ²²Na⁺ influx was evaluated according to the method described by Essah et al. (2003).

Results With advancing plant growth (Figure 1), unidirectional Na⁺ influx was increased significantly in both species, and more obvious in 100 mM NaCl (Figure 2). There was no significant difference between *P. tenuiflora* and wheat in 25 mM NaCl. But in 100 mM NaCl, *P. tenuiflora* had stronger ability than wheat to restrict the increase of unidirectional Na⁺ influx in the 4 leaves stage.

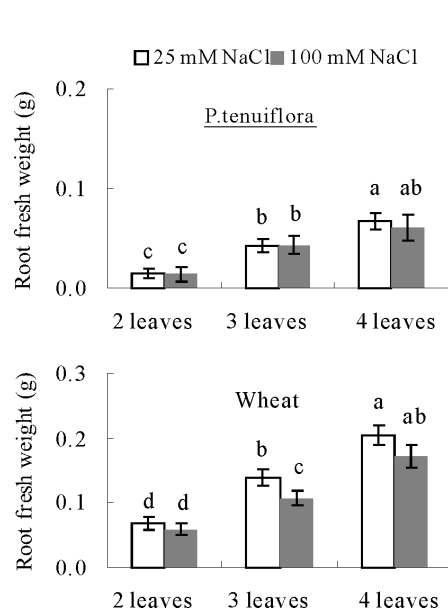


Figure 1 Root fresh weight of *P. tenuiflora* and wheat at different growth stages ($P < 0.05$, Duncan test).

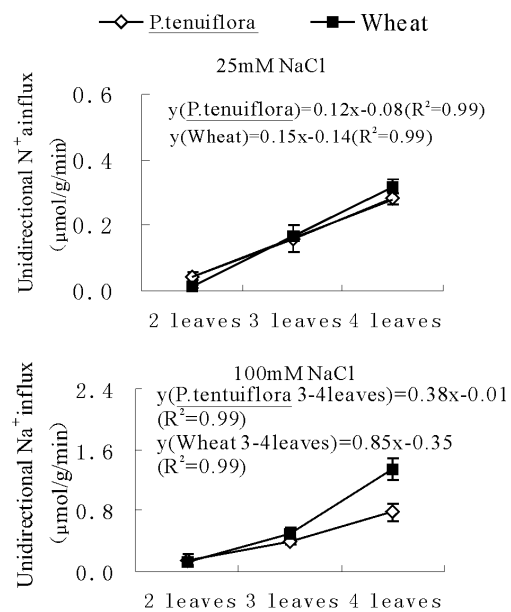


Figure 2 Unidirectional Na⁺ influx of *P. tenuiflora* and wheat at different growth stages treated with 25 and 100 mM NaCl.

Conclusions Unidirectional Na⁺ influx was increased significantly with growth stage in both species, but more obvious in 100 mM NaCl. At the 2-3 leaf stage, the capacities of restricting Na⁺ influx in both *P. tenuiflora* and wheat were similar, but significantly enhanced in *P. tenuiflora* after more mature (4 leaves). It was recommended that the growth stages should be taken into account when unidirectional Na⁺ influxes were compared between/among different growth stages or species.

References

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