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Effect of salt stress on the tall wheatgrass at the stage of seedling

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Key words: tall wheatgrass, salt-tolerance, seedling, superoxide dismutase

Introduction Tall wheatgrass (*Thinopyrum ponticum*) is perennial grass that is widely sown on saline land for grazing and soil conservation. It is known to be one of the most salt-tolerant pasture grasses. It is suited to sowing in "hard-pan" situations (Smith, 1996). The effect of salt stress on the tall wheatgrass at the stage of seedling was studied in this experiment.

Materials and methods The experiment was conducted in greenhouse with average temperature of 12–17°C and relative humidity of 65%–75%. Seeds of tall wheatgrass (*Thinopyrum ponticum* cv. Common) were obtained from Barenbrug Tianjing. Plastic buckets of 25 cm diameter and 20 cm high was lay a bed of small stones in the bottom and inserted a PVC canal each bucket. Each bucket was loaded 7.5 kg soil and added with four salts (Na_2SO_4 , NaCl , NaHCO_3 , and Na_2CO_3) and with the concentration of 0% (CK), 0.3%, 0.5%, 0.7% and 0.9%. The experiment used completely randomized design with 3 replicates. Twenty plants were reserved in each bucket after seedling. Water was added to each bucket on every other day, according to the water loss to maintain a constant salt concentration. Sample was collected at the height of about 25cm and analyzed in lab.

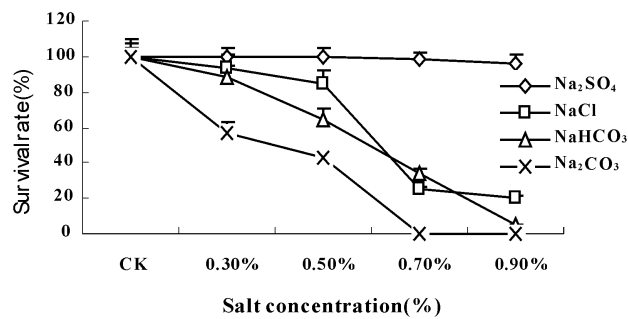


Figure 1 The effect on survival rate of seedling by different kinds of salt resistance.

Results Tall wheatgrass can adapt the stress of Na_2SO_4 at the concentration of 0.3%, 0.5%, 0.7% with survival rate no less than 96% (Liu et al., 2007). The survival rate of other treatments decreased rapidly as salt concentration increased, especially stress of Na_2CO_3 at the concentration of 0.7%–0.9% (Figure 1). Content of SOD at the stress of Na_2SO_4 increased slowly then decreased gradually as salt concentration increased. Content of SOD in other treatments decreased at different level as salt concentration increased (Figure 2).

Conclusions Tall wheatgrass can adapt the stress of Na_2SO_4 , but not tolerant to stress of NaCl , NaHCO_3 , and Na_2CO_3 . Survival rate and the content of superoxide dismutase decreased gradually with the increasing of the salt concentration.

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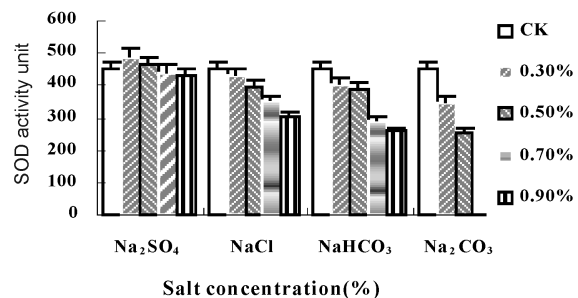


Figure 2 The effect on superoxide dismutase activity of seedling by different kinds of salt resistance.