

Study on salt tolerance of 9 varieties of *Lolium spp.* in germination and seedling stage

Li Kong-chen

Beijing Forestry University ,Beijing 100083 . E-mail :lkc861023@126 .com

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Introduction *Lolium spp.* is one of the most important germplasm resources in many parts of China , and includes many valuable characters , for examples drought , cold and barrenness tolerance , except salt tolerance . And it can fit in fertile , moist , well-drained soil even sticky soil , and it can adapt on slightly acidic soil of pH 6-7 . When they plant in a land with high salt content and alkaline , they will be at salt stress . So many researchers had made a lot of amazing efforts to find several methods to improve their salt tolerant . Now we can carry some experiment on 9 varieties to evaluate their ability of salt-tolerance .

Materials and methods The differences of salt-endurance at stages of seed germination and seedling were studied on 9 seed samples through simulating salt stress which designed to have different salinity levels (0 , 0 .3% , 0 .6% , 0 .9% , 1 .2% , 1 .5% , 1 .8% NaCl) . The 9 seed samples were collected by several places , which had their own names . The performances of the materials should be evaluated in terms of several indicators , for the single one could not reflect real salt tolerance . We chose 10 indicators which were seed relative germination rate , relative germination potential , germination process , salt hurt levels , seedling height , relative aboveground biomass , relative conductivity , chlorophyll content , relative water content (RWC) and proline content for experiment . Based on their performances under salt stresses , materials with high salt tolerance were screened using a comprehensive appraisal method .

Results and discussion With the increasing of salt stress , all the materials showed a decrease to various extent in relative germination rate , relative germination potential , plant height , relative aboveground biomass , RWC . While relative conductivity and proline content had opposite change . The rule of Chlorophyll content was not obvious . Under salt stress the change range of different physiologic indexes have relation to different grasses , then the salt-tolerance of different grasses can be evaluated through the change range of different physiologic indexes was evaluated under salt stress . Not all indicators we chose were correct . So we have analyzed correlation coefficient and variance with salt content and physiological index . Relative conductivity and Proline content were significantly correlated with salt tolerance . (Table 1)

Table 1 Analysis of Correlation coefficient and variance with salt content and Physiological index .

Varieties	relative conductivity		chlorophyll content		RWC		proline content	
	R	F	R	F	R	F	R	F
Accent brand	0 .957	54 .36*	0 .826	10 .75*	-0 .551	2 .185	0 .952	68 .20*
Turf grass								
Medalist	0 .881	17 .27*	0 .784	7 .991*	-0 .282	0 .431	0 .965	38 .96*
Bright Star	0 .958	55 .72*	0 .758	6 .739*	-0 .767	7 .130*	0 .929	31 .76*
Evening shade	0 .836	11 .64*	0 .188	0 .184	-0 .697	4 .730	0 .971	81 .51*
Key stone	0 .989	221 .0*	0 .805	9 .219*	-0 .730	5 .710	0 .918	26 .91*
Toya	0 .930	31 .78*	0 .686	4 .441	-0 .429	1 .129	0 .945	41 .82*
Forage grass								
Phoenix	0 .993	377 .7*	0 .778	7 .680*	-0 .182	0 .138	0 .966	55 .64*
Taitela	0 .916	26 .13*	0 .702	4 .868	-0 .985	164 .2*	0 .896	20 .44*
Gulf	0 .816	9 .969*	0 .351	0 .704	-0 .931	32 .59*	0 .960	47 .39*

Note : * " indicates significance at $P \leq 0 .05$ level .

The comprehensive appraisal resulted in salt tolerant groups including Accent brand , Key stone and Gulf ; sensitive groups including Medalist , Evening shade , Phoenix and intermediate groups including the others according to the above indicators .

Reference

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