

### Investigation on five ryegrass cultivars' response to increasing salt (NaCl) in irrigation water

Alizadeh, B.\*<sup>(1)</sup>, Tehranifar, A.<sup>(1)</sup>, Salehi, H.<sup>(2)</sup>, Momayyezi, M.<sup>(1)</sup>

<sup>(1)</sup> Department of Horticultural Science, Ferdowsi University, Mashhad, Iran

<sup>(2)</sup> Department of Horticultural Science, Shiraz university, Shiraz, Iran

\*corresponding author: [b-alizadeh@um.ac.ir](mailto:b-alizadeh@um.ac.ir)

#### Abstract

Soil and water salinity is one of the biggest problems in the way of green space development in most countries in Middle East such as Iran. Changing the irrigation water source and site bed soil is too extravagant or maybe impossible. Therefore, it is necessary to find and select tolerant plants for these countries. As turfgrass and ground covers are the most effective elements in parks and green spaces, it is important to find their tolerant cultivars for saline lands. Ryegrass (*Lolium perenne* L.) is a common turfgrass which is used in urban landscape. According to the wide use of ryegrass; the experiment was started to investigate the salt tolerance ability of five ryegrass cultivars ('Taya', 'Fancy', 'Barrage', 'Yarandi' and 'Esquire'). Results showed that the seeds of all the cultivars used had very good germination percentage and 'Taya' had the best seed germination percentage ('Taya': 98%, 'Fancy': 96%, 'Barrage': 96%, 'Yarandi': 94% and 'Esquire': 90%). However, 'Yarandi' had the best germination rate (time required for 50% seeds to germinate) and had the highest uniformity, i.e., the shortest total germination duration. Thereafter, 'Yarandi' showed the best seedling vigor. In order to determinate the inhibitory impact of salt on germination percentage, germination rate and root growth in solution culture, 30 seeds of each cultivar were sown in plastic beads which were floated on surface of 0.1 strength 'Rorison' nutrient solution, containing 20, 40, 60, 80, 100, and 200 mmol/L NaCl, along with control (deionized water), in 200 mL plastic beakers. A completely randomized design (CRD) was used with three replicates of each treatment. After 14 days, the germination percentage and rate and root length were measured in each beaker. Data were analyzed by

MSTATC software, and means were compared using Tukey's test at 5% level. Results showed that increasing NaCl concentration caused a decrease in the rate of seed germination and seedling root length in all the treatments. Different cultivars were screened according to their ability to stand salinity. In highest NaCl concentration (200 mmol/L) 'Taya' was the most tolerant, and 'Esquire' was the most sensitive cultivar, respectively. 'Esquire' showed 100% decrease in seed germination rate and seedling root length compared to control. The longest roots were observed in 'Taya' which indicated 90% increase compared to control. It can be concluded that 'Taya' should be used as monoculture or in seed mixture/blends in saline lands. 'Esquire' is not recommended in these regions.