

STUDYING THE PHYSIOLOGICAL RESISTANCE OF TAMARIX IN THE DESERT

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ABSTRACT

The salt-loving plant Tamarix is a valuable shrub that is cultivated for various purposes, including preventing soil erosion. Seed germination and seedling growth are critical and vital stages of this plant's growth. For this purpose, seed germination and seedling growth at different levels of osmotic potential (caused by the use of sodium chloride) and temperature were carried out in a randomized complete block design around the greenhouse of Semnan University. The secret of the tooth-like model The results of this study showed that the highest tolerance of this plant's seeds to extreme salinity concentrations was observed during germination at a temperature of 15 ° C. So that at a temperature of 25 ° C, the germination percentage at extreme salinity concentrations of -2.8 and -3.2 MPa was 22 and 68 percent, respectively. The seeds of this plant are capable of germination in a wide temperature range (from 1 to 45 °C). These findings can be useful in interpreting the ecological and physiological responses of Tamarix seed germination, in improving the tolerance of seed germination to salinity stress under desert and water deficit conditions, and in increasing the chances of successful establishment in desert ecosystems with water stress. The root system in Tamarix The drier the environment, the greater the tendency for increased root development and reduced crown development. In annual plants, dry root zones may comprise 30-40% of the total dry matter of the plant, while this proportion may reach 90% in perennial desert species of Tamarix.

KEYWORDS: Tamarix, Tolerance, soil erosion.

INTRODUCTION

Salinity stress affects plants at all stages of growth, but the sensitivity of the plant may differ at one stage of growth compared to another. At the germination stage, plant tolerance is measured only by the survival of the buds or the so-called percentage of seed germination, because no other criterion can be imagined for it, but at later stages, reduced yield is a comparable criterion for plant tolerance to salinity. Table 1 presents the relative tolerance of some crops at the germination stage and during the growth period based on the above two criteria. For example, in the case of eared corn, if the electrical conductivity of the saturated soil extract is 13 millimhos/cm, 50% of the seeds will not germinate, or if the electrical conductivity of the saturated soil extract reaches 50 millimhos/cm during the growth period, there will be a 50% reduction in yield (Alizadeh 2026).

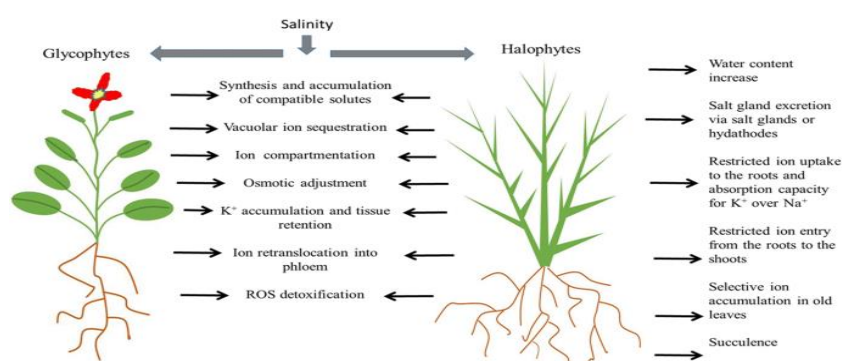


Figure 1: shows a comparison of root growth of the salt-loving Tamarix plant and other plants.

MATERIAL AND METHODS: All soil microbial activity and respiration measurement by kheyrodin, methods 2014. Soil microbial biomass carbon measurement concluded by kheyrodin method 2005). The soil, sampling of the surface soil (0-5 cm and 5-20 cm depth) under the tamarix canopy done by random method. The total number of soil samples was 62, of which 31 samples were from under the canopy and 31 samples were outside the canopy. After collecting the soil samples and transferring them to the laboratory, soil respiration analyses including microbial biomass carbon and nitrogen, (Nelson 1986). basal respiration, substrate-induced respiration, microbial yield, metabolic yield, and soil organic carbon were performed on the samples. Statistical analyses such as one-way analysis of variance and correlation coefficient were performed with SAS 9.1 software. The t-test was used to compare the average of the biological properties of the soil. Soil microbial respiration and biomass analysis bt Anderson et al. method 1982 and 1990.all soil enzymes activity concluded by kheyrodin hamid methodes 2014.

RESULT

Halophytes are plants that are able to grow and complete their life cycle in environments with high salt concentrations (usually greater than 200 mM NaCl). Figure 2 shows the results of variance analysis showed that the effect of salinity stress, temperature and the interaction of these two environmental factors on all seed quality indices including final germination percentage (FGP), germination rate of the 30th and 50th deciles of the seed population, normal seedling growth percentage (NSP), seedling length (SL) and seed vigor index (SVI) were significant at the 1% probability level. Our results were similar to those of Zang et al. 2015 and 2017.

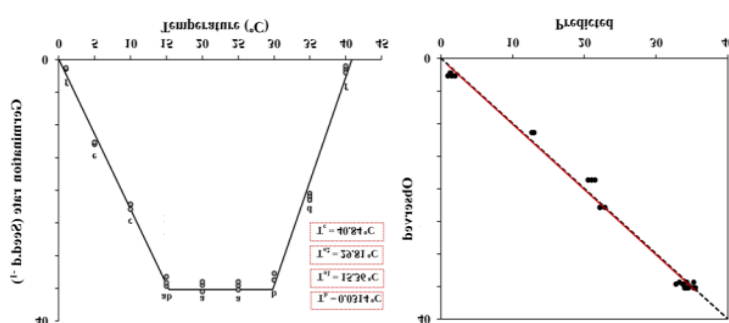


Figure 2: Determining the cardinal temperatures of Tamarix plants by fitting the data of germination rate and number of germinated seeds per day (with the Dent-like model) using Duncan's test (Divargar, 2025).

CONCLUSION

Figure 2 shows that salt-loving plants are resistant to changes low soil water decrease. With increasing soil salinity, relative water content and total chlorophyll content significantly decreased, and cell membrane permeability (malondialdehyde), sodium ion, osmoregulatory substances (proline, soluble protein), and protective enzyme activity (SOD) significantly increased, while changes in non-structural carbohydrates (NSC) were not significant. Compared with normal watering and persistent waterlogging, persistent drought had the lowest leaf relative water content, total chlorophyll content, and sodium ions, and the highest cell membrane permeability, osmoregulatory substances and protective enzyme activity. With increasing treatment time, the relative leaf water content and total chlorophyll content significantly decreased, and cell membrane permeability, osmoregulatory substances and protective enzyme activity increased more significantly than normal watering and persistent waterlogging. NSC increased under normal watering and persistent waterlogging, while significantly decreased under persistent drought. (kheyrocin 2021 and 2026) The seeds of this

plant are capable of germination in a wide temperature range (from 1 to 45 °C). These findings can be useful in interpreting the ecological and physiological responses of Tamarix seed germination, in improving the tolerance of seed germination to salinity stress under desert and water deficit condition(Qu et al. 2008).

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