

Effect of saline irrigation treatment on the growth of Napier grass ⁽¹⁾

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Abstract

The self-sufficiency rate of domestic forage crops in Taiwan is relatively low. The development of coastal lands into new farmlands for cultivation of forage crops not only will increase the planting area and the supply of domestic forage crops but also revitalize idle farmlands. The study used Napier grass (*Pennisetum purpureum* Schum.) Taishiu grass No. 3, 8, and 9 (NP cv. TS 3, 8, 9) as study materials, which were irrigated by A. 0% (control), B. 0.3%, C. 0.6%, and D. 1% sodium chloride (NaCl) solution. The forage quality and yields of Napier grass growing in environments of different salinity were investigated and evaluated for the salt tolerance of different varieties of Napier grass by physiological parameters. The results showed that the yields of all three varieties of Napier grass in 0.6% and 1% NaCl treatment were significantly lower than those in control groups. The correlation analysis was conducted between SPAD (Soil-plant analysis development) value and dry matter yield, and between electrolyte leakage rate and dry matter yield. The results showed that both correlation coefficients were approaching or exceeding 0.7, indicating a strong correlation. Therefore, both SPAD value and electrolyte leakage rate can well express the changes in yields of the Napier grass in salt stress. The nutritional contents of the Napier grass were affected by saline irrigation. Water soluble carbohydrate contents of all varieties in treatment groups were significantly lower than those of control groups. The potassium (K), calcium (Ca), and sodium (Na) contents of the Napier grass increased with the increase of salinity of the treatment groups. In southern Taiwanese and along the coast of serious groundwater salinization, the highest electrical conductivity (EC) value of the underground irrigation water is approximately 3 mS/cm. In this study, the EC value of irrigation water in 0.3% NaCl treatment group was approximately 6 mS/cm, and the dry matter yields of all the Napier grass varieties did not show significant difference from those in the control groups, indicating that Napier grass should be able to sustain the saline irrigation water in southern Taiwan and along the coast. However, this study merely explored the impact of saline irrigation, while the actual impact on Napier grass planting on salt soil remained for further clarification in the future.

Key words: Napier grass, Saline irrigation water, Salt tolerance, Physiological parameter.

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