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COMPARING LINEAR REGRESSION AND ARTIFICIAL NEURAL NETWORK MODELS FOR PREDICTION OF NACL IMPACT ON VITIS VINIFERA IN VITRO PERFORMANCE

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Ten grape (*Vitis vinifera*) genotypes (Sorkhak, rishbaba, Sahebi, Keshmeshi, Angosht Arous, Perlet, Yaghouti, Laal, Sahebi, Sefid Fakhri and Shahroudi) were in vitro screened for NaCl salinity tolerance. Different levels of salinity stress were induced using five concentrations of NaCl (0, 25, 50, 75 and 100 mM) in Murashige and Skoog (MS) medium for 30 days. The effect of salinity on in vitro performance of plantlets was investigated using linear regression (LR) and artificial neural network (ANN). To our knowledge, the ANN has not been used before to assess the salinity effect on plantlet in vitro performance. The ANN described relations between two inputs (including grape genotype and NaCl concentration) and five outputs (including number of shoot, number of leaf, number of root, root length and plantlet survival) variables. According to our results, ANN model resulted in more accurate prediction than LR for evaluation of grape in vitro performance under salinity stress. Genotype Laal showed the highest tolerance to NaCl concentration (100 mM) followed by Sefid Fakhari and Rishbaba (75 mM NaCl). We suggest the ANN modeling as a precise and alternative method or along with LR to study the effect of salinity on in vitro growth of plantlets.In addition, it is concluded that in vitro screening of native Iranian grape varieties under specific and limited conditions in combination with ANN analysis may provide a system for prediction of various varieties expected growth under field conditions.

Keywords: artificial neural network, grape, in vitro performance, *in vitro* screening, NaCl tolerance