

## Dilution of Saline Irrigation Based on Plant's Physiological Responses to Salt Stress Following by Re-Watering

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**Abstract :** Salinity and water scarcity are major environmental problems which are limiting the agricultural production. This research was conducted to construct a model to find out appropriate regime to dilute saline water based on physiological and electrophysiological properties of *Brassica napus* L., and *Orychophragmus violaceus* (L.). Plants were treated under salt-stressed concentrations of NaCl (NL<sub>1</sub>: 2.5, NL<sub>2</sub>: 5, NL<sub>3</sub>: 10; gL<sup>-1</sup>), Na<sub>2</sub>SO<sub>4</sub> (NO<sub>1</sub>: 2.5, NO<sub>2</sub>: 5, NO<sub>3</sub>: 10; gL<sup>-1</sup>), and mixed salt concentration (MX<sub>1</sub>: NL<sub>1</sub>+ NO<sub>3</sub>; MX<sub>2</sub>: NL<sub>3</sub>+ NO<sub>1</sub>; MX<sub>3</sub>: NL<sub>2</sub>+ NO<sub>2</sub>; gL<sup>-1</sup>) and 0 as control, followed by re-watering. Growth, physiological and electrophysiology traits were highly restricted under high salt concentration levels at NL<sub>3</sub>, NO<sub>3</sub>, MX<sub>1</sub>, and MX<sub>2</sub>, respectively. However, during the rewatering phase, growth, electrophysiological, and physiological parameters were recovered well. Consequently, the increase in net photosynthetic rate was noted under moderate stress condition which was 44.13, 37.07, and 43.01%, respectively in *Orychophragmus violaceus* (L.) and 44.94%, 53.45%, and 63.04%, respectively were found in *Brassica napus* L. According to the results, the best dilution point was 5–2.5% for NaCl and Na<sub>2</sub>SO<sub>4</sub> alternatively, whereas it was 10–0.0% for the mixture of salts. Therefore, the effect of salinity in *O. violaceus* and *B. napus* may also be reduced effectively by dilution of saline irrigation. It would be a better approach to utilize dilute saline water for irrigation instead of applies direct saline water to plant. This study provides new insight in the field of agricultural engineering to plan irrigation scheduling considering the crop ability to salt tolerance and irrigation water use efficiency by apply specific quantity of irrigation calculated based on the salt dilution point. It would be helpful to balance between irrigation amount and optimum crop water consumption in salt-affected regions and to utilize saline water in order to safe freshwater resources.

**Keywords :** dilution model, plant growth traits, re-watering, salt stress

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