

Crops Cold Stress Alleviation by Silicon: Application on Turfgrass

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Abstract : As a bioactive metalloid, silicon (Si) is an essential element for plant growth and development. It also plays a crucial role in enhancing plants' resilience to different abiotic and biotic stresses. The morpho-physiological, biochemical, and molecular background of Si-mediated stress tolerance in plants were unraveled. Cold stress is a severe abiotic stress response to the decrease of plant growth and yield by affecting various physiological activities in plants. Several approaches have been used to alleviate the adverse effects generated from cold stress exposure, but the cost-effective, environmentally friendly, and defensible approach is the supply of silicon. Silicon has the ability to neutralize the harmful impacts of cold stress. Therefore, based on these hypotheses, this study was designed in order to investigate the morphological and physiological background of silicon effects applied at different concentrations on cold stress mitigation during early growth of a turfgrass, namely *Paspalum vaginatum* Sw. Results show that silicon applied at different concentrations improved the morphological development of *Paspalum* subjected to cold stress. It is also effective on the photosynthetic apparatus by maintaining stability the photochemical efficiency. As the primary component of cellular membranes, lipids play a critical function in maintaining the structural integrity of plant cells. Silicon application decreased membrane lipid peroxidation and kept on membrane frontline barrier relatively stable under cold stress.

Keywords : crops, cold stress, silicon, abiotic stress

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