

EXOGENOUS HYRDOGEN PEROXIDE ALLEVIATES SEVERE DROUGHT STRESS EFFECTS ON SOYBEAN MORPHO-PHYSIOLOGY

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Drought periods are expected to increasingly occur, and hence to affect the yields of, especially, drought-susceptible crops, including soybean. On molecular level, drought elevates the concentrations of reactive oxygen species (ROS) such as hydrogen peroxide (H₂O₂), resulting in cellular damage. However, lower concentrations of ROS can regulate several mechanisms on the physiological level under drought conditions. An experiment was conducted in a controlled environment to evaluate the influence of different (0, 1, 5 and 10 mM) concentrations of H₂O₂ exogenous spray on several morpho-physiological traits of 2 soybean {Coraline (drought-susceptible) and Speeda (drought-tolerant)} genotypes under severe drought stress conditions during flowering stage. Furthermore, the plants of each treatment were further divided into 2 groups, one group was allowed to recover from drought following the flowering stage, whereas the other group was kept under drought. Our results showed that after 3 days of application, drought stress significantly decreased chlorophyll *a* and *b*, total carotenoids, stomatal conductance, plant biomass and pod weight, but significantly increased the root length of both genotypes. The application of 5 mM and 1 mM H₂O₂ foliar spray on “Coraline” and “Speeda”, respectively measurably enhanced these traits. The plants of the group where continuous drought was maintained failed to produce pods, regardless of H₂O₂ application and concentration and gradually deteriorated. “Speeda” showed better performance under drought conditions. It could be concluded that low concentrations of foliar H₂O₂ can help certain soybean genotypes overcome the effects of severe drought during even sensitive stages.