








RESEARCH ARTICLE

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Waterlogging priming alleviates the oxidative damage, carbohydrate consumption, and yield loss in soybean (*Glycine max*) plants exposed to waterlogging

Darwin Alexis Pomagualli Agualongo  (<https://orcid.org/0000-0001-9339-7665>)^{A B #}, Cristiane Jovelina Da-Silva  (<https://orcid.org/0000-0003-3239-5927>)^{A # *}, Natália Garcia  (<https://orcid.org/0000-0002-9154-7284>)^A, Fabiane Kletke de Oliveira  (<https://orcid.org/0000-0002-6487-5397>)^A, Eduardo Pereira Shimoia  (<https://orcid.org/0000-0002-2889-4259>)^A, Douglas Antônio Posso  (<https://orcid.org/0000-0003-1560-2023>)^A, Ana Cláudia Barneche de Oliveira  (<https://orcid.org/0000-0002-8856-2344>)^C, Denise dos Santos Colares de Oliveira^A and Luciano do Amarante  (<https://orcid.org/0000-0002-4219-9404>)^A

+ Author Affiliations

* Correspondence to: cristianejovs@yahoo.com.br (<mailto:cristianejovs@yahoo.com.br>)

These authors contributed equally to this paper

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Abstract

In this study, we tested whether waterlogging priming at the vegetative stage would mitigate a subsequent waterlogging event at the reproductive stage in soybean [*Glycine max* (L.) Merr.]. Plants (V3 stage) were subjected to priming for 7 days and then exposed to waterlogging stress for 5 days (R2 stage) with non-primed plants. Roots and leaves were sampled on the fifth day of waterlogging and the second and fifth days of reoxygenation. Overall, priming decreased the H₂O₂ concentration and lipid peroxidation in roots and leaves during waterlogging and reoxygenation. Priming also decreased the activity of antioxidative enzymes in roots and leaves and increased the foliar concentration of phenols and photosynthetic pigments. Additionally, priming decreased fermentation and alanine aminotransferase activity during waterlogging and reoxygenation. Finally, priming increased the concentration of amino acids, sucrose, and total soluble sugars in roots and leaves during waterlogging and reoxygenation. Thus, primed plants were higher and more productive than non-primed plants. Our study shows that priming alleviates oxidative stress, fermentation, and carbohydrate consumption in parallel to increase the yield of soybean plants exposed to waterlogging and reoxygenation.

Keywords: carbohydrate mobilisation, fermentation, flooding, hypoxia, oxidative stress, plant memory, plant productivity, pre-treatment.

References



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