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Farmers’ and academia’s views”

Assessing physiological responses of *Smallanthus sonchifolius* under water deprivation

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Abstract

Physiologically, drought (lack of precipitation) in tropical plants brings about metabolic changes which reduce photosynthesis. The present study assessed the physiological responses of yacon under drought stress using fluorescence techniques. Yacon [*Smallanthus sonchifolius* (Poeppig Endlicher) H. Robinson, *Asteraceae*] is an important root crop, rich in inulin-type fructooligosaccharides that originated in the Andes.

A non-destructive physiological evaluation of the chlorophyll fluorescence and photosynthesis was undertaken to determine its response to water deprivation for 2 weeks. This ongoing study aims at assessing the drought stress response of this yacon plant. To carry out the experiment rhizomes with vegetative eyes from one octoploid ($2n = 8x = 58$), and one dodecaploid ($2n = 12x = 87$) yacon genotype was selected and precultivated under semi-controlled greenhouse conditions (natural light conditions, air temperature $20 \pm 2/15 \pm 2^\circ\text{C}$ day/night, relative air humidity 65%-85 %).

Preliminary results show significant differences between the control and treated plants in all parameters tested. The dodecaploid genotype proved to have superior drought response in terms of stomatal conductance and fluorescence quantum yield when compared to the other genotype with lower ploidy. The genotype with a lower ploidy level was also not able to recover after the stress treatment. This study is imperative to decipher the strategies adopted by yacon plants in response to drought stress. It will also enable the identification of specific a yacon genotype as either drought stress escaper, avoider or tolerant. Understanding the stress response of yacon under water deprivation is imperative to further improve the breeding strategies of new resistance cultivars in tropical areas.

Keywords: Chlorophyll fluorescence, drought, photosynthesis, *Smallanthus sonchifolius*

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