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Procedia Environmental Sciences 29 (2015) 211 – 212

Procedia Environmental Sciences

Agriculture and Climate Change - Adapting Crops to Increased Uncertainty (AGRI 2015)

# Strategies to avoid salinity and hydric stress of pepper grafted plants

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**Abstract**

Sweet pepper is one of the most important vegetable crops in arid and semiarid regions. Grafting has been proposed as an interesting strategy that improves the responses of crops under the salinity and hydric deficits occurring in these areas.

In a previous work, we selected *Capsicum* spp accessions with different degrees of salinity and hydric stress tolerance to be used as rootstocks (the highest to lowest): *Capsicum chinense* Jacq. 'ECU-973' (code 12), *Capsicum baccatum* L. var. pendulum 'BOL-58' (code 14) and *Capsicum annuum* L var. 'Serrano' (code 5). The behavior of commercial cultivar seedlings grafted onto these rootstocks was compared during 14 days under water stress (5% polyethylene glycol) and salinity (40mM NaCl) in hydroponic culture.

Different physiological parameters were measured to test the hypothesis that tolerance might be related to the role of rootstock in altering the stress perception by the scion and to identify differences in pepper-grafted plants adaptation mechanisms in response to salt and osmotic stresses.

At a similar osmotic pressure of the solution, grafted plants onto the 12 and 14 rootstocks activated tolerance mechanisms based on ion specific responses under salinity, whereas osmotic adjustment based on proline accumulation was performed under water stress. The maintenance of the scion's homeostasis under salinity was achieved through the restriction of $Cl^-$ transport to leaves and to diminished $Na^+$ loading in roots and leaves, thus favouring $K^+$ uptake. Under both stresses, a minor negative impact on photosynthesis, nitrate reductase activity and lipid peroxidation in scion leaves grafted onto 12 and 14 rootstocks was observed.

In conclusion, the results of these works reinforce that the use of tolerant pepper rootstocks is a promising strategy to provide salinity and water stress tolerance and can consequently improve crop yield.



Peer-review under responsibility of the organizing committee of the Agriculture and Climate Change - Adapting Crops to Increased Uncertainty (AGRI 2015)

*Keywords:* graft; osmotic potential; pepper; photosynthesis; proline; salt ions



Peer-review under responsibility of the organizing committee of the Agriculture and Climate Change - Adapting Crops to Increased Uncertainty (AGRI 2015)

doi:10.1016/j.proenv.2015.07.267

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