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Proposed project	Investigating the impact of grafting on mycorrhiza colonization success and the simultaneous usage of both to improve salt tolerance of tomato
Introduction	Grafting is already commonly used in vegetable production to increase plant growth performance and quality. Inoculation with mycorrhiza fungi draws more and more attention due to its potential to increase its host pathogen resistance, influencing the host hormonal balance and improving nutrient uptake especially under stress conditions such as salt stress. In preliminary experiments the grafting procedure seems to have major impact on the colonization success of tomato (unpublished data). If a producer wants to use both grafting and mycorrhiza fungi, to maintain and improve his vegetable production, it is mandatory to be able to give recommendations, when to apply mycorrhiza after grafting to use putative positive effects of both treatments.
Materials and Methods	Ungrafted, self grafted and different rootstocks of wildtype tomatoes will be used and grown in a time course experiment under optimal and salt stressed conditions. Half of the plants will be inoculated with mycorrhiza fungi at three time points after grafting. Hormone concentrations in xylem sap, leaves and roots (ABA, CKs) will be analyzed, which is not possible at the IGZ in the same extent, to investigate the impact of the fungus on the host hormonal balance. Gas exchange measurements, mycorrhiza colonization and plant growth will be monitored.
Tasks	<ul style="list-style-type: none"> - cultivation of self grafted wildtype and ungrafted tomatoes under optimal and salt stressed conditions, with and without mycorrhiza fungi. - analysis of changes in growth, gas exchange (stomatal conductance) and concentrations of phytohormones in leaves and xylem sap related to salt stress, mycorrhiza and rootstock genotype. - Dissect the positive effects of mycorrhiza fungi on plant photosynthesis and changes in host hormone balance.
Deliverables	<ul style="list-style-type: none"> - publish a recommendation for horticultural production, how to use grafting and mycorrhiza inoculation together in an efficient way - publish information about the involvement of hormonal root to shoot signaling in salt tolerance of tomato
Duration	12 weeks
Benefits to COST Action (FA1204)	The experiments will collect information how hormonal root to shoot communication determinates salt tolerance of tomatoes via measurements of phytohormones and physiological parameters like leaf gas exchange. Additionally, the direct link between fundamental research and applied science will provide important knowledge how to use grafting and mycorrhiza in horticultural production under unfavorable conditions like salt stress.
Likely future joint applications	Joint project application of IGZ and Dpt. Nutrición Vegetal, CEBAS-CSIC Murcia, Spain: A root integrative approach to increase water use efficiency, yield stability and nutritional value in tomato (RHIZOTOM)