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Effect of Water Stress on German and Israeli Table Grapes - Tolerant or Sensitive?

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Abstract

Table grape production in Israel and Germany will be particularly endangered due to the effects of climate change. In Germany, decreasing summer precipitation parted with rising temperatures lead to increasing severity and durations of drought periods, while Israel is already combating with severe water scarcity. Both situations, in Germany and Israel, will lead to water use conflicts if there is no adaption of plants on drought periods and water use efficiency is increased. Based on this background, especially the physiological drought response of table grapes and its cultivar and rootstock specific characteristics are of major importance in order to establish distinct recommendations regarding the choose of cultivar and rootstock as well as the management and scheduling of irrigation measures. Therefore two Israeli table grape varieties will be screened as new potential varieties for German table grape production. The objectives of this study are to (I) characterise the four most relevant German and two Israeli table grape varieties according to their physiological drought response, (II) assess the effect of drought stress on relevant internal and external quality traits, (III) determine rootstocks' influence on drought stress and evaluate rootstock-scion interactions of selected cultivars and genotypes and (IV) test selected sensors regarding their ability to identify drought stress of table grapes. Until the end of 2016, two Greenhouse pot-experiments will be conducted at the University of Hohenheim. During the experiments plant growth and development parameters will be determined as well as daily water consumption, gas exchange, chlorophyll florescence and stomatal conductance. Furthermore external and internal quality traits like berry weight and size, titratable acidity, content of sugars and polyphenols will be assessed. It is expected to get an insight into physiological reactions of table grapes and to find solutions how plants and humans can adapt to coming environmental changes.

Keywords: Climate change, drought stress, Germany, Israel, table grapes, water use conflict