Title Effects of NaCl stress on red raspberry (*Rubus idaeus* L. 'Autumn Bliss')

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Abstract

The increasing interest in the cultivation of red raspberry (*Rubus idaeus* L.) in warmer climates and in the mild-Southern parts of Europe requires better understanding of the salinity effects especially in the primocane-fruiting type cultivars. The aim of this work was to study the response of the 'Autumn Bliss' primocane-fruiting cultivar in elevated NaCl concentrations.

The experiment was carried out under natural greenhouse conditions. 'Autumn Bliss' cultivar was grown in pots containing perlite. The plants were irrigated with Hoagland nutrient solution containing 0, 5, 10, 15, 20 and 30 mM NaCl. Plant growth, photosynthetic parameters, water relations, chloride and sodium content, leaf chlorophyll content and fluorescence were determined.

The results of this work indicate that increasing salt concentration in the nutrient solution leads to: (a) a decline in the photosynthetic rate and in stomatal conductance, although there is no reduction in intercellular CO_2; (b) the reduction of leaf chlorophyll content and fluorescence; (c) to a decrease in transpiration rate, leaf water potential, relative water content and plant water consumption, however, the water use efficiency is not affected; (d) the reduction of: cane length and diameter, percentage of green leaves, leaf area, leaf expansion rate and relative growth rate, while the number of leaves remain unaffected and the percentage of dead leaves increases; (e) a decrease of the plant fresh and dry weight and to an increase of the root/shoot ratio; (f) a linear increase of chloride and sodium content in the plant.

Quantifying the response of raspberry in elevated NaCl concentrations provides that the reduction in photosynthesis is most probably due to damages in the photosynthetic apparatus rather than from factors affecting stomatal closure. Besides, a pronounced toxic effect of Cl was clearly demonstrated and this points towards that the salt injury effect could be attributed to Cl toxicity (uptake and translocation). As a consequence, the decrease photosynthetic capacity and salt toxicity in the plant tissues restricted plant growth under saline conditions.