

VC65 rootstock inducing salinity-resistance and productivity to Fuerte avocado

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Summary

The background of the research is a steadily increasing irrigation water salinity in recent years and a recent quantitative evaluation of salinity damage to avocado yield on Mexican rootstock: a rise of chloride in irrigation water from 100 to 200 ppm causing a 30% yield reduction.

Since the sixties, West-Indian rootstocks were used, as it was believed to render the avocado trees resistant to 300 ppm chloride and more in the irrigation water. It was found that for the West-Indian rootstocks as a group this belief was unwarranted. Since the end of the seventies vegetative clonal (VC) rootstocks have been selected from productive trees in orchards irrigated by the saline water of 200-300 ppm chloride. The response to salinity of avocado trees on these VC rootstocks, from planting to the age of ten, has been studied at the Akko Experiment Station, on a grumusol soil with a low 7% air content at field capacity. The experiment included 'Fuerte' trees on 5 rootstocks, 3 West-Indian: VC7, VC54, VC65, and 2 Mexican: VC39 and 'Schmidt'¹ (a seedling). Two irrigation water salinity treatments were given to each of 5 replications of 2 trees: "low" 80 ppm Cl and "medium-high" 230-400 ppm Cl (230 in May-July, 400 in August-October). Annual water application was 5600 m³/ha, a somewhat lower amount than the optimal, to secure a more severe testing of tree resistance to salinity. At the low salinity, productivity on 3 of the rootstocks was found to be similar (100%) but on the VC54 it was found to be only 74% (Table 4).

Increasing the salinity resulted in a 40% yield drop on the Mexican VC39 rootstock. In contrast, yields on the West-Indian rootstocks did not alter significantly as a result of irrigation water salinization. Only on the VC7 rootstock a 13% non significant yield reduction was observed. On this rootstock also alternate bearing was higher than on VC65. For the "medium-high" salinity, but not for the "low", a significant linear relationship was found between yield and trunk cross-section area (Fig. 1). Nitrogen in the inflorescence on VC65 was found to be significantly lower than on VC39. These relationships may be of use in the evaluation of rootstocks in commercial orchards. The selection of West-Indian rootstocks VC65 was confirmed

as rendering 'Fuerte' trees salinity resistant to more than 300 ppm Chloride in irrigation water, while inducing the same productivity as a recommended Mexican rootstock. This success adds to the recent success in increasing 'Fuerte' yields by means of growth retardants. Thus 'Fuerte' trees, once the main avocado cultivar in Israel, may again take an important place in future planting, when probably only water too saline for avocado will be available.