

Potential for Using Blended Drainage Water for Irrigating West Side, San Joaquin Valley Pistachios

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Executive Summary:

Pistachios can be grown in microclimates with combinations of heat, soil and water quality not favorable to all tree crops. The lower West Side of the San Joaquin Valley, where irrigation water is expensive (surface water), or poor quality if it is ground or reclaimed (drainage) water is an example. If irrigation costs in this microclimate could be decreased by using poor quality ground or drainage water, production would be more economical. This area not only historically has higher yields, but is less favorable for development of the foliar fungal diseases that have recently decimated pistachio production in other regions. Therefore, any fact that renders pistachio production more economical in these regions is a benefit.

Physiologically, pistachios are among the most salt tolerant of the tree nut crops. Picchioni (1990), using rootstock seedlings, reported no significant reductions in growth until irrigation solutions were 13.8 dS/m. (Integerrima) and 17.9 dS/m (Atlantica). Walker (1987) suggested the mechanism of this salt tolerance was pistachios' ability to store sodium in roots and basal stems. A recent dissertation comparing the osmotic adjustment of pistachio rootstocks in a greenhouse experiment produced differential osmotic adjustment within the plant but no measurable differences in growth within the 10-month duration of the experiment. (Fardoel, 2001, unpublished dissertation) This field trial corroborates the above laboratory experiments by demonstrating no significant effects on yield up after seven years of irrigation with water up to 8 dS/m. However, tree water extraction among the different salinity treatments is demonstrating decreases in tree water uptake at 4 and 8 dS/m that are not consistent with irrigation requirements demonstrated necessary for good production (Goldhamer, 1985). The objective of this two year trial is to determine the differential salinity limits and tolerance among the four commercial pistachio rootstocks, and demonstrate a possible mechanism for the differences, while ensuring the measured yields are the result of the saline irrigation water applied.