

The Influence of Varying Concentrations of Boron on the Growth of Excised Shoots of Walnut and Pistachio Clones in vitro

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Abstract

Boron nutrition of walnut (*Juglans* L. spp.) and pistachio (*Pistacia vera* L.) is challenging because, although a required element, it is needed in only small quantities and has a narrow optimum range that varies by variety. Unlike with many other species, boron is immobile in pistachios and walnuts, accumulating in the older foliage.

The present study was undertaken to see if excised, in vitro shoots from clones of walnut and pistachio differ in tolerance to varying levels of boron in the growing medium. A total of nine clones of walnut and nine clones of UCB-1 pistachio rootstock were selected and the shoots placed in standard tissue culture media supplemented with 0, 10, 50, 100, 200, 300, 400, 500, or 1000 mg l⁻¹ of boron and placed in a controlled, aseptic environment (16/8 hours day/night at 30 μmol m⁻² s⁻¹ light, 25°C).

Growth was measured in terms of shoot length and leaf count as a percentage of control. Boron toxicity symptoms appeared as necrosis on tips on older leaves, extending to the margins and followed by leaf drop. Boron concentrations above 50 mg l⁻¹ stopped growth of most of the nine pistachio clones under study and induced leaf drop on all of them. Among the walnut clones, the rootstocks 'Vlach B' and 'VX211' and the scion 'Tulare' could grow slowly even at 300 mg l⁻¹ boron in the growth medium after four weeks of culture. 'D154W' pistachio and 'VX211 1C' walnut were the most boron-tolerant rootstocks, whereas 'Chandler' was the most boron-tolerant scion.

The differences in growth among clones in response to boron concentrations will be tested further in field trials.