Correction of zinc and boron deficiencies and control of phytophthora root rot of avocado by trunk injection

AW Whiley, KG Pegg, JB Saranah and PW Langdon

Abstract
Phosphonate at 3 concentrations (7.5, 10 and 20%) was injected into the trunks of avocado (Persea americana Mill.) trees showing advanced symptoms of canopy decline caused by phytophthora root rot. All formulations of phosphonate and potassium phosphonate, including the lower rates of 7.5 and 10%, successfully controlled root rot and resulted in improved tree health. The 7.5% phosphonate treatment permitted the formulation of chemically compatible mixtures containing zinc and boron which, when trunk-injected, increased the concentrations of these nutrients in mature summer-grown leaves. Phosphonate formulations containing 17% zinc chelate or 10% zinc nitrate and injected twice during a growing season, at 15 mL/m canopy diameter, increased leaf zinc concentrations above the critical level of 30 mg/kg DM. However, the inclusion of zinc chelate in formulations substantially increased the time of uptake of the injection compared with the formulation containing zinc nitrate. Phosphonate formulations with 0.9% boron, injected twice during a growing season at 15 mL/m canopy diameter, improved leaf boron concentrations, but they failed to reach the critical threshold concentration of 50 mg/kg DM.