

Abstract

The importation of nursery stock into New Zealand poses a biosecurity risk from the introduction of unwanted quarantine arthropods like two-spotted spider mites (TSM) and their eggs. The most resistant insect life-stage to control is often eggs. We screened two fumigants, phosphine (PH_3) and ethyl formate (EF), to eliminate the viability of a population of mixed-aged TSM eggs. The current treatments include the ozone-depleting fumigant methyl bromide (MB). There is an urgent need to reduce the use of MB due to its rising cost and global phase out. Our results suggest that the viability of TSM eggs can be completely deactivated when exposure to PH, at t g/m^3 for minimum of 24 h at 15°C . For the rapid action fumigant EF, a concentration of 30 g/m^3 for 6 h exposure at 20°C was sufficient to cause 100% mortality. Further research is needed to evaluate commercially available formulations, $\text{ECO}_2\text{Fume}^\text{®}$ (2% PH_3 in liquid CO_2) and $\text{VAPORMATE}^\text{®}$ (16.7% EF in liquid CO_2), on mites eggs in the presence of fresh produce and nursery stock. Plant tolerance to PHs and HP will determine their widespread use as a replacement to current practice.