

Heat as a sustainable postharvest disinfestation treatment for export horticultural crops

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Abstract

Heat, in the form of hot water, was first used as a disinfestation treatment to treat seed potatoes for late blight in 1882. Heat treatment has been used to control fungal, bacterial and viral diseases, plant-parasitic nematodes, and insect pests, but was shelved for about 50 years with the advent of nerve poisons (DDT, diazinon) and chemical fumigants (methyl bromide). Heat treatments not only control pests and diseases, but are a benefit to certain plants by increasing rooting, budding, and vase life. Plants, sensitive to heat injury, can also be conditioned to tolerate heat treatments. Hot water treatment for 45 to 49°C for 10 to 15 min disinfests flowers, foliage, potted plants, propagative cuttings, and media of many pests of quarantine significance, including ants, aphids, mealybugs, scale insects, plant-parasitic nematodes, snails, and slugs. Hot water dips of tropical propagative cuttings can be used to disinfest cuttings of insects, nematodes, and pathogens with the side benefit of increase in rooting. Hot air at 40°C conditions plants, foliage, and flowers to tolerate hot water, and at 44°C controls thrips and other insects. Use of steam to pasteurize (65°C for >30 min) or sterilize (85°C for >30 min) plant media will disinfest the media of fungal and bacterial pathogens and plant-parasitic nematodes. Heat is an effective and sustainable postharvest pest and disease disinfestation treatment for export horticultural crops.