

Title Evaluation of likelihood of co-occurrence of *Erwinia amylovora* with mature fruit of winter pear

Authors Todd N. Temple, Virginia O. Stockwell, P. Lawrence Pusey and Kenneth B. Johnson

Citation Phytopathology 97 (10): 1263-1273. 2007

Keywords exotic pest quarantine; phyllosphere microbiology; risk assessment

Abstract

Phytosanitary concerns about fire blight prohibit export of U.S.-grown pears to some countries without this disease. To examine these concerns, we evaluated the potential for co-occurrence of *Erwinia amylovora* with mature, symptomless winter pear fruit by inoculation experiments and by survey of commercial orchards. Immature pear and apple fruit were inoculated in orchards with *E. amylovora* strain 153N as resuspended lyophilized cells or as ooze from diseased tissues. Regardless of inoculum source, population size of Ea153N on fruit declined by an order of magnitude every 3 to 4 days during the first 2 weeks after inoculation; at 56 days after inoculation, Ea153N was not detected, except on 1 of 450 fruit with 4 colony forming units (CFU). After inoculation of flowers, calyx-end survival of Ea153N on pear and apple fruit declined from high populations at petal fall to a few cells at harvest, with no detection of the pathogen after a 7-week cold storage. Migration of Ea153N into symptomless pear fruit from diseased branches was evaluated by enrichment assay and nested polymerase chain reaction of internal fruit core tissues; these assays failed to detect the pathogen in healthy fruit from diseased trees. At harvest, *E. amylovora* could not be detected on 5,599 of 5,600 fruit of d'Anjou pear sampled from commercial orchards in major production areas of the Pacific Northwest; one fruit yielded 32 CFU of the pathogen. Postharvest, mature pear fruit contaminated with Ea153N and subsequently wounded required a dose of >10,000 cells at the wound site to allow for persistence of the pathogen through a 7-week-cold storage. We conclude that epiphytic *E. amylovora* shows similar survival characteristics on both pear and apple fruit, this pathogen is not an endophyte within mature symptomless pear fruit, its presence is exceptionally rare on commercially produced fruit, and that epiphytic survival of *E. amylovora* through a postharvest chilling period is unlikely given the unrealistically high population size required for persistence.