

Survey of *Salmonella*, Shiga toxin-producing *E. coli* and indicator bacteria during pre-harvest tomato production in the Mid-Atlantic

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During the past decade, outbreaks of foodborne illnesses associated with fresh fruits and vegetables have dramatically increased. Pathogenic bacteria such as *Salmonella* and *Escherichia coli* are often implicated in foodborne disease, and in 2011, multi-state outbreaks from farm-grown produce sickened 333 people and caused 33 deaths. Commodity specific food safety programs centered on Good Agricultural Practices have been developed to address potential sources of pre-harvest and post-harvest microbial contamination, but information gaps remain as to the risk factors and applicability of these guidelines to different climates and regions. The objective of this study was to survey small- and medium-sized farms in the Mid-Atlantic region during pre-harvest tomato production. Environmental samples were analyzed for *Salmonella*, Shiga toxin-producing *E. coli* (*stx*) and indicator bacteria (aerobic plate counts, generic *E. coli* and total coliforms). Tomato fruit, irrigation well and pond water, compost, field soil and pond sediment samples were collected every two weeks for a total of six weeks at 24 organic and conventional farms in New Jersey, Delaware, and Maryland in summer 2012. Samples were analyzed for *Salmonella* and *stx* by enrichment and subsequent PCR using species-specific primers. Indicator bacteria were quantified using appropriate 3M petrifilms. No *Salmonella* was detected in any of the 424 total samples. Three of the samples (3 of 424; 0.7%) were positive for *stx* by PCR, but no organisms were isolated following enrichment. Fecal coliforms were present on tomato fruit at each collection time from all 24 farms and 234 of 259 (90.3%) tomato fruit samples. Although generic *E. coli* as high as 6.9×10^3 CFU/ml was found in some irrigation water samples, the majority of samples (74 of 104 samples; 71.1%) were negative. This study is part of an ongoing project to develop scientifically-based food safety metrics, and we are currently surveying farms during pre-harvest leafy greens production. Data from this research will provide crucial information about the microbial status of fresh vegetables grown in the Mid-Atlantic region.