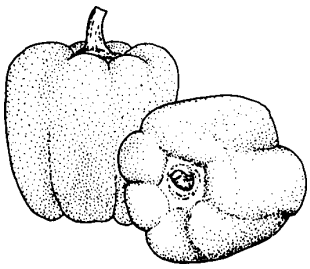
Problem Solver: Bell Peppers Hit with Late Season Losses to Decay



The Problem

A shipper of green bell peppers was experiencing a sudden large increase of claims due to blackening and decay, primarily of the cap and stem. Shipment times were only 2 to 3 days.

Analysis Trevor Suslow 2/2/2000

Handling

- No changes in handling practices or equipment
- No changes in pre-shipment routine that included packing in vented corrugated cartons, palletizing, load stabilization with corner boards, and forced-air cooling, generally for 25-35 min at 39°F (4°C).

Field and Harvest

- Harvest period was mid September through mid October with high day temperatures, cool night temperatures and occasional rainfall.
- Field yields were very high and fruit size distribution was heavily to jumbo grades
- Field accumulation prior to movement to packing operations was often over an extended period of time
- Bin fruit was not shaded
- Bins were relatively new, undamaged, and cleaned regularly
- Following transport to packing the bins were staged in an open area in full sun exposure
- Packing followed the simplified sequence of wet dump (chlorinated), lift conveyer with chlorinated spray-bar, wax application, sorting –grading-handpacking.
- Shipment often occurred within 3-4 hours of packing; during the initial period of frequent claims the highway carrier was occasionally LTL less-than-load) without refrigeration.

Lab Diagnostics

- Retained fruit and returned fruit from receivers were analyzed for the primary agent involved in decay
- The bacterial soft-rot pathogen *Erwinia carotovora* subsp. *carotovora* was the predominant organism isolated. Re-inoculation of green peppers and stem-cap reproduced the blackened decay symptoms seen as the majority spoilage defect

Solutions

Based on observations and discussion with the grower and shipper the following two primary modifications were made which dramatically reduced losses;

- Harvest crews did not pick fruit until dew-condensate was substantially gone
- A dry dump was used until other changes were implemented to reduce high fruit pulp temperatures relative to comparatively lower well-water temperatures in the dump tank. Water infiltration due to this temperature differential was obvious in stems and caps and accelerated decay. Improvements in chlorination practices were also needed.

Other Factors to Consider

A quick, simplified response was needed to minimize significant immediate economic loss, but several other factors were valuable to consider for evaluating future preventive management practices. These include,

- Excessive application of nitrogen fertilizer and irrigation water promoted a dense leaf canopy and delayed drying of plant surfaces.
- On- the-plant decay, a result of secondary infections following poorly controlled insect damage, provided a continuous source of inoculum especially with periodic rain and conditions promoting heavy dew formation.
- Careful harvesting was needed to reduce the number of decayed fruit in the bins which carried the pathogen and introduced a higher than normal “chlorine demand” to the dump tank making routine chlorine practices ineffective.
- Providing more frequent transportation and/or shading prior to packing would reduce field heat accumulation during this seasonal period when early morning harvest was not desirable
- Large fruit size tended to block air flow through carton side vents. Adjustments to routine cooling schedules, based on time alone, were needed.