

Stone Fruits—Biology

Heat as a Potential Alternative Quarantine Treatment for Codling Moth in Cherries: The Shocking Truth

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Keywords: codling moth, quarantine, cherry

'Bing' cherries were heat treated using both hot water dips and vapor forced air. Hot water dips consisted of 45, 47, 49°C treatments for durations of 5 to 40 minutes. Vapor forced air treatments ranged from 45 to 49°C for 10 to 75 minutes with a humidity of approximately 100%. Following heat treatments fruit were either hydrocooled or cooled with forced air. Fruit were cold stored at 0 ±1°C for 1 to 4 weeks. Fruit were assessed for stem condition, pitting, decay, external injury, external color, firmness, soluble solids and titratable acidity. In general, heat treatments resulted in a decrease in fruit firmness. No significant differences in fruit color or soluble solids were detected. However, fruit titratable acidity decreased with heat treatments. There were no differences in color, firmness, sugar, or acidity in hydrocooled fruit versus forced air cooled fruit. Fruit treated with gibberellic acid withstood the heat treatments much better than those which were not. Hot water dips resulted in more fruit pitting and external damage than hot air treatments. Vapor forced air treatments resulted in some stem browning. However, when compared to methyl bromide treated fruit, this appears to be within the range of acceptable quality parameters.

Concomitant with the fruit quality research, infested cherries were heat treated to assess the effects on codling moth mortality. A heat treatment of 47°C for 20 minutes resulted in 27% mortality whereas an additional 5 minutes of treatment at that temperature resulted in 100% mortality. Fruit subjected to this treatment showed no decay, slight pitting, moderate stem browning and few scalded fruit after 1 week of cold storage plus 2 days at 20°C. Also, a treatment of 45°C for 60 minutes resulted in 100% codling moth mortality. This treatment resulted in no significant decay, very slight pitting, moderate stem browning and few scalded fruit. These results indicate that heat treatments may provide a viable alternative quarantine treatment for sweet cherries.

Table 1. Effects of heating infested cherries on codling moth mortality.

Treatment temperature	Duration	GA (% MORT ±SEM)	Non-GA (% MORT ±SEM)
47°C	20 min	22.7 ± 5.7	27.2 ± 7.1
47°C	25 min	100 ± 0	100 ± 0
45°C	60 min	100 ± 0	98.2 ± 1.5

Cherries were infested with 5th instar larvae of codling moth.

4 replicates of 50 larvae per treatment.

50 larvae for each experiment served as controls.

% MORT is Abbott's corrected mortality.

