

# Pre-harvest application of harpin $\beta$ protein improves fruit on-tree and storage quality attributes of ‘Lapins’ and ‘Regina’ sweet cherry (*Prunus avium* L.)

Meng Li, Yan Wang and Yu Dong

Scientia Horticulturae 263: 109115. (2020)

---

## Abstract

The purpose of this study was to determine the effects of pre-harvest application concentration, frequency, and timing of harpin  $\beta$  protein on improving quality attributes (fruit firmness (FF), size, skin color, soluble solids content (SSC), and titratable acidity (TA)), susceptibility to physiological postharvest disorders (stem browning, surface pitting, and decay), and nutrient uptake in ‘Lapins’ and ‘Regina’ sweet cherries. A single application of  $1.5 \text{ mg L}^{-1}$  harpin 1 week before harvest (1WBH) was effective in increasing FF, SSC, TA, and calcium (Ca) uptake of ‘Lapins’ cherries at harvest compared to the control fruit. Two split applications of  $1.5 \text{ mg L}^{-1}$  harpin at 1WBH and straw color resulted in firmer ‘Lapins’ cherries as a single spray, but did not further affect quality attributes. Increasing application frequency from 1 to 3 times (pit hardening, straw color, and 1WBH) effectively retained high FF and low incidences of stem browning and surface pitting in ‘Lapins’ cherries after 4 weeks of storage at  $0^\circ\text{C}$ . For ‘Regina’ cherries, three applications of  $1.5 \text{ mg L}^{-1}$  harpin at full bloom, shuck fall, and 1WBH enhanced FF, stem pull force, and Ca uptake at harvest; surface pitting was reduced. In conclusion, 3 applications of  $1.5 \text{ mg L}^{-1}$  harpin  $\beta$  protein at pit hardening, straw color, and 1WBH improved fruit quality of ‘Lapins’ cherries, while the quality of ‘Regina’ cherries was improved by applications at full bloom, shuck fall, and 1WBH.