Pre-harvest Mandarin Rind Disorder in California

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Introduction

Citrus industry loses a significant amount of mandarin fruit either before or shortly after harvesting due to rind disorder. The damage is initiated in the fall, especially following rain. It begins with irregular water-soaked areas that develop into dark-brown, necrotic lesions covering large portions of the fruit's surface.

Figure 1. Appearance of the pre-harvest rind disorder of Satsuma Owari mandarin following rain

Objectives

The goal was to identify the physiological factors involved in the induction of the rind disorder following rain and provide the industry with an effective treatment to reduce this disorder. We also evaluated the relative susceptibility of several mandarin varieties.

Materials and Methods

A field trial was designed to test the effectiveness of different materials on reducing the incidence of the damage in several varieties. Treatments included untreated control, 2,4-dichlorophenoxyacetic acid (2,4-D) at 16 mg/L, GA at 20 mg/L and VaporGard at 0.5 percent (v/v). These treatments were applied at the color break stage, which occurred in 2019 between August-October. We evaluated the susceptibility of different varieties including, Satsuma Owari, Page, W. Murcott, Kishu, Gold Nugget and Tango. The orchards were monitored biweekly from color break stage until harvest. The number of fruit that were affected by the rind disorder was recorded through the ripening season.

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Results

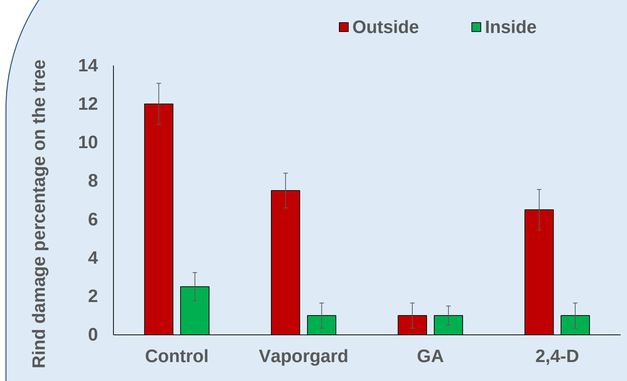

Figure 2. Effect of color break treatments on the occurrence of the pre-harvest rind disorder in Satsuma Owari mandarin.

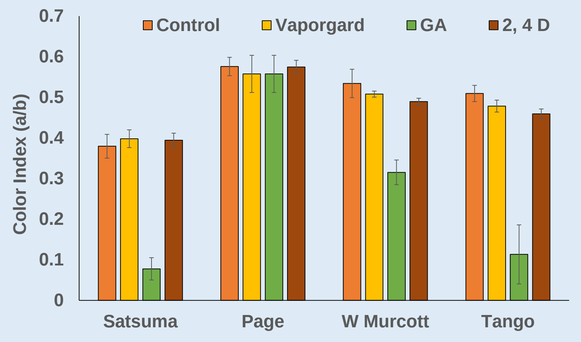

Figure 3. Effect of color break treatments on the color of different mandarin varieties at harvest.

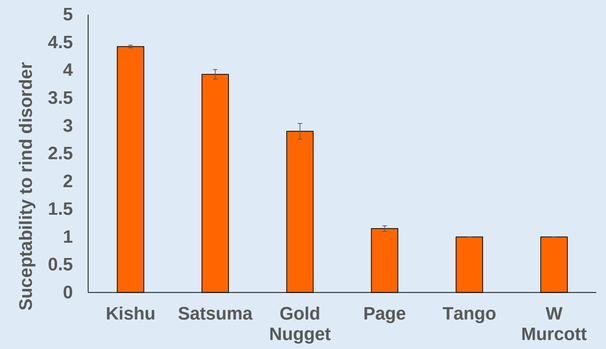

Figure 4. Susceptibility of different mandarin varieties at harvest to the rind disorder.

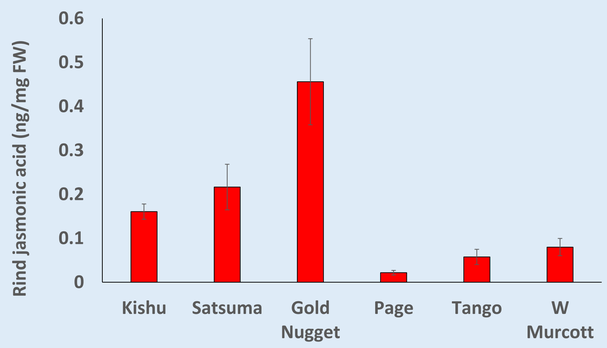

Figure 5. Jasmonic acid (JA) content in the healthy rind of the different mandarin varieties.

Conclusion

- **Fruit located in the outer part of the canopy suffer more than fruit in the interior canopy.**
- **The most susceptible variety is Kishu (ranked at 4.5 when using the scale from 1-5), followed by Satsuma Owari (3.4) and Gold Nugget (2.9), while Page (1.2), Tango (1) and W. Murcott (1).**
- **We were able to reduce damage in Satsuma Owari mandarins by applying 2,4-dichlorophenoxyacetic acid (2,4-D) at 16 milligrams/Liter (mg/L), gibberellic acid (GA) at 20 mg/L or VaporGard® at 0.5 percent (v/v) at the color break stage.**
- **GA caused a delay in color development which varied among varieties. Tango's response was more significant, Page was less responsive, and Satsuma Owari and W. Murcott each had an intermediate response.**