Evaluation of Fungicides Applied Preharvest for Postharvest Diplodia Stem-end Rot Control on Grapefruit

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Diplodia stem-end rot (SER, caused by Lasiodiplodia theobromae) is an important postharvest disease in Florida citrus. The presence of Huanglongbing (HLB) in citrus groves has exacerbated Diplodia SER. The discovery and implementation of improved decay control methods is essential to sustain Florida’s fresh citrus industry. Evaluation of preharvest fungicides or other compounds for postharvest Diplodia SER control was conducted during the 2019–20 and 2020–21 seasons on red grapefruit (Citrus × paradisi). Tested compounds and formulations included: Topsin 4.5 FL (thiophanate-methyl), Quadris Top (azoxystrobin + difenoconazole), Graduate A+ (fludioxonil + azoxystrobin), Headline (pyraclostrobin), Mentor EC (propiconazole), Mertect 340-F (thiabendazole), Switch 62.5 WG (fludioxonil + cyprodinil), Miravis Prime (fludioxonil + pydiflumetofen), Miravis Top (difenoconazole + pydiflumetofen), Thyme Guard (thyme oil) and Citrus Fix (2,4-Dichlorophenoxyacetic acid or 2,4-D). During the first season, the selected compounds were hand-sprayed on individual grapefruit (replicates) within the tree canopy in two locations (groves). During the second season, the compounds were applied to each of three trees (replicates) in each of four locations (groves). The application rates were based on label instructions. For materials with no preharvest citrus label, rates/concentrations were based on their labels for other crops or their postharvest use. Control trees were sprayed with water. Fruit were harvested 2 d and 14 d after treatment. Harvested fruit were exposed to 5-d degreening conditions [5 ppm ethylene, 85 °F, and 90% relative humidity (RH)]. The fruit were then incubated at 75 °F with 90% to 95% RH for 3 weeks and Diplodia SER occurrence was recorded weekly. Fruit treated with Topsin 4.5 FL and Graduate A+ in all tests significantly reduced Diplodia SER incidence and severity compared to the controls. Mertect 340-F, Miravis Prime, Headline, and Quadris Top significantly reduced Diplodia SER in some tests. Switch 62.5WG, Thyme Guard, Mentor EC, and Citrus Fix did not significantly reduce Diplodia SER.

Topsin 4.5 FL has previously been reported to effectively control Diplodia SER (Salvatore and Ritenour, 2007; Zhang and Timmer, 2007) and served as a positive (likely best-case) control in these tests. Topsin had once been available for Florida citrus through a temporary EPA Section 18 emergency use exemption, but efforts by the registrant to obtain a full label were abandoned in 2009. The consistent effectiveness of Graduate A+ for postharvest Diplodia SER control mirrors its reported postharvest effectiveness against L. theobromae (Zhang, 2007; Zhang and Timmer, 2007). However, Graduate A+ is currently registered only for postharvest use and the rates used in these studies are higher than what would be allowed for preharvest use. The effectiveness of Mertect 340-F against Diplodia SER is expected since its active ingredient, thiabendazole, is commonly used commercially for effective control of citrus postharvest Diplodia SER (Zhang, 2007). Headline, Quadris Top, and Miravis Prime contain fludioxonil or strobilurin compounds, which are likely the key active ingredients leading to reduced Diplodia SER. Product formulation may also affect decay control efficacy of the compounds. For instance, Switch 62.5 WG, containing fludioxonil, did not reduce Diplodia SER in all tests in this study.

Further work is in progress to evaluate concentrations of fludioxonil, strobilurins, their combinations, and formulations and new compounds for Diplodia SER control in Florida.

Literature Cited

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