

New Options for Decay Control of Fresh Citrus

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Estes Citrus Inc


Preharvest Fungicides

Fruit Decay - on Tree!

- *Diplodia (Lasiodiplodia theobromae)* causes fruit stem-end rot and was:
 - Consistently detected in the abscission zone and juice of HLB-infected fruit
 - Greater abundance of *Diplodia* was positively correlated with lower fruit detachment force
 - Fruit ethylene production is positively correlated with *Diplodia* infection levels
 - Quadris Top = multiple applications gave intermittent control under HLB conditions



Materials and Methods

- Materials were sprayed on trees 2 or 14 days before harvest
 - Three or four groves (experiments) per season
 - After harvest, fruit were exposed to 5 or 6 days of degreening conditions (5 ppm ethylene, 85°F, and 90% RH)
 - The fruit were then incubated at 75°F with 90-95% RH for up to 3 weeks and Diplodia SER and other decays were recorded weekly
 - In 2022-23, some of the fruit were also washed, waxed, stored at 50F, and evaluated for decay after 1 and 2 months
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***not labeled preharvest for bearing FL grapefruit trees**

Materials Tested 2019-23

- CONTROL - WATER
- Topsin 4.5 FL*
 - thiophanate-methyl (45%)
- Miravis Prime*
 - fludioxonil (21.4%) + pydiflumetofen (12.8%)
- Headline
 - pyraclostrobin (23.6%)
- Cannonball*
 - fludioxonil (50%)
- Abound
 - Azoxystrobin (22.9%)
- Cannonball* + Abound
- Cannonball* + Headline
- Miravis Top
 - difenoconazole (11.5%)+ pydiflumetofen (6.9%)
- Mentor EC*
 - propiconazole (23.3%)
- Luna Sensation
 - Fluopyram (21.4%) + trifloxystrobin (21.4%)
- Veltyma
 - Pyraclostrobin (17.56%) + mefentrifluconazole (17.56%)

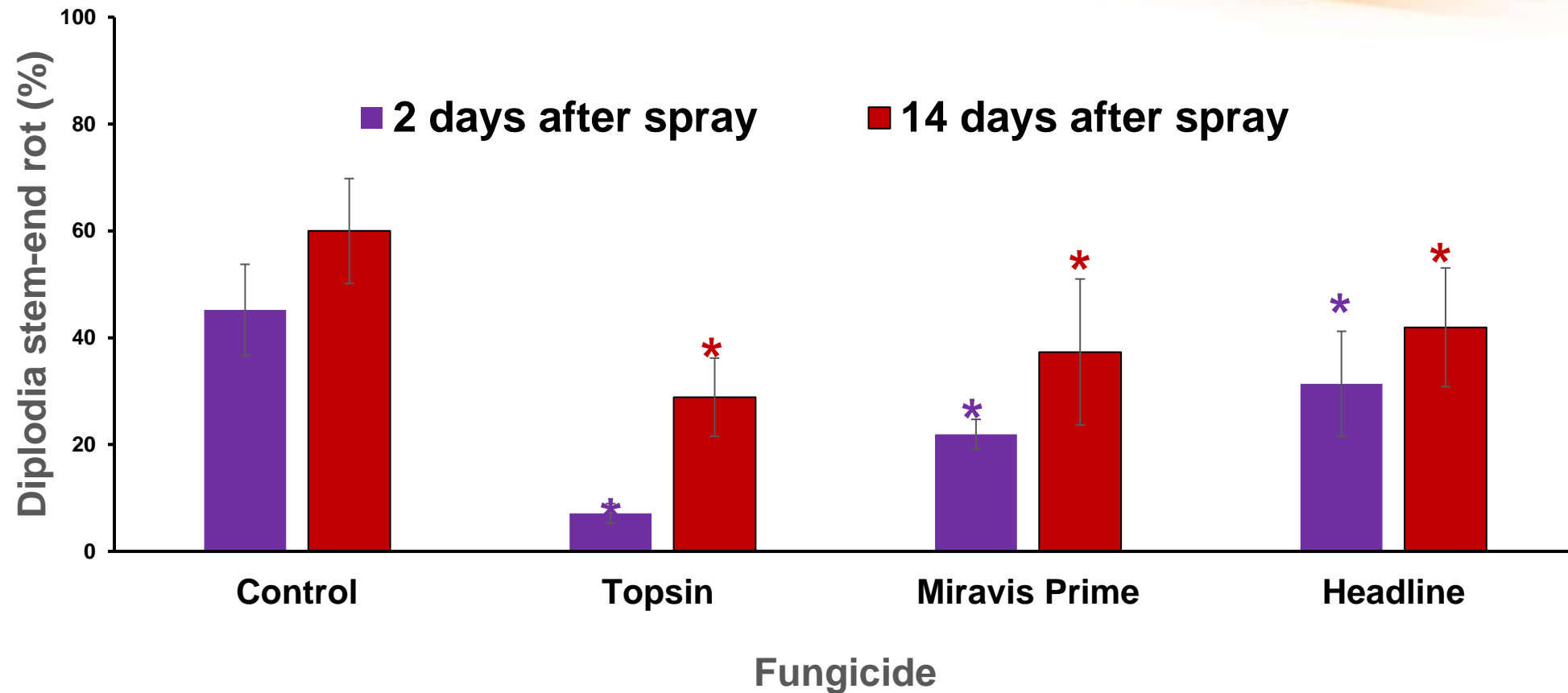
***not labeled preharvest for bearing FL grapefruit trees**

Materials Tested 2019-23

- Switch 62.5WG
 - fludioxonil (25%) cyprodinil (37.5%)
- Quadris Top
 - azoxystrobin (19.18%) + difenoconazole (11.36%)
- Switch 62.5WG
 - fludioxonil (25%) + cyprodinil (37.5%)
- Citrus Fix (2,4-D 45%)*
- Thyme Guard
 - thyme oil (23%)
- Graduate A+*
 - fludioxonil (20.6%) + azoxystrobin (20.6%)
postharvest rates
- Mertect 340F*
 - thiabendazole (42.3%)
postharvest rates

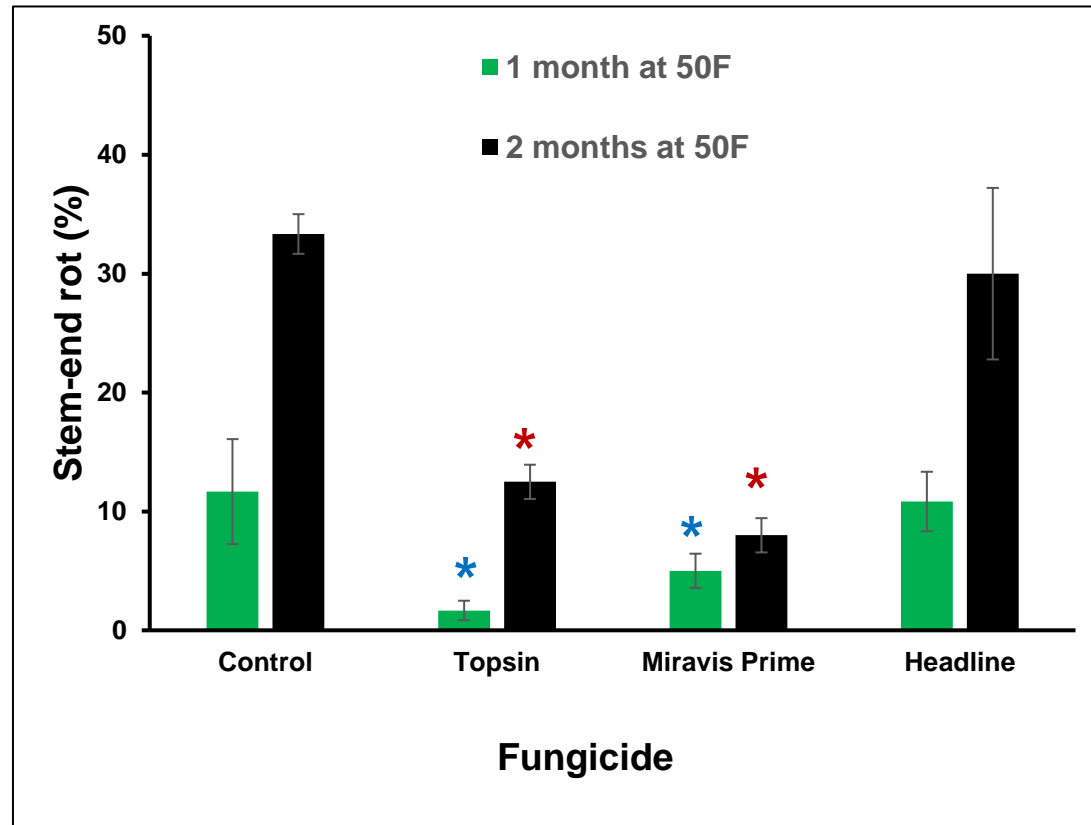


2022 - 23 Field Results

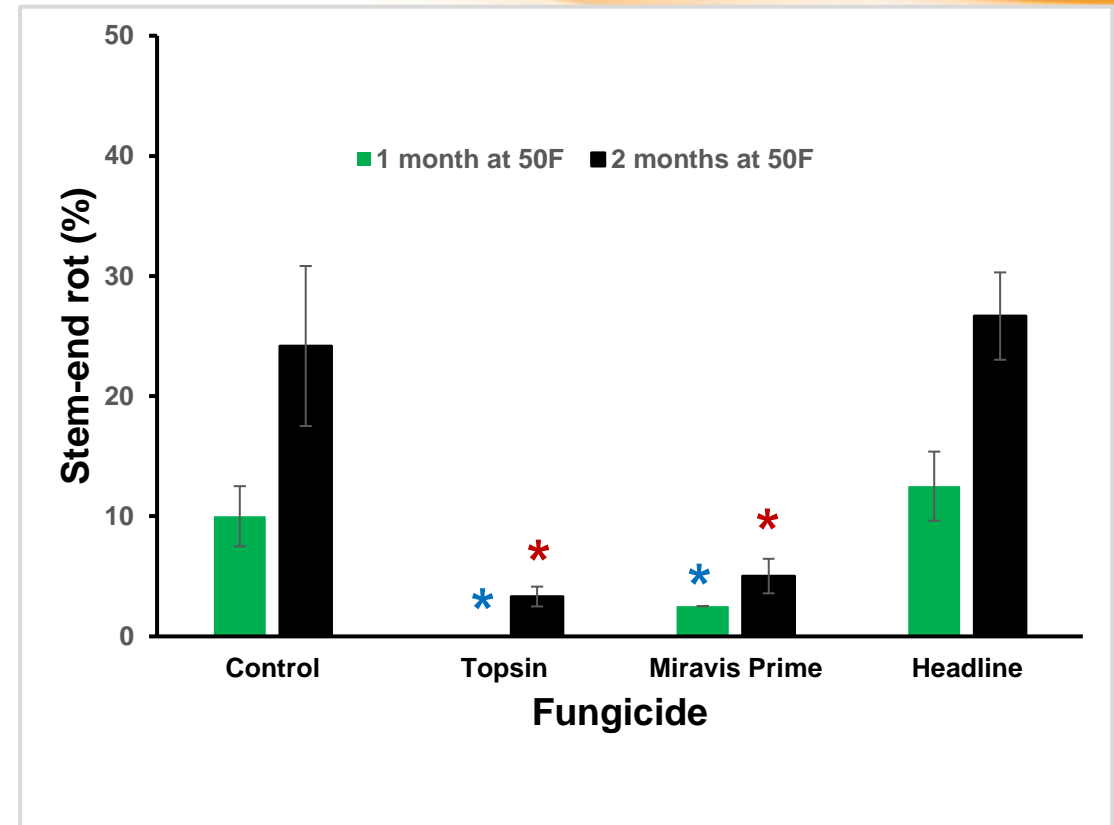


Combined postharvest Diplodia SER incidences on grapefruit of **three groves** at two harvest times after pre-harvest fungicide applications during 2022-23 fruit season. Standard errors were expressed on each bar of the graph. * -- indicates significant different at the same harvest time ($P \leq 0.05$) compared to controls.

2 days after fungicide spray



14 days after fungicide spray



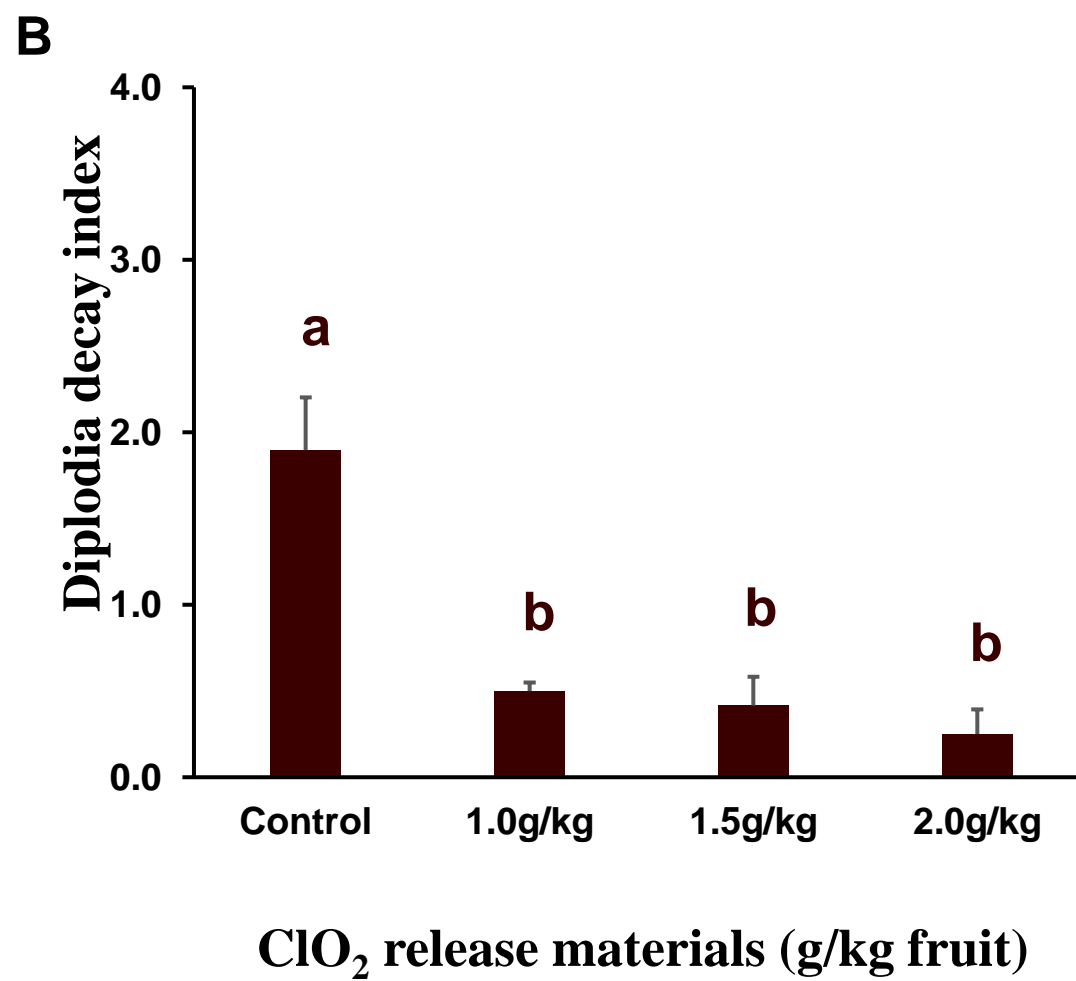
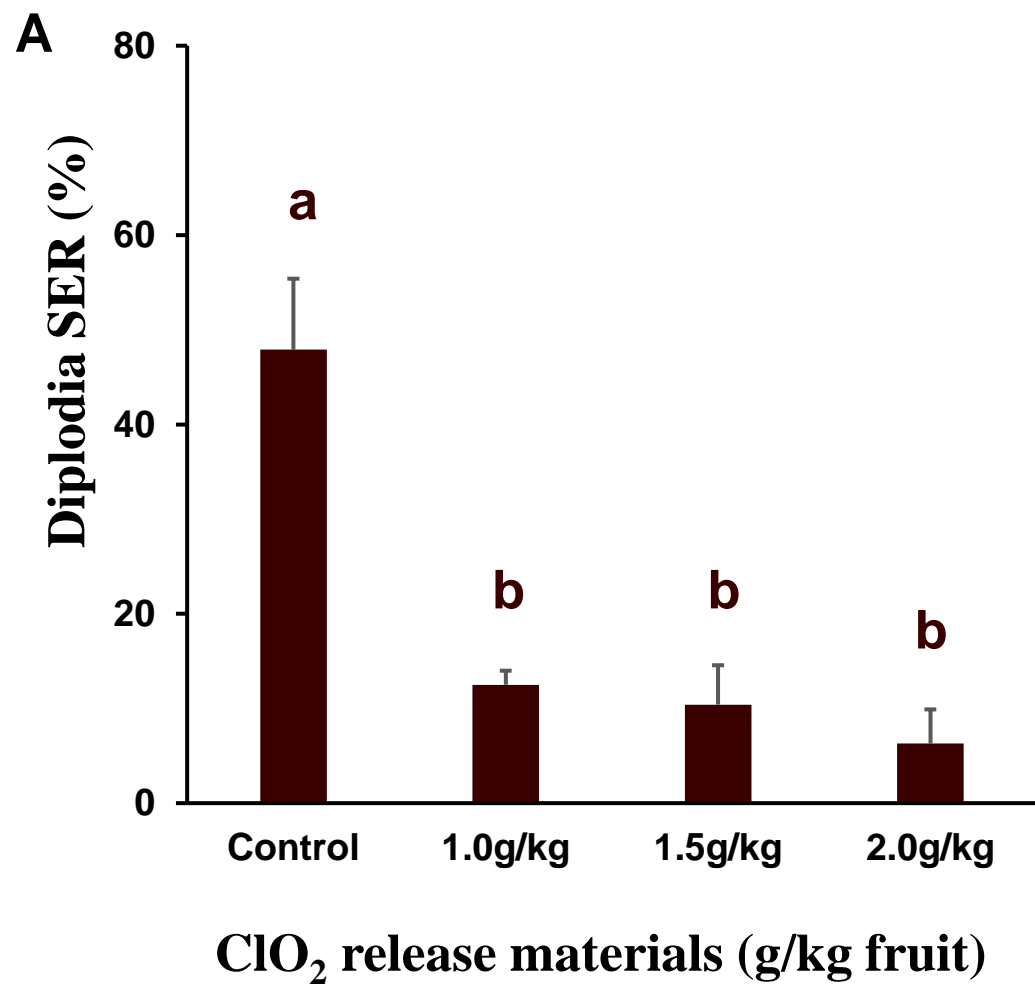
Effects of pre-harvest fungicides on postharvest stem-end rot incidences on grapefruit from two harvests and after storage (50F) for 1 or 2 months during **2022-23 season**. Fruit were washed and waxed before storage. Standard errors were expressed on each bar of the graph. * -- indicates significant different at the same harvest time ($P \leq 0.05$) compared to controls.

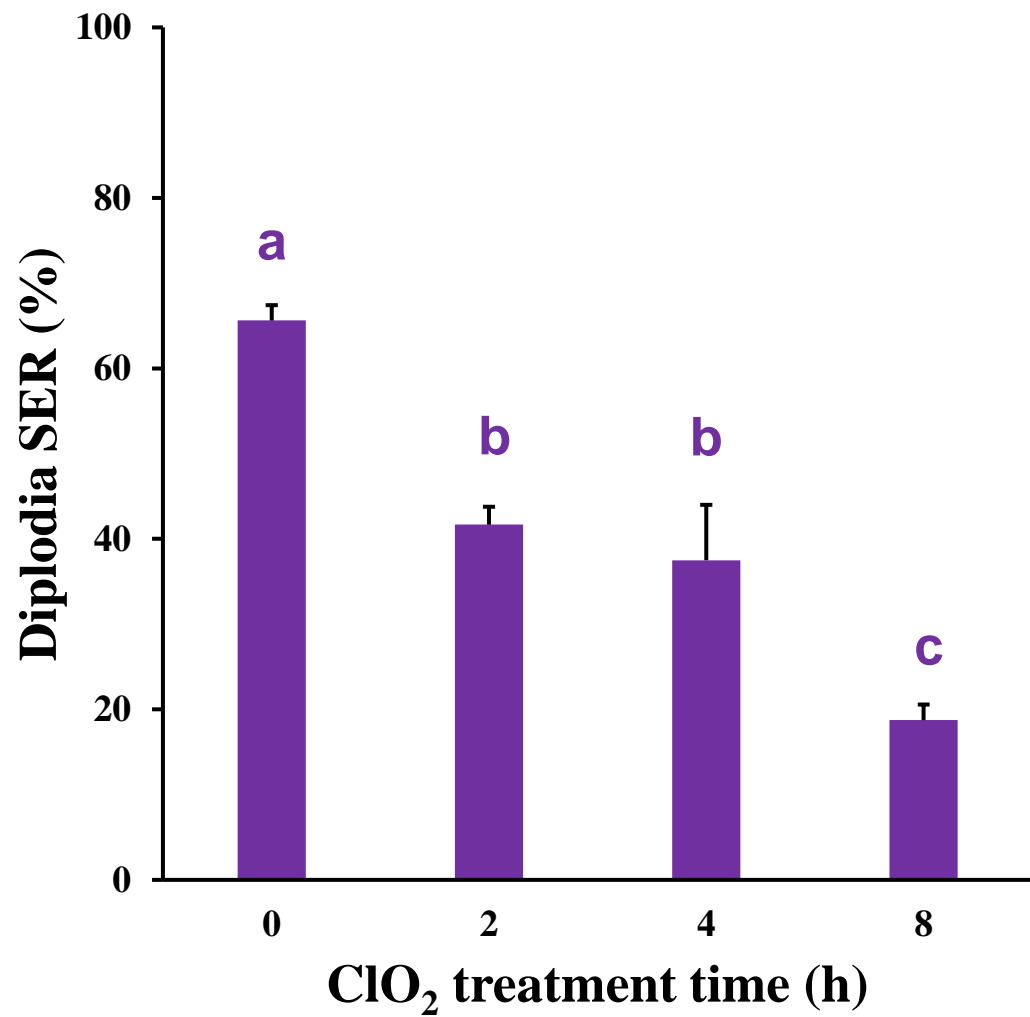
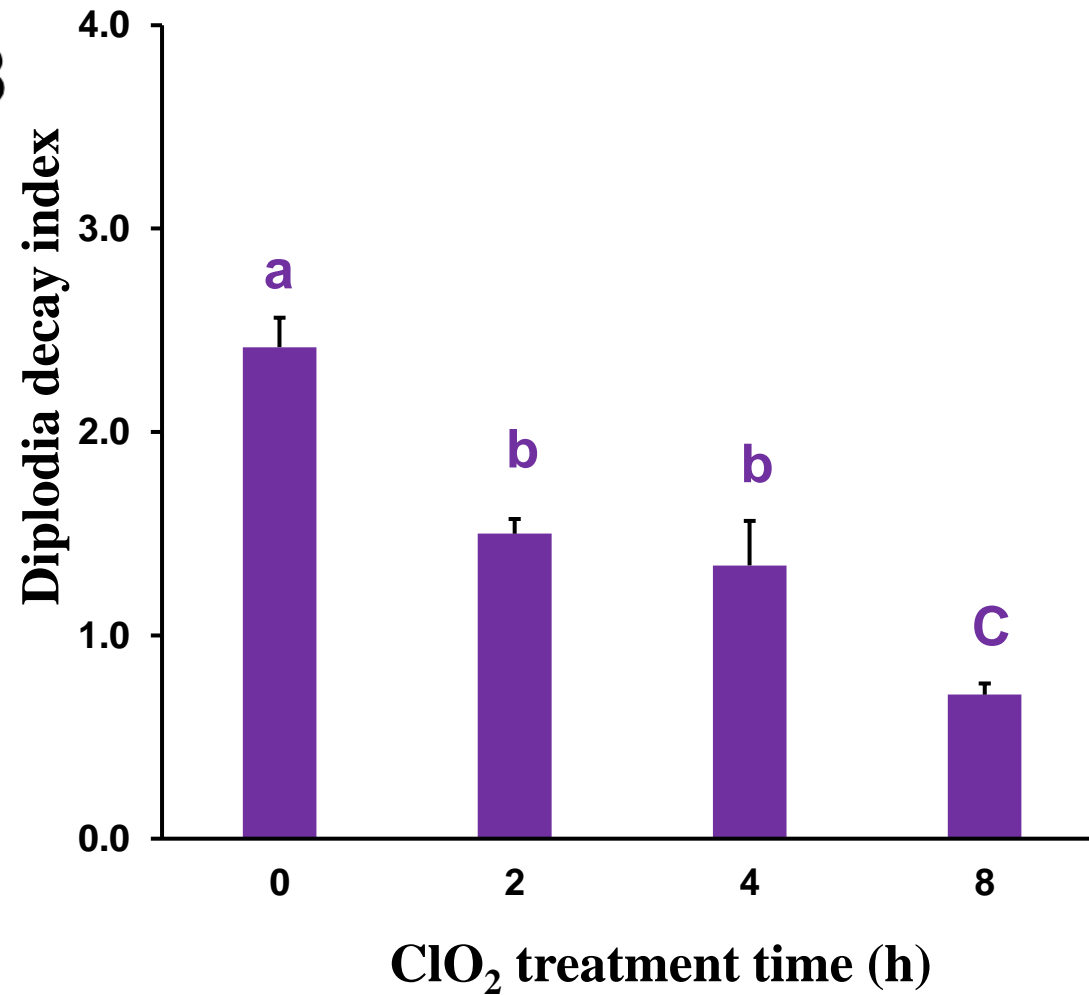
Summary

- **Topsin** 4.5FL demonstrated the best Diplodia SER control
 - but it is **NOT** registered
- Strobilurin-based fungicides (such as **Abound** and **Headline**) moderately reduced Diplodia SER when decay pressure
- **Miravis Prime** (not yet registered for grapefruit) consistently showed significant and moderate Diplodia SER control and appears to be a good candidate for grapefruit registration for Diplodia SER control




Chlorine Dioxide Gas

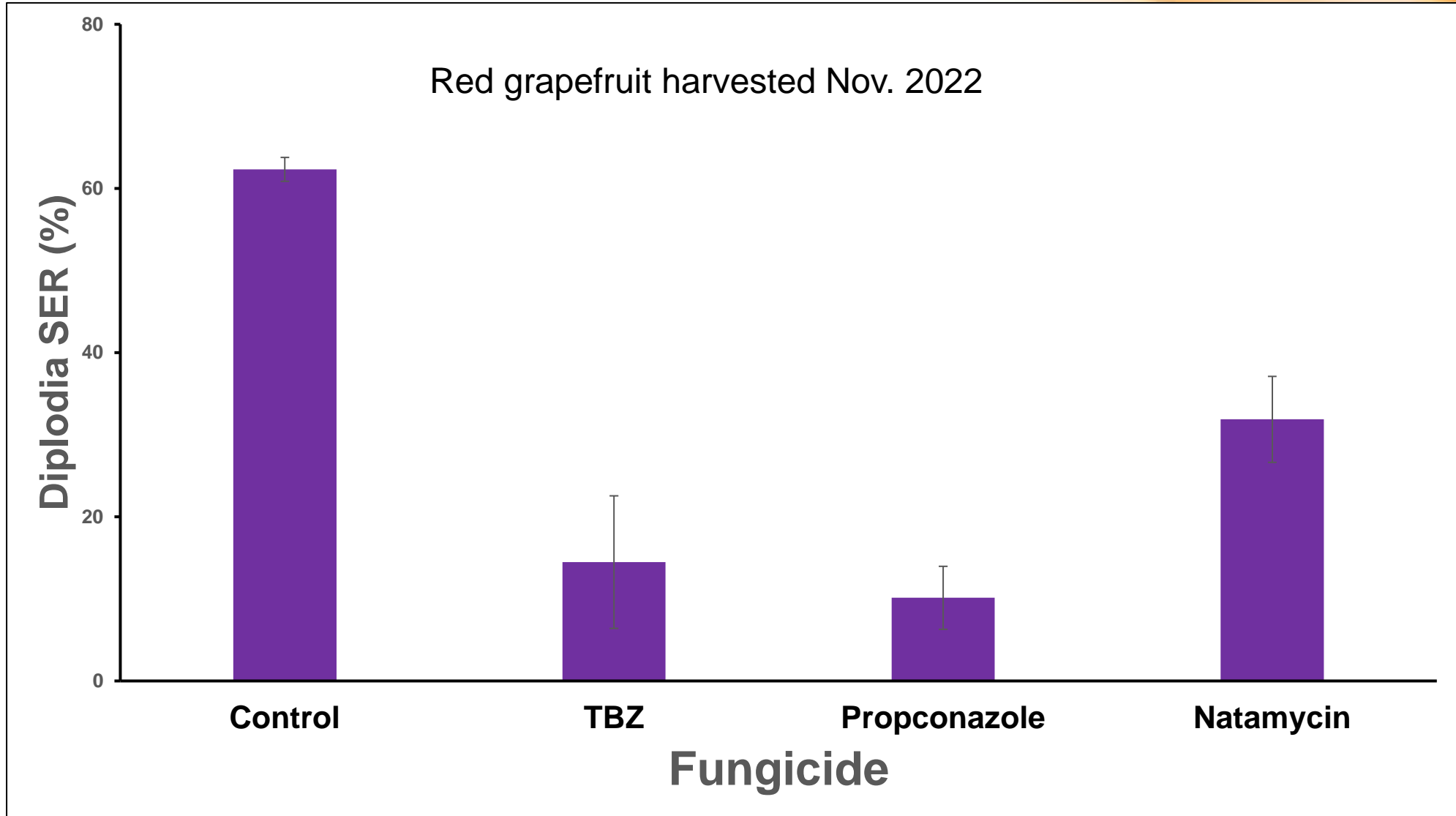


A**B**

Postharvest Fungicides

Materials and Methods

- Three experiments, each using fruit from a different grove, were conducted during the 2022-23 season
 - TBZ, propiconazole, and natamycin dips (1 min) in 1,000 ppm solutions were compared to a water control
 - Each treatment had three replicates containing 21 to 23 fruit
 - Fruit were then exposed to degreening conditions for three days
 - The fruit were then incubated at 75°F with 90-95% RH for up to 3 weeks and Diplodia SER and other decays were recorded weekly
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Pesticide Maximum Residue Limits

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Our goal is to generate and disseminate information so that perishable horticultural commodities are delivered to consumers fresh, safe, nutritious and in the form (e.g. ripe or fresh-cut) consumers desire.

Pesticide Residues & Limits



Look up the latest citrus MRLs for selected export markets and other resources for all commodities.

[More...](#)

Packinghouse Day 2021



Packinghouse Day was held on Thursday Aug. 26th [via Zoom](#). Click [here](#) to view the presentations. [More...](#)

Mission

To support Florida's diverse Postharvest horticulture industries through research, extension and teaching.

Calendar

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<http://irrec.ifas.ufl.edu/postharvest/>

Or simply search for

“UF Postharvest”

Maximum Residue Limits (MRLs) in part-per-million (ppm) For Citrus - By Country

Because MRLs change frequently, no guarantee is made concerning the accuracy of the below values. Verify these values with other knowledgeable sources within specific markets of interest.

Materials EXEMPT from US tolerances or labeled only for application to NONBEARING trees are NOT included

Proposed values are not in effect and may never be adopted, but are listed to notify of potential upcoming changes


"E" indicates potential MRL reduction or elimination for the indicated market perhaps a year or more in the future.

Abbreviations: G = grapefruit, O = sweet orange, T = tangerine (mandarin), L = lemon, P=pummelo

Visit <http://irrec.ifas.ufl.edu/postharvest/> for more details & updates

Chemical Name	Brand or Trade Names (Examples only, not exhaustive)	U.S. Citrus	CODEX Citrus	Canada Citrus	EU (G & O only)	Great Britain (G & O only)	Japan (G & O only)	Korea (G & O only)	Taiwan (G & O only)
2,4-D (2,4-Dichlorophenoxyacetic acid)	Citrus Fix, Hivol	3	1	2	1	1	3	0.15	2
Abamectin	Agri-Mek, Clinch, Zephyr, ABBA, Epi-mek, Reaper, Minecto Pro	0.02	0.02	0.02	0.04	0.04	0.1	0.01 (G); 0.05 (O)	0.01
Acequinocyl	Kanemite	0.35		0.35	0.6	0.2 (G); 0.4 (O)	2	0.01 (G); 0.7 (O)	0.2
Acetamiprid	Assail	1	1	0.5	0.9	0.9	2	0.5	0.5
Acibenzolar-S-methyl	Blockade	0.02	0.015	0.1	0.01	0.01	0.02	0.015	
Azoxystrobin	Abound, Graduate A+, Quadris Top (component)	15	15	15	15	15	10	10	10
Beta-cyfluthrin	Baythroid XL	0.2	0.3	0.1	0.3 (E)	0.02	2	0.2	0.3
Bifenthrin	Brigade, Capture, Telstar, Fanfare	0.05	0.05	0.1	0.05 (E)	0.05	2	0.01 (G), 0.5 (O)	0.5
Boscalid	Pristine (component)	2	2	3	2	2	10	2	0.01 (G); 5 (O)
Bromacil	Bromo, Hyvar	0.1		0.1	0.01	0.01	0.1	0.04	0.5
Buprofezin	Applaud, Centaur	4	1	0.1 (G, L, P), 4 (O, T)	0.01	0.01	3 (G), 2 (O)	0.01 (G), 2.5 (O)	0.5
Carbaryl	Sevin	10	15	10	0.01	0.01	5	0.01 (G), 7 (O)	1
Carfentrazone-ethyl	Aim	0.1		0.1	0.02	0.01	0.1	0.01	0.1
Chlorantraniliprole	Altacor, part of VoliamFlexi	1.4	0.7	0.7	0.7	0.7	0.7	0.6	0.5
Cyantraniliprole	Exirel; Minecto Pro	0.7	0.7	0.7	0.9	0.9	0.7	0.7	
Cyfluthrin	Baythroid	0.2	0.3	0.1	0.03	0.02	2	0.2	0.3
Difenoconazole	Quadris Top (component), Miravis Top (component)	0.6	0.6	0.8	0.6	0.6	0.6	0.6	0.6
Diflubenzuron	Micromite	3	0.5	0.1	0.01	0.01	3	0.01 (G); 2 (O)	1
Dimethoate	Dimethoate, Cygon	2	5	1.5	0.01	0.01	2	0.01	2

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Thank You!

- For more information,
visit the UF Postharvest Website

<http://irrec.ifas.ufl.edu/postharvest/>