Vegetable & Fruit News

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Potential Reduction of Tomato Fruit Cracking Using Haven

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This past season I received several calls from growers about problems they were having with fruit cracking in their tomatoes. While the fruit cracking was often seen in field tomatoes there were many reports of it occurring in high tunnel tomatoes. Fruit cracking in tomatoes can be a serious market problem and there are several factors that have an effect on it.

Cracking and splitting in tomatoes occur when there is a rapid change in soil moisture level that causes fruits to expand quicker than the tomato skin can grow. Heavy rain, especially when preceded by dry weather, is the leading cause of fruit cracking and splitting in tomatoes. There generally are two different types of fruit cracking damage. Vertical splits along the top and sides of fruits (fig. 1) are known as radial cracking and are the most serious and commonly occur during hot, humid weather (which we had a great deal of this past summer). The second is concentric cracking that happens in a circular pattern at the top of tomato fruits. When either cracking type occurs in green tomatoes the fruits are likely to rot before they ripen.

Fig. 1 Cracking along the top and sides of a tomato fruit.

This year I was looking at several different treatments in high tunnel studies examining several different tomato cultivars. One of these treatments happened to be looking at a product that reportedly reduces fruit cracking in tomato. The product is called Haven and is from Marrone Bio Innovations, Inc. Haven is an anti-transpirant, which when applied to plants reduce transpiration. Haven is derived from plant-based compounds that reflect light and heat to maintain lower leaf temperatures while at the same time reducing water loss, theoretically resulting in less stress to the crop. This article presents the results of the trial.

Methods: Transplants were produced in a greenhouse at the Wye REC (Queenstown, MD) where the high tunnel (HT) was located. Tomatoes were transplanted into the high tunnel on 15 April (this is several weeks later than we normally plant because of several different factors). The tomato cultivars *Mt. Gem* and *Celebrity* were used in this study. Tomatoes were grown on six rows of black plastic 30'long with drip irrigation. Plants were staked and tied (fig. 2).

Does a Crop Sanitizer (Jet Ag®) Reduce Spotted-Wing Drosophila Infestation?

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Background

Spotted-wing drosophila (SWD), is a major small fruit pest in the U.S. Unlike other drosophilid flies, that lay their eggs in overripe or damaged fruit, female SWD use their saw-like ovipositor to penetrate the skin of ripening fruit [1]. Besides the direct damage caused by SWD, egg-laying wounds and larval feeding can increase the risk of fruit rot infections [1] that cause crop loss both pre-harvest and post-harvest. SWD is attracted to yeast species as these are an important food for adults and larvae [2-5]. Controlling yeasts that occur on the fruit might make fruits less favorable and reduce SWD infestation. We tested the crop sanitizer JetAg® (Active ingredients: hydrogen peroxide and peroxyacetic acid) to determine whether it impacts SWD infestation and the fungal community on blackberries. As a crop sanitizer, JetAg® is labelled to control yeasts (attractants for SWD) and fungi causing fruit rot infections.

Methods

In 2019 and 2020, the crop sanitizer JetAg® was tested at the Western Maryland Research and Education Center (WMREC, Washington County, MD) in floricane fruiting blackberries (Variety: Ouchita). We treated two rows with 1% JetAg® and two rows with water (45 ft each), with treatments assigned to alternating rows. In 2019, JetAg® was applied once (8/1) during the growing season and in 2020, 3 applications were made in consecutive weeks (one application per week: 7/22; 7/29; 8/5). We used a rate of 100 gal/acre (100psi; 3mph) and applications were made with an airblast sprayer (Durand Wayland 150) with a two-sided row crop head attached (Durand Wayland disc nozzles; 5 nozzle vegetable head attachment) to direct the spray into the canopy.

In both years, SWD infestation was measured before and one week after each application. Ten marketable fruit were randomly harvested from each treatment replicate and SWD infestation was assessed using larval flotations. One week after the last application, 20 marketable fruit per treatment replicate were randomly harvested and examined for fruit rot incidence. To study the fruit fungal community, fruit were sampled from the exterior portions of the canopy before the first application and 24h after each application. In 2019 a total of 30 fruit and in 2020 a total of 20 fruit per row were sampled. Fruit samples were rinsed and the rinse was plated on a selective growth medium (**Figure 1**). After 48h incubation time, all yeasts and hyphal fungi were counted and different yeasts and hyphal fungi were isolated and identified.

Figure 1: Yeast and hyphal fungi colonies on growth media

Results

In both years, SWD infestation was not impacted by JetAg® after any application (**Table 1**). Likewise, we did not observe a difference for fruit rot infections one week after the last application. Fruit rot occurrence was generally low, with no infected fruit in 2019 and 6 (30%) infected fruit in 2020 in both treatments.

Table 1: Mean ± standard error of SWD infestation in blackberries before and after JetAg® application

Year	Treatment	Application date	Sampling date	SWD/g fruit
2019	Control	8/1	8/1	0.02 ± 0.02
2019	JetAg®	8/1	8/1	0.04 ± 0.02
2019	Control	8/1	8/8	0.08 ± 0.03
2019	JetAg®	8/1	8/8	0.14 ± 0.01
2020	Control	7/22	7/22	0 ± 0
2020	JetAg®	7/22	7/22	0 ± 0
2020	Control	7/22	7/30	0 ± 0
2020	JetAg®	7/22	7/30	0.1 ± 0.1
2020	Control	7/29	8/6	0.4 ± 0.2
2020	JetAg®	7/29	8/6	0.6 ± 0.2
2020	Control	8/5	8/13	0 ± 0
2020	JetAg®	8/5	8/13	0.2 ± 0.1

In both years, there was no significant impact of JetAg® on yeast abundance. In 2019, yeast abundance was similar 24h after application of JetAg® and water (**Figure 2**). In 2020, yeast abundance decreased after the first and second application, but increased after the third application. However, the slight decrease in yeast abundance in 2020, did not reduce SWD infestation.

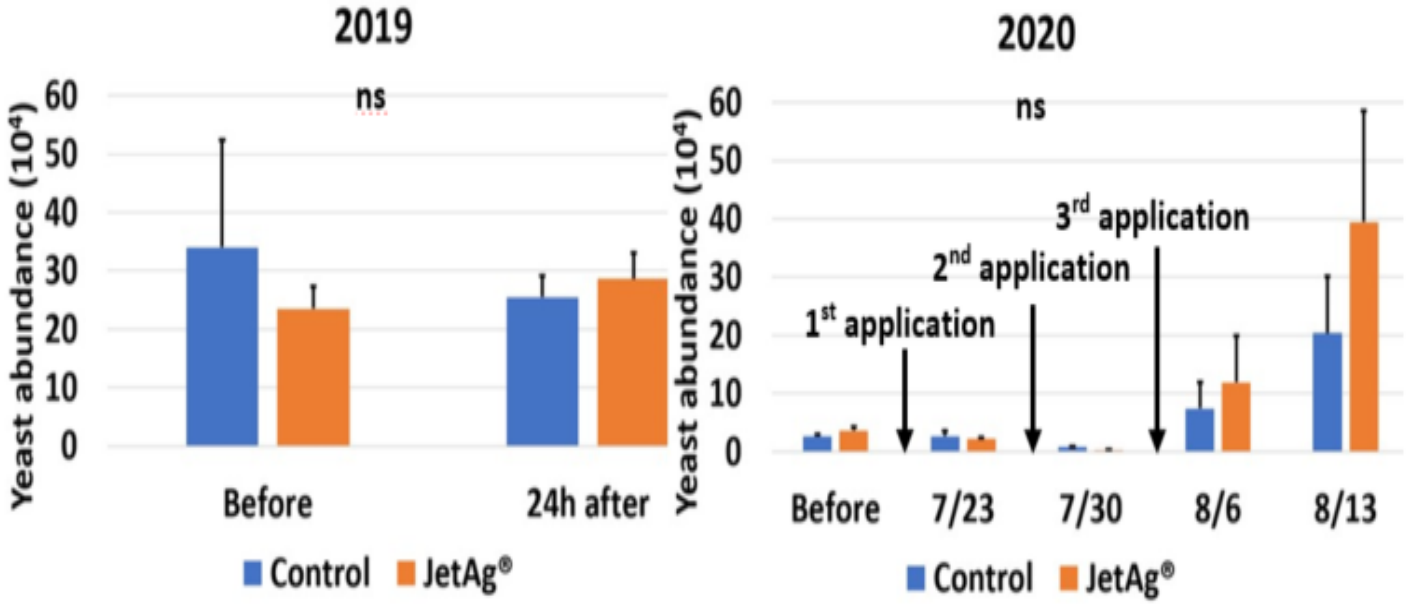

Figure 2. Average number of yeast species washed from blackberry fruit in 2019 and 2020. Fruit were sampled before and 24h after each water (control) or JetAg® application. Error bars represent the standard error of mean. ns = no significant difference between treatments on any sampling date.

In 2020, hyphal fungi abundance was significantly reduced in plots treated with JetAg® after the second application (7/30) and one week after the third application (8/13) compared with the control treatment (**Figure 3**). However, efficacy against surface fungi was inconsistent because abundance was similar between treatments on 7/23 and 8/6.

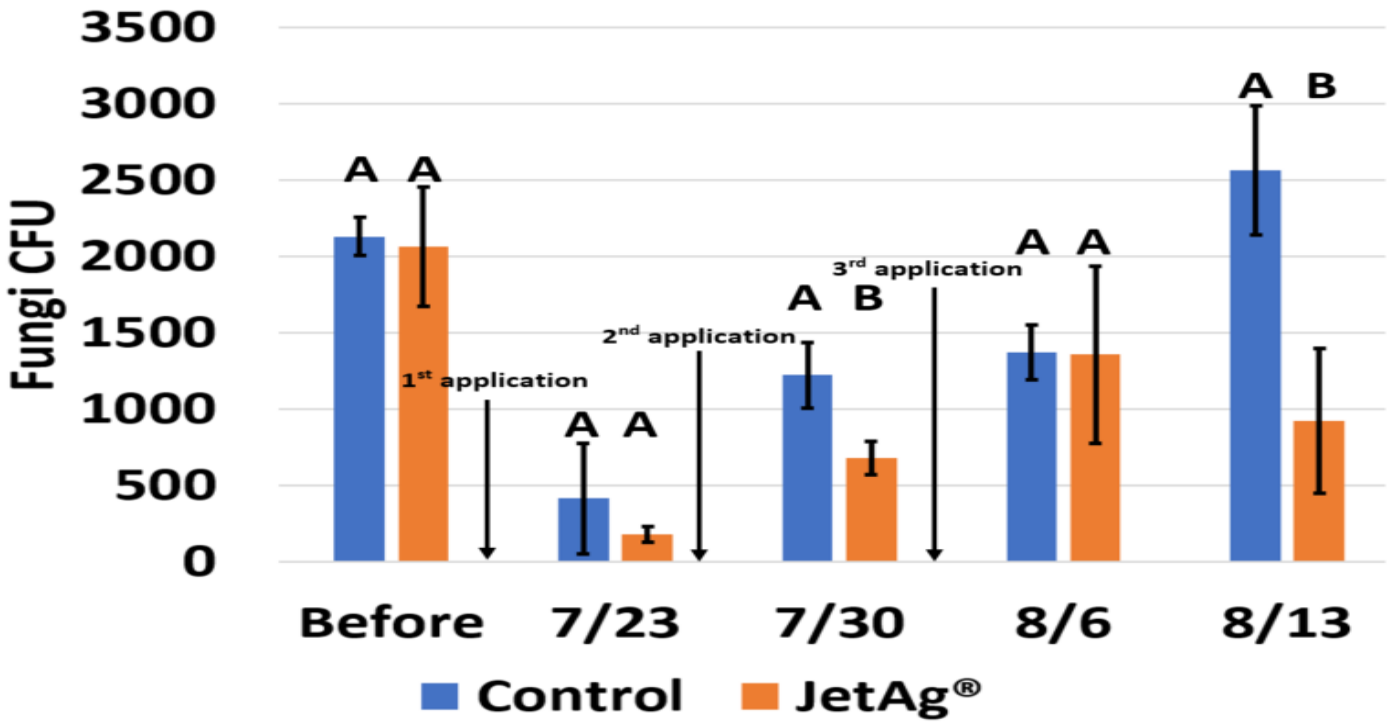

Figure 3. Average number of fungal colony forming units (CFU) in 2020 washed from blackberries. Error bars represent the standard error of mean. Means followed by the same letter at the same sampling time are not significantly different at α = 0.05.

In 2019, several of the yeasts were species associated with SWD (*Hanseniaspora* spp., *Pichia* spp., and *Wickerhamiella* spp.) which might affect the attractiveness of fruit to SWD. Hyphal fungi that were washed off from the fruit included *Fusarium*, *Cladosporium*, *Penicillium*, *Alternaria*, and *Aspergillus* species. Particularly, *Fusarium* and *Cladosporium* species can cause fruit rot pre- and post-harvest and should be monitored during the field season [6]. While we did not observe a strong effect on yeast diversity after application of water or JetAg®, we observed 40% less *Fusarium* species 24h after JetAg® application in 2019. However, at the same sampling time 22% more *Cladosporium* species were observed, which suggests lower efficacy for this species. We are still identifying 2020 yeasts and hyphal fungi.

Conclusions

After two seasons of studying JetAg® for SWD control, it has not reduced SWD populations or impacted yeast abundance. Control of hyphal fungi (like those responsible for *Fusarium* fruit rot) was observed to a certain extent which suggests some practicality for fruit rot management. Further in-depth data analysis is needed to examine how JetAg® impacts the fungal community and which species might be controlled.

Acknowledgements

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2020 Virtual Twilight Tour

With in-person meetings being cancelled due to COVID-19 restrictions, we have taken our annual twilight tour virtual! There's no tractor or hay wagon this year, but you can still learn what's been going on at the University of Maryland Research and Education Centers this past summer. Please enjoy these video presentations, and we look forward to having you back on the farm next year!

Video Presentations:

1. Can Spotted-Wing Drosophila Vector Fruit Rot Fungi?
2. Developing a perennial living mulch system to manage cantaloupe pests
3. An IPM approach to controlling harlequin bug in Brassica crops
4. Optimizing Trellis Systems to Control Spotted Wing Drosophila
5. Marigolds, more than dependable bloomers
6. Can sequential applications of soil-applied herbicides provide weed control in pumpkin?
7. New Living Mulch and Cover Crop Combinations for Weed Suppression and Natural Enemy Enhancement

Good Morning, Farmer!

Dear Farmers,

Beginning December 2020 and running through March 2021, the University of Maryland Extension will host ***Good Morning, Farmer!*** An online gathering place where farmers can discuss topics of interest, learn from experts and provide support through community fellowship.

For more information and links to registration, please go to:
https://extension.umd.edu/anne-arundel-county/good-morning-farmer

February 26, 2021 | Friday 8 am-Noon Region: Mid/Upper Eastern Shore	To register >>>	agenda coming soon

FORAGE

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January 14. 2021 |Thursday Morning 9 am-Noon	To register >>>	agenda coming soon
January 19, 2021 | Tuesday Morning 9 am-Noon	To register >>>	agenda coming soon

Connect with your local Extension educator to receive newsletters and notifications of events.
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See the Attachments!

1) Virtual Basic Gap Flier.
2) Statewide Extension Team Meeting Flier.

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