Control of Anthracnose on Watermelon with Fungicide Sprays Timed According to the Melcast Warning System, 2007

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Introduction

Anthracnose, *Colletotrichum obriculare,* is one of the most significant pathogens of cucurbits in the U.S. In addition to reducing yield as a foliar pathogen, quiescent or latent infections of *Colletotrichum orbiculare*, present a major threat as a postharvest pathogen.

Melcast is a disease-warning system that uses hourly leaf wetness and temperature data to help melon growers schedule fungicide applications for managing fungal diseases. Melcast translates hourly temperature and leaf wetness duration data into environmental favorability index (EFI) values. Fungicide applications are advised at intervals defined by epidemiological time (EFI values) rather than by chronological time (days or weeks).

Materials and Methods

Watermelon transplants *cvs.* Sangria (guard rows) and Crimson Tyde (treatment rows) were planted to black plastic-covered beds in a drip-irrigated field at Iowa State University Horticultural Station, Ames, IA. The planting pattern consisted of plants spaced 3 ft apart on plant beds spaced 8 ft from center to center. Standard practices for management of fertility, weeds, and insects for muskmelon grown in Iowa followed Iowa State University Extension recommendations. The experiment was arranged as a randomized complete block design with four replications and nine treatments. Each treatment consisted of 10 plants. Treatment plots were 25-ft long and alternated with guard rows to buffer between plots. There was also an 8-ft buffer between plot ends. Fungicides were applied with backpack sprayers. All plots were sprayed with fungicides, except the non-treated control, on June 27 when vines first touched within rows.

Subsequent treatments were applied either on a set schedule or using the Melcast model for anthracnose leaf blight with a threshold of 35 EFI to trigger fungicide applications. Treatment and guard rows were inoculated on July 4 with *Colletotrichum obriculare*.

Weather data input for Melcast was obtained with either on-site equipment (Model CR10, Campbell Scientific) (Treatment 9) or remotely estimated (ZedX, Inc.) with a combination of timeframe estimations and model corrections (Treatments 1 to 6) (Table 1). Treatment 8, a negative control, did not receive fungicides and Treatment 7 received fungicide applications on a calendar-based schedule.

Foliar disease severity was evaluated weekly, beginning 23 days after inoculation evaluations (July 27 to August 7). Each subplot was rated separately and then the results were averaged and used for Area Under Disease Progress Curve (AUDPC) analysis.

Results and Discussion

Our results show that the highest severity was recorded in Treatment 8, unsprayed control. The least severity was observed in Treatment 5, 72-h forecast-non corrected. Corrected versions of the disease-forecasting model, data sources, or time frame of input data did not result in reduced anthracnose severity.

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Table 1. Severity of anthracnose at the ISU Horticulture Station, 2007.

Trt #	Weather data source	Time frame of data input	Model correction[a]	Anthracnose severity[b]	
8	--	Unsprayed	-	21.2	A
6	ZedX Inc.	72-h forecast	corrected	14.7	AB
3	ZedX Inc.	24-h forecast	-	12.0	B
9	On-Site	Hindcast	corrected	12.0	B
7	--	Calendar-based	-	11.2	B
2	ZedX Inc.	Hindcast	corrected	11.2	B
1	ZedX Inc.	Hindcast	-	10.8	B
4	ZedX Inc.	24-h forecast	corrected	10.6	B
5	ZedX Inc.	72-h forecast	-	9.3	B

[a]Kim et. al 2002, 2004.
[b]Means followed by different letters differ ($P < 0.05$) (LSD = 9.26).