9 Celery

Where: Grand Gallery Room D
MI Recertification Credits: 2 (1B, COMM CORE, PRIV CORE)
OH Recertification Credits: 1 (presentations as marked)
CCA Credits: PM (2)
Moderator: Mark Cnossen, Cnossen Farms, Wayland, MI

2:00 PM **Preliminary Screening of New Nematicides for Celery**
- Marisol Quintanilla-Tornel, Michigan State University

3:00 PM **Celery Pathology Update (OH 2B, 0.5 hr)**
- Mary Hausbeck, Michigan State University

3:30 PM **Celery Weed Control Update (OH 2C, 0.5 hr)**
- Bernard Zandstra, Michigan State University

4:00 PM **Session Ends**

Annual Meeting of Michigan Celery Research Inc. will be held at the conclusion of the Celery session.

Celery Weed Control 2019

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EXPO, Grand Rapids, MI
December 5, 2018

Herbicides Review

Current and new herbicides for celery

Dual Magnum 7.62 EC

When: Before or after transplanting
Rate: 2 pt (1.9 lb ai)
PHI: 62 days
Weeds: Annual grasses, nutsedge, pigweeds, nightshades
Label: 24c indemn. (**www.farmassist.com**)
MOA: VLCFA synthesis inhibitor 15(K3)

Caparol 4L
Prometryn

When: After transplant, 4-6 weeks later
Rate: 1-2 qt (1-2 lb ai); 2 qt max per year
Weeds: Broadleaves and grasses
There is resistant common purslane
MOA: PS II inhibitor 5(C1)
Current status: under review at EPA

Lorox 50 DF
Linuron

When: After transplanting up to 8 inches
Rate: 1.5-2 lb (0.75 - 1 lb ai)
Weeds: Broadleaves and grasses
MOA: PS II inhibitor 7 (C2)
Current status: under review at EPA

Lorox Situation December 2018

1. Interim decision December 2018 – proposed label changes
2. Federal Register will announce a 60 day public comment period
3. EPA announces required label changes
4. Another comment period
5. Final announcement of new label

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Chateau 51 WDG
Flumioxazin

When: Before transplanting or 3-7 days after transplanting

Rate: 3 oz (0.096 lb ai)/acre

Weeds: broadleaves and grasses

MOA: PPO inhibitor 14 (E)

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Poast 1.5 E & Select Max 0.97 E

Post grass control

MOA: ACCase inhibitor 1(A)

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New Herbicides for Celery

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Zidua 85 WDG (pyroxasulfone) (1)

When: Pre or Post transplant

Rate: 2.5 – 5.0 oz (0.133 – 0.267 lb ai)/acre

Weeds: Annual grasses, com. groundsel, com. purslane, ladysthumb, marsh yellowcress, pigweeds, Virg. pepperweed, shepherdspurse

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Zidua 85 WDG (pyroxasulfone) (2)

Tolerance issued: 10/26/18

Label: 2019

MOA: VLCFA synthesis inhibitor 15 (K3)

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Prowl H_2O 3.8 CS
Pendimethalin

Pre or Post transplanting

Weeds: com. lambsquarters, com. purslane

EPA Caution 9/18

MOA: Mitosis inhibitor 3 (K1)

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Fusilade DX 2E

Fluazifop

Weeds: Post Grasses

Pria: 10/7/18

Label for 2019?

MOA: ACCase inhibitor 1(A)

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Potential Celery Weed Control with New Herbicides (1)

Pre-transplanting:

Zidua

Prowl H_2O

Dual Magnum

Chateau

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Potential Celery Weed Control with New Herbicides (2)

Post-transplanting:

Dual Magnum – immediately post TP

Chateau – 3-7 days post TP

(Prowl H2O) - ?

(Zidua) - ?

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Postemergence Celery Weed Control

Postemergence (3-6 weeks):

Caparol 2 qt – broadleaves

Lorox 1.5-2 lb – broadleaves

Poast or Select Max – grasses

(Fusilade) - grasses

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Summary

1. Several other herbicides will be labeled for celery soon.
2. Resistant common purslane will be controlled.
3. Lorox should be approved with few changes to label.

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Acknowledgements

- Michigan AgBioResearch
- MSU Extension
- USDA-NIFA
- Celery Research Inc.
- All growers
- K-I Chemical USA
- Syngenta Crop Protection

Celery Pathology Update

Dr. Mary K. Hausbeck, 517-355-4534
Michigan State University, Department of Plant, Soil & Microbial Sciences

Michigan ranks second in the U.S. for celery production, an industry worth $12.7 million to the state in 2017. In recent years, celery growers have experienced crop loss and increased management costs due to rot (Figure 1), which appears to affect plants of differing ages in the field. Celery is affected by many pathogens and requires intensive control strategies. High relative humidity and frequent rainfall (or irrigation) in Michigan favor pathogens; growers rely on fungicides for crop protection. This particular disease has recently wreaked havoc for many growers in Michigan.

This year, celery samples with symptoms of petiole wilt were collected from a number of different fields in the state. *Fusarium* species have been reliably isolated from the vascular tissue of the petioles. Efforts are currently underway to determine whether this *Fusarium* is the same organism responsible for Fusarium yellows which caused devastating losses to Michigan celery growers decades earlier before the development of resistant varieties.

Fungicide options for *Fusarium* are especially limited, expensive, and difficult to implement due to a dense plant canopy. Currently, growers do not have the needed test data and guidelines to limit this disease on celery. We initiated fungicide studies that are detailed below.

Figure 1. Root rot on celery sampled in 2018.

Evaluation of fungicides for control of root rot of celery.

Fungicide studies were conducted in a grower-cooperator's field in Van Buren County, MI in a muck soil previously planted to sorghum. Trial 1 was a 13-treatment replicated product trial, whereas larger strip trials tested four products but were not replicated (Table 1). Celery 'CR1' seedlings were transplanted on 28 June with approximately 32,000 plants per acre. Spacing was 30 inches between rows and 6 inches between plants within a row. Fertilization, weed and insect control were managed by the grower cooperator to commercial standards. A completely randomized block design with four replicates was established. Each treatment replicate consisted of two rows that were 20 feet long with a 2-foot buffer zone between treatments within a row. Treatments were applied using a CO_2 backpack sprayer and a broadcast boom equipped with three XR8003 flat-fan nozzles calibrated at 50 psi and delivering 50 gal/A.

Table 1. Products tested.

Product	Active ingredient	FRAC[1]	Labeled
Aprovia Top EC	difenoconazole/benzovindiflupyr	3/7	no
Cabrio WG	pyraclostrobin	11	yes
Luna Experience SC	fluopyram/tebuconazole	7/3	no
Luna Sensation SC	fluopyram/trifloxystrobin	7/11	yes
Miravis Prime SC	pydiflumetofen/fludioxonil	7/12	yes
Mycostop WP	*Streptomyces griseoviridis*	--	
Omega SC	fluazinam	29	no
Pristine WG	pyraclostrobin/boscalid	11/7	yes
Quadris SC	azoxystrobin	11	yes
Quadris Top SC	azoxystrobin/difenoconazole	11/3	no
RootShield WP	*Trichoderma harzianum*	BM02	yes
Tebuzol SC	tebuconazole	3	no
Tilt EC	propiconazole	3	yes

[1]Numbers and letters are used to define the fungicide groups by their mode of action. BM=biologicals with multiple modes of action. Visit www.frac.info for more information about FRAC codes.

Trial 1: Treatments were applied on 15, 25 June; 9, 17, 30 July; 10 and 20 August. Dead plants were counted on 17, 23 and 28 August, and stunted plants were counted on 28 Aug. Numbers of dead plants in the untreated control plot increased from 4.3 on 17 August to 9.5 on 28 August, and the untreated control averaged 6.3 stunted plants on 28 August (Figure 2). Three treatments limited dead plants to ≤6.0 on 28 August: Luna Experience, Pristine and Aprovia Top. Mycostop treatments resulted in more dead plants than the untreated control. Applications of Cabrio, Luna Experience, Omega, and Quadris limited stunted plants to ≤6.0; all other treatments resulted in more stunted plants than the untreated control.

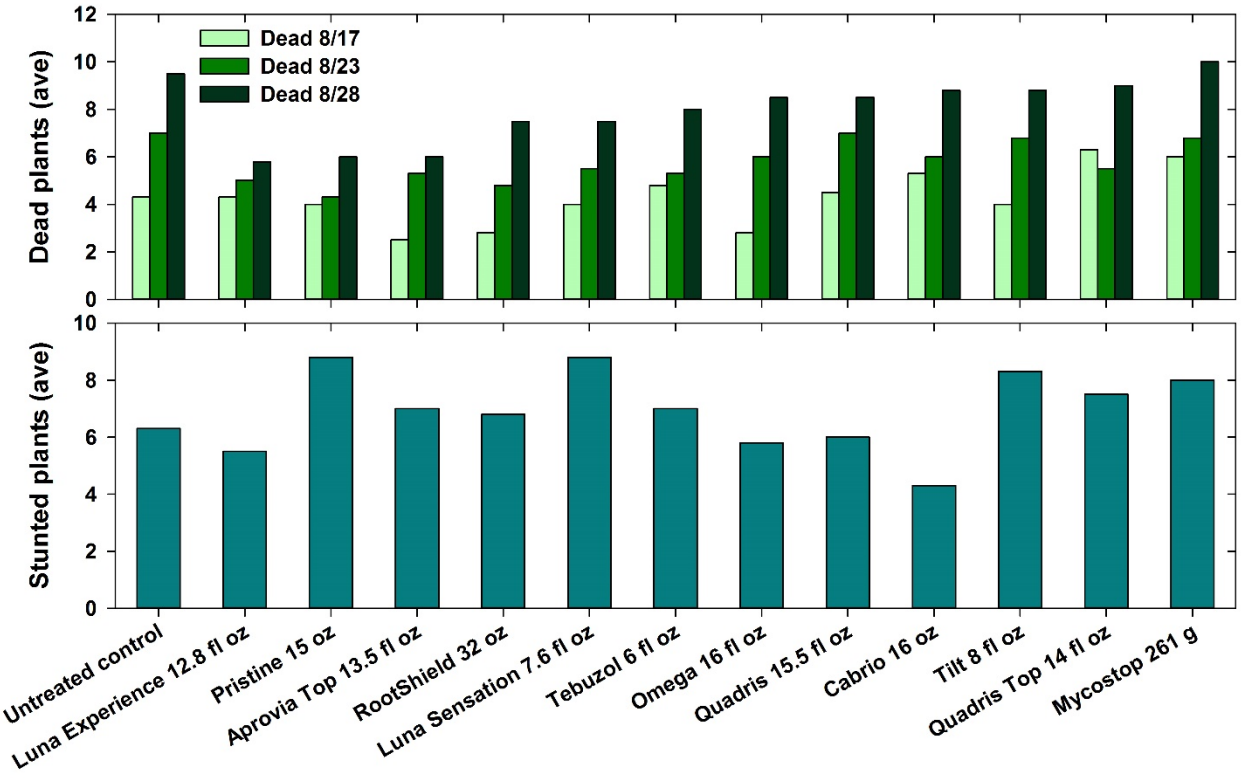

Figure 2. Trial 1: Evaluation of fungicides for control of root rot of celery.

Strip Trials: Treatments were applied on 17, 30 July; 10, 20, 28 August. Dead plants were counted on 23 Aug and 11 September. The control rows had 34 and 46 dead plants for Trial 1 and 48 and 49 dead plants for Trial 2 by 11 September (Figure 3). The best fungicide treatment in Strip Trial 1 was Omega, with 16 dead plants on 11 September; the worst treatment was Miravis Prime with 39 dead plants. The best treatment in Strip Trial 2 was Quadris Top, with 21 dead plants on 11 September; the worst treatment was Omega with 35 dead plants.

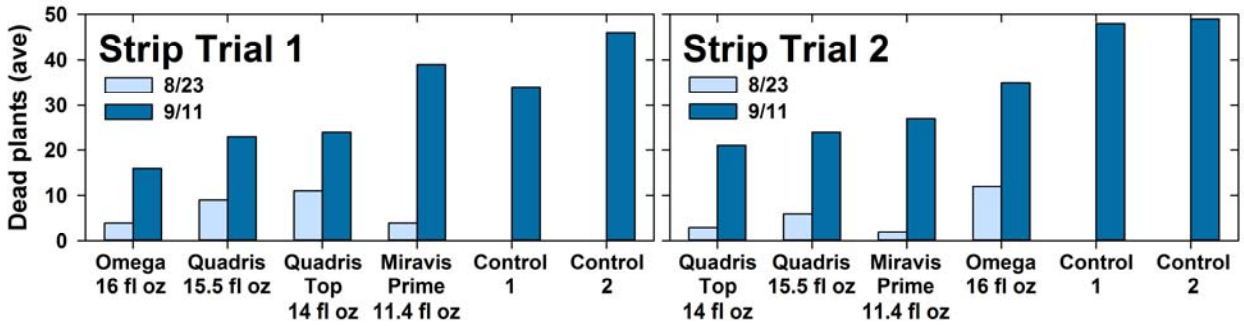

Figure 3. Evaluation of four fungicides for control of root rot of celery in two strip trials.

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