Onion

Moderator: Bruce Klamer, V & W Farms

9:00 am	Lessons from NY on Bacterial Bulb Rot and Implementing a Scouting based Thrips Control Program • Ashley Leach, Purdue University
9:40 am	Nitrogen Fertility Trials in Onions • Zack Hayden, Michigan State University Horticulture Department
10:10 am	Pathogens Causing Bulb Rot in Onion and Stemphylium Update • Mary Hausbeck, Michigan State University
10:40 am	Season-long Weed Control in Onions • Bernie Zandstra, Michigan State University Horticulture Department

Pathogens Causing Bulb Rot in Onion and Stemphylium Update

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Bacterial Disease. Onion plants with symptoms of bacterial stalk and leaf necrosis (Figure 1A) were sampled from commercial fields in six Michigan counties. Ten bacterial isolates were identified by Biolog and DNA sequencing; *Pantoea agglomerans* (42.5%), *P. ananatis* (17.4%) and *Enterobacter cowanii* (7.5%) were the most prevalent species (Figure 1B). *P. agglomerans*, *P. ananatis* and *E. cowanii* caused disease when onion seedlings and bulbs were inoculated. More *P. ananatis* isolates (92%) were pathogenic on seedlings than *P. agglomerans* or *E. cowanii* (approximately 50%). Isolates were tested for sensitivity to the bactericide copper hydroxide: 41% of *P. agglomerans* isolates, 19% of *P. ananatis* and 22% of *E. cowanii* isolates were tolerant, suggesting that copper hydroxide products may not limit bacterial pathogen populations in Michigan onion fields.

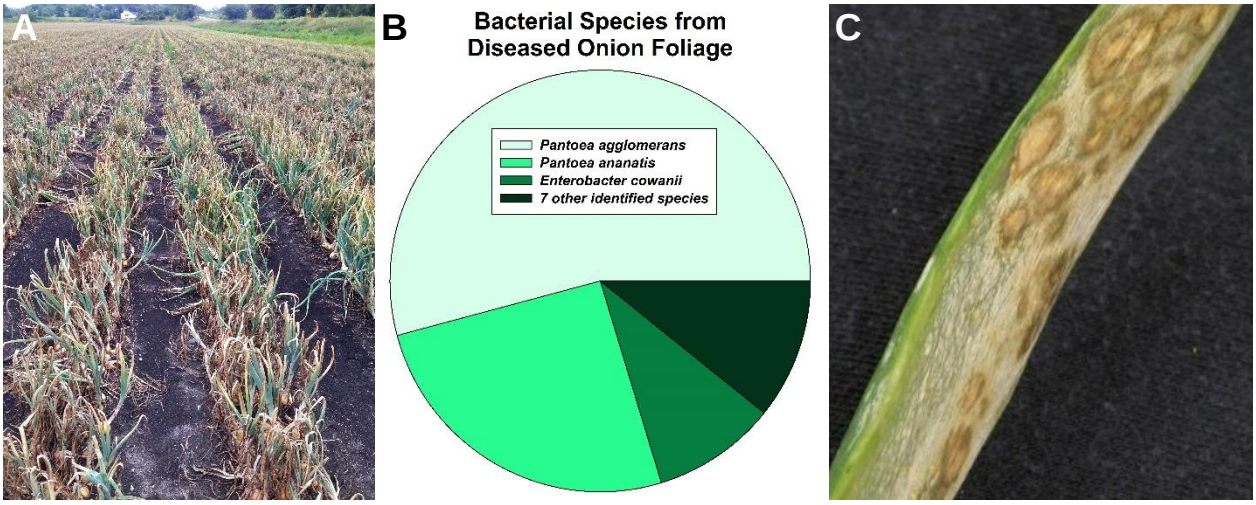

Figure 1. (A) bacterial stalk and leaf necrosis of onion in the field. **(B)** bacterial species isolated from infected onion plants. **(C)** Stemphylium leaf blight on onion foliage.

Experiments varied temperatures (59, 68, 77, 86°F) [15, 20, 25, 30°C], relative humidities (40, 60, 70, 80, 100%) and plant age (6, 8, 10, 12, 14 weeks) of onion plants inoculated with *P. agglomerans*, *P. ananatis* and *E. cowanii*. Increasing disease severity resulting from each bacterial species occurred at 77 to 86°F [25 to 30°C] and 80 to 100% relative humidity, typical of weather during Michigan's growing season. Cool temperatures, 59°F [15°C], and low relative humidity, 40 to 60%, limited disease. Susceptibility of plants increased with age; 10- to 14-week-old plants were more severely diseased than 6-week-old plants. It is recommended that bacterial diseases be managed through the later post-bulb-development stages (14-week-old and older) to limit late-season epidemics and bulb rot, especially when high temperatures, 77 to 86°F [25 to 30°C], and relative humidity greater than 80% occur.

Stemphylium Blight. Stemphylium leaf blight (*Stemphylium vesicarium*) historically has been considered a secondary pathogen of blighted onion foliage. In recent years it has emerged as a primary pathogen that has seemingly displaced the once commonly occurring purple blotch (caused by *Alternaria porri*). *S. vesicarium* occurs as small, light yellow to brown, water-soaked lesions that turn dark with spores (Figure 1C). Coalescing spots resulted in blighted leaves, defoliating the crop and compromising bulb quality, leading to storage rot caused by secondary bacterial pathogens. Stemphylium leaf blight on onion causes indirect loss through premature leaf senescence which negatively impacts bulb size, yield,

and storage quality. An aggressive pathogen in Michigan for the last couple of growing seasons, *Stemphylium* is not always readily controlled by the fungicide programs that the industry relied on to limit purple blotch.

Field Trials. Two trials were established to compare fungicides for control of Stemphylium leaf blight. Fourteen products were tested including the following labeled for use on onion: Aprovia Top (difenoconazole/benzovindiflupyr [3/7]), Bravo WeatherStik (chlorothalonil [M05]), Koverall DG (mancozeb [M03]), Luna Experience (fluopyram/tebuconazole [7/3]), Luna Tranquility (fluopyram/pyrimethanil [7/9]), Manzate ProStick (mancozeb [M03]), Miravis Prime (pydiflumetofen/fludioxonil [7/12]), Omega (fluazinam [29]), Pristine (pyraclostrobin/boscalid [11/7]), Quadris (azoxystrobin [11]), Quadris Top (azoxystrobin/difenoconazole [11/3]), Rovral (iprodione [2]), Tilt (propiconazole [3]). One product not labeled for use on onion was also tested: Luna Sensation (fluopyram/trifloxystrobin [7/11]). FRAC codes are the alphanumeric codes in the brackets []. The codes are assigned by the Fungicide Resistance Action Committee and are based on the mode of action of the active ingredient(s).

Plants treated with Luna Tranquility or Luna Experience alternated with Bravo WeatherStik had significantly less foliar necrosis and produced fewer small bulbs and more large bulbs than plants treated with the two other fungicide programs or the untreated control in trial 1. In trial 2, foliar necrosis was significantly limited compared with the untreated control plants by applications of Aprovia Top, Bravo WeatherStik, Luna Experience, Luna Sensation, and Omega applied alone, or by alternating programs of Miravis Prime-Bravo Weatherstik-Tilt+Coverall and Luna Tranquility-BravoWeatherstik-Tilt+Koverall. Significantly more large bulbs and total yield were produced by plants treated with Luna Experience applied alone, and alternating programs of Miravis Prime-Bravo Weatherstik-Tilt+Coverall and Luna Tranquility-BravoWeatherstik-Tilt+Koverall. Always check product labels and follow instructions. Rotate among FRAC codes when applying fungicides.

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Project GREEEN

Onion Weed Control in 2020

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EXPO – Grand Rapids, MI
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2019 Preemergence applications

Hybrid: Champ (110 day; Solar Seeds)

Planted:	4/15
Early PRE + Buctril: (10 DAP)	4/25
Delayed PRE + Buctril : (29 DAP) (onions emerged)	5/14

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2019 Postemergence Herbicide applications

PO1:	5/29 1 LS
PO2:	6/18 2 LS
PO3:	7/24 4-6 LS
Harvest:	10/9 (180 days)

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Rainfall

- April 15-30: 1.94 inch
- May 1-31: 3.37 inch
- June 1-30: 4.52 inch
- Total: 9.83 inch

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Treatments that Reduced Onion Yield

1. Zidua 0.133 PRE
7. Chateau 0.064 PO1
8. Zidua 0.133 Delayed PRE
9. Zidua 0.267 Delayed PRE
11. Zidua 0.133 PO1, 2

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Treatments that did not Reduce Onion Yield

2. Zidua 0.267 PRE
3. Prowl 1.9 PRE
4. Prowl 1.9 PRE
Zidua 0.133 PO1, 2
5. Prowl 1.9 PRE
Zidua 0.267 PO3
13. Prowl 1.9 PRE
Zidua 0.133 PO3

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Ladysthumb Control

	5/28	6/10
1. Zidua 0.133 PRE + Buctr	1.7	3
2. Zidua 0.267 PRE + Buctr	2	4.3
3. Prowl 1.9 PRE + Buctril	1.3	3.3
8. Zidua 0.133 DPRE + Buc	10	10
9. Zidua 0.267 DPRE + Buc	10	9.7
10. Prowl 1.9 DPRE + Buct	9.7	9.7

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2020 Proposed Zidua Label for Onion

1. Rate: 1.7 oz/acre (0.09 lb/ai).
2. Timing: Onion 2-6 leaves.
3. Soil: Muck with > 20% OM.
4. One application per year.
5. Weeds: grasses, ladysthumb, nightshade, purslane, pigweed, nutsedge.

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Zidua Use on Onion – Muck Soil

1. Prowl H_2O + Buctril	DPRE
2. Prowl H_2O + Goaltender	2LS
3. Prowl H_2O + Chateau	3-4 LS
4. Zidua + Goaltender	4-5 LS
5. Outlook + Goaltender	5-6 LS

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GoalTender on Onion

- New company: Nutrichem
- MI 24c label for application after 1 LS has expired.
- Apply 4 fl oz at 2, 4, 6 LS.

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Summary – Onion WC 2020

1. Zidua is labeled at low rate at onion 2-6 LS.
2. GoalTender 24c label for 1 LS has expired.
3. Prowl H_2O at emergence was safe on onion.
4. Zidua at emergence stunted onion and reduced yield.
5. DPRE application of Prowl H_2O + Buctril controlled LATH all season.

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Thank You

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Questions?

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