Research Update on Fungal Disease Management in Onion

Efficacy of individual fungicides on Botrytis leaf Blight (BLB)

Treatments and rate per acre	Application frequency	AUDPC
Rovral 1.5 pt	4	989.6 b
Scala 18 fl oz	4	1256.8 a
Luna Tranquility 16 fl oz	4	824.6 b
Omega 500 1 pt	4	877.3 b
Miravis Prime 11.4 fl oz	4	802.9 b
Merivon 11 fl oz	4	942.4 b
Luna Flex 12 fl oz	4	846.2 b
Non-treated check	-	1380.0 a

- Scala has been consistently slipping since last two years.
- Luna Tranquility has Luna and Scala. Slipping of Scala may put pressure on Luna componenet of the fungicide (not good for fungicide resistance management)
- Luna Flex can be an alternative. This fungicide is labeled on onion; Luna+Difenoconazole. It has similar efficacy as Luna Tranquility.

Cevya: A novel FRAC 3 fungicide shows promise in 2021 and 2022 field trials

Treatments and rate per acre	Application frequency	AUDPC
Luna tranquility 16 fl oz Cevya 5 fl oz	4 4	735.0 b
Luna Tranquility 16 fl oz Inspire super 20 fl oz	4 4	760.0 b
Merivon 11 fl oz Cevya 5 fl oz	4 4	865.0 b
Merivon 11 fl oz Inspire super 5 fl oz	4 4	790.0 b
Non-treated check		1155.0 a

Ranking of Fungicides with Respect to their Efficacy on Botrytis

Fungicides	Efficacy
Omega 500	High-to-moderate
Miravis Prime	Moderate
Luna Tranquility/Luna Flex	Moderate
Inspire super	Moderate
Fontelis/Merivon	Moderate
Rovral	Moderate-to-low
Pristine	Moderate-to-low
Switch	Moderate-to-low
Quadris	Moderate-to-low
Quadris Top	Moderate-to-low
Scala	No efficacy/potential field resistance

Ranking of Fungicides with Respect to their Efficacy on Stemphylium

Fungicides	Efficacy
Luna Tranquility	High-to-moderate
Inspire super	Moderate
Miravis Prime	Moderate
Quadris top	Moderate-to-low
Pristine	Moderate-to-low
Switch	Moderate-to-low
Quadris	Moderate-to-low
Rovral	Low
Omega 500	No efficacy
Scala	No efficacy

Research Update on Bacterial Disease Management in Onion

Distribution of bacterial genera on symptomatic onion foliage and bulbs in GA in 2022



Chemical Management Depends on Copper-based products

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Treatment and rate of product/acre	Active ingredient(s)	Internal rot (%)
Mankocide 2.5 lb	Mancozeb + CuOH	8.3 b
Kocide 3000 1.5 lb	CuOH	9.0 b
Champ 1.5 lb	CuOH	10.3 b
Oxidate 5.0 1.28 fl oz/gal	H_2O_2 + peroxyacetic acid	9.5 b
Forticept 1.28 fl oz/gal	Thyme oil	13.4 b
Agrititan 800 ppm	TiO ₂ /Zn	10.7 b
LifeGard 2 fl oz	Bacillus mycoides strain J	7.0 b
Nordox 1 lb	Cu ₂ O	4.7 b
Mastercop 1 pt	CuSO ₄	14.3 b
Howler 5 lb	Pseudomonas chlororaphis strain AFS009	8.6 b
Theia 3 lb	Bacillus subtilis strain AFS032321	18.6 ab
NUCop 1.5 lb	Cupric Hydroxide	<u>5.5 b</u>
Non-treated check		37.3 a

- Six applications at a 10- to 14-day interval; first application coincided with first leaf senescence (first week of March 2021)
- Spring 2021 in Vidalia, GA was relatively cool and drier than 2020, and bacterial foliar symptoms did not appear until a week prior to harvest
- **2021 trial results:** More bulb rot (37.5% incidence in check plots); ManKocide was the most effective, then other copper products, AgriTitan, & Lifegard



Copper-based bactericide rotated with LifeGard significantly reduced bacterial bulb rot

Copper-based program alternated with LifeGard	Percent bulb rot (%)
Mankocide 2.5 lb (3 app) LifeGard 2 oz wt (3 app)	5.8 b
Nordox 1 lb (3 app) LifeGard 2 oz wt (3 app)	5.3 b
Mastercop 1 pt (3 app) LifeGard 2 oz wt (3 app)	12.4 b
NUCop 1.5 lb (3 app) LifeGard 2 oz wt (3 app)	4.3 b
Oxidate 5.0 1.28 fl oz (3 app) LifeGard 2 oz wt (3 app)	8.8 b
Champ 1.5 lb (3 app) LifeGard 2 oz wt (3 app)	20.0 ab
LifeGard 2 oz wt (6 app)	9.6 b
Non-treated check	28.5 a

Tank-mixing biologicals (LifeGard or Serenade ASO) with Copper-based products; a possibility

Treatments	Foliar disease AUDPC
Serenade ASO+Nordox (6 app)	165.3 b
LifeGard+Nordox (6 app)	145.8 b
Serenade ASO+Nordox (6 app)	178.8 b
LifeGard+Nordox (6 app)	151.7 b
Serenade ASO (6 app)	156.0 b
LifeGard (6 app)	183.6 b
Nordox (6 app)	146.5 b
Non-treated check	219.06 a

Evaluation of digging methods on post-harvest incidence of bacterial rot (2022)

Methods of onion digging	External bacterial rot (%)	Internal bacter rot (%)	ia
Chain digger	5.2 a	1.3 B	
Straight-blade undercutter	4.7 a	10.7 A	
P-value	0.472	<0.001	



Evaluation of harvesting methods on post-harvest incidence of bacterial rot (2022)

Methods of onion harvest	External bacterial rot (%)	Internal bacterial rot (%)
Mechanical harvest (Top Air Onion harvester)	2.3 a	3.0 B
Manual harvest	1.6 a	12.5 A
P-value	0.312	0.002

Internal rot was associated with mainly *Pantoea* spp., and external rot was associated with *Burkholderia* spp. and *Pectobacterium* spp. based on arbitrarily-collected symptomatic samples.

Optimized neck length that improves storability of onions 2021 Chris Tyson, Aubrey Shirley, and Derrick Bowen

Neck length clipped	External rot (%)	Internal rot (%)
5-inches	10.0 a	4.5 B
3-inches	9.5 a	4.0 B
1-inch	14.2 a	19.0 A

Optimized neck length that improves storability of onions (2022) (Ross Greene)

Treatments	Bacterial rot (center rot) after 30-day of storage (%)
Neck clipped flush (0")	18.5 A
Neck clipped after field curing (1")	18.0 A
Neck clipped after field curing (2")	13.0 B
Neck clipped after field curing (3")	13.0 B

Based on this trial, optimum neck clipping length to reduce storage bacterial rot is 2" or higher.

This trial will be repeated in 2023.

Optimized neck length that improves storability of onions (2022) (Ross Greene)



Optimized neck length that improves storability of onions (2022) (Ross Greene)







Integrated Disease Management for Center Rot: How can we integrated insecticide, herbicide and bactericide programs to reduce losses due to center rot?

County Agent Field Trial Results

Integrated Management of Center Rot in Onion





How insecticide, herbicide and bactericide management programs can be integrated to reduce losses due to center rot?

Insecticide/ Herbicide Applications 2021-2022

LOW INPUT:	GROWER STANDARD:	HIGH INPUT:	ORGANIC:
Goal @1qt	Goal @1qt	Goal @1qt	Hand Weeding
Prowl @1qt	Prowl @1qt	Prowl @1qt	No insecticides
No insecticide	Mustang Maxx @ 4oz.	Goal @ 3oz.	
		Torac @ 24oz	
		Radiant @10 oz	Not Conducted 2021

Copper Applications

** All fungicide applications remained within maximum annual rates

LOW INPUT	GROWERS STANDARD	HIGH INPUT	ORGANIC
No Application	1.5 lbs. Kocide 3000	1.5 lbs. Kocide 3000	1 lbs. Nordox
No Application	No Application	1.5 lbs. Kocide 3000	No application
No Application	1.5 lbs. Kocide 3000	1.5 lbs. Kocide 3000	1 lbs. Nordox
1.5 lbs. Kocide 3000	No Application	1.5 lbs. Kocide 3000	No Application
No Application	1.5 lbs. Kocide 3000	1.5 lbs. Kocide 3000	1 lbs. Nordox

Plot Design

- 240 bulbs
- 20 feet long
- 6 feet wide
- 4 reps per system



CR incidence in bulb; a two-year outlook









2022 Average Yield & Input Costs 800 700 600 500 \$49 400 300 200 100 0 Low Input Grower Standard High Input Organic Yield (40 lb. Boxes per Acre) Input Cost (\$/Acre)

Two Year Average Yield & Input Costs









The Grower Standard System yielded 2,160 lbs. more than the Organic System despite the \$78 increase in input cost.

Despite the Low Input System having the lowest cost associated with inputs by \$40 an acre, the Low Input System still profited \$2,611 less per acre than the Grower Standard.

The High Input System yield more than the other standards by the following weights: Grower Standard: 1,960 lbs., Organic: 4,120 lbs., Low Input: 8,200 lbs.

The High Input System increased profit by the following amounts: Grower's standard \$730, Organic \$1,714, and Low input \$3,341.

