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RESEARCH REPORT
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Evaluation of New Fungicides for White Rot Suppression in Processing Onions

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Introduction

White rot is a major disease of onion and garlic and is caused by the fungus *Sclerotium cepivorum*. The fungus is spread by small sclerotia produced on decayed bulbs and roots and as few as one sclerotium per liter of soil can result in significant crop losses. Multiple UC experiments over the last 10 years have shown the fungicide tebuconazole (Folicur or Tebustar) is the most effective active ingredient for suppression of white rot. Penthiopyrad (Fontelis), a new fungicide from DuPont, provides similar or slightly less suppression of white rot compared to tebuconazole. The most effective fungicide application method is in-furrow application at planting. Applying fungicides after onion emergence has not improved control of white rot compared to in-furrow application.

In 2017, we evaluated several new fungicides for suppression of white rot including fluopyram (formulated as Velum Prime), solatenol, adepidyn, and fluxapyroxad. Harvest results are not available yet, but in-season leaf dieback ratings collected in September suggest tebuconazole and penthiopyrad (current standards) likely provide similar or superior white rot suppression compared to these new fungicides.

2017 Site Information

- **Soil type-** mucky silty clay loam-4.2% OM
- **Growing season-** early May to late September
- **Irrigation –** solid-set sprinklers
- **Onions-** 36 inch beds with 4 seed-lines spaced 6 inches apart; 2-inch seed spacing; Sensient Technologies processing variety
- **Design-** RCB with 5 blocks (reps)

2017 Study Methods

In early May 2017, the field was tilled and beds were shaped for onion planting. On 5/8/17, white rot sclerotia soil samples were collected to determine sclerotia levels at onion planting. Onions were planted on 5/15/17. Onion beds were spaced 36 inches apart with four seed-lines per bed spaced 6 inches apart. Onion in-row seed spacing was 2 inches. The onion variety was an early maturing Olam processing type. Fungicide treatments were applied in-furrow at planting. In-furrow fungicide was applied using Teejet 8001 EVS nozzles @ 30 psi. The nozzles were mounted on the onion planter to apply a 3 inch band directly over the seed-line after seed placement but before furrow closure with soil.

Onion stand density was measured in each plot by counting the number of green onions in all seed lines for the center two rows for the entire plot length on 7/7/17. Onion vigor was visually estimated in each plot on 7/7/17 and 8/8/17 using a 0 to 10 scale, with 10 = highest vigor in the trial. Visual leaf die back ratings were taken on 8/29/17, 9/13/17, and 9/21/17. Leaf die back was estimated using a 0 to 100% scale. Onion yield was measured by harvesting all onions in each plot on 10/3/17. All onions were run across a grade-line to remove loose soil and green tops. Onion bulbs were then hand-sorted based on the presence of white-rot symptoms. A total weight was recorded for clean, disease-free onions and onions with white-rot symptoms (decay through 1st scale, mycelium, and sclerotia) in each plot. Decay severity on onion bulbs with white-rot symptoms was visually estimated for each plot using a 1-5 scale with 5 equal to most severe decay.

Results

Onion stand and early season onion vigor did not differ among fungicide treatments and the untreated control suggesting all fungicide treatments did not injure the crop. All fungicides increase mid-season onion vigor compared the untreated control (Figure 1). Several fungicides decreased the percentage of onion plants with late season leaf dieback (symptom of white rot) with Tebustar, Fontelis, and Merivon having the lowest levels of leaf dieback (Figure 2). At harvest, Tebustar, Fontelis, and Merivon had the highest clean (disease-free) onion yield and percentage of clean bulbs (Figures 3 & 4). This study showed some of the new SDHI fungicides have activity on white rot especially Merivon, but none of the newly released fungicides provided improved suppression of white rot compared to tebuconazole.

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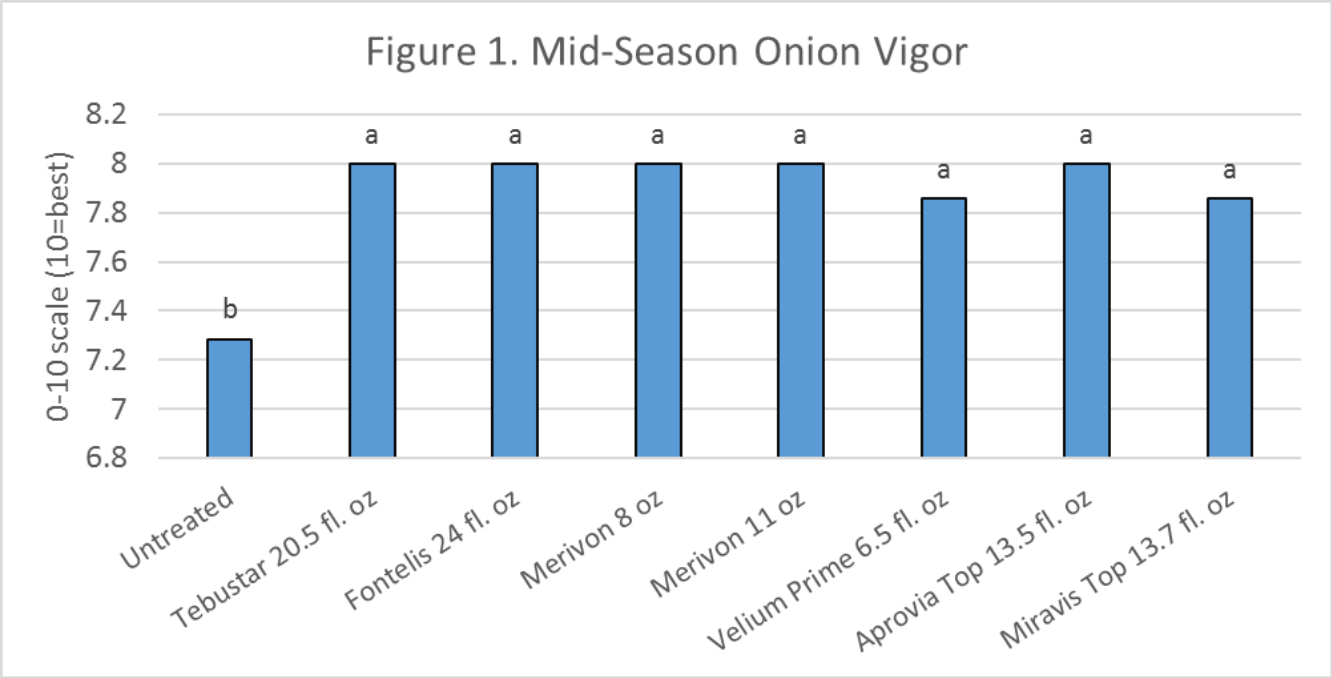
Figure 1. Mid-Season Onion Vigor
0-10 scale (10=best)
8.2
8
7.8
7.6
7.4
7.2
7
6.8
b
a
a
a
a
a
a
a
Untreated
Tebustar 20.5 fl. oz
Fontelis 24 fl. oz
Merivon 8 oz
Merivon 11 oz
Velium Prime 6.5 fl. oz
Aprovia Top 13.5 fl. oz
Miravis Top 13.7 fl. oz

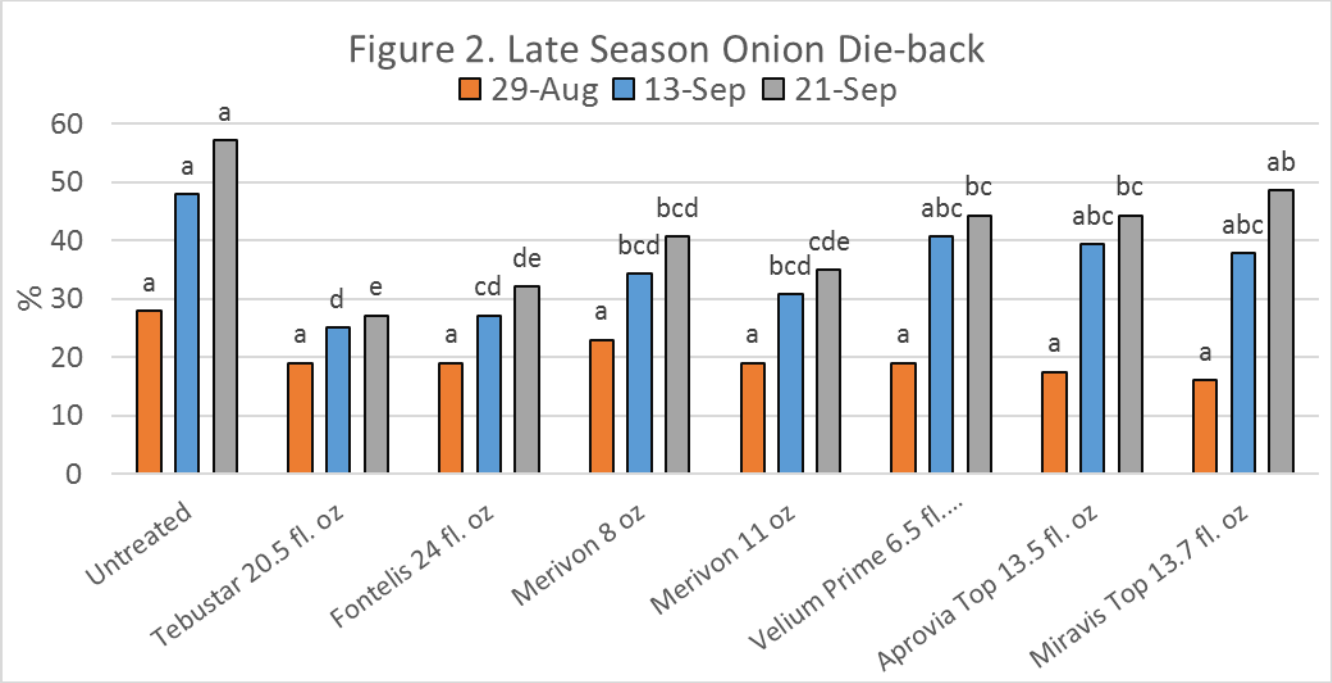
Figure 2. Late Season Onion Die-back
29-Aug
13-Sep
21-Sep
%
60
50
40
30
20
10
0
a a a
a d e
a cd de
a bcd bcd
a bcd cde
a abc bc
a abc bc
a abc ab
Untreated
Tebustar 20.5 fl. oz
Fontelis 24 fl. oz
Merivon 8 oz
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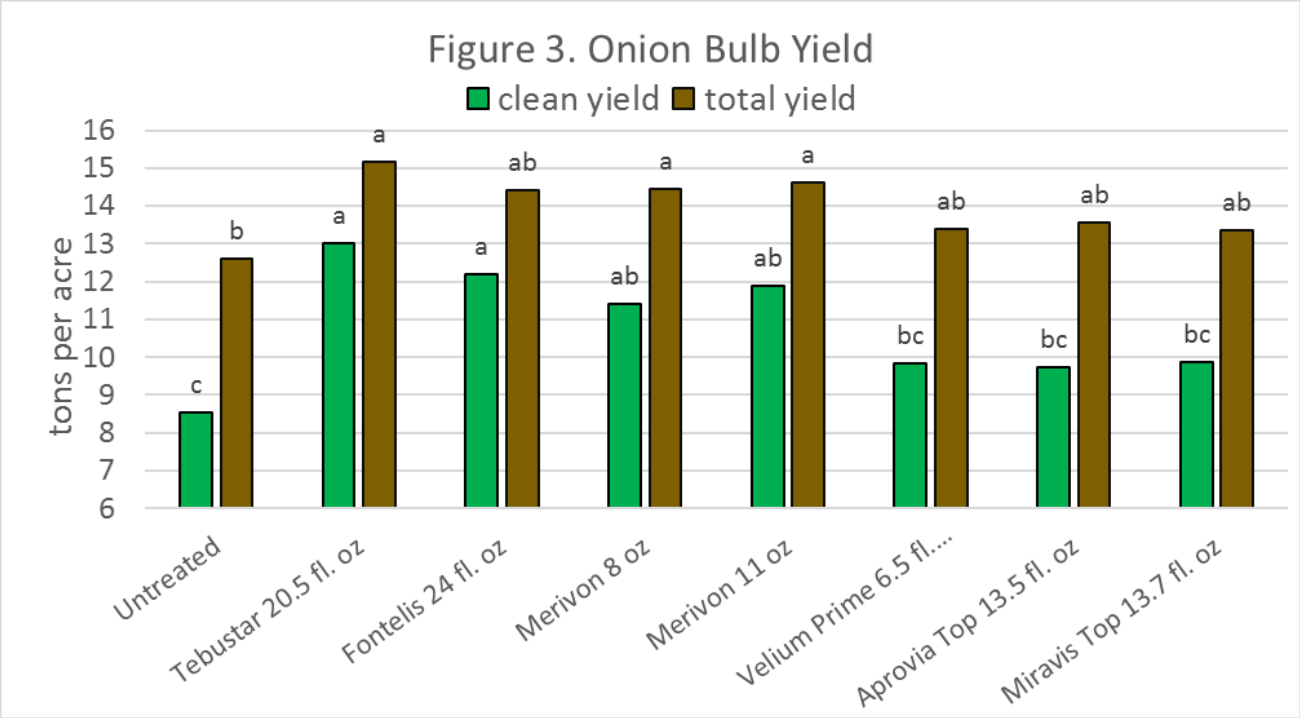
Figure 3. Onion Bulb Yield
clean yield
total yield
tons per acre
16
15
14
13
12
11
10
9
8
7
6
c
b
a
a
a
ab
a
ab
ab
a
ab
bc
ab
bc
ab
bc
ab
Untreated
Tebustar 20.5 fl. oz
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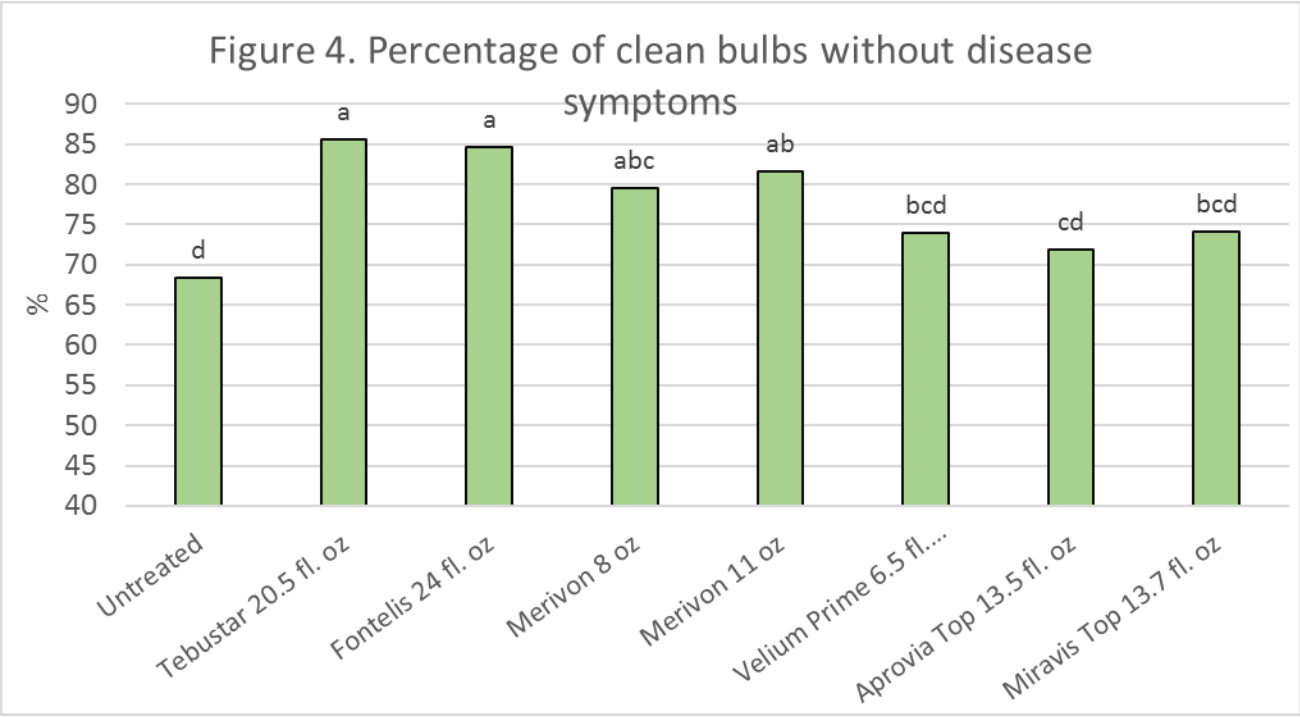
Figure 4. Percentage of clean bulbs without disease symptoms
%
90
85
80
75
70
65
60
55
50
45
40
d
a
a
abc
ab
bcd
cd
bcd
Untreated
Tebustar 20.5 fl. oz
Fontelis 24 fl. oz
Merivon 8 oz
Merivon 11 oz
Velium Prime 6.5 fl....
Aprovia Top 13.5 fl. oz
Miravis Top 13.7 fl. oz