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2019 Fungicide Screening for Suppression of White Rot and Smut in Onions

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Introduction

In 2019, a study was conducted at the Intermountain Research and Extension Center to evaluate fungicides for their activity at suppressing white rot and onion smut in processing onions. All fungicide treatments were applied in-furrow at planting. Onion seed was treated with Regard (spinosad) to control maggots and Pro-Gro (carboxin + thiram) to further suppress onion smut. The study site was heavily infested with white rot and onion smut. **Some pesticides listed in this report are not registered for onion use in California. Make sure to follow all pesticide labels!**

2019 Site Information

- **Soil type-** mucky silty clay loam-6.8% OM
- **Growing season-** May 8, 2019 to October 3, 2019
- **Irrigation –** solid-set sprinklers
- **Onions-** 36 inch beds with 4 seed-lines spaced 6 inches apart; 2-inch seed spacing; Olam processing variety
- **Design-** RCB with 5 blocks (reps)

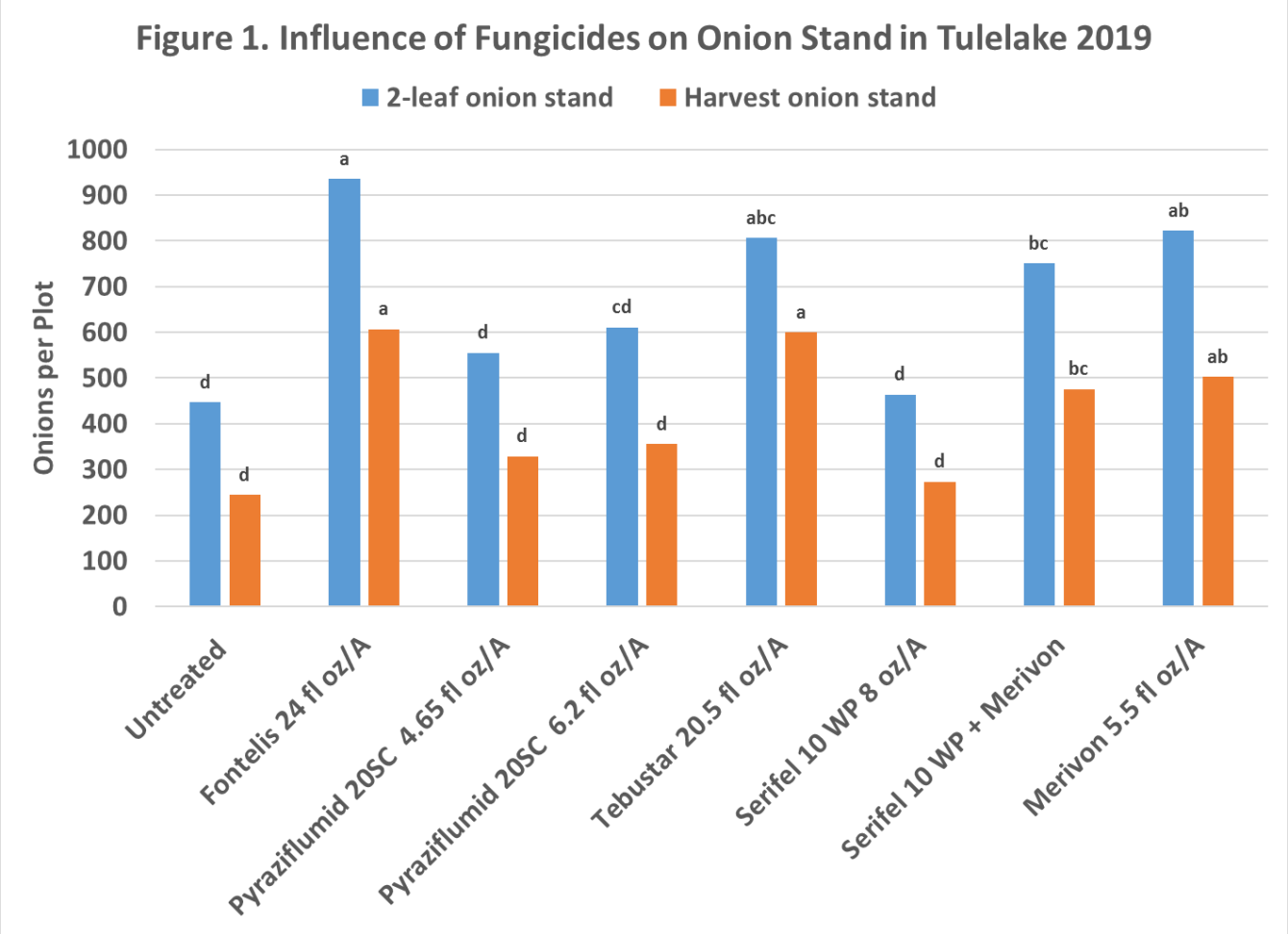
2019 Study Methods

In early May 2019, the field was rototilled and beds were shaped before onion planting. Fungicide treatments were applied in-furrow at planting time. In-furrow fungicides were 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. Onion stand density was measured in each plot by counting the number of green onions in all seed lines for the entire plot length. Onion vigor (color, height, and leaf cover) was visually estimated in each plot using a 0 to 10 scale, with 10 = highest vigor. Onion smut severity was visually evaluated when onions were in the 5-6 leaf growth stage using 0-10 scale with 10= most severe. Late season visual leaf dieback ratings were

taken starting 9/17/19 using a 0 to 100% scale. Onion yield was measured by harvesting all onions in each plot on 10/3/19. Onions were run across a grade-line to remove loose soil and green tops. Onion bulbs were hand-sorted based on the presence of white-rot and smut. A total weight was recorded for disease-free onions, onions with white-rot symptoms (decay through 1st scale, mycelium, or sclerotia), and onions with smut (small bulbs with raised black blisters from spores). Onions with both symptoms (few onions) were classified as white rot.

Results

Fungicides had a significant effect on early season and late season onion stand with Fontelis, Merivon, and Tebustar having the highest stands (Figure 1). The primary cause of early season onion stand loss was onion smut (personal observation), even though onion seed was treated with Pro-Gro to suppress smut. Onion death later in the season was from a combination of hail, white rot, and onion smut (personal observations).



Visual differences in above-ground onion vigor were very evident mid-season (Figure 2). Fontelis and Tebustar had the highest vigor at all evaluations (Table). Both fungicides had the least amount of late season leaf dieback from white rot and lowest amount of stunting and pustules on leaves from onion smut (Table). At harvest, Fontelis, Tebustar, and Merivon treatments had the lowest percentage of smut on bulbs (Table).

Figure 2. Differences in mid-season onion vigor.

Table. Influence of Fungicides on Onion Vigor and Disease Severity in Tulelake 2019

Trt #	Treatment	2-leaf vigor	Mid-season vigor	5-leaf onion smut severity	Late season leaf dieback	Yield with white rot	Yield with smut	Clean yield
		1-10; 10= best	1-10; 10=best	1-10; 10=severe	%	% of total	% of total	% of total
1	Untreated	3.8 d	2.4 d	7.8 a	37 a	9.5 b	50.9 a	39.7 b
2	Fontelis 24 fl oz/A	8.2 a	7.5 a	2.7 de	13 b	9.8 b	7.9 b	82.2 a
3	Pyraziflumid 20SC 4.65 fl oz/A	5 cd	3.2 cd	6.6 ab	40 a	12 ab	44 a	44.1 b
4	Pyraziflumid 20SC 6.2 fl oz/A	5.6 c	4.2 c	5.8 b	37 a	12.5 ab	40.3 a	47.2 b
5	Tebustar 20.5 fl oz/A	7.4 ab	7.6 a	2.4 e	14 b	12.6 ab	7.8 b	79.6 a
6	Serifel 10 WP 8 oz/A	4.2 d	3.5 cd	7.7 a	35 a	20.1 a	52 a	27.9 b
7	Serifel 10 WP + Merivon	6.8 b	6.1 b	4.3 c	31 a	12.5 ab	19.3 b	68.2 a
8	Merivon 5.5 fl oz/A	7.3 ab	6.2 b	3.8 cd	35 a	11.3 ab	18.4 b	70.3 a

Means with different letters are significantly different (Tukey's HSD test)

The combination of white rot and onion smut had dramatic effect on onion yield (Figure 3 on page 4). Total onion yield was greater than 11 tons per acre in treatments that suppressed both diseases while total onion yield was less than 3 tons per acre in the untreated control. Total onion yield in all treatments was significantly lower than typical onion yield in disease-free fields which is normally over 20 tons per acre. Fontelis and Tebustar had the highest clean "disease-free" bulb yield. Both Merivon treatments had higher clean bulb yield compared to the untreated control. Pyraziflumid and Serifel had clean bulb yields similar to the untreated control.

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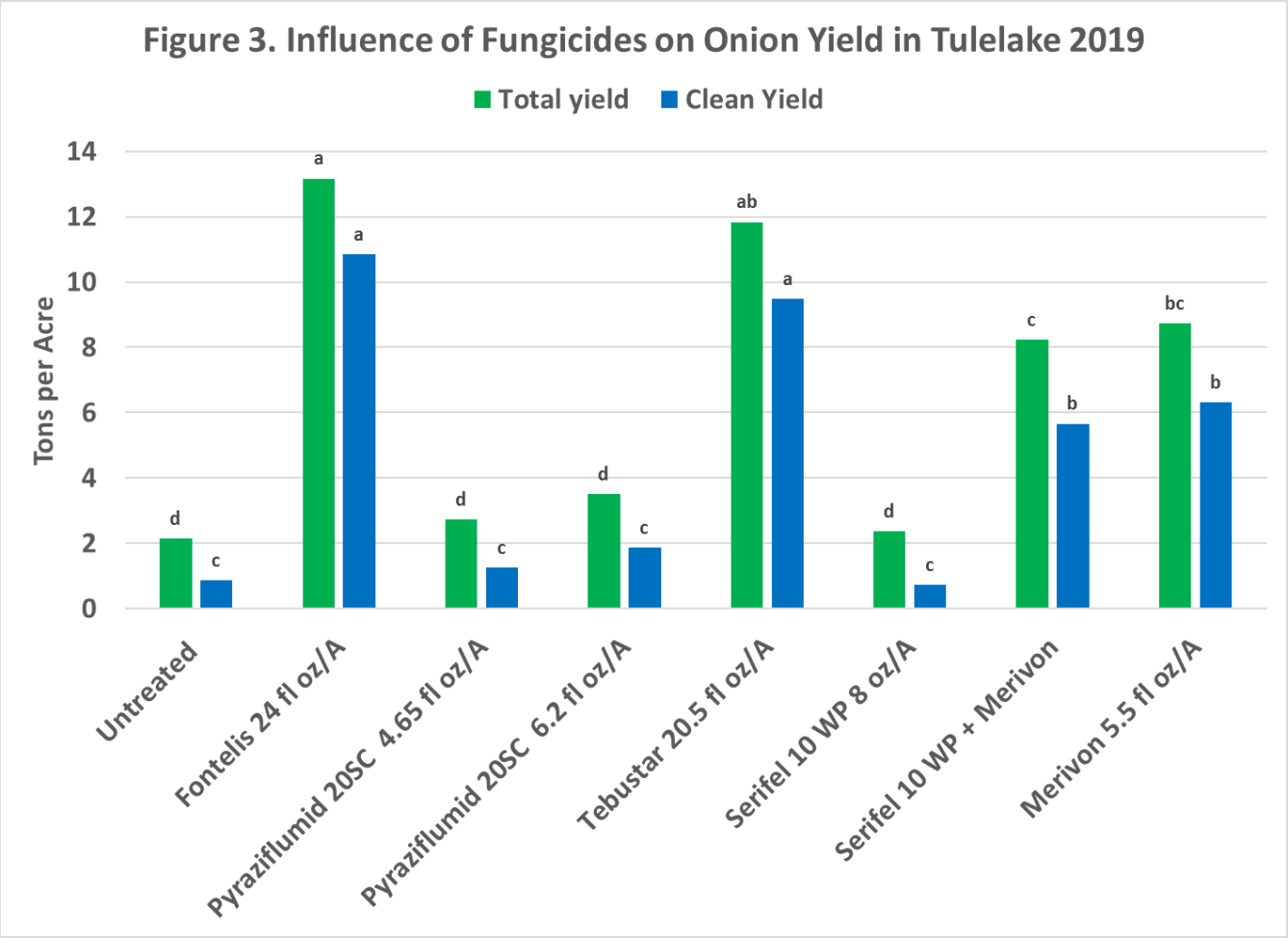
Figure 3. Influence of Fungicides on Onion Yield in Tulelake 2019
Total yield
Clean Yield
Tons per Acre
14
12
10
8
6
4
2
0
d
c
a
a
d
c
d
c
ab
a
d
c
c
b
bc
b
Untreated
Fontelis 24 fl oz/A
Pyraziflumid 20SC 4.65 fl oz/A
Pyraziflumid 20SC 6.2 fl oz/A
Tebustar 20.5 fl oz/A
Serifel 10 WP 8 oz/A
Serifel 10 WP + Merivon
Merivon 5.5 fl oz/A