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RESEARCH REPORT

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Evaluation of Fungicides and Seed Treatments for Suppression of Smut and White Rot in Onions

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Introduction

In 2018, three trials were conducted at the Intermountain Research and Extension Center to evaluate new fungicide approaches for suppressing white rot and onion smut. The first study looked at tank-mix combinations of fungicides applied in-furrow. The second study evaluated the influence of altering the band-width of fungicides applied in-furrow. The third study evaluated the effect of roto-till incorporating Fontelis in onion beds before planting in combination with tebuconazole applied-in furrow. The study site was infested with white rot and also had a high incidence of onion smut (unknown to the research team at the start of the field season). Thus, all white rot trials had high incidence of both diseases. **Some pesticides listed in this report are not registered for onion use in California. Make sure to follow all pesticide labels!**

2018 Site Information

- **Soil type-** mucky silty clay loam-4.6% 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; Olam processing variety
- **Design-** RCB with 5 blocks (reps)

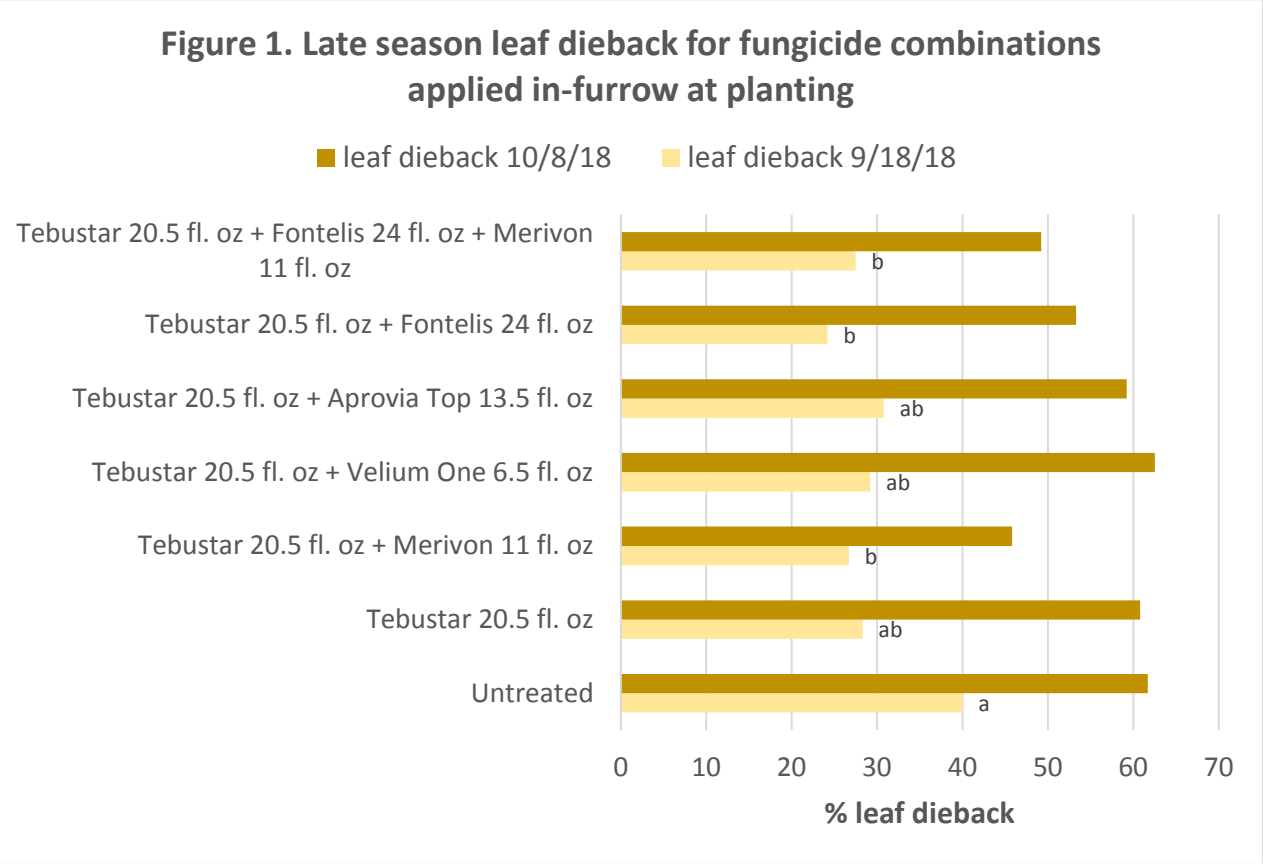
2017 Study Methods

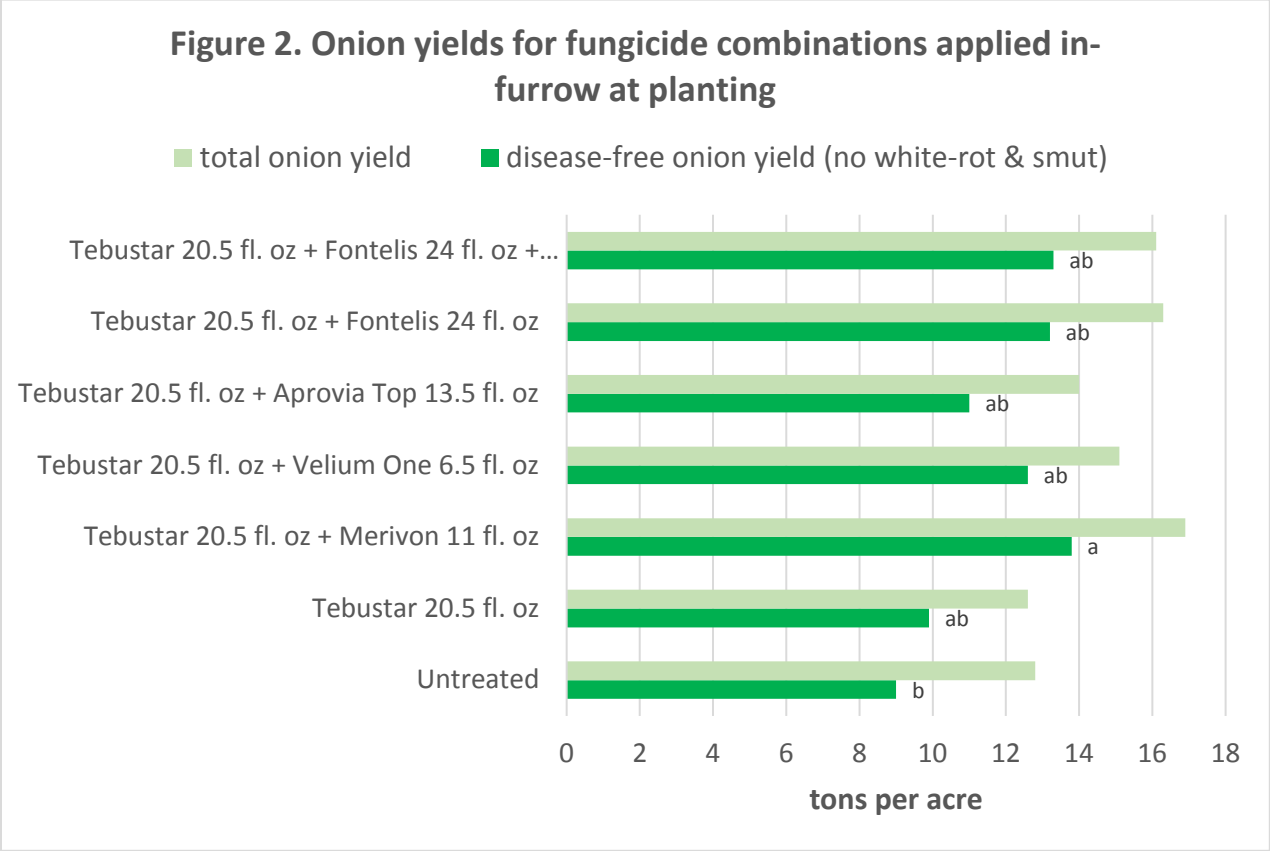
In early May 2018, the field was tilled and beds were shaped before onion planting. Onions were planted on 5/7/18. Fungicide treatments were applied in-furrow at planting time. In-furrow fungicides were applied using Teejet 8001 EVS nozzles @ 30 psi. The nozzles were mounted on the onion planter to apply a 3-inch band directly over the seed-line after seed placement but before furrow closure. The exception was the fungicide trial evaluating different band-widths where the width was set at 1.5 inches or 3 inches. Fontelis was roto-till incorporated into onion beds (2-3 inches deep) using a

Johnston roto-till bed shaper a day before planting. 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 on 7/19/18 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 9/12/18 using a 0 to 100% scale. Onion yield was measured by harvesting all onions in each plot on 10/10/18. 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

Fungicide Tank-mix Results- Significant results are presented in Figures 1 and 2. There was no difference between treatments regarding early-season vigor and onion smut severity. Late season leaf dieback differed between treatments with the untreated having the highest leaf dieback and Tebustar + Merivon, Tebustar+ Fontelis, and Tebustar + Fontelis + Merivon having lower leaf dieback compared to the untreated control (Figure 1). Total bulb yield and average bulb size did not differ between treatments. Disease-free yield (no white rot and smut) was different between Tebustar + Merivon and the untreated control (Figure 2). In summary, tank-mixing new fungicides with Tebustar produced similar or slightly better suppression of white rot compared to Tebustar alone.





Altering In-furrow Fungicide Band-Width Results- Significant results are presented in Figures 3 & 4. Early season vigor did not differ between treatments suggesting narrowing the band-width to 1.5 inches for all tested fungicides did not injure the crop. Fontelis at the 1.5 inch band width had lower onion smut severity compared to the untreated control although the 1.5 inch Fontelis band width did not differ from other fungicide treatments. The untreated had higher late season leaf-dieback compared to fungicides, but leaf-dieback ratings did not differ between fungicide treatments. Disease-free onion yield differed between treatments (Figure 3). The untreated control had the lowest yield, and Fontelis at both band-widths and Merivon at the 1.5 inch band-width had the highest yield. Average bulb size followed the same treatment trend compared to disease-free yield. In summary, the 1.5 inch (narrow) band-width of Fontelis, Merivon, and Velium Prime numerically had the highest total yield and disease-free yield of the study, but the 1.5 inch band-width was statistically similar compared to the 3 inch band-width for all measured variables.

Figure 3. Influence of band-width for fungicides applied in-furrow on disease-free onion yield (no white rot & smut)

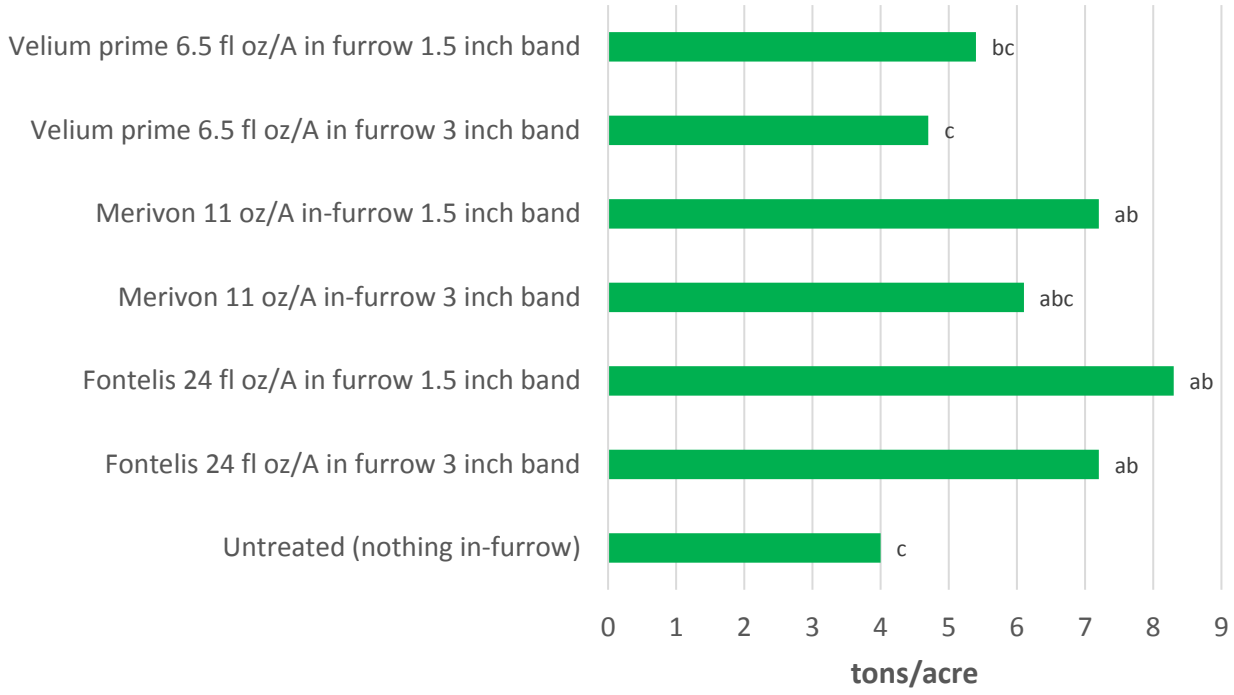
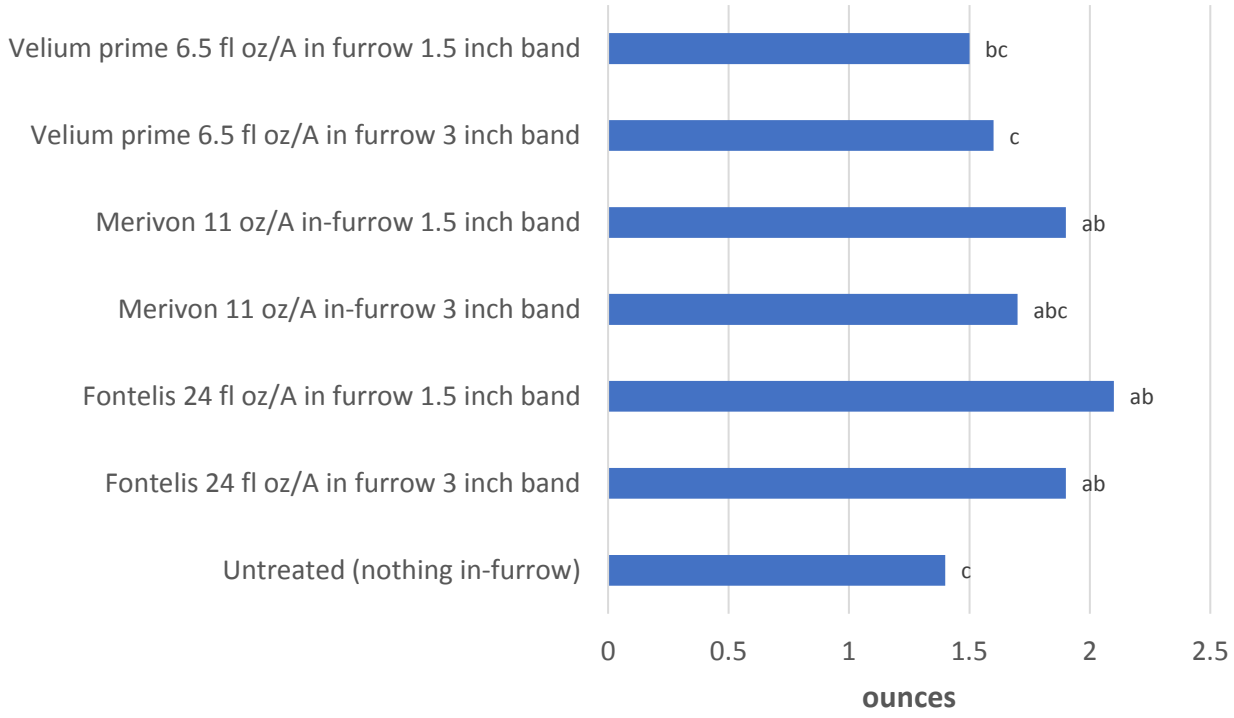


Figure 4. Influence of band-width for fungicides applied in-furrow on average bulb size



Roto-till incorporating Fontelis in combination with tebuconazole (Tebustar) in-furrow results- Roto-till incorporating Fontelis with tebuconazole had numerically higher early season vigor, higher onion stands, and lower late season leaf dieback compared tebuconazole alone (Table 1). This combination of Fontelis and Tebustar also resulted in numerically higher total onion yield and disease-free clean yield. Future research is needed to examine this approach of roto-till incorporating Fontelis especially as it relates to increasing onion stands. The stand increase associated with rototilling Fontelis was likely related to suppression of early-season onion diseases not white rot since white rot rarely impacts onion stand and early season vigor.

Table 1. Influence of roto-till incorporating Fontelis in combination with Tebustar in-furrow

trt #	Treatment Name	Product Rate per Acre	4 leaf vigor rating(0-10 scale)	Late season leaf dieback (%)	Late season leaf dieback (%)	Onion stand at harvest (plants/ bed ft)	Total onion yield (ton/A)	Clean onion yield (ton/A)	Onion yield with white rot (ton/A)	Onion yield with smut (ton/A)
1A	Untreated (nothing in-furrow)	n/a	6.2b	37.5a	51.7	20.6b	13.3	9.9	2.2	1.2
2A	tebuconazole in-furrow	20.5 fl oz	6.9ab	30ab	43.3	23.1ab	15.6	12.4	1.8	1.4
3A	tebuconazole in-furrow Fontelis roto-till incorporated	20.5 fl oz 24 fl oz	7.2a	25.8b	40.8	25.9a	17.4	14	2	1.4

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