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Using Onion Seed Treatments to Protect Spring-Seeded Dehy Onions from Maggots and Onion Smut

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Introduction

Two studies evaluating seed treatments for management of maggots were conducted at IREC in 2018. One trial was part of a regional study evaluating seed treatments for maggots, and the other trial evaluated the influence of combining seed treatments with tebuconazole in-furrow. Both study sites had moderate onion smut pressure this year, thus differences in onion stand, vigor, and yield were influenced by both maggots and onion smut. Onion maggot, *Delia antiqua*, and seed corn maggot, *Delia platura*, were captured on yellow sticky traps placed along field edges. Larvae of both species feed on young onion plants, often resulting in seedling mortality. Onion smut, *Urocystis cepulae,* survives in the soil via spores that may persist for over 15 years. Spores are triggered to germinate by onion exudates like white rot. Onions are susceptible to infection from planting until the cotyledon is fully mature approximately 12-24 days after planting. Once plants are infected the fungus can spread to new leaves resulting in stunted plants, stand loss, and severe yield loss. ***Some pesticides listed in this report may not be labeled for use in onions. Please consult pesticide labels for use instructions.***

2018 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; 4-inch seed spacing; fresh market Seminis LaSalle variety
- **Design-** RCB with 6 blocks (reps)

2018 Study Methods

Studies were conducted at the UC Intermountain Research and Extension Center. Plots were organized in a randomized complete block with 6 replications. Plots were 6 ft by 24 ft. Seed treatments were commercially applied by Incotec and in-furrow tebuconazole (Tebustar) was applied at 20.5 fl. oz/A using an even fan nozzle set to a 3 inch band at 40 GPA. Seed corn maggot and onion maggot flies were present with seed corn maggot being the dominant pest. Seed treatment efficacy was determined by measuring onion plant density and vigor multiple times during onion establishment. Onion plant density and bulb yield were measured at harvest. Onion stand (plant density) was determined in each plot by counting the number of green onions in the entire plot area (6 ft by 24 ft). 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. 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 then hand-sorted based on the presence of smut and white rot. A total weight was recorded for disease-free onions, onions with white rot, and onions with smut (small bulbs with raised black blisters from spores).

Results

Influence of combining seed treatments with tebuconazole applied in-furrow at planting- Onion stand differed between treatments at all evaluation times (Figure 1). Interestingly, the fungicide component of both insecticide seed treatments influenced onion stand. The highest stand was obtained using Sepresto and the F-300 + Pro-Gro fungicide package. Adding thiram + peneflufen fungicides to Sepresto and tebustar in-furrow caused crop injury, stand-loss, and reduced vigor up until the 4-leaf stage (some data not shown in Figures), although this treatment gave good smut suppression. At the 5 to 6-leaf stage, Sepresto treatments had lower onion smut severity compared to all Regard treatments especially Regard without a fungicide package (Figure 2). The reason Sepresto suppressed onion smut better than Regard is unknown; it could be related to the insecticides' influence on maggot feeding and subsequent disease infection. Total onion yield differed significantly between treatments (Figure 3) with treatments having the highest stand and lowest smut severity having the highest yield. The percentage of bulbs with smut and white rot symptoms was less than 8% for all treatments. Regard with no fungicides had 92.4% disease-free yield while all other treatments had 96% or higher disease-free bulb yield.

Figure 1. Influence of seed treatments and tebuconazole in-furrow at planting on onion stand in a field with white rot, smut, and maggots

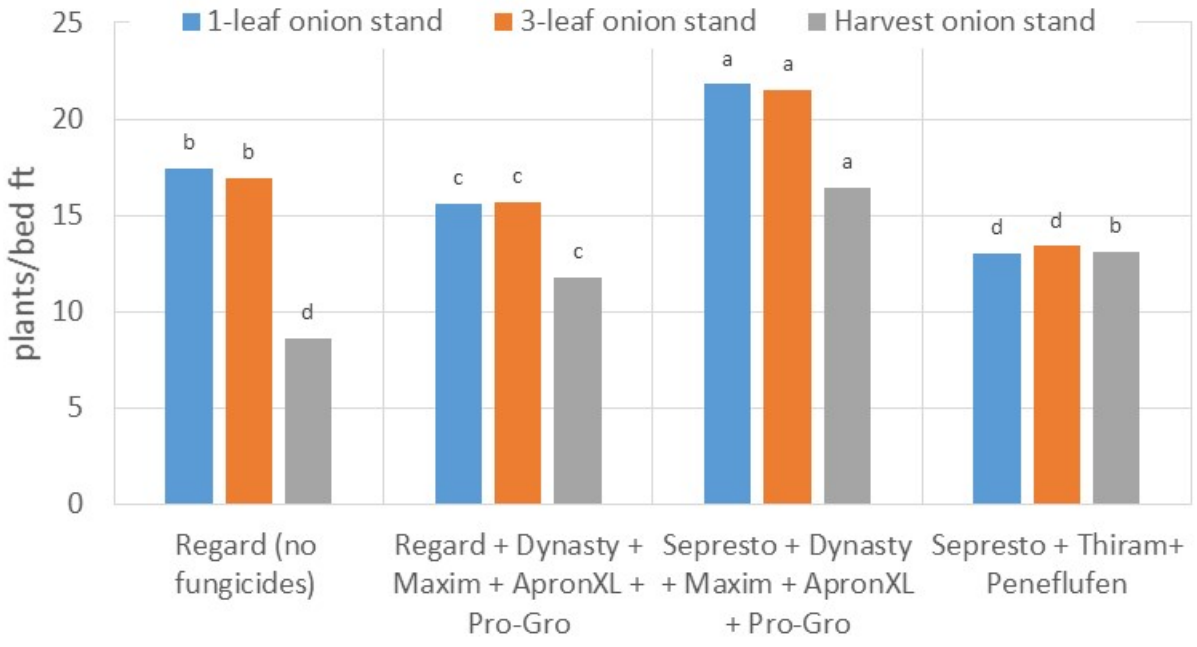
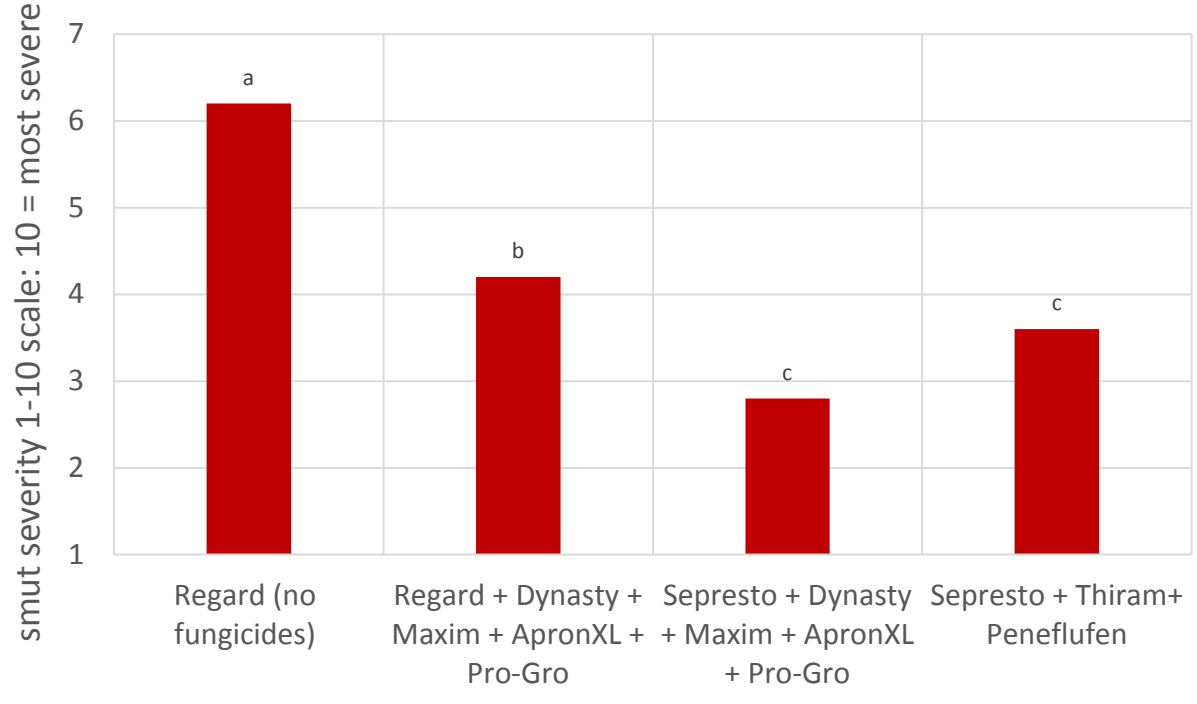
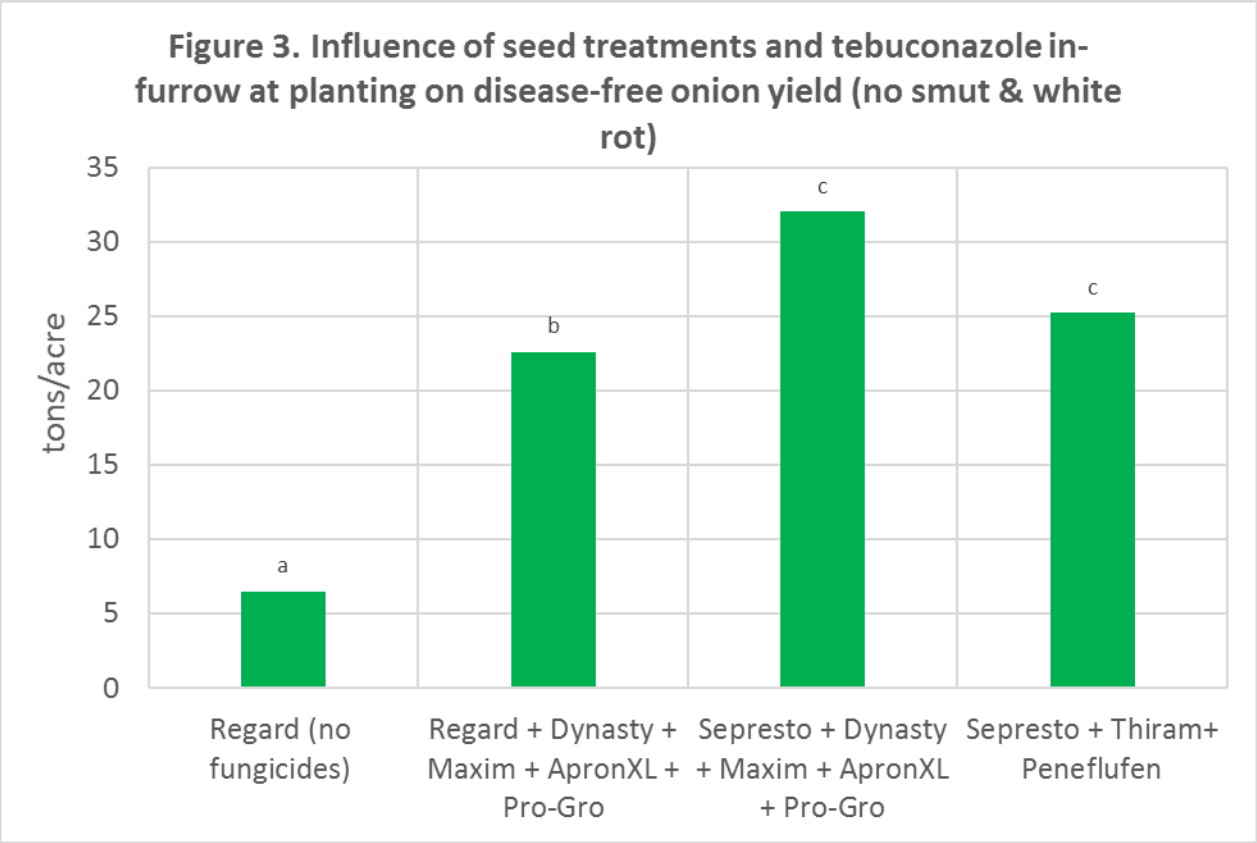


Figure 2. Influence of seed treatments and tebuconazole in-furrow at planting on early season onion smut severity





Influence of seed teatments alone (no fungicide applied in-furrow) for maggots and smut- Onion stand differed between treatments for all evaluations (Table). Regard + Cruiser had the highest onion stand at the 1-leaf and 3-leaf stages with 22 onions per bed ft. Sepresto and Trigard had the next highest onion stands with 20 plants per bed foot at the 3-leaf stage. Onions stands for all treatments decreased from the 3-leaf stage to harvest (Table). Regard only, Regard + fungicides, and no insecticide (control) + fungicides had the highest onion smut severity. Regard without fungicides had the lowest yield (15.5 ton/A) due to stand loss and smut severity (Table). Regard + Cruiser and Sepresto treatments yielded over 30 ton/A. These results generally agree with previous research, although Regard and Sepresto normally offer very similar yields and stands without smut pressure.

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Table. 2018 Tulelake Onion Maggot Seed Treatment Study

Trt#	Treatment	1-leaf onion stand plants/ bed ft	3-leaf onion stand plants/ bed ft	Harvest onion stand plants/ bed ft	3-leaf onion vigor 0-10 scale	onion smut rating 0-10 scale; 10 = high severity	Onion yield ton/acre
1	No insecticide + Dynasty + Maxim + Apron XL + Pro-Gro	17 b	18 b	14.6 a	7 a	4.3 ab	26.6 a
2	Sepresto + Dynasty + Maxim + Apron XL + Pro-Gro	19 ab	20 ab	16.9 a	7 a	3.4 b	31.1 a
3	Regard + Cruiser + Dynasty + Maxim + Apron XL + Pro-Gro	22 a	22 a	17.7 a	7 a	3.3 b	34 a
4	Regard + Dynasty + Maxim + Apron XL + Pro-Gro	17 b	18 b	14.6 a	7 ab	4.1 ab	26.6 a
5	Trigard + Dynasty + Maxim + Apron XL + Pro-Gro	19 ab	20 ab	15.8 a	7 a	4 b	28.3 a
6	Sepresto + Thiram +Penflufen	18 b	19 ab	16 a	7 a	3.8 b	30.5 a
7	Regard only (=FarMore OI100)	18 ab	19 ab	10 b	6 b	5.8 a	15.5 b

ANOVA and Tukey's HSD was used for mean comparisons. Treatments with the same letter are not statistically different.