An evaluation of soil-applied fungicides for control of Phytophthora crown and root rot of pepper

Brenna Aegerter, University of California Cooperative Extension, San Joaquin County

METHODS

This field trial was conducted on the campus of the University of California, Davis at their Armstrong field facility (N 38° 31' 11" W 121° 45' 40"). Soil type at this location is a Yolo silty clay loam. Sweet bell peppers (cv. Wizard) were transplanted on May 12th, 2008. Bed width was 30" and in-row transplant spacing was 12". Just prior to transplanting, the soil was inoculated with vermiculite that had been colonized by the oomycete pathogen *Phytophthora capsici* in the laboratory. The rate of inoculation was 10 cc of colonized vermiculite per linear foot of row. The vermiculite was dribbled into a seed line made on the edge of the bed several inches out from the transplant row. After transplanting, the field was immediately furrow-irrigated and was irrigated weekly thereafter. The first fungicide application was made on May 16th, as we were not able to make the first application at transplanting due to high winds. Subsequent applications were made at 14 to 18 day intervals (June 3rd, June 17th, July 2nd). To ensure movement of the fungicides down into the soil, applications were made in a large volume of water (100 mls per plant, or about 460 gallons per acre). Treatments and timings were as follows:

Treatment	Product	Rate/acre	Active ingredient	Timings
1	untreated control	-	_	-
2	Presidio	3 oz	fluopicolide	AC
	Phosphite	4 qt	phosphorous acid	AC
	Ridomil Gold	1 pt	mefenoxam	BD
3	Presidio	4 oz	fluopicolide	AC
	Phosphite	4 qt	phosphorous acid	AC
	Ridomil Gold	1 pt	mefenoxam	BD
4	Ridomil Gold	1 pt	mefenoxam	ABCD
	Phosphite	4 qt	phosphorous acid	AC
5	Ridomil Gold	1 pt	mefenoxam	AD
	Revus	8 oz	mandipropamid	BC

The surviving stand of pepper plants was recorded two weeks after transplanting, and then at regular intervals through the season. Plants which died immediately after transplanting were assumed to have suffered from transplant shock and are not included in disease incidence counts.

RESULTS

The inoculation method worked well to ensure high disease pressure throughout the trial. However, a smaller volume of inoculum could have been used and would likely have resulted in less severe disease pressure. Also, it was unfortunate that some irrigation water from an adjacent sprinkler-irrigated planting was blown over into the north edge of the pepper planting, making the disease more severe in

the north half of the field and increasing the variability of the resulting data. Interestingly, the buffer rows that were not inoculated did not exhibit any disease, suggesting that there was little to no movement of the pathogen between adjacent plots.

All the materials tested show some potential for control of Phytophthora crown rot, as they were able to somewhat prolong survival of peppers under very high disease pressure (Figure 1). However, when the area under the disease progress curve (AUDPC) was analyzed, there was no significant treatment effect (P = 0.306). Results might have been different had the materials been applied prior to the inoculation (first treatment was 4 days post-inoculation) and also if the materials been applied through a drip-irrigation system. Evaluation of these materials to control *Phytophthora capsici* crown and root rot should continue.

Figure 1. Disease incidence (percentage of plants diseased) over the course of the season

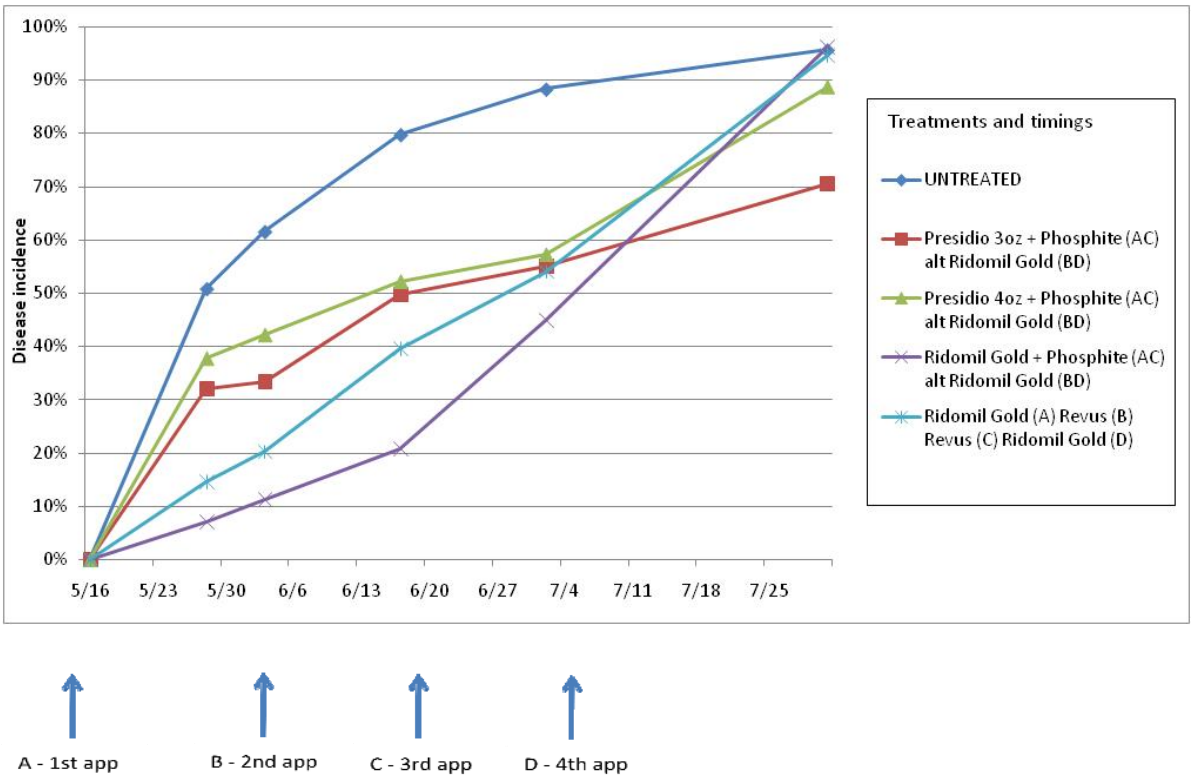

Table 2. Effect of fungicides on disease incidence over the course of the season

Treatment	AUDPC[z]
1 untreated control	55.55
3 Presidio (4oz) + Phosphite alt Ridomil Gold	40.64
2 Presidio (3oz) + Phosphite alt Ridomil Gold	35.72
5 Ridomil Gold + Phosphite alt Ridmil Gold	34.67
4 Ridomil Gold alt Revus	28.57

[z] Calculated from ratings taken on six dates of the proportion of peppers diseased from May 16th through July 31st, 2008. Numbers represent the means of four replicates.