Chemical Control/New Products

Influence of Fungicides and Powdery Mildew on Spider Mite Populations

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Objectives

Sulfur is commonly used for mildew control on tart cherries in Utah. Growers prefer sulfur for mildew control on tart cherries because it is relatively low cost, and profit from tart cherries is inconsistent. However, sulfur use has been associated with outbreaks of phytophagous mites (Pickett 1949). The emphases of this study were to determine the effects of fungicide choice (Rally vs sulfur) on powdery mildew control and on phytophagous and predaceous mite populations in a commercial tart cherry orchard. In addition, the relationship between the occurrence of powdery mildew and mites on tart cherry was evaluated.

Results

Fungicide Effects on Mite Populations. The spider mite population was a mixture of *Tetranychus urticae* and *T. mcdanieli.* The predominant predaceous mite was *Typhlodromus occidentalis.* The variation in mite densities among replications of the sulfur treatment were very large. Therefore, although the difference in mean numbers of mites appears numerically significant, analysis of variance showed no statistical differences in mite densities between fungicides on either date (Table 1). No predaceous mites were found on sulfur treated leaves whereas low densities were found on Rally treated leaves (Table 1).

Powdery Mildew Effects on Mite Populations. The incidence of mites on leaves was influenced by the presence of mildew in the 6 August samples. More spider mites were found on leaves with mildew than without (Table 2). In addition, a greater percentage of leaves with mildew was infested with both spider and predaceous mites than leaves without mildew (Table 2).

Powdery Mildew Control. Rally provided significantly better control of foliar mildew than sulfur. Leaves were rated for degree of mildew infestation where 1=healthy, 2=a few lesions barely visible, 3=obvious mildew on several leaves, and 4=mildew on most leaves with twisting and distortion of leaves. The mean mildew ratings were 1.56 for Rally treated leaves and 2.72 for sulfur treated leaves. This was significantly different at the 5% level.

Conclusions

Rally provides much better control of foliar mildew than sulfur and probably also reduces the possibility of spider mite damage during a growing season where environmental conditions are conducive to mite build-up. Substantially more spider mites were found on sulfur-treated than Rally treated leaves. Predaceous mites were present on Rally treated trees but not detected on the sulfur treated trees. This suggests that natural control of phytophagous mites by

predaceous mites will be hindered or prevented by sulfur applications.

There is also an apparent interaction between the presence of mildew on leaves and the populations of mites. The mildew seems to provide a better habitat or a preferred site for both phytophagous and predaceous mites.

Reference Cited

Pickett A. D. 1949. A critique on insect chemical control methods. Can. Entomol. 81: 67-76.

Table 1. Mean numbers of phytophagous spider mites (SM) and predaceous mites (Typh) per 40 leaves in Rally and sulfur treated tart cherry trees. All life stages of mites observed (eggs, immatures, and adults) are presented as combined totals.

	9 July		23 July	
Fungicide treatment	SM	Typh	SM	Typh
Rally	0.3a	2.5a	52.3a	5.3a
Sulfur	108.8a	0.0a	787.5a	0.0a

Means within a column followed by the same letter are not statistically different ($P = 0.05$). Mite counts were log transformed (log(x+ 1)) before analysis.

Table 2. Mean numbers of mites and percentage of mite-infested leaves with and without powdery mildew in Rally treated tart cherry trees. All life stages observed (eggs, immatures, and adults) are presented as combined totals.

	6 August				27 August			
	mites/leaf		% leaves infested		mites/leaf		% leaves infested	
Treatment	Spider	Typh	Spider	Typh	Spider	Typh	Spider	Typh
Mildew	2.4a	0.7a	45.0a	41.3a	0.5a	0.3a	8.3a	25.0a
No mildew	0.1b	0.4a	10.0b	26.3b	0.1a	0.4a	5.0a	26.7a

Means within a column followed by the same letter are not statistically different ($P = 0.05$). Percentage data was transformed (arcsine (sqrt(x))) before analysis.