

Integrating control strategies for grape powdery mildew (*Uncinula necator*) – 2002

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Introduction and Objectives:

A two-year study was initiated in the spring of 2002 to investigate the ability of a new type of biological control organism – fungal feeding mites in the family Tydeidae - to feed on and control grape powdery mildew. In addition, the study aimed to investigate the ability of the mite to survive and control powdery mildew in the presence of several of the most common pesticides used in grape production.

Materials and Methods:

The study was conducted at the Western Colorado Research Center – Orchard Mesa, Grand Junction, CO on Chardonnay grapes. The experimental design was a 3 x 2 factorial with three main effect treatments (nontreated control, a standard DMI / strobilurin rotation program, and a Stylet-Oil program) and two secondary effect treatments (+ / - mites). Each treatment was replicated ten times. There were eight vines per plot for the main treatment. For the sub-plots, each main plot was split in half and the North / South half assigned at random to receive or not receive mite inoculation.

Tydeid mites were collected from wild grape vines near Fort Collins, CO and transferred to the vineyard on 11 July 2002. Protective sprays were applied on 13 July and 5 August 2002. The products used in the DMI / strobilurin rotation program were Nova 40W and Sovran 50WDG. Stylet-Oil was applied at 1 % (vol/vol). Foliar and cane mildew infection incidence and severity were evaluated at 31 July and 7 October 2002. Fruit mildew infection incidence and severity was evaluated just prior to harvest. Mite counts were taken periodically throughout the season. Five leaves per sub-plot were sampled at random, wrapped in moist paper towels and sealed in plastic bags, and then sent to Dr Andrew Norton at CSU in Fort Collins for counting. A similar sample was taken on 11 July 2002, just prior to the mite inoculation.

Data was analyzed using SAS ver. 8 software.

Results and Discussion:

The mean densities of mites found on leaves in October 2002 did not differ between the mite treatments. In fact, mite densities were slightly lower on inoculated vines compared to non-inoculated vines (Table 15). This was true for both Tydeid and Phytoseid mites. As no Tydeid mites were found on leaf samples taken just prior to the mite release, the presence of Tydeid mites on non-inoculated vines might be due to insufficient control of spread of mites from inoculated to non-inoculated vines. Another possibility is that Tydeid mites were already present in the vineyard prior to mite release but were not detected due to low densities at the time of sampling. It is worth noting that Tydeid mites were found on leaf samples, albeit at low densities, taken from two out of three commercial vineyards within the Grand Valley AVA.

Table 15. Effect of fungicide program and Tydeid mite inoculation on incidence and severity ratings of powdery mildew and mite densities on Chardonnay leaves.

	31 July 2002		7 October 2002		Number / 5 leaves ¹	
	Incidence	Severity	Incidence	Severity	Tydeids	Phytoseids
Control	1.7	4.2	97.9	45.9	3.4	0.7
Rotation	1.5	4.1	78.2	15.4	4.7	0.9
Stylet-Oil	1.5	4.5	93.8	41.3	0.4	0.1
No Mites	1.7	4.0	90.5	34.1	3.5	0.8
Mites	1.4	4.6	89.4	34.3	2.1	0.4

¹ Samples taken on 1 October 2002.

Mean densities of both Tydeid and Phytoseid mites in October 2002 were similar in the non-treated control and the DMI / strobilurin rotation program but were reduced by the Stylet-Oil program (Table 15). Based on those preliminary data it appears that Stylet-Oil has a negative effect on those beneficial mites.

The incidence and severity of powdery mildew infections on leaves was very low at the end of July 2002, irrespective of treatment (Table 15). In contrast, incidence and severity in early October was lower with the DMI / strobilurin program than in the control and Stylet-Oil program. Incidence exceeded 90 % for the control and the Stylet-Oil while it was 78 % for the DMI / strobilurin program. Likewise, severity was about one third in the rotational program compared to the other two.