Management of Cherry Powdery Mildew

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Powdery mildew on tart cherry is a fungal disease of sporadic importance in Michigan. However, when favorable environmental conditions occur, such as in 2003, disease can be significant in affected blocks. Powdery mildew is most important during summers with hot, dry weather. The fungal pathogen requires little moisture for spore germination and growth on leaf surfaces. As little moisture as that present from high humidity from fog can stimulate spore germination and growth; intermittent rains can provide enough moisture to initiate epidemics. Powdery mildew typically is first seen on the underside of leaves and so orchard scouting is important for initial disease detection. The fungus grows as a white mat on leaf surfaces; continued fungal growth results in spread to upper leaf surfaces (Fig. 1). Mildew can cause leaves to become brittle, and these leaves can then be subject to premature removal during harvest. The most significant economic aspect of mildew is fruit infection of sweet cherry, which is significant in the Pacific Northwest. Fortunately fruit infections of tarts or sweets rarely occur in Michigan. Continued buildup of powdery mildew late into the season could affect the overall photosynthetic capacity of trees, although data demonstrating this are not available.

As we also observed in 2003, conditions suitable for powdery mildew are less favorable for cherry leaf spot and brown rot. Thus, during hot, dry summers, growers are apt to spray less fungicides for disease control, resulting in less suppression of powdery mildew. In years favorable for leaf spot and brown rot, mildew is typically less of a problem in part because growers are spraying more frequently.

We rated the efficacy of several classes of fungicides for powdery mildew control on Montmorency tart cherry in 2003. The experiment was conducted at the Northwest Horticultural Research Station on 24-year-old trees. We utilized singletree blocks with four replicates per fungicide treatment. Fungicide applications were initiated at late bloom and continued on a 10-day cycle through a fourth cover spray. We did not apply any postharvest sprays. Powdery mildew occurrence was assessed in late August as the percentage of infected leaves on 20 terminals selected randomly from each tree.

The overall occurrence of powdery mildew was 45.6% on unsprayed control trees (Table 1). The best mildew control was achieved using the strobilurin fungicide Flint and the new combination stobilurin/boscalid fungicide Pristine. It should be noted that these fungicides were applied for the full season in the test plots for efficacy analyses; **for resistance management, stobilurin and sterol-inhibitor (SI) fungicides should not be applied more than two times consecutively.** As a group, the SI fungicides Elite, Indar, and Rubigan provided a middle level of mildew control, approximately 50% less mildew on SI-treated trees compared to that observed on untreated trees.

Timing of fungicide applications for powdery mildew control are very important. The fungus probably overwinters in buds and the level of overwintering survival is governed by winter temperatures with reduced survival following severe winters. Control of primary disease inoculum appears to be of less importance for powdery mildew. Gary Grove at Washington State reported that secondary cycles drive powdery mildew epidemics. **Thus, summer cover sprays targeting mildew control would be critical.**

Tart cherry growers have to balance fungicide applications to target two major diseases (leaf spot and brown rot) and powdery mildew, a disease of sporadic importance. Mildew

control can be initiated at petal fall; this timing would be especially important in orchards with previous significant mildew infection. This spray timing is more critical for leaf spot control, and this disease must take precedence because leaf spot is the most economically important tart cherry disease. Chlorothalonil is currently the most important early-season fungicide for leaf spot control both for its broad-spectrum activity and because it lessens the dependence on strobilurin and SI fungicides. Remember that chlorothalonil is not registered for use after shuck split. Since chlorothalonil does not control powdery mildew effectively, growers could consider including a mildew control during the early season, if necessary. One possibility is the use of low rates of sulfur for mildew suppression. Sulfur can be applied throughout the season, but the combination of low rates and long spray intervals may not suppress mildew under disease-conducive conditions. In seasons with reduced powdery mildew risk, low rates of sulfur could be tank-mixed with fungicides throughout the season yielding an overall suppression of fungal diseases.

As stated above, cover sprays applied after shuck split represent the critical timing for mildew control. Strobilurins are currently the fungicides most effective in mildew suppression; these fungicides are also excellent for controlling leaf spot and very good to excellent for controlling brown rot. One program, which might be effective, would utilize a strobilurin or the strobilurin/boscalid fungicide Pristine for the 1st and 3rd cover spray using SI's or another alternative for the 2nd and 4th cover sprays. Remember, the 4th cover spray timing is important for brown rot control as well. The combination of effectiveness of the fungicide and timing will drive the overall success of the program.

Table 1. Management of powdery mildew of tart cherry using fungicides. Full season applications involved six sprays that were initiated during late bloom and continued at approximately 10-day intervals. Treatments 1, 3, and 4 were SI fungicides; treatments 2 and 5 were strobilurin and strobilurin/boscalid fungicides, respectively.

	Fungicide (rate per acre)	**Timing**	**% Powdery Mildew[a]**
1	Elite 45WP (6 oz) + Induce 0.06% v/v	full season	23.7 bc
2	Flint 50WG (2.6 oz)	full season	13.6 e
3	Rubigan 1EC (8 fl oz)	full season	26.7 bc
4	Indar 75W (2 oz) + Latron B-1956 0.12% v/v	full season	23.2 bc
5	Pristine 38WG (14.7 oz)	full season	4.0 f
6	Untreated control		45.6 a

[a] Means within a column followed by the same letter are not significantly different according to Fisher's Protected LSD ($P \leq 0.05$).

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