Powdery Mildew (*Erysiphe necator)* of Grapevine

Current Management Options

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BACKGROUND:

Powdery Mildew is a persistent disease problem that many grape producers are faced with, especially amongst California vineyards. This disease is caused by the fungus (*Erysiphe necator=Uncinula necator)* (Figure 1) . The impact of powdery mildew infection varies among cultivars and the time of first infection. Developing fruit (<8° Brix) is highly susceptible to powdery mildew, but ripened berries become resistant (>15° Brix). On leaves, powdery mildew develops best on young tissue, typically not infecting leaves more than two months old. Shoots, petioles, and clusters are also susceptible during the growing season. Powdery Mildew is highly prevalent in mild, cool weather, especially in areas with humidity and rainfall. Conidial spore production occurs 7 to 10 days after primary infection by ascospores and conidia will continue to be produced throughout the season as long as moderate temperatures (70° to 85°F) exist. Paired with dense canopies, this disease thrives in these types of conditions. However, temperatures above 33°c (91°F) can kill the fungus, especially if exposed to extreme sunlight.

Figure 1. Powdery Mildew on grapevine (cultivar Chenin blanc –12- yrs-old)

SYMPTOMS:

Powdery Mildew can be immediately recognized by the dusty (powdery) appearance on the surface of berries (Figure 2A). Resulting in berry scabbing at early stages of the disease, and eventually cracking (Figure 2B). On the surface of infected tissue, the fungus forms a white web-like mat of mycelium (Figure 3A). Typically on leaves, colonies are found on the underside of exposed leaves, or on both sides of well-shaded leaves. Growing shoots can also experience scars amongst the green tissue, demonstrating active infection sites (Figure 3B). Late in the season, small, spherical, black fruiting bodies (chasmothecia) form on infected regions of the grapevines. These fruiting bodies act as the primary inoculum source that is eventually released in the spring, activated by the presence of moisture.

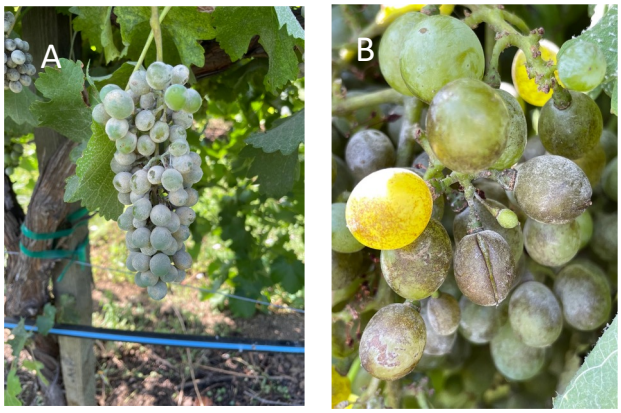

Figure 2. Common symptoms of powdery mildew on grapes. Dusty appearance from chains of spores (A). Berry cracking (B).

MANAGEMENT:

Sulfur application continues to be an effective and economical method, but in order to be effective, products must be applied before the disease develops. Sulfur dusting should be done 7-14 days after bud break and repeated every 7-10 days. Discontinue the use of soft chemistry products (sulfurs, biologicals, systemic acquired resistance products, and contact materials) when disease pressure is high because by themselves, they will not provide adequate control. If eradication is necessary, a light summer oil may be used anytime in the season if there is no sulfur residue present (i.e. at least 2 weeks before or after a sulfur treatment). Basal leaf removal can improve coverage of powdery mildew fungicides on clusters and leaf removal by itself (as done for Botrytis control) results in 50% disease control. When the disease pressure is high, switch to a more complete program is a combination of a DMI compound with sulfur. Programs like these help eliminate resistance problems and create an effective approach to eliminating this disease. Our laboratory annually examines the efficacy of fungicide treatment programs to prevent and control this disease complex using synthetic, biological, and organic fungicides. Results from these trials can be found on our lab website at https://ucanr.edu/sites/eskalenlab

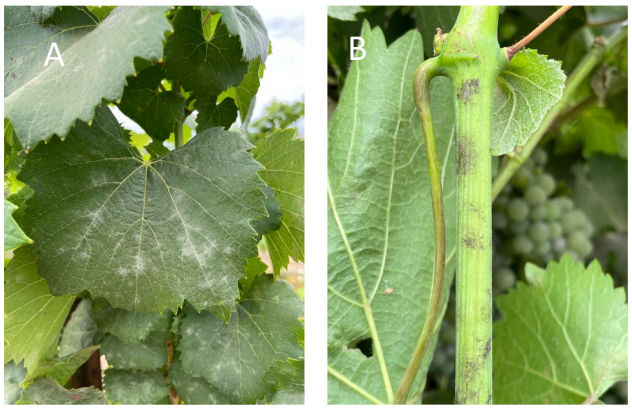

Figure 3. Powdery mildew symptoms on infected green tissue, causing mycelium growth on leaves (A). A growing shoot with active powdery mildew infection sites (B).

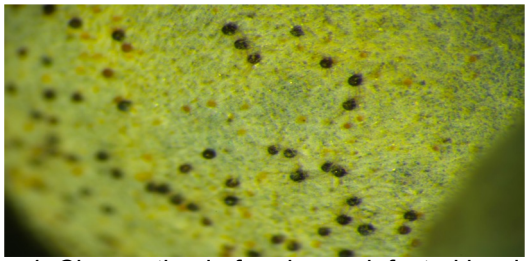

Figure 4. Chasmothecia forming on infected berries of a grapevine

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