

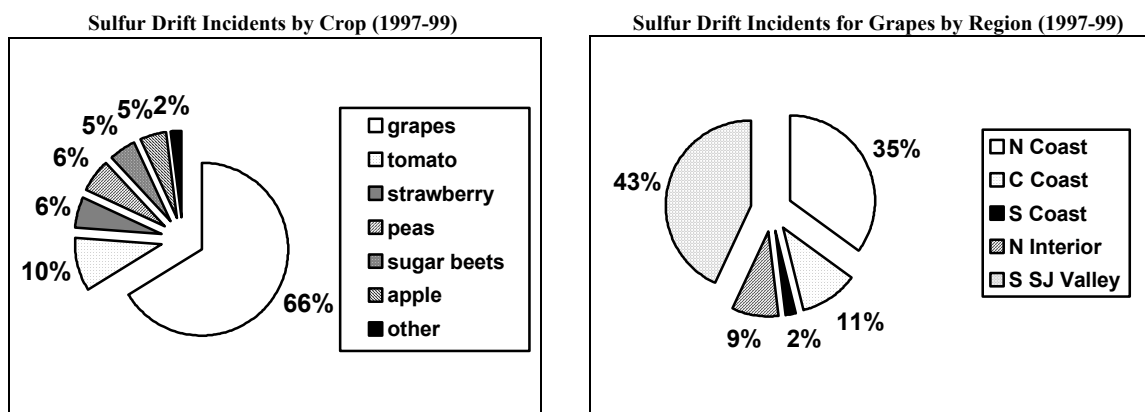
Best Management Practices for Sulfur in Winegrapes

Sulfur is a natural element used safely for centuries to control plant pathogens and mites. As an active ingredient, sulfur is the leading pesticide used in California agriculture. It is an important and effective tool for managing powdery mildew – one of the major diseases affecting grapes throughout the world. Uncontrolled mildew seriously reduces winegrape yields and quality.

Human exposure to sulfur can cause eye and skin irritation and breathing difficulty – especially in sensitive individuals. But, compared to most pesticides, it has minimal effects on humans and the environment. In fact, sulfur use is approved for organic farming.

So, what is the concern?

Reports of sulfur drift have occurred in recent years. A survey by the Department of Pesticide Regulation found 86 reported incidents of sulfur drift during 1997 to June 1999. Two thirds of the reports cited grapes as the target source, distributed throughout all winegrape regions. Moreover, 80% of reports for grapes were attributed to dust applications. Incidents included dust drifting onto surrounding structures, such as neighboring residences, schools, and places of business. Dust drift onto workers in surrounding fields and moving vehicles also was reported.



Dusting sulfur constitutes the foundation for powdery mildew control in grapes throughout California. In fact, a majority of winegrape acres are treated with dusting sulfur each year – many treated repeatedly. However, public complaints of sulfur drift have increased. Why? The key factor seems to be the increase in agricultural/urban interfaces.

Uses of sulfur best management practices will minimize the potential for drift from treated vineyards, especially onto surrounding “sensitive areas”. Dusting sulfur must be managed with particular care because of its high visibility and susceptibility to offsite movement by wind.

What are sensitive areas?

Sensitive areas are locations surrounding vineyards where people, organisms, or structures could be exposed to pesticides. For sulfur, these areas include schools, bus stops, busy roadways, residences, or other areas of human activity. Sulfur sensitive areas also can include nearby crops (such as pears) and waterways.

How to reduce the potential for drift and avoid incidents?

The following practices can be integrated into programs for managing sulfur that achieve mildew control while preventing drift and public complaints. A management plan should be developed incorporating those practices appropriate for each grower’s vineyard and circumstances. Applicators must understand the plan as it relates to the geography of the vineyard and surrounding areas.

Best Management Practices

- *Being a Good Neighbor.* Sulfur stewardship includes being aware of the concerns of neighbors and local communities. Consider a policy of discussing vineyard actions with neighbors, speaking with community organizations about the importance of sulfur as a relatively benign crop protection tool, and forming a regional team of growers to serve as the first contact with the public for negotiations and troubleshooting. These actions enable mutual understandings and better relations, thus decreasing the probability of complaints.
- *Canopy Management.* Use trellis systems and canopy thinning techniques (*e.g.*, leaf pulling, shoot thinning, cane cutting) that open canopies to recommended levels. Besides benefiting fruit quality, a properly opened canopy provides conditions less conducive to mildew and other diseases, potentially enabling use of lower sulfur rates and fewer applications for achieving adequate coverage.
- *Monitoring Mildew Development.* Use the powdery mildew index as a tool for optimally timing and possibly reducing the frequency of fungicide applications (including sulfur).
- *Establishing Buffers.* Establish reasonable buffer zones to prevent drift onto sensitive areas and human exposure to applications. Buffer distances vary with weather conditions, formulation (dust/wettable), application method (ground/air), presence of barriers (*e.g.*, trees), and characteristics of sensitive areas. If buffers determined for dust application overlap some border vine rows, apply separate fungicide sprays (less prone to drift) to these rows or dust border rows during conditions when buffers can be reduced.
- *Dealing with Extra-Sensitive Areas.* Consider applying wettable sulfur or other low-risk fungicide sprays to parts of or entire vineyards near extremely sensitive areas.
- *Selecting Rates.* Adjust rates of sulfur or other fungicides to the lowest effective rate according to vine growth and development. Higher label rates may not be required early in the season to achieve adequate coverage. Use of lower rates decreases risks of pesticide drift, particularly for dusting sulfur.
- *Equipment Operation.* Maintain, calibrate, and select application equipment to deliver the intended rate as accurately and quietly as possible. For dust, be extra cautious of drift during row turns and reduce RPM at row ends or shutoff dusting equipment if possible.
- *Weather Monitoring.* Monitor weather conditions before and during applications. No sulfur applications can be made when winds exceed 10 miles per hour, but consider using an even lower threshold. Avoid applications when winds are blowing towards sensitive areas and during temperature inversions.
- *Timing Applications.* Decrease public visibility and the potential for complaints by making applications during periods of least human activity (*e.g.*, at night, weekends). Develop a sequence for application that attracts the least attention. For nighttime applications, minimize “noise” complaints by treating rows closest to residential areas first.
- *Resistance Management.* Although mildew resistance to sulfur has never been found, consider rotations with other fungicides as a preventive measure against resistance and sulfur drift.

The winegrowing community must be proactive in resolving important environmental and social issues. Addressing the issue of public complaints of sulfur drift is no exception. The greater use of sulfur best management practices should decrease drift incidents, prevent further regulation, and retain sulfur as a viable organic tool for agricultural production.