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Cover crops in vineyards linked to increased frost risk during early vine growth stages

Growers weigh sustainability benefits against potential damage as unmanaged vegetation lowers nighttime temperatures in spring

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As more winegrape growers adopt sustainable practices, the use of cover crops in vineyards has become increasingly common. These crops, planted between vine rows, offer a range of benefits including improved soil health, reduced erosion, better water

infiltration, and enhanced biodiversity. However, recent observations and field experiences suggest that allowing cover crops to grow unchecked beyond budburst may increase the risk of frost damage—a concern that is gaining attention among viticulturists.

In vineyards, frost events typically occur in early spring when young vine shoots are particularly vulnerable. During these events, even a small drop in temperature can cause significant damage to developing buds and shoots. Cover crops, while beneficial in many ways, can contribute to lower nighttime temperatures by acting as an insulating layer over the soil. This insulation reduces the amount of solar radiation absorbed by the soil during the day and limits the release of stored heat at night. As a result, vineyards with tall or dense cover crops may experience colder conditions compared to those with bare or closely mowed soil.

Research supports this concern. A study comparing weedy vineyard conditions to bare soil found that minimum air temperatures could be more than 1°F lower in areas with vegetation. While this difference may seem minor, it can be critical during frost events where damage thresholds are often crossed with just a slight temperature drop.

In recent years, several vineyard managers who allowed cover crops to grow past budburst without mowing reported unexpected frost damage. Although it is difficult to directly attribute the damage solely to cover crop management, these cases highlight the importance of considering frost risk when making decisions about vineyard floor management.

For vineyards located in regions where frost has not historically been a problem, extending cover crop growth may introduce new challenges. In such cases, growers might need to invest in active frost protection systems like wind machines or overhead sprinklers—tools that come with significant installation and operational costs. For vineyards already equipped with these systems, longer or more frequent use may be required if cover crops are left unmanaged during critical periods.

The decision to maintain or mow cover crops after budburst should be based on a careful evaluation of site-specific conditions. Factors such as vineyard topography, historical frost data, and available resources for frost protection all play a role. While

traditional practices like pre-budburst mowing or tillage have their drawbacks—including increased erosion and nutrient loss—they were often adopted for practical reasons related to local climate and resource availability.

As sustainability goals evolve and new practices are introduced, it is essential for growers to weigh both the benefits and risks associated with each approach. The push toward improving soil biology through extended cover crop growth must be balanced against the potential for increased frost exposure. In some cases, a compromise—such as maintaining a closely mowed cover crop combined with active frost protection—may offer a viable solution.

Ultimately, vineyard managers must make informed decisions that consider both environmental goals and economic realities. As more data becomes available and experiences are shared across growing regions, best practices will continue to evolve. For now, understanding how cover crop management affects vineyard microclimates remains a key factor in protecting yields during vulnerable stages of vine development.