



# Prevention and Control Strategies of Powdery Mildew for Grape Cultivation Applied with Rain-Shelter Under a Two-crop-a-year System

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## ABOUT THE STUDY

The cultivation mode of two-crop-a-year system is widely used in the hot areas of southern China. This cultivation system makes full use of the light and heat resources throughout the year through the use of appropriate advancing germination technology. Thus, the grapes can be harvested twice a year, and the yield and benefit also be increased. Whereas, the cycle of disease and insect pest control with two-crop-a-year system is greatly extended compared with the conventional mode of one-crop-a-year, which results in the extra work pressure of prevention and control for the related workers. On the other hand, rain-shelter cultivation is usually used in two-crop-a-year system, which has been effective in reducing the impact of disease occurrences caused by rainfall in the southern region of China, such as downy mildew, anthracnose, gray mold, ripe rot, and so on. It is worth noting, however, the microclimate of the vineyard was changed and powdery mildew became one of the most serious diseases in this cultivation mode.

## CAUSES

Direct contact with rainwater, strong ultraviolet light and high temperature are the inhibiting conditions for powdery mildew occurrence. Because rain-shelter cultivation effectively blocks rain water and reduces the light intensity in facilities, powdery mildew pathogen can obtain favorable survival environment in it. In addition, the occurrence of powdery mildew for winter grape growing season is more serious under two-crop-a-year system, which is related to preference temperature and less rainfall in the second half of the year.

## STRATEGIES

### Plant the varieties with excellent powdery mildew resistance

To select grape varieties with excellent powdery mildew resistance and suitable for two-crop-a-year system, by carrying out grape cross breeding is very important for sustainable grape cultivation in hot areas. Of course, this requires new varieties to integrate heat resistance, disease resistance, good flowering and other traits.

### Precise prevention and control measures

It is necessary to carry out a comprehensive investigation of powdery mildew resistance for grape cultivars in hot planting region. Specific

prevention and control schemes were designed according to different powdery mildew resistance levels. This is to avoid the use of less fungicides for susceptible cultivars, while the use of more fungicides for resistant cultivars. Meanwhile, the analysis and forecast of meteorological data should also be considered as a reference factor in the design of prevention and control programs. Continuous cloudy days, little rain and appropriate temperature will increase the risk of powdery mildew occurrence.

### Other optional beneficial actions

Compared with one-crop-a-year cultivation mode, two-crop-a-year system should increase the number of sanitations for vineyard in winter. During the end of one growing season (winter grapes harvest) and the beginning of the next (summer grapes germination), the whole vineyard was sprayed with sulfur or lime-sulfur after harvest, during pruning, and at the bud swelling stage. Measures to increase light exposure can also be adopted as a control strategy: in sunny weather, open the rain shelter so that the vines can receive better light; Laying reflective film and proper leaf removing treatment to improve the light conditions in the rain shelters can not only help to reduce the occurrence of powdery mildew, but also improve the fruit quality.

## CONCLUSION

To summarize, in the face of the problem of prevention and control of powdery mildew under two-crop-a-year system in hot areas, the most important aims are to reduce the amount of fungicide, improve the quality and realize the precise prevention and control of powdery mildew. To further improve the prevention and control measures of powdery mildew in hot areas by means of varieties and cultivation, rather than relying only on the prevention and control with fungicide. Effective and reasonable prevention and control measures can help promote the sustainable development of grape cultivation in hot planting region.

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