Powdery Mildew Control in Vineyards by Robots and UV-C Technology

Description

In recent years, vineyards around the world have been witnessing the growing use of advanced machines.

Personally, Iâ??ve always been fascinated by machines, probably because of my civil engineering background, where I had the opportunity to work alongside a wide range of construction equipment and infrastructure machinery. I have always admired how such machines can simplify complex tasks, improve efficiency and solve real world problems.

Viticulture is no exception. One area where machines are making a significant impact is the control of fungal diseases such as powdery mildew through autonomous robots and advanced UV-C systems.

The Challenge: Powdery Mildew

Powdery mildew is one of the most widespread fungal diseases affecting vineyards worldwide. It infects leaves, shoots and grape clusters, reducing both yield and fruit quality. If left unchecked, it can also compromise the quality of the wine produced.

For decades, winegrowers have relied on repeated fungicide applications throughout the growing season to keep the disease under control. While effective, this approach increases production costs and raises concerns about environmental sustainability, chemical use and labour requirements. These challenges have encouraged the search for smarter and more sustainable alternatives.

Helios UV: Harnessing the Power of Light

Helios UV stimulation | Image â?? Solarimpulse.com

One approach is the **Helios UV Boosting Machine**. Rather than killing the fungus directly, it briefly exposes the vine canopy to carefully controlled **UV-C light** during the day. Think of it as a vaccine like training session for the vine. The short burst of UV light stimulates the grapevineâ??s own natural defence system, encouraging it to produce compounds such as salicylic acid that help it respond more quickly when disease strikes. As a result, powdery mildew finds it much harder to establish itself.

The machine doesnâ??t completely replace fungicides, but it reduces the vineyardâ??s dependence on them. Vineyard managers use it a few times during key stages of the growing season as part of an integrated disease management programme.

Thorvald: The Autonomous Vineyard Robot

Another remarkable innovation is **Thorvald**, an autonomous vineyard robot developed in Norway. Like the Helios UV system, it uses UV-C light to control powdery mildew. However, Thorvald takes the concept a step further by combining the treatment with autonomous navigation.

Instead of boosting the vineâ??s natural immunity, this autonomous electric robot equipped with UV-C lamps drives through the vineyard **at night**. The darkness is important because UV-C light is far more effective in against fungal spores after sunset. As the robot moves along the vineyard rows, the UV light damages the DNA of mildew spores and harmful microbes, preventing them from reproducing.

Thorvald in daytime | Image â?? AFN/ Jason Henry

Thorvaldâ??s modular design allows it to perform additional vineyard tasks beyond disease control, making it a versatile platform for precision viticulture.

A Smarter Approach to Disease Control

Robots and UV-C technology demonstrate how engineering and science are helping vineyards address one of viticultureâ??s most persistent challenges. Rather than replacing traditional vineyard management, they provide growers with additional tools to reduce chemical inputs while maintaining healthy vines.

As someone with an engineering background, I find it fascinating to see technology solving practical problems in yet another field. It is a reminder that innovation in wine is no longer confined to the winery or cellar. Increasingly, it is happening in the vineyard itself, where engineering, science and viticulture are working together to produce healthier vines, better grapes and, ultimately, better wines.

As I continue travelling through wine regions, Iâ??ll certainly keep an eye out for these machines in action among the vines. I look forward to updating this post with new insights, first-hand observations, and actual photographs from the vineyards.

Till then itâ??s cheers from my side !!