vinetur

Researchers identify grapevine gene that helps vines resist a crop-damaging fungus

The study found that VvMYB3R5 raises protective compounds, offering breeders a target for hardier wine and table grapes.

Monday, September 21, 2026



A study published in the journal Plant Physiology reports that a grapevine gene known as VvMYB3R5 plays a central role in helping vines resist Colletotrichum viniferum, a fungal pathogen that damages grape crops and reduces fruit quality.

The paper identifies VvMYB3R5, a 3R-MYB transcription factor, as a positive regulator of the plant's defense response. Transcription factors are genes that help switch other genes on or off. In this case, the researchers found that VvMYB3R5 affects the production of proanthocyanidins, or PAs, compounds that are part of the plant's natural chemical defenses.

According to the study, C. viniferum causes a serious disease in grapevine and can have a significant effect on both yield and quality. That makes the findings relevant for growers who are looking for ways to limit losses without relying only on external disease control measures. Grapevines are economically important not only for fresh fruit but also for wine production, so any genetic pathway tied to stronger disease resistance could eventually matter for the beverage industry if it can be used to protect harvests and preserve fruit quality in vineyards.

The researchers said functional tests showed a clear pattern. When VvMYB3R5 was overexpressed, meaning the plant was made to produce more of it, proanthocyanidin levels increased and the vines showed greater resistance to the fungus. When the gene was silenced, PA levels fell and the plants became more vulnerable to fungal attack. The results point to a direct link between the activity of this transcription factor, the buildup of protective compounds, and the vine's ability to withstand infection.

Proanthocyanidins are secondary metabolites, a class of plant compounds that often serve protective roles. In grapevines, they are already known to be important parts of normal fruit and tissue chemistry. The new work places them more clearly in the disease-resistance pathway described in the paper, suggesting that the vine's ability to accumulate these compounds can shape how strongly it responds when the pathogen is present.

The study adds to a broader effort in plant science to identify genes that can be used to strengthen crop resilience from within the plant itself. Rather than focusing only on the fungus, the research centers on the host plant's own regulatory system. By showing

that VvMYB3R5 promotes PA biosynthesis and improves resistance, the paper gives plant breeders and molecular biologists a more specific target for future work.

That could have practical value for vineyards over time. Fungal diseases can lower marketable yield, weaken fruit quality, and add costs for growers through crop protection efforts and lost production. In wine grapes, disease pressure can also affect consistency in raw material entering the cellar. A resistance mechanism linked to VvMYB3R5 and proanthocyanidin synthesis may therefore offer a potential path for breeding or biotechnology strategies aimed at reducing those risks, though the study does not claim an immediate commercial application.

The authors said that understanding the molecular basis of VvMYB3R5-mediated resistance could help efforts to improve grapevine cultivars through genetic manipulation. In practical terms, that means researchers may now have a better basis for testing whether this gene can be used to develop vines that are less susceptible to infection while maintaining fruit quality. For growers and producers tied to wine and other grape-based beverages, that raises the prospect of more sustainable viticulture if future research confirms that stronger built-in resistance can be translated into field performance.