

Optimizing Disease Management in the Rioja Wine Region: A Study on *Erisiphe necator* and the Gubler-Thomas Model

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Abstract

Erisiphe necator is endemic in the Rioja Appellation of Origin. Vine growers exert significant effort to protect their crops, given the economic losses this disease causes. Different studies have shown that using Gubler-Thomas Model (GTM) can reduce treatments by up to 20% compared to a full-time protection strategy. This reduction is achieved by optimizing applications based on temperature variations in late spring and summer when the disease's conidial stage is active. Additionally, since GTM is quite conservative further reductions in sprayings seem feasible. To evaluate GTM and disease severity, 11 experimental plots with three treatments: a) Unsprayed Control (UC), b) Fully Protected crop – periodic sprayings according to product prescriptions (FP), and c) sprayings following Gubler-Thomas (GT) were established in different areas of La Rioja wine region from 2018 to 2023. Results revealed significant variability in disease severity, with some years experiencing minimal damage in bunches across all treatments, including UC. GTM did not detect these variations in disease severity, indicating a similar risk level between years. Despite this, following GTM advice instead of FP practice lead to a 20% reduction in treatments, with no effect on disease symptoms on the bunches. This raises questions about the seasonal variation. Are spring conditions causing higher severity during the conidial stage? Is there a specific climatic parameter or measurement distinguishing a severe season from a mild one? Factors like radiation, precipitation, or extreme temperatures in different months might contribute to this variability.

Keywords: powdery mildew, bioclimatic models, Gubler-Thomas