An Economic Evaluation of Early Adoption of Trunk Disease Preventative Practices in Winegrape Vineyards

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Issue

Trunk, or woody-canker, diseases, including Botryosphaeria dieback, Eutypa dieback, and Phomopsis dieback, present a serious challenge to viticulture productivity. The majority of California vineyards over age 10 are likely infected and yield losses can reach over 90%. The overall economic impact of losses in California vineyards has been estimated at 10% of gross producer value. Trunk diseases take many years to develop and start showing symptoms years after infection has already occurred, while preventative management practices are limited. While preventative management practices are available, there is a hesitancy to start using them in newly-established vineyards, possibly due to uncertainties about cost-effectiveness and disease control efficacy.

Methodology

In our simulated economic experiment, we constructed a representative stochastic economic model to simulate production in fictional vineyards throughout California’s diverse production regions. Our data came from the scientific literature, interviews with growers, post-harvest control advisors (PQA), and farm advisors, and from responses to PQA and grower survey questionnaires. The survey also provided us with insights into innovations and growers’ decision-making. The baseline model simulated production from a healthy vineyard and then subjected it to a trunk disease, assuming no preventative action was taken. We then simulated scenarios where different practices with varying costs and efficacy were adopted at different vineyard ages. Next, we used an economic comparison between the baseline model of these scenarios to gauge the potential economic gains if adopting these practices. Relative to no action or waiting until a vineyard exhibited symptoms of trunk diseases (and yield loss) were the two widespread.

Results

Annual average returns for healthy vines were relative to the no action (resist or treat) but in some cases were net losses relative to action on the vineyard. In addition, starting nutrition at 4 years was the most effective. In many cases, the profit margin of a healthy vineyard was directly linked to the vineyard’s health. Overall, a practice adopted in year 5 is earning at least 4 more years of profit and yields. Adopted in year 7, there is a year to 3 years earning at least 4 years. Adopted ever earlier could only add up to 10 years of active returns.

Conclusions

Delayed pruning, 5% of the disease control practices, starting in year 3 to 4 several years to pay for its applications. The practice would take in year 3 to 4 several years to pay for its applications. The practice would increase overall returns in years 10 to 25.

Commentary

The economic analysis provides a cost-benefit analysis for early adoption of preventative practices. The analysis suggests that early adoption of preventative practices can result in increased economic yield and profitability in the long run. The analysis also highlights the importance of early adoption, as delays in adoption can result in reduced economic gains. The analysis is based on a stochastic economic model that simulates production in fictional vineyards throughout California’s diverse production regions. The results of the analysis provide valuable insights into the cost-effectiveness and economic feasibility of preventative practices for trunk disease control.