

**Trunk disease management: grower usage and perceptions of preventative practices.**



**Kendra Baumgartner**  
United States Department of Agriculture, Davis, CA

**Mark Lubell**  
**Vicken Hillis**  
University of California, Davis

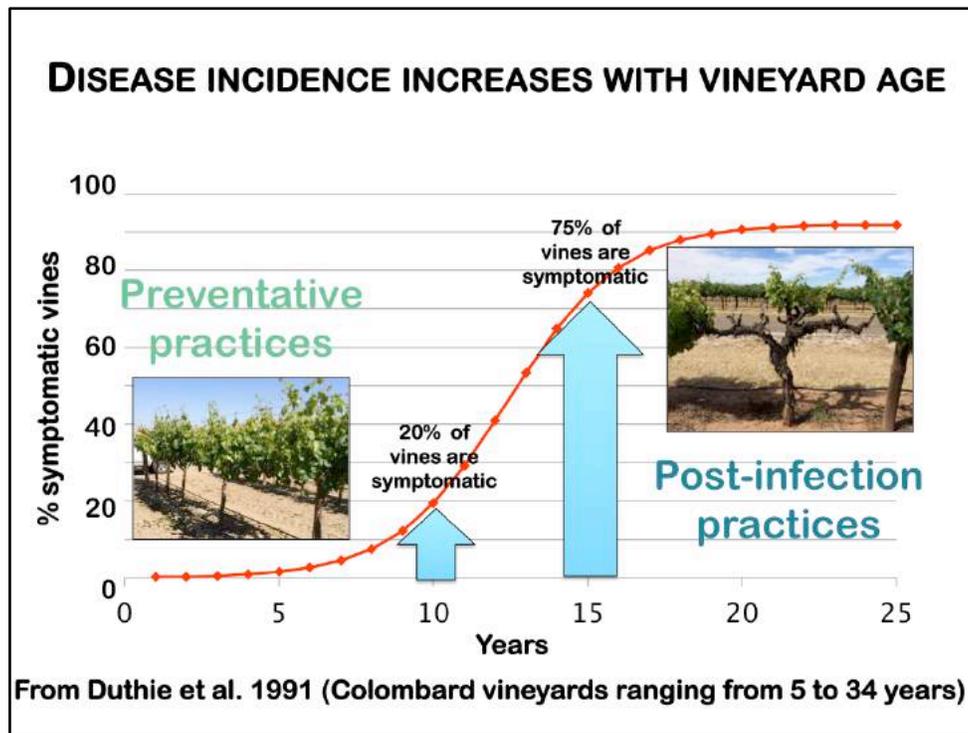
**Jonathan Kaplan**  
California State University, Sacramento



United States Department of Agriculture  
National Institute of Food and Agriculture

[treeandvinetrunkdiseases.org](http://treeandvinetrunkdiseases.org)

This is a presentation about some of the progress we've made on the socioeconomic objective of the SCRI grant. We as researchers think the preventative practices for trunk diseases are effective, based on the field trials that have been published. We set out to determine whether growers actually use these practices. Our survey of wine-grape growers in six grape-growing regions of California showed a relatively low proportion of growers adopt preventative practices. Furthermore, among growers who adopt preventative practices, they tend to time them too late in the lifespan of the vineyard; a majority of growers who use preventative practices start doing so in mature vineyards, where trunk diseases are already established. Among the growers who adopt preventative practices in young vineyards, they also tend to have a positive perception of the cost-efficacy of the practices. This relationship between adopting a preventative practice, doing so at the proper time, and having a positive perception of its cost-efficacy made it clear to us that we need to communicate the long-term economic benefits of preventative practices.



Typically disease incidence increases as a vineyard matures, when you have conditions that are favorable for disease establishment and spread, such as a susceptible cultivar, high pathogen pressure, and lack of disease management. For example, in a susceptible cultivar such as Colombard (for which this data was gathered), by year 10, **approximately 20% of the vines** are symptomatic. By year 15, its **up to 75%**. This sharp increase is not due to a higher level of susceptibility in years 10 to 15, but rather that symptom expression occurs years after the infections are established. The 1<sup>st</sup> pruning wound infections occur before year 10, when the vineyard is young. It takes multiple years for them to appear. To lessen this sharp increase, we recommend that growers use **preventative practices** starting when the vineyard is young and healthy. Once disease incidence is high, however, management based on prevention is no longer optimum, and they must resort to more costly **post-infection practices**.

PREVENTATIVE PRACTICES		
Delayed Pruning	Double Pruning	Protectants
		
December ✘ January ✘ February ✘ March ✔	1 <sup>st</sup> pass in December, 2 <sup>nd</sup> pass in March	Topsin, Rally, B-Lock, Vitiseal

Three practices have been shown in field trials by researchers to minimize infections of pruning wounds. This includes DELAYED PRUNING, DOUBLE PRUNING, and PRUNING-WOUND PROTECTANTS.



We surveyed wine-grape growers in six regions, reaching a total of 417 growers, to determine which practices growers use, and their perceptions of practice efficacy and cost.

## WINEGRAPE GROWERS



- TurningPoint audience response system
- Meetings organized by farm advisors & regional grower groups

Our survey of growers was done in person at meetings, using the TurningPoint audience response system. Everyone in the audience had a remote control 'clicker' (as shown at left). I asked the questions in a PowerPoint presentation and then they keyed in their answers.

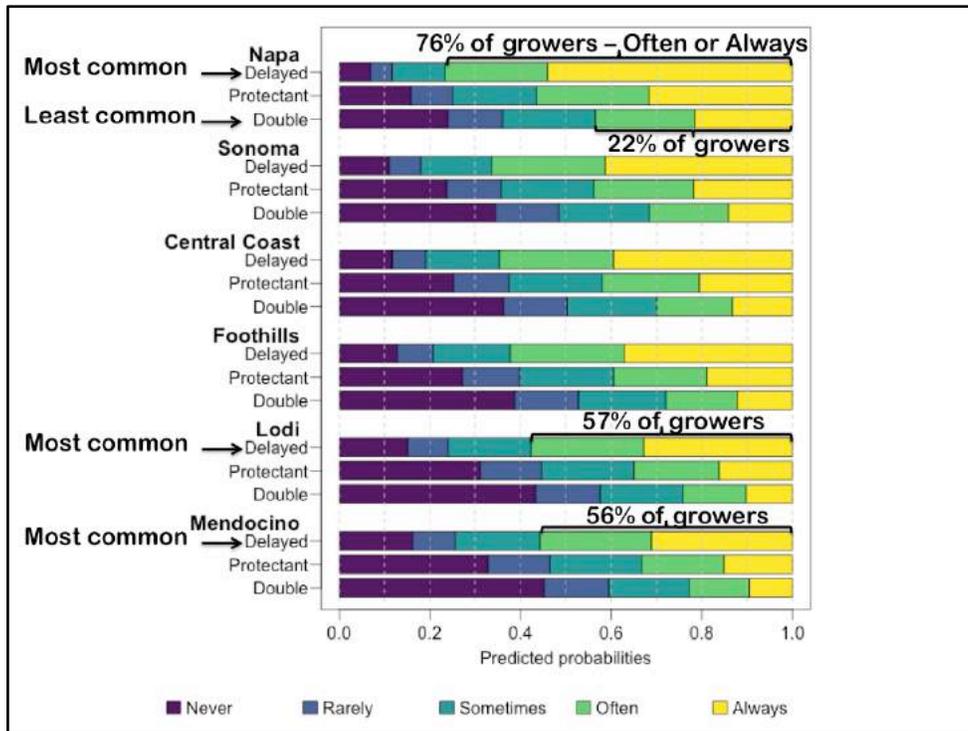


How **often** do you use delayed pruning?

*Select one response.*

1. Never
2. Rarely
3. Sometimes
4. Often
5. Always

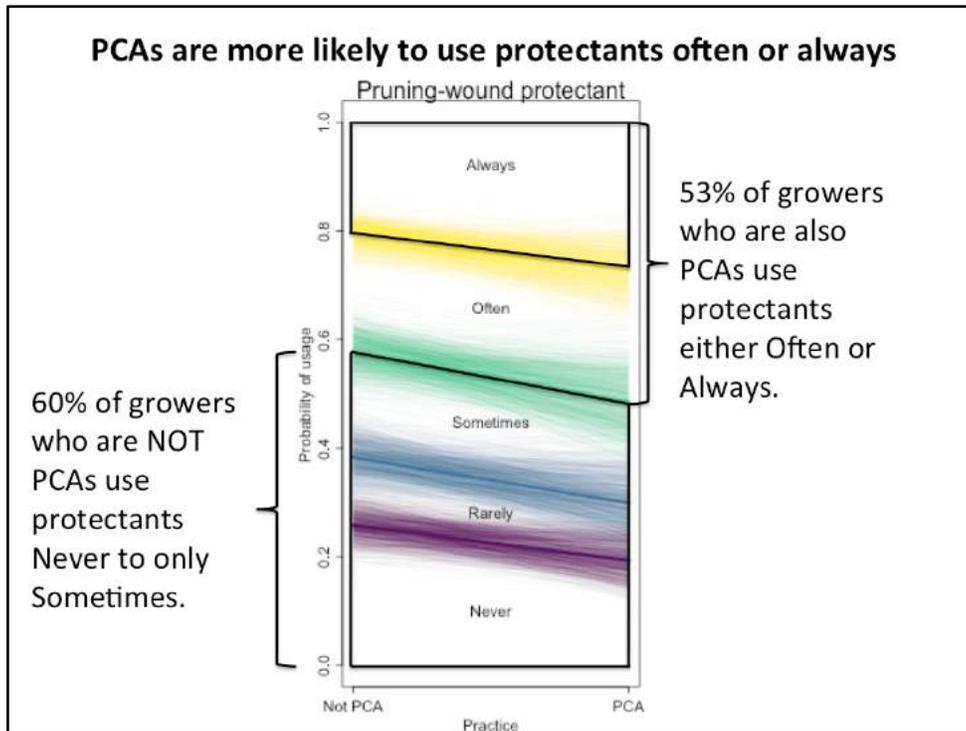
We asked growers how often they use delayed pruning...and asked this same question for all three preventative practices.



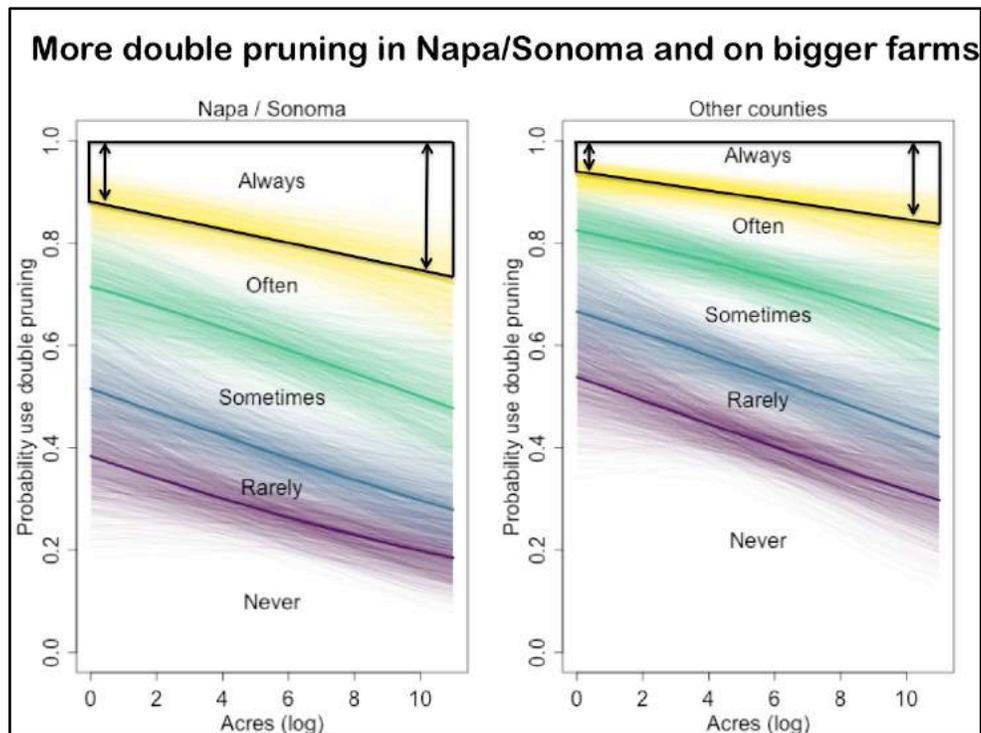
We found that delayed pruning is the most common practice in all regions. In Napa, for example, 76% of growers said they use delayed pruning often or always. Double pruning is the least common: in Napa, only 22% of growers use double pruning often or always. Napa has the highest rates of adoption of these preventative practices. Lodi and Mendocino have the lowest. In those regions, the most common practice is delayed pruning, but the percentage of growers who use it often or always is closer to 50%.

<b>PREVENTATIVE PRACTICES</b>		
<b>Delayed Pruning</b>	<b>Double Pruning</b>	<b>Protectants</b>
		
<b>\$0 per acre</b>	<b>\$250 per acre</b>	<b>\$80 per acre</b>

It's not a huge surprise that delayed pruning is most popular because it costs the least to implement. Here you can see the annual costs of each practice, which are expressed in comparison to the cost of standard pruning (i.e., pruning in December). Standard pruning costs approximately \$150-\$200 per acre. Delayed pruning costs the same as standard pruning, it just happens later in winter, so it is shown here as having a cost of \$0 per acre. Double pruning costs \$250 more than standard pruning. Protectants (1 application per winter) cost \$80 additional dollars, on top of standard pruning.



This graph shows the answers to the question, “How often do you use pruning-wound protectants?” We can see how being a PCA is associated with usage of protectants. To understand this graph, focus on the spaces between the lines, rather than the lines themselves; the answers to the question fall within the white spaces between each line. Within the group of growers who use protectants often or always, 50% of them are also PCAs. A slightly larger proportion –60%– of growers who are not PCAs use protectants never to only sometimes.



Double pruning was more common in Napa and Sonoma. Note the space for Always is bigger for Napa/Sonoma, compared to that of Other counties. (Also, see the huge space for Never in Other counties). Double pruning was also more common on larger farms. As farm acreage goes up, both in Napa/Sonoma and in Other counties, growers are more likely to use double pruning than those with smaller farms. Higher usage of double pruning, the most costly preventative practice, in Napa and Sonoma may reflect the higher price of fruit in these two regions.



A new mechanical pruning machine costs up to ½ M\$. It isn't cost effective unless you can spread its expense over many vines, and at a larger acreage, the economy of scale makes a mechanical pruning machine more cost-effective than paying a crew to prune by hand.

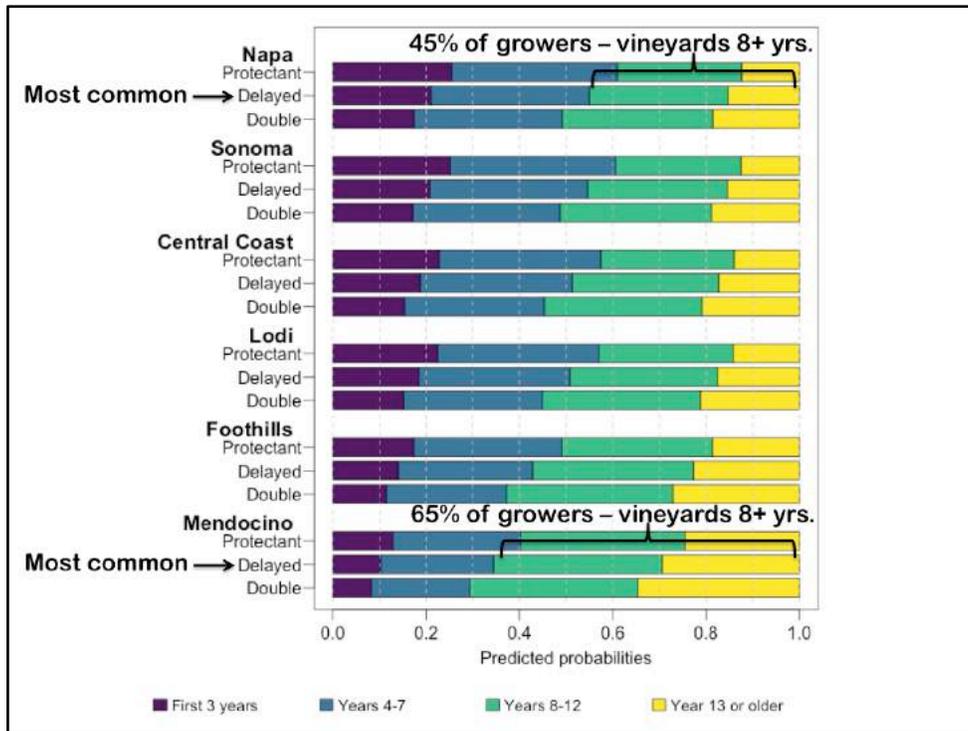


What is the typical **age of the vineyard** when you start using delayed pruning?

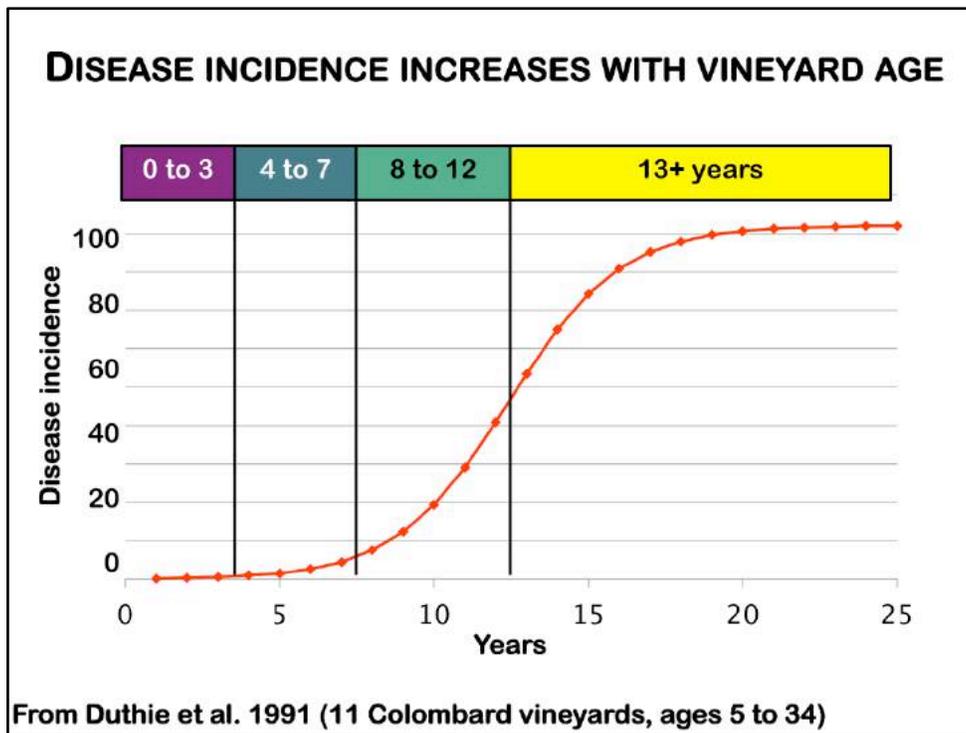
*Select one response.*

1. Within the first 3 years
2. Years 4-7
3. Years 8-12
4. Year 13 or older

We asked growers when they started using each practice, in the lifespan of the vineyard.



In Napa, where delayed pruning was used by the most growers, 45% of them start to use this practice in vineyards 8 years and up. In Mendocino, even more growers –65%– started using delayed pruning in mature vineyards.



As I mentioned earlier, by year 10, a susceptible cultivar will have a disease incidence of approximately 20%. By year 15, it can be as high as 75%. These vines are already infected...preventative practices are not as effective when adopted in mature vineyards.

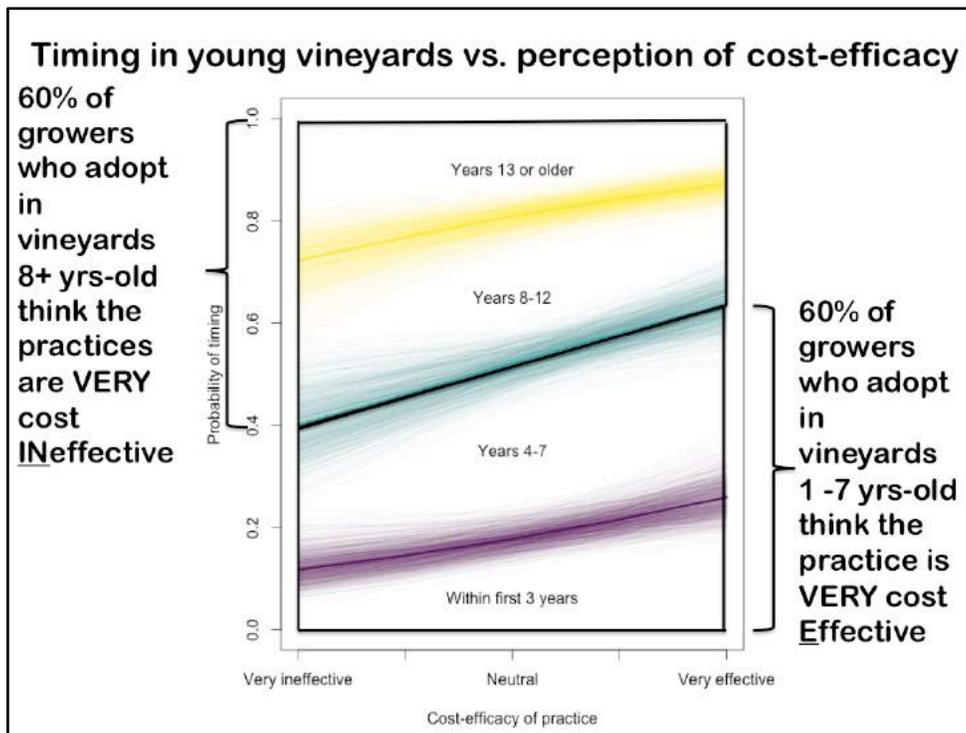


How **cost-effective** do you think delayed pruning is?

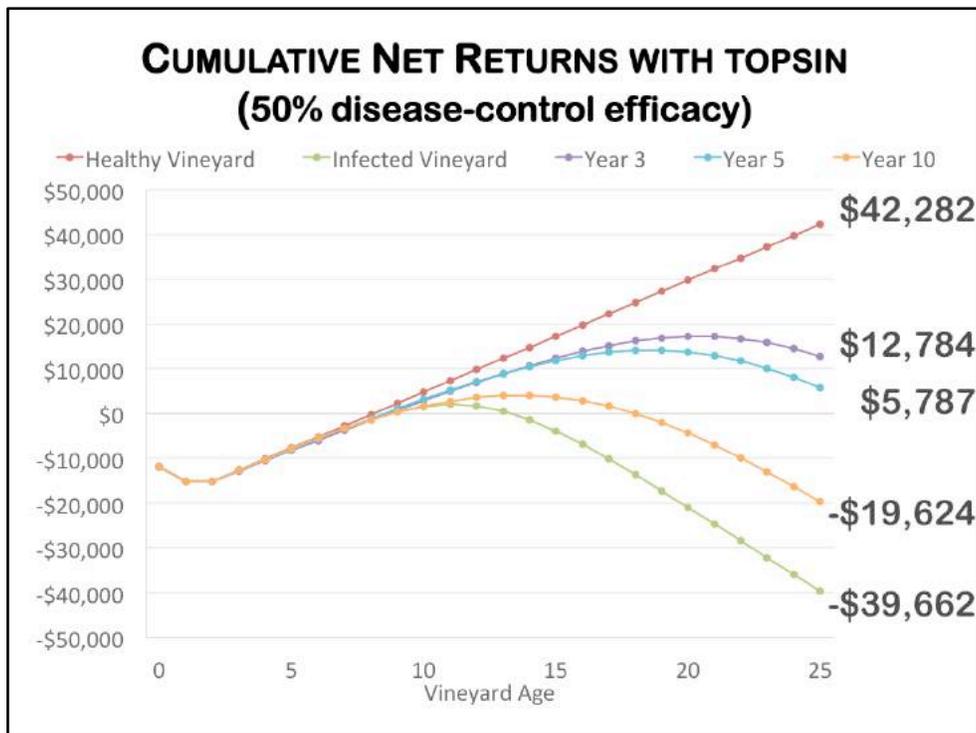
*Select one response, even if you do not use this practice.*

1. Very ineffective
2. Somewhat ineffective
3. Neutral
4. Somewhat effective
5. Very effective
6. Don't know

We asked growers how cost-effective they considered each practice.



Here we see the relationship between when a grower adopts a practice and the grower's perception of the cost-efficacy of the practice. The majority of growers who adopt a preventative practice in a mature vineyard also think the practice is very ineffective. The majority of growers who adopt a preventative practice in a young vineyard (this is the proper timing) also think the practice is very effective.



It is more cost effective to adopt preventative practices in young vineyards, before you see symptoms. We used economic simulations to quantify the economic benefits of adopting preventative practices in young vineyards. Since Topsin has been extensively studied, relative to other practices, we use it here to illustrate an important point regarding the early adoption of preventative practices in young vineyards. If we assume a very modest level of disease control efficacy — 50% of the pruning wounds are protected — the cumulative net returns from adopting Topsin applications are significantly higher than taking no action. Starting Topsin applications in years 3 or 5 can result in a positive return on investment (\$12,784 and \$5,787 per acre, respectively); whereas adopting Topsin applications in year 10 results in a net loss (-\$19,624 per acre), although is not as costly as taking no action (net loss of \$39,662 per acre).

Specialty Crop Research Initiative  
USDA, National Institute of Food & Agriculture

[treeandvinetrunkdiseases.org/trunk-disease-management-in-california-preventative-practices-in-young-vineyards-post-infection-practices-in-mature-vineyards](http://treeandvinetrunkdiseases.org/trunk-disease-management-in-california-preventative-practices-in-young-vineyards-post-infection-practices-in-mature-vineyards)



United States Department of Agriculture  
National Institute of Food and Agriculture

We are developing trunk disease management guidelines that incorporate new economic figures, to help convince skeptical growers to adopt preventative practices AND to do so in young vineyards. You can see these management guidelines on our project website.