

Identify Sociological Hurdles to Adoption of Trunk Disease Management Practices

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This research is part of a broad effort to understand grower decision-making in the context of trunk disease management.

Research Components

- Semi-structured interviews
- Survey of advisors
- Grower survey
- Decision-making experiments and theoretical modeling

Research project consists of the following components

Two years ago, discussed the semi-structured interviews

Reported on the grower survey earlier this year

Today will be talking about a survey of pest control advisors and other individuals who play an advisory role, like consultants and farm managers

That survey is completed and I'll discuss some of the results here.

Main project for the future is a related effort to conduct decision-making experiments that are closely tied to theoretical modeling

- will talk about that briefly too today

Research Questions

- What practices are advisors recommending to prevent and manage trunk diseases?
- Why are preventative practices being under-recommended?
- What sources of information do advisors use to learn about disease management?

The advisory survey examined three key questions

Survey of Advisors

- 265 respondents (133 for grapes)
 - Growers: 58%
 - Farm management: 30%
 - Dealer/distributors: 15%
 - Consultants: 14%
- Licensed PCAs: 53%

To give you a sense of the pool of respondents to the survey:

The survey was distributed to CAPCA membership and it was also distributed to the constituencies of various organizations or individuals

We had over 250 respondents, but people could opt into different branches of the survey that focused on different crops

Here I'm reporting on the results of the grape section of the survey alone

These are job categories that follow CAPCA's breakdown

Survey of Advisors

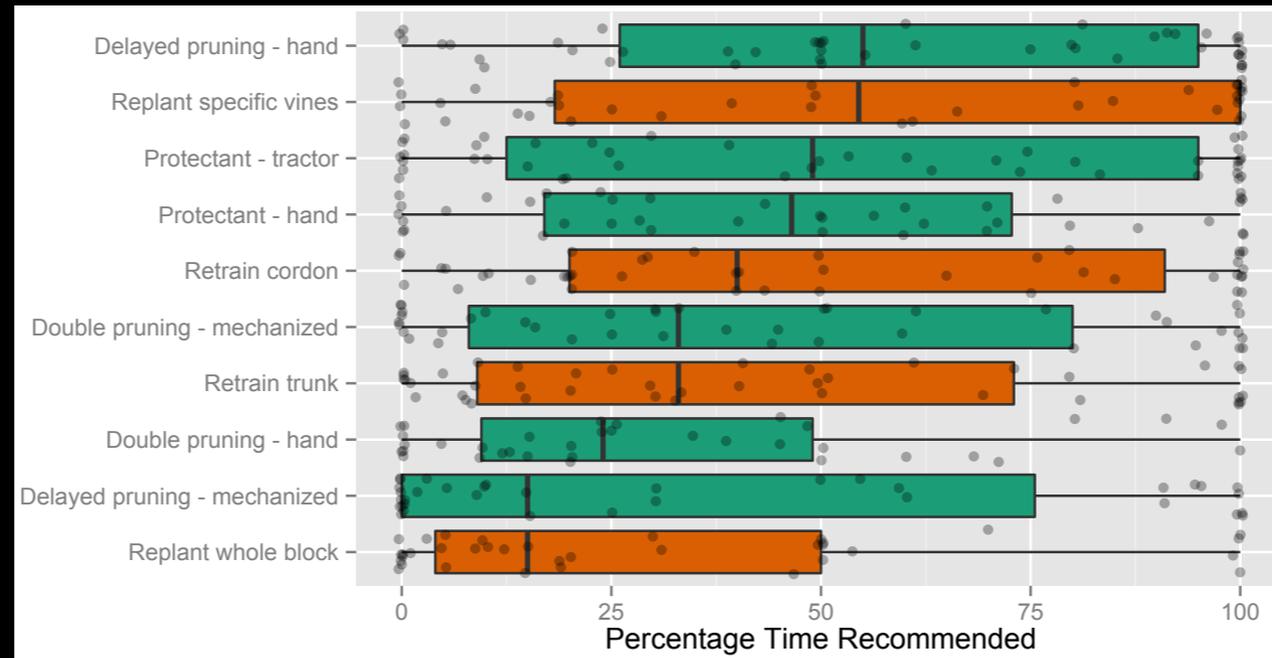
- San Joaquin: 45
- Napa: 37
- Sonoma: 30
- Sacramento: 29
- Yolo: 23
- Fresno: 18
- Solano: 17
- Monterey: 16
- San Luis Obispo: 13
- Amador: 12
- Santa Barbara: 11
- Madera: 11
- Kings: 10
- Tulare: 10
- Stanislaus: 10
- Mendocino: 10

This slide shows you the breakdown by county of the number of responses

Research Questions

- What practices are advisors recommending to prevent and manage trunk diseases?
- Why are preventative practices being under-recommended or improperly used?
- What sources of information do advisors use to learn about disease management?

Recommendation of practices by advisors



We asked people about their recommendation of 10 different management practices

- some of which are preventative (green):
 - delayed pruning
 - double pruning
 - pruning-wound protectant
- some of which are post-infection (red): retrain or replant

What you see here is the distribution of responses to the question about how often you recommend a particular practice, when the opportunity arises?

- the dots show the individual responses
- the rectangular boxes are called box plots
- bar shows the median percentage, ends of box show the 25th and 75th percentiles, ends of whiskers show the full range

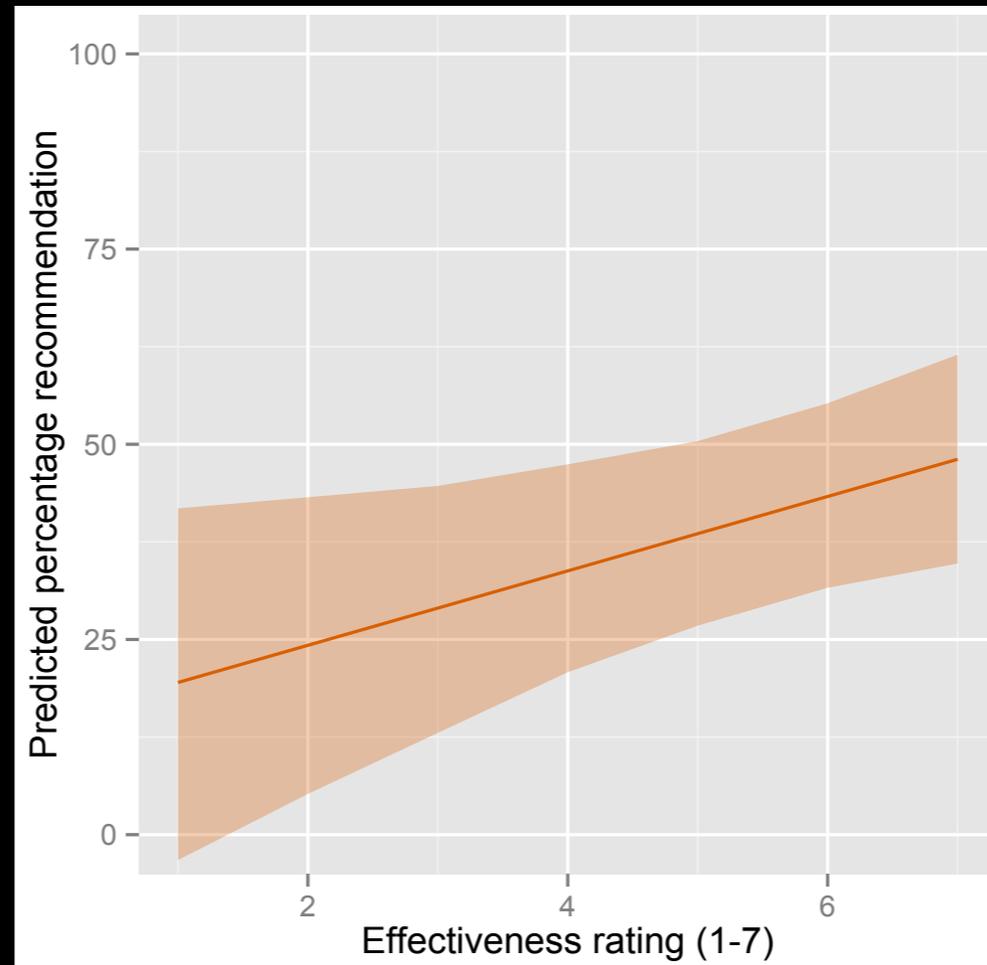
Delayed pruning is the most commonly used practice, followed by pruning wound protectants, and then double pruning

The main finding here is that we're not seeing any evidence of a preference for recommendations for preventative practices. Advisors are not recommending the preventative practices more frequently than they recommend the post-infection practices.

Research Questions

- What practices are advisors recommending to prevent and manage trunk diseases?
- Why are preventative practices being under-recommended?
- What sources of information do advisors use to learn about disease management?

So for the advisory survey we were interested in three key questions



We examined various factors that might be associated with advisor recommendations of different practices.
A key factor associated with whether or not an advisor recommends a practice, is how effective they think the practice is.
We asked advisors to rate practices in terms of their effectiveness in managing trunk diseases on a scale of 1-7.
As seen here, the higher the effectiveness rating, the more likely an advisor is to recommend the practice.

Other factors

- Factors *associated* with practice recommendation
 - Costs of practice (-)
 - Disease prevalence (+)
- Factors *NOT associated* with practice recommendation
 - practice type
 - number of clients / acreage of clients
 - job type
 - region
 - years experience

Other factors associated with practice recommendation are shown here.

Practices that are more costly are recommended less frequently.

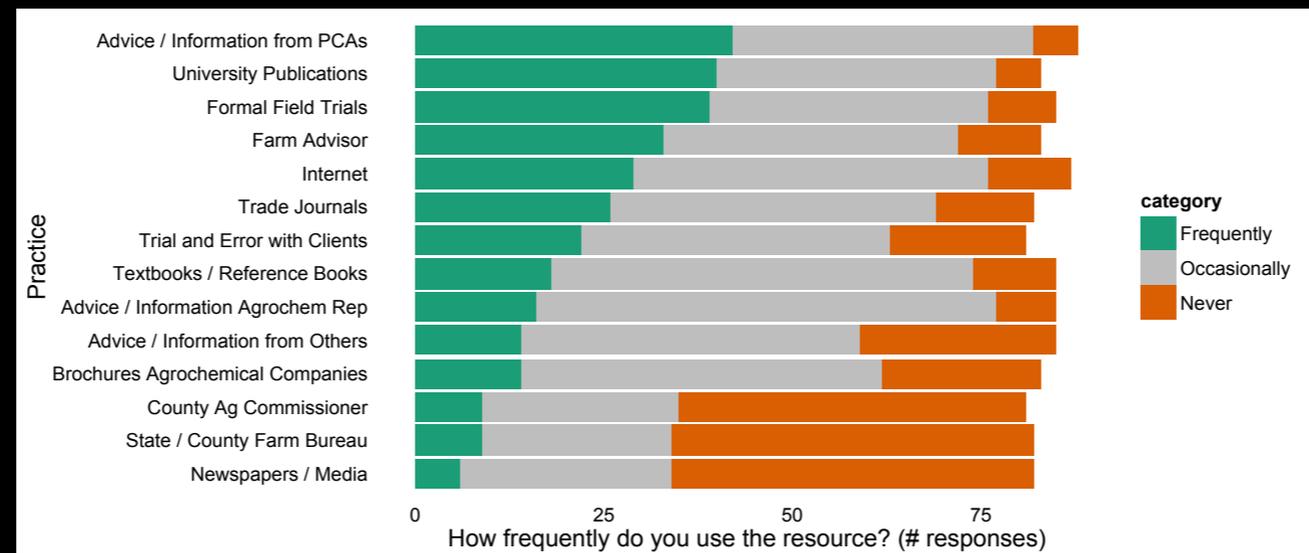
Advisors who have experienced greater levels of disease prevalence, on average, are more likely to recommend practices (both preventative and post-infection).

Practice type (preventative vs. post-infection) is not associated with practice recommendation. So again, we don't find any evidence that advisors are recommending preventative practices more frequently than post-infection practices.

Research Questions

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- Why are preventative practices being under-recommended?
- What sources of information do advisors use to learn about disease management?

So for the advisory survey we were interested in three key questions



We asked advisors how frequently they use the following list of information resources.

Interestingly, we found that both personal and written information sources are among the most important, but particularly those that tend to be considered “expert” sources

- e.g., other PCAs, university publications, formal field trials, farm advisors

Another interesting point is that the internet is ranked highly, which contrasts to some ideas about the farming industry not using online formats very much. This could be a sign of a changing trend, or it could be that our respondent pool (advisors) are more connected to online resources than others in the industry, such as an average grower.

Conclusions

- No differences between preventative and post-infection practices
- Most important factors associated with practice recommendation include:
 - perceived effectiveness of practice
 - perceived cost of practice
 - disease prevalence
- Other experts (personal and written) are important information sources

We have further results from our advisory survey, stay tuned for upcoming publication or feel free to reach out to us with questions.

Decision-making experiments

- Examine patterns of preventative disease management as a function of:
 - costs and benefits of the practice in question
 - uncertainty about future probability of infection
 - access to and use of social information

Experimental methods complement observational studies like the advisory survey I previously described.

A strength of the experimental approach is that you can control the environment and clearly identify causal relationships between factors of interest

- e.g., how does changing the costs and benefits of a practice in question influence preventative management

weakness of the experimental approach is that you create an artificial environment, so need to be concerned with how well that artificial environment represents reality

Decision-making experiments

- Participants choose whether or not to use a preventative management practice
- They obtain a yield based on that choice and other factors built into the experiment
- This process repeats for a number of periods so that respondents can learn from their choices as well as the choices of others
- Experimenters manipulate various factors in the experiment (costs/benefits, access to social information, environmental uncertainty) and observe how these variables influence decisions

To do this: set up a scenario, where individuals choose whether or not to use a preventative management practice each year

They obtain yields based on the choice they make and whether or not their crop is infected and to what extent

These simulated years repeat for a number of periods and individuals have the opportunity to learn from their own experience as well as others

Experimenters manipulate various factors of interest and observe resulting changes in management strategies on the part of farmers.

Timeline

- Theoretical modeling that underlies the experiments is currently ongoing
- Spring - Fall 2015: Pilot experiments with university students either online or in-person on campus
- Summer 2015 - Winter 2015-6: Conduct experiments with growers either online or in-person at expos / conferences

Theoretical modeling is currently ongoing. The theoretical work is like a simulation of the experimental environment.

Thank you!