

# Preferred Information Channels and Source Trustworthiness: Assessing Communication Methods Used in Florida's Battle Against Citrus Greening

Ricky Telg, Tracy Irani, Paul Monaghan, Christy Chiarelli  
Michael Scicchitano and Tracy Johns

## Abstract

The purpose of this study was to examine the perceived source credibility, as viewed by Florida citrus growers, of state and national agricultural organizations associated with containing the plant disease called citrus greening. This study sought to determine the types of information that agricultural opinion leaders received from these agriculture organizations. In late 2007, three focus groups were conducted at county Cooperative Extension Service offices in three major areas of citrus production. The number of participants ranged from four to six for a total of 15. Growers were asked about their awareness and understanding of citrus greening; management practices; cooperation with fellow producers and institutions that played a role in citrus greening management; preferred avenues of communication; and information dissemination methods. Qualitative analysis was conducted to identify key themes and patterns within each topic category. Focus group results indicated that Florida citrus growers preferred to receive information about citrus greening primarily through face-to-face meetings and field days. They also preferred to receive their information from other growers in order to find out how their fellow farmers handled citrus greening. Focus group participants struggled with trusting regulators and university researchers, based on the growers' previous experiences during the unsuccessful citrus canker eradication program and growers' perceptions of the practicality of the research. Finally, growers were critical of the lack of available information about citrus greening from regulators and university researchers.

## Keywords

citrus greening, trust, information channels

## Introduction

The Florida agricultural industry ranks second in the overall state economy (Woods, 2008) at \$137 billion in sales revenue in 2007, with citrus production, processing, and marketing, alone, worth an estimated \$9.3 billion and employing an estimated 70,000 people. Despite the annual economic impact, the Florida citrus industry is not immune to natural problems, such as disease (Woods, 2008; Zwick & Carr, 2006). Citrus canker struck the state in the late 1990s and early 2000s, causing the implementation of the controversial U.S. Department of Agriculture's Citrus Canker Eradication

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Program, which proved unsuccessful following the 2004 and 2005 hurricane seasons, when hurricanes spread the disease throughout the state.

A more recent and possibly potentially more damaging disease threatening Florida's citrus industry is citrus greening (Huanglongbing or "yellow dragon"), discovered in Florida in 2005 (Yates, Spann, Rogers, & Dewdney, 2009). It has been called the "world's most serious citrus disease" (Hollis, 2008, para. 1) because of the rapid decline of trees, once they are infected. The bacterium found in Florida originated in China and is spread rapidly by an insect, the Asian citrus psyllid. After a tree is infected, the new shoots of growth lose their color and turn yellow, hence the name, "yellow dragon." Fruit production is slowly destroyed, and the tree can eventually die. An infected tree is usually removed from the grove. Nearly all of the state's 568,000 acres of citrus acreage is threatened by citrus greening (Yates, Spann, Rogers, & Dewdney, 2009).

Citrus producers in the state have faced similar disease and environmental crises in the past decade, such as citrus canker and hurricane damage. Even so, citrus greening is a unique challenge because it can remain undetected in an infected tree for several years without displaying symptoms and can then spread rapidly through the flying psyllid (Chung & Brlansky, 2009; Yates et al., 2009). Not only is it difficult to detect and control, but the growing number of abandoned citrus groves in the state means the disease is not always managed uniformly, and this can impact the entire industry. A grove that is sold for real estate development and which does not have a caretaker or greening control program may contaminate neighboring operations that are spending resources to control greening. The USDA's National Agricultural Statistics Service reported there are at least 140,000 acres of abandoned citrus groves in Florida (USDA/NASS, 2009). At the time this article was written, there was not a federal- or state-mandated program for greening control similar to the USDA program to control the spread of citrus canker.

The crisis of citrus greening in Florida raises issues about how agricultural producers respond to university research and the Cooperative Extension Service, their perceptions of regulatory institutions, and their dependence on information from organizations and their neighbors. Individuals who depend on the agriculture industry for their livelihoods expect timely information from trustworthy industry leaders and organizations. Historically, opinion leaders have been recognized as an important link in the diffusion of messages to the general public or target audiences (Lazarsfeld, Berelson, & Gaudet, 1948). Researchers have also analyzed the credibility, trustworthiness, and overall attitude of communication messages (Hovland & Weiss, 1954; Kelman & Eagly, 1965; Sternthal, Phillips, & Dholakia, 1978). These studies have reported that credibility, trustworthiness, and overall attitude play important roles in determining how messages are perceived and accepted.

The project described in this article was conducted to assist Tropicana – one of the largest citrus processors in the state – to better understand Florida citrus growers' attitudes and behaviors regarding preferred management practices (PMPs) to contain citrus greening. Focus groups were conducted with Florida citrus growers in late 2007 to gather information about the growers' awareness and understanding of citrus greening, their current management practices, and the best ways for organizations to provide growers and managers with information about greening and other citrus diseases and issues. The purpose of the overall study was to recommend preferred management practices (PMPs) to contain citrus greening. The purposes of this particular article, as part of the overall study, are as follows: 1) describe participants' preferred information and communications channels for receiving information about citrus greening management; 2) describe levels of trust and source credibility of information provided by sources of information on citrus greening, including UF/

IFAS, the USDA, processors, and pesticide companies; and 3) assess the quality of information and research being conducted to manage the disease.

### **Theoretical/Conceptual Framework**

Source credibility is a foundational element of this study. Hovland, Janis, and Kelley (1953) examined qualities that could affect a communicator's credibility, including how well the source communicates and the communicator's membership in a particular social status group, as well as attitudes towards the communicator. The researchers posited that source credibility is the degree of trustworthiness combined with the degree of expertness perceived by the message receiver. Sternthal et al. (1978) asserted that a source perceived to be credible will have more of an impact on the message recipients. O'Keefe (1990) defined credibility as the judgments "made by a perceiver (e.g. a message recipient) concerning the believability of a communicator. Communicator credibility is thus not an intrinsic property of a communicator; a message source may be thought highly credible by one perceiver and not at all credible by another" (p. 131). Erdem and Swait (2004) defined source credibility to be the "believability of an entity's intentions at a particular time" (p. 192). This definition also includes the specific factors of trustworthiness and expertise, first described by Hovland et al. (1953) in understanding the broader concept of source credibility.

Lazarsfeld et al. (1948) pioneered the concept of opinion leaders in their two-step flow model of communication. Since then, other researchers have conducted experiments in an effort to better understand the qualities an opinion leader possesses and the impact opinion leaders can have on the diffusion of innovations (Corey, 1971; Burt, 1999; Valente & Davis, 1999). Corey (1971) noted "opinion leaders are 'trusted and informed' people who exist in virtually all groups [of people]" (p. 48). Robinson (1976) characterized opinion leaders as individuals who are different from the general public either because of "social position or status or by virtue of their greater interest in the topic at hand" (p. 307).

Rogers (2003) defined the concept of opinion leadership as "the degree to which an individual is able to influence other individuals' attitudes or overt behavior informally in a desired way with relative frequency" (p. 27). Additionally, opinion leaders have been described as individuals who, through personal interaction, are able to make ideas or innovations infectious to those with whom they come in contact (Burt, 1999). Leonard-Barton (1985) examined the effect opinion leaders have in the diffusion of innovations process. Results indicated that individuals within the general public tend to rate new innovations more positively when subsequently opinion leaders have also rated the innovation positively. Opinion leaders often have a "unique and influential position in their system's communication structure: they are at the center of interpersonal communication networks" (Rogers, 2003, p. 27). Valente and Davis (1999) discussed the possibility of accelerating the diffusion of innovation by utilizing opinion leaders' credibility. The researchers wrote that in order for the opinion leaders to accurately diffuse an innovation into a community, they must be viewed as "credible by the community citizens" (p. 63).

One of the elements to be considered within source credibility is the receiver's attitude towards the communicator. Kelman and Eagly (1965) conducted two experiments to measure the perceptions of communicator content. The first experiment examined the tendency of participants to misperceive the message of a negative commentator because the message went against the participants' position on the issue. In this experiment, the negative speaker was judged "consistently lower in trustworthiness, expertness, general attractiveness and representativeness" (p. 66). In the second experiment, the

communicators took basically the same position on an issue, but addressed the position from different angles, or themes. The message of the positive communicator was more likely to be accepted by the subjects.

Valente, Poppe, and Merrit (1996) studied opinion leadership and interpersonal communication. Results indicated that the amount of credible information available on a specific topic affects the amount of interpersonal communication about the topic. The authors described interpersonal communication as giving and seeking of information. Additionally, when credible information about a topic is extensive, the need for the giving and seeking of information from others is reduced. However, when there is not a surplus of credible information available to people “the higher the level of misinformation, fears, and doubts about an innovation, the greater the associated interpersonal communication and opportunities for opinion leadership” (Valente, et al., 1996, pp. 261-262).

An additional factor that should be considered when assessing source credibility is the message receiver’s initial attitude toward the message. Frewer, Howard, and Shepherd (1998) studied the role prior attitudes play in “determining individual responses to incoming information” (p. 16). Specifically, the researchers were investigating the application of prior attitudes toward the issue of genetic engineering in food production. They found that prior attitude toward an issue does play a role in how a message is viewed and accepted. Additionally, the information’s source was rated as more knowledgeable and trustworthy when the individual had an initial positive attitude of the issue.

Windham (2009) examined agricultural opinion leaders’ perceptions of source credibility of organizations from which they received information. Overall, agricultural opinion leaders receive the majority of their information from organizations in which they are most involved. The organization whose primary goal was research and education rated high on the expertise constructs of credibility including knowledgeable, qualified, expert, skilled, and experienced, but lower on the trustworthiness constructs of credibility, including honest, dependable, trustworthy, sincere, reliable, and balanced. Agricultural opinion leaders trust information the most that originates from the organization in which they are most involved.

## Methods

The research design for this study was qualitative and exploratory in nature. As a methodology, qualitative research provides the opportunity for exploration and collection of rich data that can lead to deep insights and understandings beyond what quantitative methods might produce, especially in an exploratory study. Focus groups, a qualitative technique particularly useful in exploratory studies, was the methodology that was used for this study. “Focus groups can provide insight into complicated topics where opinions or attitudes are conditional or where the area of concern relates to multifaceted behavior or motivation” (Krueger, 1994, p. 45). Focus groups are essentially a group interview technique, typically conducted with between 6-8 participants who are either randomly selected or whom are chosen because they possess representative, specific traits and characteristics of interest. Focus group participants interact and discuss with a moderator present to guide discussion over a prescribed range of topics. As a qualitative method, focus groups are designed to “bring together several participants to discuss a topic of mutual interest to themselves and the researcher” (Morgan & Spanish, 1984, p. 254). Focus groups have the advantage of being more naturalistic in terms of the ability participants have to interact with each other. Focus group results are not generalizable in nature, but the insights gleaned from focus group data collection and analysis can be used to inform decisions, uncover attitudes and perceptions and provide actual statements from real people (Creswell, 1998).

In late 2007, three focus groups were conducted at county Extension offices or Research and Education Centers in three major areas of citrus production in Florida. The population of this study was citrus growers in the state of Florida. Participants were recruited by the Florida Survey Research Center (FSRC), a market research firm at the University of Florida, using a list of grove owners provided by Florida Citrus Mutual – the state-level producer’s association – and Tropicana. The market research firm utilized trained telephone interviewers and a computer-aided telephoning interviewing system that allowed interviewers to work from a standardized script and automatically program callbacks to minimize error. Those grove owners who were interested in participating were asked a series of screening questions about their availability, potential meeting locations, and the size of their groves. Based on these characteristics and availability, the FSRC selected the most diverse groups of participants possible to participate in each of the three focus groups. Attempts were made to include owners of small, medium, and large groves to ensure that a range of practices and opinions were represented.

In total, 15 grove owners and managers participated in the focus groups: four in the Lake Alfred group, five in the DeSoto County group, and six in the Indian River group. One focus group was held on November 13, 2007 (Citrus Research and Education Center in Lake Alfred); one was held on December 5, 2007 (DeSoto County Extension Office in Arcadia); and, one on December 12, 2007 (Indian River REC in Fort Pierce). Each session lasted 90 minutes. Focus groups were held at UF/IFAS County Extension Offices or Research and Education Centers.

A moderator’s guide was developed and reviewed by a panel of experts prior to the focus groups being conducted. An objective moderator and assistant moderator from FSRC conducted the focus group sessions. The moderator and assistant moderator were not members of the agriculture industry. Each session began with general introductions to encourage participants to become comfortable in the group setting. Growers were asked about their awareness and understanding of citrus greening; management practices; cooperation with fellow producers and institutions that played a role in citrus greening management, namely processors, the University of Florida’s Institute of Food and Agricultural Science (UF/IFAS), and governmental regulators; preferred avenues of communication; and information dissemination methods.

The focus group sessions were recorded using audio, video, and field notes, and sessions were transcribed and analyzed using Glaser’s (1978) constant comparative technique. Researchers looked for common themes, similarities and dissimilarities, and observations of nonverbal cues, interactions, and reactions to questions and interactions with other citrus producers. Transcripts were coded for themes, and categories created. As themes emerged they were compared to existing categories to look for common relationships. New categories were created for distinct themes that did not fit existing categories. An audit trail including original data analysis, codes, semantic relationships, and listing of all domains was kept for verification and trustworthiness.

## Results

Three themes emerged from the focus groups: the identification of preferred information and communication channels; the perceptions of trust and the relationships growers have with different institutions and with one another; and the need for timely and practical information on citrus greening management.

### Preferred Information and Communication Channels

Focus group participants stated they preferred receiving information about citrus greening management through face-to-face means, primarily meetings and field days. Most had been to training classes on greening offered by local Extension offices, which they found useful, but they appreciated going into the field to see the processes in action. Growers were most interested in attending meetings with other growers, often held at Extension offices, at which they could share information about greening. One grower said, “I would think that probably the most effective [approach] is to do the grower meetings. When you have new information to share they call these meetings, and I would assume that would be the most effective and timely.” The growers also mentioned sharing information through e-mails and traditional communication channels, such as the magazine *The Citrus Industry* and through a UF/IFAS e-mail newsletter on citrus greening, but most preferred face-to-face communication methods.

### Trust and Relationships

There was wide variation in the degree of “trust” according to various sources of information about greening, such as UF/IFAS, the USDA, processors, and pesticide companies. However, all participants agreed they most trust other growers as sources of information and preferred practices. As one grower said, “He’s (grower) already tried something, experienced it, done something. I like to hear what other growers are doing.”

*Neighbors:* One of the most discussed barriers to PMPs for citrus greening was the behavior of other growers and “neighbor” owners of abandoned groves. Most of the participants in the focus groups were proactive in attempting to deal with greening, but they were aware not all growers were doing the same. Because the USDA is not managing greening in the same way that canker was, there is no formal program of inspection or forced tree removal to control the spread of the disease. The focus group participants worried about the impact that neighboring groves may have on their own groves, especially in regards to controlling psyllids, as discussed by this grower:

One of the philosophies [for being proactive against greening] is killing psyllids as much as you can, control them as much as you can, but everybody is not buying that....one of the local chemical guys tells me that 80% of his clientele don’t kill psyllids – don’t target them specifically. So if your neighbor is not spraying psyllids, then I think you’re going to pay the price.

A grower in another group agreed: “I think that is our biggest challenge, though, is our neighbors.” Another said, “You feel vulnerable to those around you.” Of particular concern were neighboring groves that are organic, are abandoned, or are no longer actively growing citrus, having either been sold to developers who have yet to develop the land or to cattle farmers. In the case of organic groves, no pesticides are used to control psyllids or other insects. In the case of inactive groves, no psyllid management exists:

In our area, you’ve got a lot of developers who have bought properties, and now the economy has changed. The housing situation has changed, and they’re sitting on groves. They’re not putting any money into it.

Since many groves are adjacent to one another, psyllids could enter one grove from another where spraying is not occurring. This is especially problematic for owners who have smaller groves (10- to

20-acre blocks) surrounded by others who may not be controlling psyllids. Most participants saw abandoned groves as a statewide problem hampering their control efforts, as noted by this grower: “Because you’ve got them leased for cattle and there’s [sic] trees out there and you know nothing’s been going on, I think statewide, it’s a huge problem.”

*Education Institutions, Regulators, and Processors:* The citrus industry has developed relationships with many institutional partners over the years, including University of Florida citrus and plant disease researchers, the state Extension service, juice processors and packing houses, grower associations at the regional and statewide level, and the U.S. Department of Agriculture. Participants in the focus groups often mentioned how they relied on all of these organizations for assistance with citrus greening information and control. At the same time, they expressed their ambivalence about government interference in their management decisions. They also expressed doubts about university research results and whether it is economically rational to implement recommended practices. Focus group participants also raised issues with the juice processors as they sought a solution to the crisis.

Some sentiment was related directly to the citrus growers’ experience during the citrus canker eradication program. Researchers demonstrated that canker spores could spread to neighboring trees in an area of 1,900 feet around the infected tree. This led to the “1,900-foot rule,” and the USDA mandated the removal of all trees within that space, a situation that growers have not forgotten. As the following grower said:

And we took this huge hit following guidelines, I mean I followed them to a ‘T.’ Nineteen hundred foot, we questioned it. We asked them, ‘Don’t we need to adjust this? This is starting to get out of hand.’ So now greening comes around and it’s now, ‘You’ve got to burn your trees. We want to take all your trees out. You’ve got to burn your trees if you’ve got them infected.’ I’m not saying that’s not the right thing to do, but these guys [citrus growers] have been burnt and they’re going to be careful about it.

Other growers also expressed reluctance at following university or regulatory guidelines on citrus greening, as they did for citrus canker. One grower said, “You can’t always just follow blind. We’ve done that, and it didn’t work.” Growers also expressed worry that they might be penalized if their groves were labeled as infected or problematic, limiting their ability to sell their fruit. They also said, though, that all sides need to set aside “political” or “bureaucratic” issues and come together to find solutions.

Many growers said that the citrus processors should be more actively involved in finding solutions to issues like citrus greening – whether by encouraging research on resistant plant varieties, maintaining or increasing prices to support growers’ increased caretaking costs, or merely promising that growers who test positive for greening will not be “blacklisted” by processors. Broadly, some of the growers also worried that processors may find out they have infected trees in their groves and refuse to buy their fruit, further decreasing their income and ability to work to eradicate greening. Growers said processors should be more active in supporting practices to control greening, since “all the processors and growers are really in this thing together,” as one grower said.

Growers indicated that they have replaced their trust in outside institutions with more reliance on fellow growers:

We’re in this to make money. The growers got one thing in mind. You got the chemicals, you got the doctors [Ph.D.s], you’ve got a lot of bureaucracy. I’m not saying everybody’s got an

evil side, but sometimes they get skewed differently and any researcher you talk to, most of them will have an orange tree in their backyard, but they're not making their livelihood trying to grow a farm.

### ***Timely and Practical Information***

Members of all three focus groups expressed their frustration with the uncertainty surrounding citrus greening. Growers repeatedly indicated feeling challenged in how to deal with the disease because of the lack of quality information at their disposal. Growers noted the lack of available information on citrus greening was a major challenge for growers to overcome, limiting their understanding of effective control and prevention methods, as well as their plans for implementing measures that are available. Said one, "We understand the other diseases....but the greening thing – we don't know." The unanswered questions and lack of information often left growers wondering what to try next: "They [scientists] don't know [how psyllids move]. And to me, that's the big scare; we have no idea."

Growers expressed a need for practical and sound research and information they could implement in the field and use to make reasoned decisions for their businesses. All focus group participants said there are many unanswered questions related to citrus greening, and most would like to see these researched further. One said, "Time will tell. There's [sic] more questions than answers. We're waiting on research." The growers were in support of box tax funds being used to support research on citrus greening. The growers said they realized the value of university and USDA research, but they needed to find practical applications in it, as noted by this grower:

But [research has] got to get from the paper to the field, and the stuff on the paper doesn't always make sense or adapt to the field, and that's where the actual growers have got to put it to work.

They repeatedly distinguished between research and application components of information on greening, stressing the practical knowledge that growers bring to the issue:

As much as I'm a fan of the University of Florida and USDA and I sit on all these research panels and do all this stuff, the truth is, growers – a lot of times – figure out the answer to agricultural problems. And they might get a little tick here and there on some research or maybe they get some real important stuff from research, but nine times out of ten a grower will figure something out based on what he's heard.

While growers commented that they appreciated and held in high regards the research work done by plant scientists, they worry that the research process moves too slowly to be timely. Some said they would benefit more from some "trial and error" testing of possible controls and solutions that growers and managers are implementing in the field. As one grower said, "By the time you get a recommendation, you're dead and gone. You're out of business. I think you get more out of a little trial and error." Many specifically noted that citrus greening is a bigger threat than citrus canker:

I was talking to my friend just today, and he said that canker was a boil, but greening is cancer. There's just that much difference. We're learning to live with canker, but I think we're going

to have to convince growers that this [citrus greening] is really that serious.

At least part of the growers' concern seemed to stem from the faster-than-expected spread of citrus greening, the latency time, and a belief that they need to proactively move "ahead" of the disease: As one grower said, "I think it's like the story of the three little pigs. I think the damn big wolf is here and fixing [sic] to eat us if we don't build a brick house and figure out how to stop this thing."

Most said greening will get worse and continue to spread because those who are not using control measures will ruin others. Still, despite these concerns, several participants remain optimistic: "We're not in panic mode...we need to learn from it, see what we can do, tackle it head on." Most said they can learn to manage this disease, as they have previous diseases, if they have the proper information and the cooperation and participation of all involved – growers, processors, and researchers. As one grower said:

If you want us to continue to grow citrus in Florida, everybody's going to have to step up to the plate. And the only people that are going to find a cure for greening are the people in this room (motioning to other growers), and the people out there in the industry. IFAS is not going to do it for us. UDSA is not going to do it for us. So we're out there trying things, and some people have been persecuted because they have tried things. And now that those things are starting to look a little bit better, their neighbors are like, 'Hmmm. Maybe we need to rethink this program.' Everybody needs to keep an open mind and be willing to learn something new every day.

### **Discussion and Conclusions**

Focus group results indicated that Florida citrus growers preferred to receive information about citrus greening via meetings and field days. They also preferred to receive information from other farmers, to find out how their peers have been handling citrus greening. Focus group participants were less likely to prefer information transmitted by other methods, such as publications or e-mail. Growers were concerned about the possible lack of action of their neighbors to manage citrus greening. Focus group participants struggled with trusting plant researchers and regulators, based on two primary reasons: 1) growers' previous experiences during the unsuccessful citrus canker eradication program and 2) growers' perceptions of the practicality of researchers' information. Finally, farmers were critical of the lack of information; they also thought information they did receive was not provided in a timely manner, saying that "no one told us" of the devastating impact of citrus greening, until it became too late.

Because citrus greening is in the early stages in Florida, producers said they lack sufficient knowledge and experience with the best ways to identify the disease and apply cost-effective treatments. While the actions of neighboring operations can add another element of uncertainty for citrus managers, participants in this study said their fellow growers have proven to be their best means of support during the greening crisis. Growers, with assistance from university and government researchers, have trained one another in identifying greening and controlling it, and fund researching to treat the disease.

Findings in this study complement previous studies' results on source credibility and opinion leadership. Valentine and Davis (1999) noted the need for opinion leaders to be credible in their communities in order for an innovation to be diffused. Citrus growers in this study looked to other

citrus growers to be those credible sources of information. The growers were less likely to view research institutions and government agencies as having information that would help them battle citrus greening and were more likely to seek information and assistance directly from those in the citrus growing community whom they viewed as credible. In essence, the citrus growers became opinion leaders on this topic due to the perceived trust and information they had in the community (Corey, 1971). They worked and shared information collaboratively to diffuse any innovation that might stop the spread of citrus greening (Leonard-Barton, 1985; Rogers, 2003).

Similar to Windham's (2009) results that farmers and growers hold research institutions highly, the focus group participants in this study also had high regards for research institutions overall. However, on the topic of citrus greening, the growers held research institutions in somewhat low regard, based primarily on their collective experiences with research institutions during the previous citrus canker outbreak. This negative experience caused citrus growers to doubt whether research institutions would have the answers the growers needed to control citrus greening. Frewer et al. (1998) also found the role prior attitudes play impacts an individual's response to incoming information. The citrus industry's experience with citrus canker may have played a role in the response to this latest disease, as growers reacted to greening largely on their own and were wary of the regulatory interference that they perceived had characterized the canker eradication program.

Citrus growers in Florida have faced many crises and threats to sustainability. They continue to produce an agricultural crop in a state where land values, until recently, made it very attractive to sell farmland to real estate development. Growers face growing competition from overseas producers. In the past decade, they have confronted a series of devastating diseases and hurricanes. This is the larger context of the citrus greening plague that is sweeping the state. The disease itself is difficult to monitor, contributing to the widespread uncertainty and making communication and expert guidance even more important. While agricultural researchers and Extension have played a key role in identifying the disease and recommending practices, they must also recognize how the current environment affects growers' perceptions of institutions and their need for information. Growers may have greater trust in their fellow growers who have stepped up their leadership roles. Extension, researchers, and government agencies must utilize the growers as partners.

## **Recommendations**

The following recommendations for practice are based on this study's findings:

### **Preferred Information and Communication Channels**

Although Extension services and other education-dissemination organizations have devoted tremendous resources to place information online or in other electronic-friendly forms, this study indicates that face-to-face communication methods – in the forms of field days, training programs, and grower meetings – remain extremely important to growers. Growers want to be able to share what they have learned through trial and error to control pests and diseases.

Another communications channel aspect to consider, based on the results of this study is the impact of social media. This study was conducted prior to the widespread use of social media (Facebook, Twitter, YouTube, and blogs). Extension faculty should determine what – if any – social media delivery methods their clientele are using. If growers have adopted social media, then these methods should be utilized to provide a forum for growers to share information. Studying growers' current social media habits also would be a recommendation for further research.

### **Trust and Relationships**

As this study implies, it is important for agricultural communicators, Extension, and related educational organizations to get “buy in” from impacted and targeted audiences, if new control or management practices are to be introduced. Growers in this study said they did not feel they were part of the solution; they were told what to do, but did not really have a say about the control methods. In addition, this study shows that trust that has been built up over time can be lost in a short period. Growers’ negative experiences with the citrus canker eradication program tainted their views of the control methods for citrus greening. Growers did not feel the citrus greening recommendations were in growers’ best interests, due in large degree to their distrust of researchers, regulators, and processors. A recommendation from this study would be for organizations to continue to build trust with growers; in this study, trust could have been built – based on growers’ perceptions – by allowing growers to be partners in the process, not outsiders looking in. Lastly, it is recommended that researchers, Extension faculty, or other change agents wishing to establish a behavior change, such as disease management efforts, should identify opinion leaders in their local communities to be advocates on their behalf.

### **Timely and Practical Information**

A disturbing conclusion drawn from this study is that growers may perceive researchers as providing control methods that are more academic than practical. Several focus group participants discussed “Ph.D’s,” “academic and scientific research,” and “not practical research” in a derogatory way. Some said they believed researchers were more concerned with publishing academic papers than finding practical solutions to citrus greening. Therefore, it is highly recommended that researchers strive to show the practical side of their research to growers – whether through Extension field days or how-to, practical publications.

### **About the Authors**

ACE members Ricky Telg and Tracy Irani are professors in the University of Florida’s Department of Agricultural Education and Communication, where they teach courses on digital media development, journalistic writing, media relations, and public relations. Paul Monaghan is an assistant professor in UF’s Department of Agricultural Education and Communication. His focus is on the dissemination of community-based social marketing methods among Florida’s Cooperative Extension Service faculty. Christy Chiarelli is the associate director of development for UF’s College of Agricultural and Life Sciences, where she works to secure private support for the college. Michael J. Scicchitano is director of the Florida Survey Research Center and a faculty member in UF’s Department of Political Science, where he directs the master’s program in Public Affairs. Tracy L. Johns, an assistant professor in Political Science, teaches graduate courses in data analysis and research methodology, and is the research director at the Florida Survey Research Center.

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