# Identifying Publics in Citrus Producing States to Address the Issue of Citrus Greening

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**Abstract**

Citrus greening is a critical issue facing the agricultural industry in the United States. The disease has been identified in residential and commercial areas, and there is a need to identify best practices in communicating with the public about the disease. The Situational Theory of Publics (STOPs) uses audience segmentation to determine how to best communicate with target consumers and was used to guide this study. The purpose of the study was to determine the types of publics present in the citrus producing states of Florida, California, and Texas as they relate to citrus greening. An online survey was completed by 1,541 respondents in the states of interest. The majority of respondents in all three states had low issue involvement and high knowledge related to citrus greening. The publics were categorized as active, aware, aroused, and inactive, and differences were noted across demographic categories. There were also differences in the types of publics present across states; Florida had the largest percent of active publics. Communication in Florida should use calls to action to encourage specific behaviors from the active public, but agricultural communicators in Texas and California need to focus messages and campaigns on increasing issue involvement related to citrus greening. Future research should test messages about citrus greening using focus groups to gain a greater understanding of consumers' information seeking behaviors related to the disease.

**Keywords**

citrus greening, audience segmentation, publics, communication campaign

## Identifying Publics in Citrus Producing States to Address the Issue of Citrus Greening

The number of critical issues affecting agricultural and natural resources industries is vast (Environmental Protection Agency [EPA], 2016), and many can be addressed through human intervention. One important issue the agricultural industry is facing is citrus greening. In 2005, the citrus disease Huanglongbing (HLB) was identified in Florida (UF/IFAS Citrus Extension, 2016). The disease is commonly referred to as citrus greening due to the discoloration of the fruits caused by the bacterium. Infected trees have misshapen, small, green fruit that are bitter to taste. Within as little as five years, citrus greening can kill infected trees (University of California, Agriculture and Natural Resources [UC-ANR], 2016). If citrus greening continues to spread throughout citrus producing states, the effects could be detrimental and the United States (US) citrus industry may completely collapse. One of the major problems with citrus greening is there is currently no cure or affordable management practice available to growers (Singerman & Useche, 2016).

Florida produced more than 130 million boxes of oranges in the 2012/2013 season (U.S. Department of Agriculture-National Agricultural Statistics Service [USDA-NASS], 2016a) but only 81 million boxes of oranges in the 2015/2016 season (USDA-NASS, 2016b). A field box of citrus holds approximately 90 pounds of oranges, 85 pounds of grapefruit, or 95 pounds of tangerines (Florida Citrus Mutual, 2012). By 2016, all commercial and residential citrus growing counties in Florida had been affected by citrus greening (UF/IFAS Citrus Extension, 2016).

Florida is the number one citrus producing state in the US and contributes more than $8 billion in output annually (Hodges, Rahmani, Stevens, & Spreen, 2014), but its orange production is predicted to continue to decrease due to citrus greening in upcoming seasons (USDA-Foreign Agricultural Service, 2017). California is the second highest producer of oranges with more than 50 million boxes produced in the 2015/2016 season (USDA-NASS, 2016b). Growers hoped that citrus greening would not make it to California but the first case was identified in the summer of 2015 (Ferris, 2015). Texas is the third largest contributor to the citrus industry with 1,691 boxes produced in the 2015/2016 season (USDA-NASS, 2016); however, they were not immune to citrus greening. The insect-spread disease arrived in Texas in 2012 (Herrick, 2012). With all three major citrus producing states infected, the US citrus industry is in jeopardy of collapse if the spread of the disease remains unstopped (Davis, 2017; Kelley, 2017; Teague, 2017).

Florida's citrus industry alone has lost more than $4 billion and 41,284 jobs due to citrus greening between 2005 and 2011 (Hodges et al., 2014). The California citrus industry has yet to experience the negative impacts of citrus greening (USDA-NASS, 2015) due to how new the disease is to the area. However, the effects of the disease could devastate California's $1.9 billion citrus industry (USDA-NASS, 2015) and 22,000 employees (Citrus Pest and Disease Prevention Program [CPDPP], 2016). Texas is the number one producer of grapefruit in the US, which can also be affected by citrus greening, and its total citrus industry was valued at $55 million in 2015 (USDA-NASS, 2015). The value of the Texas citrus industry dropped $15 million since the disease arrived in 2012.

While the threat of citrus greening is a concern for the agricultural industry in these citrus producing-states and citrus growers are particularly concerned, the ramifications of the disease will affect consumers as well (Perez, 2017). Future orange juice prices are expected to increase due to a shortage of citrus (Perez, 2017). However, citrus consumption is predicted to increase (USDA-Foreign Agricultural Services [FAS], 2016). Citrus is also used in desserts, mixed drinks, beauty products, and home goods (Florida Department of Citrus, 2017), which could make the effects of a potential citrus industry collapse widespread (USDA-FAS, 2016). Aside from not

having certain products available, customers will also be faced with indirect effects if their states lost the citrus industry. Thousands of people would be out of work and the states could lose billions of dollars in revenue (CPDPP, 2016; Hodges et al., 2014; USDA-NASS, 2015). To compensate for this lack of revenue, government officials may elect to reduce tax breaks or increase tax rates to generate revenue (Tax Policy Center, 2016).

Increasing public awareness of citrus greening will be critical in helping to stop its spread and keeping the citrus industry intact. For residential citrus owners, early detection and tree quarantine can help stop the spread from one tree to another (UC-ANR, 2016). News outlets in California and Texas have asked residential citrus owners to look for symptoms of citrus greening and report infected trees to proper authorities (Kelley, 2017; Teague, 2017). Residential citrus owners are encouraged to help protect citrus by inspecting their trees for insect damage, purchasing trees from reputable nurseries, and calling state specialists if they believe their tree has been infected (CPDPP, 2016). An aware and active public is needed not only to help stop the spread of citrus greening in residential areas but to support the industry itself. Public support for the citrus industry can be demonstrated through consumer purchase of US citrus products and support of government-funded research initiatives and farm subsidies in the commercial sector. Previous research has explored communication strategies when reaching out to producers affected by citrus greening (Telg et al., 2012) but how to communicate about citrus greening with different publics has not been explored. The purpose of this research was to identify the types of publics in Florida, California, and Texas in regard to citrus greening.

## Conceptual Framework

To achieve desired results of human intervention and to encourage behavioral and attitudinal changes with specific audiences, audience segmentation can be used to develop strategic communication around agricultural and natural resource issues (Gorham, Lamm, & Rumble, 2014; Layman, Doll, & Peters, 2013; Maibach, Leiserowitz, Roser-Renouf, & Mertz, 2011; Monaghan, Ott, Wilber, Gouldthorpe, & Racevskis, 2013). Audience segmentation involves categorizing people from one public into smaller, homogenous public clusters and is often used in communication campaigns when addressing contextual issues. These smaller publics share common beliefs, values, and attitudes (Slater, 1995), which allows organizations to strategically plan how to best utilize resources to communicate (Dibb, 1999).

Audience segmentation can be a useful strategy when communicating about specific issues in agricultural and life science. Segmenting an audience allows a communicator to target specific audiences' motivations to encourage behavioral changes rather than hoping a universal communication strategy will resonate across all audiences (Kotler, Roberto, & Lee, 2002). Categorizing general audiences into sub-publics surrounding an issue is one way to implement audience segmentation (Grunig, 1983).

Dewey (1927) originally defined publics as groups of people faced with the same problem and collaborating to address an issue. Using that definition, Grunig and Repper (1992) differentiated between publics and stakeholders by stating stakeholders are chosen by organizations to be marketed and communicated to, while publics develop organically and actively seek information about an issue from an organization. However, Grunig (1983) proposed there is not one set public. Depending on the issue, publics will actively, passively, or simply not communicate (Grunig, 2005). The Situational Theory of Publics (STOPs) further elaborated on this hypothesis and explored why there are both passive and active publics. Identifying differences in types of publics

could aid in the development of appropriate communication methods dependent upon the situation (Grunig, 1983).

Grunig (1983) identified four different types of publics: nonpublics, latent publics, aware publics, and active publics. Nonpublics are not exposed to an issue or problem, while latent publics are exposed to the issue but do not recognize it as an issue. Aware publics recognize a problem exists but do not take action, and active publics recognize a problem and take action. What type of public a person is categorized into is dependent upon their level of issue involvement, problem recognition, and constraint recognition (Grunig, 1983). Issue involvement is how people are able to connect themselves to a problem personally, while problem recognition requires a person to be aware of a problem that affects them. Constraint recognition is an individuals' perception regarding whether or not they can do anything about the problem. Those who are high in involvement and issue recognition but low in constraint recognition for a situation are categorized as active publics. Conversely, those with low problem recognition and involvement and high constraint recognition are considered non-publics (Rawlins, 2006).

Depending on the type of public, different communication strategies should be implemented (Rawlins, 2006). For those in the active public, communication should be behavior-oriented and include a call to action. These people are considered advocate stakeholders and will likely take action such as providing endorsements, making donations, and letter writing. Dormant stakeholders are the portion of the aware public that are not quite ready to become involved in an issue. Sometimes inactivity is due to lack of knowledge or not seeing the personal connection with the issue. Communication for this public should focus on increasing knowledge or personal relevance accordingly. Adversarial stakeholders are similar to advocate stakeholders in that both groups are active publics. However; adversarial stakeholders do not support the issue. Rawlins (2006) recommended organizations aim for win-win solutions with this group through conflict resolution strategies. Finally, apathetic stakeholders represent the latent public and simply are not aware an issue exists. Communication with this group should aim at increasing the saliency of the issue and inviting members to become involved in addressing the problem (Rawlins, 2006).

Hallahan (2000) expanded on STOPs and specifically explored the role of the inactive public in public relation strategies, arguing that it is most often overlooked or forgotten. Hallahan (2000) explored the roles of issue involvement and knowledge and how they predicted consumers' responses to communication. Active publics have high issue involvement and high knowledge (Hallahan, 2000), try to affect change, and initiate conversations with organizations about issues. Communication with this group should encourage open dialogue and address leaders of the public. Aware publics have high knowledge and low involvement and are unlikely to communicate about the issue unless they would benefit personally from the communication. This group could hold influence in the community and its behavior should be monitored. Communication should encourage (or discourage depending on the issue) this group to act as influencers and supply it with more information on the issue (Hallahan, 2000).

Hallahan (2000) split Grunig's (1983) latent public category into inactive and aroused publics. The aroused public was characterized by low knowledge and moderate/high issue involvement. This group has some familiarity with the issue and will seek information to reduce related perceptions of risk. Hallahan (2000) recommended communicators research the source of this group's arousal and frame messages related to the public's concern of the issue.

People with low knowledge and low issue involvement were labeled as the inactive public. Inactive publics are unlikely to seek information on an issue outside their own personal needs or without being prompted (Hallahan, 2000). Therefore, organizations should be proactive in

providing this public with information. By motivating this public to learn more about an issue and increasing their knowledge on the topic, organizations can also build positive relationships with inactive publics. Organizations have to find ways to facilitate opportunities to communicate with the inactive public and enhance their motivation to process the information (Hallahan, 2000).

Major (1998) used STOPs to determine how to communicate to publics after a natural disaster. Interpersonal discussions related to the problems made people feel more connected to the problem and demonstrate higher problem recognition. Rather than use traditional outlets like newspapers and television to convey information about a natural disaster, Major (1998) suggested using social platforms, like community centers and churches, to increase interpersonal communication when developing community response plans. Additionally, messages should include specific risks related to the community to help increase problem recognition (Major, 1998). Roser and Thompson (1995) found that using fear appeals in messages evoked strong emotional responses from publics who were already emotionally involved in an issue. Additionally, the researchers determined that emotional arousal drove publics to become active.

Aldoory, Kim, and Tindall (2010) also used STOPs to explore how shared risk experiences influence risk communication. The researchers determined that if viewers could identify similarities between themselves and the victims or spokesperson of food terrorism in a news story, their issue involvement increased. The researchers concluded that the media could heighten awareness of an issue, which would lead to consumers exhibiting behaviors to protect themselves against potential risks. Recommendations included using sources in media coverage that share similarities with the audience (Aldoory et al., 2010).

## Purpose and Objectives

The purpose of this study was to identify and understand the types of publics in Florida, Texas, and California as they relate to citrus greening to provide insight to the development of communication campaigns that will resonate and encourage the public to take action. The following objectives guided the research:
1. Describe respondents' issue involvement and knowledge associated with citrus greening.
2. Describe respondent characteristics based on the public category they fall within as it relates to citrus greening.
3. Describe the types of publics present in Florida, California, and Texas related to citrus greening.

## Methods

Survey methodology was used to fulfill the purpose of this study. Purposive, non-probability sampling methods were used to collect the sample for the study. Residents 18 years and older of Florida, California, and Texas were selected as the population of interest due to the states' high citrus production (USDA-NASS, 2015). Additionally, citrus greening has been identified in all three states (Ferris, 2015; Herrick, 2012; UF/IFAS Citrus Extension, 2016). These citrus-state residents could help mitigate the effect of citrus greening by reporting diseased trees, purchasing local citrus products, and supporting government-funded initiatives to address citrus greening. Even though citrus greening had been in California for a relatively short time compared to Florida or Texas, the disease could have significant impacts on the state in the future (Ferris, 2015).

Identifying the publics in all three states could help develop strategic communication critical to the success of the industry.

The online survey company, Qualtrics, delivered the survey to 2,757 potential respondents. Quota questions were asked at the beginning of the survey to ensure approximately equal response between states and two attention filter questions were used to alleviate issues with respondents randomly selecting answers. After incomplete responses were discarded, there were 1,541 usable responses that met the quota and passed the attention filter questions for a participation rate of 55.9%. A limitation to non-purposive sampling methods is not everyone in the population has an equal chance of selection. Additionally, only residents with computer and internet access could participate in the study. These limitations can lower the generalizability of results (Ary, Jacobs, & Sorensen, 2010).

The nine questions analyzed from this study came from a larger survey of 55 questions. The survey also asked respondents about their perceptions of gene technology in agriculture in addition to questions related to citrus and citrus greening. The face and construct validity of the instrument was assessed by a panel of experts that included the Associate Director for UF/IFAS Center for Public Issues Education at the University of Florida, an associate professor with specialized knowledge in survey design, and an assistant professor with a concentration in food production. Additionally, a pilot study was used to identify any issues with the instrument. All the constructs in the study were found to be reliable at a Cronbach's alpha of .70 (Field, 2013). The survey was open from September 24, 2015 to October 7, 2015 to avoid a history effect on the respondents' answers.

Hallahan's (2000) definition of publics was used for this study. Respondents were categorized as having high or low issue involvement and knowledge and coded as belong in the active, aware, aroused, or inactive public. The constructs for issue involvement and knowledge were researcher developed. Issue involvement was measured with a four-item, five-point bipolar semantic differential scale. Scales with at least four items are considered internally reliable (Harvey, Billings, & Nilan, 1985; Hinkin & Schriesheim, 1989). Statements included, "I am very concerned about citrus greening disease/ I am not at all concerned about citrus greening disease," "I am bothered by citrus greening/ I am not bothered by citrus greening," "citrus greening directly affects me/citrus greening does not directly affect me," and "I care a great deal about finding a cure for citrus greening disease/I do not care at all about finding a cure for citrus greening disease." Positive statements were coded as a five and negative statements were coded as a one. An index was created by calculating the average of the four items. Similar to previous scholars (Haugtvedt & Petty, 1992), the researchers categorized the respondents as having high or low issue involvement based on their indexed score. Respondents were considered to have *high issue involvement* if their mean on the index was equal to or higher than the average for the sample (*M* = 3.30, *SD* = .95). *Low issue involvement* was coded as anything below the sample mean for issue involvement.

Five knowledge questions asked respondents about how citrus greening was spread, where it originated, what part of the tree it infected, symptoms of citrus greening, and what states were infected (Florida, California, Texas, or none). Specific, technical questions about citrus greening were omitted from the knowledge construct because the depth of information was assumed to be beyond what the average consumer would know. Five knowledge questions were determined to be sufficient (Harvey et al., 1985; Hinkin & Schriesheim, 1989) because the construct was not ambiguous (Ary et al., 2010). The number of questions was also limited to reduce respondent fatigue during a long survey (Lavrakas, 2008). A count variable was created for the knowledge construct; each correct answer counted as one point. The scale ranged from zero (no knowledge)

to five (complete knowledge). If respondents answered at least three questions correctly, they were coded as having *high knowledge* for this sample of the population. *Low knowledge* included respondents answering between zero and two questions correctly. A limitation to this type of measurement is the researcher has to assume the respondent is not guessing. While open-ended knowledge questions could have provided more valid results, that type of questioning also tends to receive "don't know" answers from people who are not confident in their correct answer (Mondak, 2001). For this reason, along with the large sample size, the researchers elected to use multiple choice questions.

The researchers followed Hallahan's (2000) categorization of publics using knowledge and issue involvement to categorize the respondents. Those with high knowledge and high issue involvement were coded as active publics, and high knowledge and low involvement were coded as aware publics. Aroused publics included respondents with low knowledge and high involvement, and inactive publics included low knowledge and low involvement respondents (Hallahan, 2000).

Demographic questions asked about age, sex, education, income, and race (check all that apply). A full description of respondents can be seen in Table 1. The majority of the respondents were over the age of 45 and more than 50% were female. Approximately one-third of the respondents had a four-year college degree and one-third had an annual income of $75,000 or more. The majority of the sample was white and one-tenth were Hispanic. Approximately one-third of respondents had children living in their home.

All data were analyzed in SPSS. Descriptive statistics were used in objectives one and two. For objective one, the data were split by state to determine the issue involvement and knowledge of respondents in Florida, California, and Texas separately. Two Chi-square tests were used to explore the association between state and knowledge and issue involvement. The data file was split in objective two to analyze the demographic characteristics of each public. Descriptive statistics and Chi-square tests were used to fulfill objective three. *Post hoc* tests were used to determine where statistical differences existed between the states.

Table 1
*Description of Respondents* (n = 1,541)

|  | % |
| --- | --- |
| Age |  |
| 18-24 | 2.4 |
| 25-44 | 26.8 |
| 45-64 | 40.4 |
| 65+ | 30.4 |
| Gender |  |
| Female | 52.6 |
| Male | 47.4 |
| Education |  |
| High School or less | 14.6 |
| Some College | 23.2 |
| 2-year College Degree | 11.8 |
| 4-year College Degree | 33.0 |
| Graduate or Professional School | 17.5 |

| Income | |
|---|---|
| $25,000 > | 15.2 |
| $25,000 -$49,999 | 24.6 |
| $50,000 -$74,999 | 22.9 |
| $75,000 -$149,999 | 28.6 |
| $150,000 or more | 8.7 |
| Race | |
| White | 88.6 |
| African American | 5.5 |
| Other | 7.6 |
| Hispanic | 10.9 |
| Children in Home | 32.7 |

## Results

### Issue Involvement and Knowledge Related to Citrus Greening

Examining the respondents within each state separately, Florida, California, and Texas had a similar percentage of respondents with high knowledge of citrus greening (Table 2); a Chi-square test was not statistically significant between knowledge and states ($X^2(2) = 5.59$, $p = .06$). However, there was a statistically significant association between states and issue involvement ($X^2(2) = 6.97$, $p = .03$). The majority of respondents in the three states did not express high levels of issue involvement, but *post hoc* tests revealed Florida had a larger proportion of high issue involvement respondents compared to California or Texas.

Table 2

*Issue Involvement and Knowledge in California, Florida, and Texas*

| | California ($n = 523$) | Florida ($n = 516$) | Texas ($n = 502$) |
|---|---|---|---|
| Category | % | % | % |
| High Issue Involvement | 42.4$_a$ | 49.8$_b$ | 43.0$_a$ |
| High Knowledge | 60.0 | 62.8 | 55.6 |

*Note*. Identical subscripts across public category indicate no statistical differences between states ($p < .05$).

### Description of Publics

The largest age groups in active, aware, and inactive publics were respondents between the ages of 45 and 64 (Table 3). The largest proportion of aroused respondents were between the ages of 25 and 44, which was nearly twice the proportion of that age group in the active public. The majority of active and aware publics were female, and the majority of aroused and inactive publics were male. Education across the publics was similar; the largest proportion of respondents in each category had earned a 4-year college degree. The publics also had similar distribution of race ( the majority were white) and ethnicity. However, the aroused and inactive publics had larger

proportions of Hispanic respondents compared to the other public categories. The aroused public was the only one where more than half the respondents had children living at home.

Table 3
*Description of Respondents in Each Public*

|  | Active (n = 438) % | Aware (n = 479) % | Aroused (n = 257) % | Inactive (n =367) % |
|---|---|---|---|---|
| Age |  |  |  |  |
| 18-24 | 1.1 | 2.5 | 2.7 | 3.5 |
| 25-44 | 17.1 | 21.7 | 46.7 | 31.1 |
| 45-64 | 45.7 | 43.4 | 31.5 | 36.5 |
| 65+ | 36.1 | 32.4 | 19.1 | 28.9 |
| Gender |  |  |  |  |
| Female | 54.8 | 56.8 | 49.4 | 46.9 |
| Male | 45.3 | 43.2 | 50.6 | 53.1 |
| Education |  |  |  |  |
| High School or less | 13.0 | 12.9 | 17.1 | 16.9 |
| Some College | 22.8 | 23.4 | 24.5 | 22.3 |
| 2-year College Degree | 13.7 | 11.7 | 7.0 | 13.1 |
| 4-year College Degree | 34.0 | 33.4 | 34.6 | 30.0 |
| Graduate or Professional School | 16.4 | 18.6 | 16.7 | 17.7 |
| Income |  |  |  |  |
| $25,000 > | 16.4 | 16.3 | 12.2 | 14.4 |
| $25,000 -$49,999 | 25.3 | 25.5 | 19.8 | 25.9 |
| $50,000 -$74,999 | 24.4 | 19.8 | 25.7 | 23.2 |
| $75,000 -$149,999 | 27.2 | 31.3 | 27.2 | 27.8 |
| $150,000 or more | 6.6 | 7.1 | 15.2 | 8.7 |
| Race |  |  |  |  |
| White | 89.3 | 88.7 | 89.1 | 87.2 |
| African American | 5.5 | 4.6 | 6.2 | 7.1 |
| Other | 7.5 | 7.7 | 7.4 | 7.1 |
| Hispanic | 10.5 | 6.5 | 16.7 | 13.1 |
| Children in Home | 25.3 | 22.1 | 52.5 | 32.7 |

**Types of Publics in California, Florida, and Texas**

Florida was the only state with the highest proportion of respondents identified as active (Table 4). The largest public in both California and Texas was aware. A quarter of respondents in California and Texas, and one-fifth of respondents in Florida were identified as part of the inactive public. There was a statistical association found between type of public and geographic location ($X^2$ (6) = 13.21, $p$ = .04). The only statistical difference between states was that Florida had a larger proportion of active public respondents compared to California or Texas.

Table 4
*Types of Public in California, Florida, and Texas*

|  | California (*n* = 523) % | Florida (*n* = 516) % | Texas (*n* = 502) % |
|---|---|---|---|
| Active | $27.3_a$ | $33.3_b$ | $24.5_a$ |
| Aware | $32.7_a$ | $29.5_a$ | $31.1_a$ |
| Aroused | $15.1_a$ | $16.5_a$ | $18.5_a$ |
| Inactive | $24.9_a$ | $20.7_a$ | $25.9_a$ |

*Note*. Identical subscripts across public category indicate no statistical differences between states ($p < .05$).

## Discussion, Implications, and Recommendations

This study sought to explore the types of publics in Florida, California, and Texas regarding citrus greening to inform how to communicate most effectively with residents of citrus producing states. Raising awareness of citrus greening in these states could help the industry if residents support government initiatives, purchase state-grown citrus products, and report infected trees they may own. Around half of the respondents across all three states were categorized as having low issue involvement, which indicates a need to increase the personal relevance of citrus greening to consumers in citrus producing states. California and Texas had a smaller portion of respondents with high issue involvement compared to Florida. Citrus greening has been present in Florida for more than a decade (UF/IFAS Citrus Extension, 2016), and residents of the state may have been exposed to more news coverage or personal stories about the disease and feel involved with the issue as a result. Additionally, more than half of the respondents had high knowledge of citrus greening; however, only five knowledge questions were asked (a limitation of the study), and respondents could have been guessing the answers rather than displaying true knowledge.

Research has shown that highlighting similarities between groups, such as family values and personal needs, can increase issue involvement among the public (Aldoory et al., 2010). Therefore, to increase issue involvement of citrus greening in all three states, agricultural communicators should use media appropriate for their audience to cover stories of individual growers affected by citrus greening or potentially increased citrus prices to make the impacts of the disease personal. In addition, to help people feel more connected to the issue of citrus greening, interpersonal communication can be promoted through the use of social networking (Major, 1998), which can include in-person and online communication. Communicators in Texas, Florida, and California should focus on increasing issue involvement by framing messages around how important the citrus industry is to the state and to individual farm owners. Another way to increase issue involvement is to use spokespersons with similar psychological and physiological characteristics as the target audience (Aldoory et al., 2010). For example, a communication campaign targeting families should use a spokesperson who is a mother or father to increase issue involvement from the public.

The largest age group of the aroused public were between the ages of 25 and 44, which is consistent with the largest age group in the overall sample. This public represents apathetic stakeholders (Rawlins, 2006). To target this age group, communication with the purpose of increasing awareness of citrus greening could be distributed in community areas that are frequented by this demographic such as local farmers markets, groceries, community centers, and

town forums. Since the majority of active and aware respondents were women, they will also need to be targeted specifically. These publics represent dormant and advocate stakeholders, and communication with them should provide a call to action (Rawlins, 2006). Additionally, about a quarter of these publics had children, and framing the issue of citrus greening around the effects of not having orange juice available for children could increase the personal relevancy of the issue (Rawlins, 2006) and create an emotional response to the potential decrease in orange juice availability (Roser & Thompson, 1995). A call to action in the communication should focus on women who serve as leaders in their community to influence others' perceptions and awareness of citrus greening (Hallahan, 2000). Additionally, using two-way communication in social media platforms like Twitter, Facebook, and Instagram will encourage open dialogue amongst the active public to encourage them to exhibit specific behaviors (Major, 1998).

Education level amongst the publics was relatively uniform. This finding indicates that education level holds little effect on the type of public in regard to citrus greening. However, the aroused public had nearly twice the proportion of respondents earning more than $150,000 a year compared to the other publics. This public has high issue involvement, but low knowledge (Hallahan, 2000). Communication can be distributed in affluential neighborhoods to target this public through appropriate media channels (e.g. mailers, homeowner meetings, etc.). Communicators will need to research the source of arousal for the group and ensure messages target the consumers' concerns (Hallahan, 2000) related to citrus greening, whether that be increased citrus price or loss of local jobs and economic downturn. Since the majority of the aroused public had children, communication should be family-focused. Additionally, information about citrus greening could be taught to children in a formal school setting, which could lead to discussions in the family about citrus greening and increased knowledge. Increasing the knowledge of this group is important to help guide the public from being aroused to active. Communicators need to increase knowledge or issue involvement to create an active public that can help lead to behavioral changes that mitigate the effects of citrus greening (Grunig, 1983).

Florida was the only state to have the highest percentage of respondents fall into the active public category due to it having the largest proportion of respondents with high issue involvement and high knowledge of citrus greening. This high percent of an active public is likely the result of Florida being the top citrus producing state in the US (USDA-NASS, 2016b) and the presence of citrus greening in the area for the past ten years (UF/IFAS Citrus Extension, 2016). The consumers in Florida should be interested in taking action regarding citrus greening, and agricultural communicators should focus their communication on encouraging specific behaviors (Rawlins, 2006), which could include reporting infected trees (CPDPP, 2016) or making donations for research efforts. General awareness campaigns should be used to increase problem recognition for consumers who are not part of the active public.

California's and Texas' largest public was the aware public. Communicators in California and Texas should focus messaging on increasing issue involvement to encourage this public to develop into an active public. Approximately a quarter of the respondents in Texas and California and a fifth of the respondents in Florida were categorized as the inactive public. This group is not likely to seek information about a topic outside their personal needs (Hallahan, 2000). Communication in Texas, California, and Florida should focus on increasing a sense of issue involvement to target inactive publics and encourage specific behaviors (Hallahan, 2000).

Further research could include conducting focus groups or interviews to gain an in-depth understanding of consumers' perceptions of citrus greening. Collecting questions, quantitatively or qualitatively, on consumers' information seeking behaviors regarding citrus greening would

also provide greater insight into the types of publics present (Grunig, 1989). Message frames focusing on consumer values versus knowledge of citrus greening should also be tested to determine their effect on issue involvement and knowledge. Additionally, alternative ways to measure knowledge should be investigated. Qualitatively assessing knowledge could represent knowledge more accurately than the present study because it could lessen the effects of guessing on a multiple choice knowledge construct in a survey.

One limitation of this study is that the data differentiated between the publics in citrus producing states but not between publics in the states themselves. Citrus is not produced in every county in Florida, California, and Texas, so future research should compare publics between citrus producing counties and non-citrus producing counties to create targeted communication. Another limitation is this study explored the publics identified by Hallahan (2000), but further research could use the categorizations developed by Grunig (1983) to gain a more detailed and nuanced understanding of the types of public present in Florida, California, and Texas. The survey could also be replicated in other countries affected by citrus greening to address cultural differences between publics. Finally, other critical agriculture and natural resources issues like animal welfare, food safety recalls, and water quality and quantity could be explored using STOPs to further identify how to communicate about issues more broadly.

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