Self-reported Willingness to Pay for Texas Persimmon Fruit as a Food Source

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SUMMARY. The purpose of this study was to test the consumer-stated willingness to pay (WTP) of a native Texas plant fruit product, texas persimmon (*Diospyros texana*), for the restaurant industry, as well as for the consumer market. Farmers' markets and restaurants specializing in either local foods, organic foods, or both were the focus of the market samples. Responses were gathered from five cities located in the geographic area of central Texas where the fruit is native including: San Marcos, Austin, New Braunfels, Wimberley, and Bastrop. About 400 quantitative survey responses were collected from farmers' markets consumers during market days. Seven interviews collecting qualitative responses from restaurateurs provided more in-depth data on the value of the product to specialty restaurants. Restaurateurs responded positively to the texas persimmon and stated they would be willing to pay between \$3.59 and \$3.69/lb of texas persimmon. Results indicated the prime audience for the texas persimmon to be those who attend farmers' markets in the age group of 25–34 years who value locally produced foods and are concerned about the environment. Farmers' market consumers were willing to pay prices similar to specialty fruit prices.

Concerns over how food is grown, harvested, processed, and shipped have led to a revitalization of the local and organic movements (Curtis, 2011). The word revitalization is used because local and organic methods were how humans fed themselves historically until the last 200 years when industrial agriculture changed the agrarian landscape (Mazoyer and Roudart, 2006). The reasoning behind a resurgence of these ideas is that many of the diseases of civilization, such as diabetes, heart conditions, and high cholesterol, originated from a Western industrialized diet (Diamond, 1997). Some interested in a better diet, and a closer relationship with their food sources have begun to support small, local farmers rather than large-scale food corporations (Curtis, 2011). This alternative to industrial food comes with a higher price for the consumer, individually or combined, as higher food costs and increased effort to

purchase noncorporate food (Curtis, 2011).

The crops grown by these small farmers tend to still be the same crops grown by the large corporations, just on a smaller scale. Most of this produce is not native to where it is being grown. A native or indigenous species is one that occurs in a particular place without the help of humans (Schwartz, 1997) and exists within a specified geographical region of interest currently or historically without direct or indirect human intervention (Morse, 2009). Grocery stores and farmers' markets in the United States are full of various produce originally cultivated in Europe, Asia, and Africa, and grown in places in which, for the most part, they did not evolve. While many of these crops can easily grow in these novel places, it can lead to more energy spent tending to the crops (Clay, 2004; Gremillion, 1996) in the form of physical work, fertilizer application (organic or synthetic), and pest management efforts.

However, there are edible plants not yet commercialized (Arrigo et al., 2011; Bradbury and Emshwiller, 2011; Emshwiller et al., 2009; Sampliner and Miller, 2009). These plants are all around in the local landscapes; they need only to be identified and used. The edible species of plants not used by mainstream farming have potential, whether as food or for industry (Turner, 2009) in the areas in which they originated. If the plant existed there, then it adapted to the local environment (Oxford English Dictionary, 2012). By growing native food crop plants, farmers could create a new niche market and potentially reduce resources invested in managing their crops since the plants are adapted to regional conditions and have a safeguard against pestilence (Little et al., 2010). The rare fruit from another part of the world may not be necessary for health-conscious living, or for generating a profit marketing a new crop (Starling, 2007). Native plants have been marketed in the horticultural industry for landscape use, but little marketing research has emphasized the use of native plants as a food source. Those studies conducted have seen favorable results (Pomper et al., 1999; Templeton et al., 2003).

Typically, identifying a target audience is one of the first steps in new food product development (Costa and Jongen, 2006; van Kleef et al., 2005). The purpose of this study was to test the consumer WTP of a native Texas plant fruit product, texas persimmon, for the restaurant industry as well as for the consumer market. Specific objectives included surveying both restaurant owners and local farmers' markets, as well as testing for the relationship between WTP and preference for native and local products, and environmental attitudes to identify the potential target audience for the texas persimmon fruit.

Materials and methods

NATIVE CROP CRITERIA AND CHOICE. A review of central Texan

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Units

To convert U.S. to SI, multiply by	U.S. unit	SI unit	To convert SI to U.S., multiply by
0.3048	ft	m	3.2808
3.7854	gal	L	0.2642
0.4536	lb	kg	2.2046

native plants with reliable distribution and edible parts was conducted. Criteria in choosing the plant for the study included selecting a drought-tolerant plant (Wrede, 2010) since, while this study was being performed, the state of Texas was under a level of drought that was the worst on record (Stonewall County Courier, 2012; Texas Comptroller of Public Accounts, 2012). Because of the drought, normally abundant native fruit were severely lacking in number (Hawkes, 2011; Texas Comptroller of Public Accounts, 2012) and a plant with a drought tolerance was necessary to facilitate harvesting. In addition, it was important for the plant to have sweet, fleshy fruit. Studies have shown the human palette enjoys sweet foods (Mennella et al., 2005), and fleshy fruit would be more appealing to the participants (Giovannoni, 2001). Additionally, it was preferred for the fruit studied to be one in which the participant lacks familiarity. Some Texas native fruit were available in grocery stores (though not necessarily marketed as such), and so any participant might have a biased opinion of those already available, were they presented to the participant.

The Texas persimmon is native to the central Texan area and has been used by Native Americans, European settlers, and local wildlife as a food source (Turner, 2009). The Texas persimmon is a small upright tree ranging in size from under 10 ft to rare instances of 40 ft. They grow in dry alkaline soils, which are common across the Edwards Plateau of central Texas, meaning their distribution is wide. The fruit is a black berry, usually less than 1 inch in diameter, which ripen starting in late July and until September (Wrede, 2010). This fruit has a high concentration of sugar, and the flesh itself is easy to remove from the seeds and skin, thus facilitating the processing done to it on a small scale. The flesh is also black and extremely sweet because of the high concentration of sugar, and was used extensively in jams and pies by western U.S. settlers (Turner, 2009). Because of these qualities, the fruit of the Texas persimmon were used for the study.

HARVESTING, HANDLING, AND STORAGE. The fruit was harvested by hand upon ripening over the course of the summer season. This was due

to there being no easily attainable mechanisms for harvesting these fruit, as they are not commercially grown. After harvest, all fruit were cleaned of vegetative debris, washed and placed in sterile, resealable bags. The volume of these bags depended on their use. Restaurateurs were given 0.5-lb containers for their own use. The fruit used for the farmers' market surveys were stored in a 1-gal container and placed in a bowl for the participants to inspect. The fruit was then stored in a safe and secure refrigerator until it was ready to be delivered to the recipients.

SAMPLING. Two sample groups were selected for the study. One was a small group of restaurateurs (seven in total) and the other was a large group of farmers' markets attendees (400 in total). These were chosen for diversity of sample groups and opinions, and the exact criteria for their selection are described below.

RESTAURATEUR SAMPLE AND INTERVIEW SESSION. Qualitative interview data were collected from locally and independently owned restaurant owners/chefs who would potentially consider purchasing Texas persimmons wholesale for restaurant specialty dishes. When interview appointments were established, it was made clear the researcher would be interviewing the most executive individual who made choices relating to the food at the restaurants. This was usually the head chef (or derivatives of that title) and was also frequently the owner of the restaurant. Interviews lasted various amounts of time but were mostly under 30 min.

These restaurant owners/chefs were chosen based on whether they currently purchased local food, organic food, or both. While the exact percentage of overall restaurants in the region identifying within this niche market is unknown, reports are that the numbers have doubled since 2009 (Buchholz, 2012). This criterion was chosen as the concept where local and organic movements were considered a proxy for a food-related niche market. The rationale was if the restaurants were already participating in a niche market, the owners' opinions of a potential new niche market would be more reliable. Aggregate website lists of regional restaurants were used to find the niche market restaurants. From these websites, only restaurants that explicitly

noted the use of local food, organic food, or both were contacted. Phone calls and in-person visits were used to ascertain whether the restaurant would be participating. The participants were the first seven who responded positively after initial contact. This number corresponded with Morse's (2000) perspective that 6–10 participants were necessary to glean ideas from a target audience of those who face new needs of the market, those who are likely to profit from innovations [otherwise known as "lead users" (Lüthje and Herstatt, 2004)], or both.

Participants in the interview study were selected from the central Texan communities of San Marcos, Austin, and Wimberley. This region is the northern range of the Texas persimmon. The selection of these cities allowed the researchers to investigate the opinions of residents of the areas in which the fruit grows naturally.

RESTAURATEUR INTERVIEW QUESTIONNAIRE. The restaurateurs were given 0.5 lb of ripe fruit to analyze as they responded to the questionnaire. A panel of experts made up of horticulture, agricultural business, marketing, and focus group researchers reviewed the questionnaire before administration and questions were based on those from previous reliable and valid studies. The questionnaire asked open-ended questions regarding restaurateurs' specific thoughts and sensory perceptions of the fruit (Schreier et al., 2007), the niche food qualifiers: "local," "organic," and "native" (Kelley et al., 2006; Nie and Zepeda, 2011; Robinson and Smith, 2000), and how the restaurateurs chose suppliers (Kallas et al., 2011). Niche food terms were defined for the restaurateurs. In addition to attitudes and purchasing habits, the participants were administered a WTP question, which asked them to select a price they would pay for 1 lb of the fruit product (Schubert et al., 2010). Lastly, the participants answered demographic questions including those relating to age, education level, household income, and gender information (Hustvedt and Dickinson, 2009).

FARMERS' MARKET CONSUMER SAMPLE. About 400 quantitative survey responses were collected from those attending farmers' markets during market days in five cities located in the geographic area of central Texas where the fruit is native including San

Marcos, Austin, New Braunfels, Wimberley, and Bastrop. Surveying those who attended farmers' markets allowed researchers to target those individuals who were predisposed to participating in niche markets such as those of organic and local. Participants were surveyed regardless of whether they made a purchase.

FARMERS' MARKET CONSUMER SURVEY QUESTIONNAIRE. Farmers' market consumers viewed a bowl of the Texas persimmons while filling out surveys, so as to better answer the more hypothetical questions. Twenty-one Likert scale (Likert, 1967) questions gathered information on the general feelings the participants had on subjects related to native plant use, environmental attitudes, local food use, and the consumer's WTP for the product. Niche food terms were defined for the participants. Demographic questions included those asking age, education level, household income, and gender. A panel of experts made up of horticulture, agricultural business, marketing, and focus group researchers reviewed the questionnaire before administration, and questions were based on those from previous reliable and valid studies of consumer behavior (Cornelissen et al., 2008; Helfand et al., 2006; Hustvedt and Dickinson, 2009; Krystallis and Chrysoschoidis, 2005).

FARMERS' MARKET CONSUMER SURVEY NATIVE PLANT-USE QUESTIONS AND SCORING. Farmers' market consumers were asked two questions relating to their use of native plants (native plant-use score). These questions required respondents to report whether they used native plants in their landscape or garden or bought food products made from native plants in the last year. This section was intended as a cursory measurement between awareness of native plants, and the WTP for the food products coming from these plants. Questions asked were as follows: "I bought a product made from a native Texas plant in the last year" and "my family and I have planted native Texan plants in the last year." The possible responses were "yes," "no," "I don't know," and "not applicable." Responses of "yes" received 4 points, "I don't know" received 3 points, "no" received 2 points, and responses of "not applicable" received 0 points. Nonresponses to questions were left

uncoded. The response "I don't know" received more points than the responses of "no" and "not applicable" because while the respondent is not answering positively, they are also not giving a negative response. Because the native plant-use score is measuring whether they have made use of native plants, a response of "I don't know" would denote that the respondent acknowledges that they may have used a native plant, but are not sure.

Respondents were classified on a scale of low, medium, and high native plant use based on their native plant-use score with this scale ranging from 0 to 8 points. Individuals with a score of 0 to 2 points (indicating most responses scored 1 point or less) were classified as having a "null native plant use" because respondents' answers for questions were the response "not applicable." Those with a score of 3 to 4 points (indicating most responses scored 1 or 2 points) were classified as having "low native plant use." Those with a score from 5 to 6 points (indicating most responses scored 3 or fewer points) were classified as having "medium native plant use," and those with a score of 7 to 8 points (indicating at least one of their responses scored 4 points, and the other either 3 or 4 points) were classified as having "high native plant use."

FARMERS' MARKET CONSUMER SURVEY ENVIRONMENTAL ATTITUDE QUESTIONS AND SCORING. Respondents were asked five questions relating to their environmental attitude (environmental attitude score). Examples of questions included "I believe that I behave in an environmentally conscious way," "when I buy a product, I take ecological considerations into account," and "all plants and animals play an important role in the environment." Possible answers were "strongly agree," "agree," "undecided," "disagree," and "strongly disagree." Responses of "strongly agree" received 5 points, while responses of "agree" received 4 points, responses of "undecided" received 3 points, responses of "disagree" received 2 points, and responses of "strongly disagree" received 1 point. Nonresponses to questions were left uncoded. These questions were adapted from a previous study, which generated Cronbach's alpha of 0.84 (Cornelissen et al., 2008).

Respondents were classified as having negative, mediocre, and positive environmental attitudes based on their environmental attitude scores. Possible scores ranged from 0 to 25 points. Individuals with scores of 10 or fewer points (indicating most responses were 2 or fewer points) were classified as having "negative environmental attitudes," while those with scores from 11 to 20 points (indicating most responses were 4 or fewer points) were classified as having "mediocre environmental attitudes," and those with scores of 21 to 25 points (indicating at least one of their responses scored 5 points, and the other responses either 4 or 5 points) were classified as having "positive environmental attitudes."

FARMERS' MARKET CONSUMER SURVEY LOCAL FOOD-USE QUESTIONS AND SCORING. Consumers of the farmers' market were asked 11 questions relating to their purchase of local foods (local food-use score) and their attitude toward local food. Examples of questions included "I prefer to buy locally," "I typically buy food at a local farmers' market," and a question on how often the respondent bought "Local fresh produce." The possible answers were "strongly agree," "agree," "undecided," "disagree," and "strongly disagree." Responses of "strongly agree" scored 5 points, while responses of "agree" scored 4 points, responses of "undecided" scored 3 points, responses of "disagree" scored 2 points, and responses of "strongly disagree" scored 1 point. Nonresponses to questions were left uncoded.

Respondents were classified on a scale of low, medium, and high local food use based on their local food-use score. Possible points for scores ranged from 0 to 55 points. Individuals with a score of 34 or fewer points (indicating most responses were 3 or fewer points) were classified as having "low local food use," while those with a score from 35 to 44 points (indicating most responses were 4 or fewer points) were classified as having "medium local food use," and those with a score of 45–55 points (indicating at least one of their responses scored 5 points, and the other responses either 4 or 5 points) were classified as having "high local food use."

WTP QUESTIONS AND SCORING. The questions regarding WTP were

presented in both restaurateur and farmers' market consumer questionnaires and both put forward a hypothetical situation presenting texas persimmons for \$2.99/lb. This price was selected based on the prices for cherries at local grocery stores at the time of the survey and were considered by horticulturists to be a valid comparison fruit for the study because of the similarity in size, flesh, and sweetness with the texas persimmon. The participants were allowed to examine the fruit. One question asked consumers how much more they would be willing to pay in increasing increments of \$0.10 from \$0.10 to a maximum of \$0.70, with the options of "other" and "none of the above" as alternatives. If "none of the above" was chosen, respondents would continue to the next question asking how much less they were willing to pay, in the same increments and the same range as the first question, with the opt-out answers of "other" and "I would not be willing to pay for texas persimmons, no matter the price" (Krystallis and Chryssochoidis, 2005). The CV table questions were based on previous research (Helfand et al., 2006; Krystallis and Chryssochoidis, 2005) and were known to be valid and reliable with Cronbach's alpha values ranging from $P = 0.73$ to 0.96 . Self-reporting WTP is known to have the limitation of sometimes exceeding the amount consumers would actually pay using actual money. Therefore, these study results may not be generalizable to the overall population.

The responses given were coded as one range of answers between the two questions with a value of zero being assigned to, "I would not be willing to pay for texas persimmons, no matter the price," and the value of 16 given to the "other" response in the positive range of price options, and the intervening responses valued according to their place in between those two values. These codes were combined into one range of possible scores, as both questions were asking, essentially, the same question, and those providing positive responses would, by the nature of the questions, not provide negative responses; therefore, one range could be applied to all possible answers.

DATA ANALYSIS FOR RESTAURATEUR SURVEY RESPONSES. Restaurateur qualitative interview data were organized

and tabulated by developing themes. Because of the variety of responses given, three themes were created (positive comments, negative comments, and neutral comments). Responses could register in more than one theme, thus reflecting the mixture of positive, negative, and neutral comments given in the interviews. These results were summarized by frequency of response by the various themes developed. For the questions where facts were needed, rather than attitudes, a simple tabulation was made for each of the responses given, and is presented. The WTP of the restaurateurs was assessed using descriptive statistics for the questions concerning how much more or less they were willing to pay for the texas persimmons.

DATA ANALYSIS FOR FARMERS' MARKET CONSUMER SURVEY RESPONSES. Farmers' market consumer survey data were analyzed using descriptive statistics and frequencies. The demographics garnered from the farmers' market participants (including age, education, household income, gender, and ethnicity) were compared with each individuals' various scores (including WTP, local food-use score, environmental attitude score, and native plant-use score) using a series of Pearson's product-moment tests. Analysis of variance (ANOVA) tests were used to look for differences between variables.

Results

A Cronbach's alpha reliability analysis determined the overall farmers' market consumer survey instrument to have good reliability ($\alpha = 0.801$).

Restaurant and industry experience

Of the seven restaurants participating in interviews, two were located in San Marcos, two were in Wimberley, and the other five were in Austin. Respondents' experience in the industry varied from 8.5 to 15 years, with all but one respondent having worked in the industry for more than 10 years. As for their time working their particular position in the restaurant, times varied from 7 months to 6 years. The particular positions held by participants included various chef titles such as "Chef-Owner," "Head Chef," and "Executive Chef." Of the duties performed by the participants, the most common had to do with either

day-to-day issues such as scheduling employees' shifts and ordering products (57%), food management issues (86%), or both.

Demographic breakdown of restaurateurs

Of the restaurateurs interviewed, $\approx 86\%$ (6) were between the ages of 25 and 34 years, and $\approx 14\%$ (1) were between the ages of 35 and 49 years. Additionally, $\approx 71\%$ (5) were male. About 86% (6) of respondents were Caucasian, and a further 14% (1) were Hispanic (of any race). Household incomes varied slightly more among respondents, with $\approx 43\%$ (3) earning between \$25,000 and \$34,999 per year, 29% (2) earning between \$35,000 and \$74,999 per year, 14% (1) earning between \$75,000 and \$99,999 per year, and another 14% (1) earning between \$100,000 and \$149,999 per year. Finally of those surveyed, five respondents had received bachelor's degrees, and five had received associates' degrees from culinary schools. There was an overlap of degree types earned by this group, and because the degrees were associated with the respondents' areas of expertise, totals of both degree types earned were reported.

Restaurant ordering details

The participants were asked further details about the restaurants, including how much produce was purchased each week, and what proportions were organic or local, and finally, how long the restaurant had been in operation. The amounts of produce purchased each week by the restaurants ranged from ≈ 600 to ≈ 2500 lb. Most (71%) of respondents had to give estimates because of the varied nature of the containers in which produce arrived at their restaurants. Of the respondents, two (40%) stated buying 80% to 90% organic produce. Participants generally (57%) did have estimates on the amount of locally grown produce purchased, and some gave very specific ratings (one participant gave the percentage of 24.19% of their produce being locally grown). Estimates included 80 to 100 lb/week and 25% to 30% of their product. The length of time restaurants had been in operation varied from 2 to 10 years, with most (71%) being in operation for at least 6 years.

Restaurateurs' views on organic food

When asked their attitude concerning the term "organic" as it relates to food, four (57%) responded with positive comments. Examples of positive comments included, "less pollution," "consumer views as great," and simply "positive." Negative reactions totaled three (43%), with examples of negative comments including, "jaded because it's used as a marketing tool," "used to make food snooty," and "not better for nutrition." Neutral reactions totaled four (57%), with examples of neutral comments including, "sometimes organic is better," "different depending on food, fruit versus root vegetables," and "misunderstood."

Restaurateurs' views on local food

When asked their attitude concerning the term "local" as it relates to food, seven (100%) responded with positive comments. Examples of positive comments included "cost-effective," "more important than organic," and simply "in support." Negative reactions totaled two (29%), with examples of negative comments including, "harder to stock everyday stuff year-round," and "customers aren't willing to pay." Neutral reactions totaled three (43%), with examples of neutral comments including, "organic is more expected" (implying that customers look for the term organic more than the term local), "it should supplement the menu," and "it should be from within 40 to 80 miles."

Restaurateurs' views on native food

When asked their attitude concerning the term "native" as it relates to food, five (71%) responded with positive comments. Examples of positive comments included "customers respond well to native," "lends character," and simply "positive." Only one respondent gave a negative attitude toward native (14%), saying it "doesn't do anything. Doesn't carry a lot of weight." Neutral reactions totaled four (57%), with examples of neutral comments including, "tugs at historic heartstrings," "thinks of foraging," and "connects sense of nature."

Restaurateurs' views on the taste of persimmon

When asked their opinions after tasting the texas persimmon, five

respondents (71%) answered with positive comments. Examples of positive comments included "good for desserts with sugar," "sweet taste," and simply "rich." There were no negative reactions to the taste of the fruit. Neutral reactions totaled five (71%), with examples of neutral comments including "like a blueberry and a plum," "not overly potent," and curiously, "reminiscent of fish."

Restaurateurs' views on other sensory opinions of persimmon

When asked to comment on other sensory experiences with the texas persimmon, three respondents (43%) answered with positive comments. Examples of positive comments included "color is unique, and surprising," "color is cool for a plate," and "smell is mild, like rain in El Paso." Negative reactions totaled three (43%), with examples of negative comments including "skins are tricky," and "color not good for cooking." Neutral reactions totaled four (57%), with examples of neutral comments including "color between a blueberry and a cherry," "smell reminds me of plum," and "mellow scent."

Restaurateurs' views on likelihood of purchase of persimmon in the restaurant

When asked whether they would consider purchasing the texas persimmon for their restaurant, five respondents (71%) answered with positive comments. Examples of positive comments included "appealing because of rarity," "would purchase," and "that it was unique and fun." Negative reactions totaled two respondents (29%), with examples of negative comments including that they would have to use it as a sauce "because of the seeds," "and "difficult because of seeds, skins, and processing." Neutral reactions totaled five (71%), with examples of neutral comments including "trial period" and "needs to be organic also."

Restaurateurs' views on offer of native fruit on menu

When asked whether they would consider incorporating native fruit into their menu, seven respondents (100%) answered with positive comments. Examples of positive comments included "part of identity," "a good component," and "customers

would respond well." Neutral reactions totaled four respondents (57%), with examples of neutral comments including "type of restaurant is important," and "not necessarily known for that."

Restaurateurs' views on produce properties

When asked about properties they looked for when purchasing produce for the restaurant, commonly mentioned responses included "freshness," "seasonality," "location" (meaning that it came from a local producer), and "quality."

WTP of restaurateurs

Of the restaurateurs interviewed, all were willing to pay more for the texas persimmon when asked for a specific price above or below the median of "\$2.99." Specifically, one respondent was willing to pay "\$0.30 more" (14.3%), two respondents were willing to pay "\$0.60 more" (28.6%), one respondent was willing to pay "\$0.70 more" (14.3%), and three respondents were willing to pay "other" [on the positive end of the spectrum (42.9%)]. The mean WTP for the lead users was 14.57, meaning that they were willing to pay between "\$0.60 more" and "\$0.70 more" than the base price of \$2.99/lb of texas persimmon, or between \$3.59 and \$3.69/lb.

Farmers' market survey

FARMERS' MARKET SURVEY RESPONDENTS. Surveys were collected from 384 respondent visitors at farmers' markets in San Marcos, Austin, Wimberley, Bastrop, and New Braunfels. This number was considered to be an adequate sample based on previous studies (Haghiri et al., 2009; Krystallis and Chryssochoidis, 2005) and interpretation of the work by Krejcie and Morgan (1970) on survey sample size given the total population of all five communities being 902,868 (U.S. Census Bureau, 2012a, b, c, d). About one-third of the total number of surveys (120) came from the four cities other than Austin to adequately sample from those locations. The remaining number (264) came from Austin.

The demographics of the sample did not match the actual demographics of the five cities (U.S. Census Bureau, 2012a, b, c, d). The age of

the respondents were more heavily weighted toward older demographic groups with 81% of the respondents being between 25 and 64 years old, as opposed to the actual demographics, where 61% are between 25 and 64 years old. The sample was disproportionately female (67%), compared with the near even 50/50 split in the actual demographics. The stated ethnicities of the surveys were disproportionately Caucasian (75%), compared with the actual demographics of the cities (53%). Finally, 66% of the sample stated they had achieved either a bachelor's degree or a graduate degree, compared with 43% from the actual demographic. The only result that most closely resembled those found in the census was the income level of the respondents, with 27% earning between \$35,000 and \$74,999, compared with the 35% in the actual demographics. However, when these demographics were compared with other farmers' market consumer studies, the demographics were very similar to this sample. In the study by Wolf et al. (2005), the average consumer was a woman (64%) between 25 and 60 years old (63%), with an income of between \$30,000 and \$64,999 (45%), who had at least her bachelor's degree, if not a graduate degree (55%).

FARMERS' MARKET NATIVE PLANT-USE RESULTS. Respondents included 16 participants classified having a null native plant use (4%), 26 participants with no/low native plant use (7%), 106 participants with medium native plant use (27%), and 251 participants with high native plant use (63%). The mean overall score for all the respondents for native plant use was 6.82, indicating a medium to high native plant use.

FARMERS' MARKET ENVIRONMENTAL ATTITUDE SCORES. Respondents included no participants with negative environmental attitudes (0%), 64 participants with mediocre environmental attitudes (16%), and 336 participants with positive environmental attitudes (84%). The mean overall environmental attitude score for all respondents was 21.80, indicating, on average, respondents had positive environmental attitudes.

FARMERS' MARKET LOCAL FOOD-USE SCORES. Respondents included 49 participants with low local food use (12.4%), 229 participants with medium

local food use (57.4%), and 120 participants with high local food use (30.3%). The mean score for the local food-use score was 41.22, indicating, on average, respondents were classified as medium local food users.

WTP OF FARMERS' MARKET CONSUMER RESPONDENTS. Farmer's market respondents included 26 participants not wanting to pay for the texas persimmon at all (6.5%), 9 participants who would pay another price besides those offered, but lower than the positive values offered (2.3%), 3 participants who would pay \$0.70 less (0.8%), 1 participant who would pay \$0.50 less (0.3%), 1 participant who would pay \$0.40 less (0.3%), 4 participants who would pay \$0.10 less (1%), 11 participants who would pay \$0.10 more (2.8%), 17 participants who would pay \$0.20 more (4.3%), 22 participants who would pay \$0.30 more (5.5%), 15 participants who would pay \$0.40 more (3.8%), 78 participants who would pay \$0.50 more (19.5%), 37 participants who would pay \$0.60 more (9.3%), 101 participants who would pay \$0.70 more (25.3%), and 61 participants who would pay a higher price other than those offered, and higher than the negative values (as they did not select a lower price); i.e., the positive "other" response (15.3%). The average WTP was 12.36, or between "\$0.40 more" and "\$0.50 more" than the base price of \$2.99, or

between \$3.39 and \$3.49/lb of texas persimmons.

Demographic comparisons of WTP among farmers' market consumers

Demographic comparisons revealed relationships between age and WTP (Table 1). No other demographic relationships or differences were found in comparisons of education (Tables 1 and 2), income (Tables 1 and 2), gender (Table 2), or ethnicity (Table 2) comparisons as well, revealing that most demographic groups were willing to pay a similar price for the native fruit, texas persimmon. However, a relationship between age and WTP was found.

AGE COMPARISONS. A Pearson's product-moment correlation indicated a significant negative relationship between age and WTP [$r = -0.138$, $P = 0.007$ (Table 1)]. This showed that as participants' age increased, WTP decreased. An ANOVA test further compared the age groups to WTP. Significant differences ($P = 0.033$) were found indicating differences in WTP values based on age group (Table 2). Post hoc analysis (LSD) indicated the age groups "25–34 years," "50–64 years," and "65+ years" were significantly different from each other. The age group of "25–34" was significantly different from the age groups "50–64", and "65+" ($P = 0.005$ and 0.035 , respectively). All

Table 1. Correlation matrix indicating the Pearson's product-moment correlation between willingness to pay (WTP) rating and the demographic variables of education, income, and age group in the study of the market viability of native texas persimmon as a food source.

	Education ^z	
WTP value ^y	Pearson correlation	-0.038
	<i>P</i>	0.461
	<i>N</i>	379
	Income ^x	
WTP value	Pearson correlation	0.049
	<i>P</i>	0.359
	<i>N</i>	358
	Age group ^w	
WTP value	Pearson correlation	-0.138
	<i>P</i>	0.007*
	<i>N</i>	381

^zEducation categories included "less than 9th grade," "9th–12th grade, no diploma," "high school graduate or equivalent," "some college, no degree," "associate's degree," "bachelor's degree," "trade school," "graduate or professional school/degree."

^yWTP values ranged from 0 to 16 points. Higher WTP values indicated a greater price promised for the texas persimmon. Lower WTP indicated a lower price promised for the texas persimmon.

^xIncome categories included "less than \$14,999," "\$15,000 to \$24,999," "\$25,000 to \$34,999," "\$35,000 to \$74,999," "\$75,000 to \$99,000," "\$100,000 to \$149,999," and "\$150,000 and over."

^wAge groups included under 25 years, 25–34 years, 35–49 years, 50–64 years, and 65+ years.

*Statistically significant at the 0.05 level.

other age groups were statistically similar. Furthermore, those within the age group “25–34 years” had the highest mean WTP ratings, followed by those “35–49 years”, then those “under 25 years,” and finally those “50–64 years” and “65+ years” with the lowest WTP value. These results verified the correlational tests in showing that the age group “25–34 years,” the youngest group, had a greater WTP when compared with older groups, confirming the finding that as age increased, WTP decreased.

NATIVE PLANT-USE COMPARISONS. A Pearson’s product–moment correlation indicated no relationship between native plant-use scores and WTP [$r = 0.006$, $P = 0.900$ (Table 3)]. ANOVA tests further compared the native plant-use score groups to WTP values. No significant differences

($P = 0.693$) were found in WTP based on native plant-use score group (Table 4) indicating those who reported using native plants in their daily lives were willing to pay a similar amount for texas persimmon when compared with those who reported using native plants less often.

LOCAL FOOD-USE COMPARISONS. A Pearson’s product–moment correlation indicated a positively correlated significant relationship ($r = 0.156$, $P = 0.033$) between local food-use score and WTP. This correlation showed that as the local food-use score increased, WTP increased as well (Table 3). ANOVA tests further compared the local food-use score groups to WTP values. Significant differences ($P = 0.004$) were found indicating differences in WTP based on local food-use score group (Table 4). Post

hoc analysis (LSD) indicated the local food-use score group of “low local food use” was significantly different from the “medium local food-use” group ($P = 0.013$) and “high local food-use” group ($P = 0.001$). This means that a lower local food-use score was related to a lower WTP. The “low local food use” category’s mean WTP value was 10.5 (with a 10 being the WTP choice of “\$0.20 more”) compared with the approximate 12 and 13 scores of “medium local food use” and “high local food use” (12 being the choice of “\$0.40 more” and 13 being “\$0.50 more”), which indicated a respondent’s local food use is an important factor in determining WTP, and a lower local food-use score meant a lower WTP. This supported findings of a positive correlation between local food-user score and WTP.

Table 2. Analysis of variance comparisons of willingness to pay (WTP) and the demographic variables of age, gender, income, education, and ethnicity in the study of the market viability of native texas persimmon as a food source.

	Sample size (no.)	WTP mean score (0–16 scale) ^a	SD	df	F	P
Age group (yrs)						
Under 25	33	12.454	3.817	4	2.653	0.033*
25–34	119	13.160	3.385			
35–49	86	12.756	3.931			
50–64	113	11.531	5.232			
65+	30	11.267	5.883			
Gender						
Female	252	12.230	4.480	1	0.732	0.393
Male	128	12.640	4.297			
Income						
Less than \$14,999	43	12.372	4.370	7	0.818	0.573
\$15,000–\$24,999	26	12.769	3.456			
\$25,000–\$34,999	45	12.667	3.931			
\$35,000–\$74,999	107	11.916	4.786			
\$75,000–\$99,999	45	12.178	4.811			
\$100,000–\$149,999	52	12.500	4.560			
\$150,000 and over	39	13.720	2.874			
Education						
Less than 9th grade	2	5.000	5.657	7	1.376	0.214
9th–12th grade, no diploma	2	11.000	2.828			
High school graduate or equivalent	5	14.400	1.341			
Some college, no degree	73	12.795	3.811			
Associate’s degree	30	12.200	3.872			
Bachelor’s degree	149	12.600	4.035			
Trade school	9	11.000	6.123			
Graduate or professional school/degree	109	11.991	5.247			
Ethnicity						
Caucasian	291	12.574	4.460	4	0.994	0.411
African American	9	11.333	4.690			
Asian/Pacific Islander	19	12.579	4.298			
Hispanic (of any race)	37	11.162	4.180			
Other	22	12.394	4.382			

^aWTP values ranged from 0 to 16 points. Higher WTP values indicated a greater price promised for the texas persimmon and lower WTP indicated a lower price promised for the texas persimmon.

*Statistically significant at the 0.05 level.

ENVIRONMENTAL ATTITUDE SCORE COMPARISONS. A Pearson's product-moment correlation indicated a positively significant relationship ($r = 0.176$, $P = 0.001$) between environmental attitude scores and WTP. This correlation showed that as environmental attitude score increased, WTP increased as well (Table 3). ANOVA

tests further compared the environmental attitude score groups to WTP. Significant differences ($P = 0.013$) were found indicating differences in WTP based on environmental attitude score group (Table 4). This showed respondents' attitude toward the environment were related to WTP. In addition, the mean scores

of the two scored groups are both positive WTP values (a score of 11 meaning "\$0.30 more" and a score of 12 meaning "\$0.40 more," respectively), meaning that both the "mediocre environmental attitude" and "positive environmental attitude" groups were willing to pay more than the baseline amount proffered in the survey. These results combined would insinuate that those with anything more than a negative attitude toward environmental concerns would be willing to pay more for Texas persimmons.

Table 3. Correlation matrix indicating the Pearson's product-moment correlation between willingness to pay (WTP) rating and native plant-use scores, local food-use scores, environmental attitude scores in the study of the market viability of native Texas persimmon as a food source.

Native plant-use score (0–8 points) ^z		
WTP value ^y	Pearson correlation	0.006
	<i>P</i>	0.900
	<i>N</i>	386
Local food-use score (0–55 points) ^x		
WTP value	Pearson correlation	0.156
	<i>P</i>	0.033*
	<i>N</i>	386
Environmental attitude score (0–25 points) ^w		
WTP value	Pearson correlation	0.176
	<i>P</i>	0.001*
	<i>N</i>	386

^zNative plant-use scores ranged from 0 to 8 points. Higher native plant use scores indicated a greater use of native plants in respondents' overall life.

^yWTP values ranged from 0 to 16 points. Higher WTP values indicated a greater price promised for the Texas persimmon. Lower WTP indicated a lower price promised for the Texas persimmon.

^xLocal food-use questions were adapted from Hustvedt and Dickinson (2009). Local food-user score ranged from 0 to 55 points. Higher local food-user score indicated a greater amount of locally produced products purchased by the participant, and a lower local food-user score indicated less locally produced products were purchased by the participant.

^wEnvironmental attitude questions were adapted from Cornelissen et al. (2008) study of consumer behavior. Environmental attitude score ranged from 0 to 25 points. Greater environmental attitude scores indicated a greater sensitivity to issues concerning the environment and a lower environmental attitude score indicated a lower sensitivity to issues concerning the environment.

*Statistically significant at the 0.05 level.

Discussion

As there have been limited studies investigating the use and demand of native plants as a food source, this study provides a starting point in creating a new niche market based on Texas persimmons as a food source. When introducing a novel product, it is important to establish whether the potential consumers are actually interested in the product (van Kleef et al., 2005), and part of that is identifying the potential consumers.

Results from the restaurateur survey revealed overall support of the Texas persimmon when concerning taste and the potential to work with and market the product. In addition, a majority supported both the food term "local" as well as "native." These results indicated support for both native plants as a food

Table 4. Analysis of variance comparisons of willingness to pay (WTP) and the native plant-use scores, local food-use scores and environmental attitude scores in the study of the market viability of native Texas persimmon as a food source.

	Sample size (no.)	WTP mean score (0–16 scale) ^z	SD	df	F	<i>P</i>
Native plant use (0–8 points) ^y						
Null native plant use	13	10.923	6.130	3	0.675	0.693
Low native plant use	25	12.680	2.826			
Medium native plant use	103	12.524	3.881			
High native plant use	245	12.330	4.770			
Local food-use score classification (0–55 points) ^x						
Low local food use	44	10.800	5.130	2	5.624	0.004*
Medium local food use	223	12.258	4.323			
High local food use	113	13.078	4.283			
Environmental attitude score classification (0–25 points) ^w						
Mediocre environmental attitude	119	11.496	4.723	1	6.213	0.013*
Positive environmental attitude	267	12.732	4.254			

^zWTP values ranged from 0 to 16 points. Higher WTP values indicated a greater price promised for the Texas persimmon and lower WTP indicated a lower price promised for the Texas persimmon.

^yNative plant use scores ranged from 0 to 8 points. Higher native plant use scores indicated a greater use of native plants in respondents' overall life.

^xLocal food-use questions were adapted from Hustvedt and Dickinson (2009). Local food-user score ranged from 0 to 55 points. Higher local food-user score indicated a greater amount of locally produced products purchased by the participant, and a lower local food-user score indicated less locally produced products were purchased by the participant.

^wEnvironmental attitude questions were adapted from the Cornelissen et al. (2008) study of consumer behavior. Environmental attitude score ranged from 0 to 25 points. Greater environmental attitude scores indicated a greater sensitivity to issues concerning the environment and a lower environmental attitude score indicated a lower sensitivity to issues concerning the environment.

*Statistically significant at the 0.05 level.

source as well as the possible connotation between native foods and niche food markets among chefs and chefs-owners. All participants responded positively when asked how much more they would pay for the texas persimmon (“\$0.30 more” to “other” on the positive range of values, the highest of the responses of which was \$1.50 more than the base price of \$2.99). The mean WTP value indicated the restaurateurs would be willing to pay between \$3.59 and \$3.69/lb of texas persimmon.

The farmers’ market consumer survey revealed the broad attitudes of those who participated in farmers’ markets. Survey results indicated the majority of participants had a high native plant-use score, a positive environmental attitude score, and a medium local food-use score. In addition to these aggregate scores, the majority of participants were willing to pay more than the suggested base price of \$2.99 based on their WTP value (with a total mean WTP of 12.36 and a value of 12 being “\$0.40 more”). Therefore, the average visitor at the farmers’ markets used (and was aware he/she was using) native plants, had a positive attitude toward issues concerning the environment, was moderately supportive of local foods, and was willing to pay ≈\$3.39/lb of texas persimmons. The average customer was concerned with environmental issues and was receptive of the local food movement, which is supported by previous studies of farmers’ market attendees (Curtis, 2011; Hunt, 2007; Wolf et al., 2005).

Finally, results from the study suggested the prime audience for the texas persimmon to be those who attend the farmers’ market in the age group of 25–34 years who value locally produced foods and are concerned about the environment. Therefore, for any future texas persimmon endeavors, this particular demographic group would be the best choice to target as future consumers. Again, because of the shortage of studies investigating native fruit in the market, additional studies should be conducted to put these results into perspective. This includes additional studies on both native fruit and novel food products in general.

These findings indicated several conclusions: first, the restaurateurs’ approval of both native and local foods,

as found from their qualitative responses, and the texas persimmon in particular indicated any potential market for the fruit should include restaurants as a dependable consumer of the native food niche market. The primary concerns of restaurateurs were those of freshness and reliability. This would mean that any enterprise taking advantage of this market would need to consider that native plants are highly seasonal. Thus, any relations with restaurants would be seasonal as well. Second, the vast majority of farmers’ market consumer had a high WTP. This showed that if the texas persimmon were to be offered in a farmers’ market (or other potential native foods), the product could potentially be offered as a high-value specialty crop. This study was limited in that consumers visiting farmers’ markets were not able to taste-test the fruit. Future studies should allow consumers to taste and choose to purchase the product among other options, as well as consider how they would use the product either fresh or in dishes.

Literature cited

- Arrigo, N., R. Guadagnuolo, S. Lappe, S. Pasche, C. Parisod, and F. Felber. 2011. Gene flow between wheat and wild relatives: Empirical evidence from *Aegilops geniculata*, *Ae. neglecta* and *Ae. triuncialis*. *Evol. Appl.* 4(5):685–695.
- Bradbury, E.E. and E. Emshwiller. 2011. The role of organic acids in the domestication of *Oxalis tuberosa*: A new model for studying domestication resulting in opposing crop phenotypes. *Econ. Bot.* 65(1):76–84.
- Buchholz, J. 2012. Tapping the ‘locavore’ market. 31 Aug. 2012. <<http://www.bizjournals.com/austin/print-edition/2012/08/31/tapping-the-locavore-market.html?page=all>>.
- Clay, J. 2004. *World agriculture and the environment*. Island Press, Washington, DC.
- Cornelissen, G., M. Pandelaere, L. Warlop, and S. Dewitte. 2008. Positive cueing: Promoting sustainable consumer behavior by cueing common environmental behaviors as environmental. *Intl. J. Res. Mktg.* 25(1):46–55.
- Costa, A. and W. Jongen. 2006. New insights into consumer-led food product development. *Trends Food Sci. Technol.* 17(8):457–465.
- Curtis, K.R. 2011. Direct marketing local foods: Differences in CSA and farmers’ market consumers. 1 May 2012. <http://extension.usu.edu/files/publications/publication/Economics_AppliedEconomics_2011-01pr.pdf>.
- Diamond, J.M. 1997. *Guns, germs, and steel: The fates of human societies*. Norton, New York, NY.
- Emshwiller, E., V. Nina, F. Terrazas, T. Theim, and A. Grau. 2009. Origins of domestication and polyploidy in oca (*Oxalis tuberosa*; Oxalidaceae). 3. AFLP data of oca and four wild, tuber-bearing taxa. *Amer. J. Bot.* 96(10):1839–1848.
- Giovannoni, J. 2001. Molecular biology of fruit maturation and ripening. *Annu. Rev. Plant Physiol. Plant Mol. Biol.* 52(1):725–749.
- Gremillion, K. 1996. Diffusion and adoption of crops in evolutionary perspective. *J. Anthropol. Archaeol.* 15(2): 183–204.
- Haghiri, M., J. Hobbs, and M. McNamara. 2009. Assessing consumer preferences for organically grown fresh fruit and vegetables in eastern New Brunswick. *Intl. Food Agr. Mgt. Rev.* 12(4):81–100.
- Hawkes, L. 2011. Drought affects deer, but season opens well. *Southwest Farm Press* 38(23):24.
- Helfand, G.E., J. Park, J. Nassauer, and S. Kosek. 2006. The economics of native plants in residential landscape designs. *Landsc. Urban Plan.* 78(3):229–240.
- Hunt, A.R. 2007. Consumer interactions and influences on farmers’ market vendors. *Renew. Agr. Food Syst.* 22(01):54–66.
- Hustvedt, G. and M. Dickinson. 2009. Consumer likelihood of purchasing organic cotton apparel: Influence of attitudes and self-identity. *J. Fashion Mktg. Mgt.* 13(1):49–65.
- Kallas, Z., F. Lambarras, and J. Gil. 2011. A stated preference analysis comparing the analytical hierarchy process versus choice experiments. *Food Qual. Prefer.* 22(2): 181–192.
- Kelley, K.M., J. Conklin, J. Sellmer, and R. Bates. 2006. Invasive plant species: Results of a consumer awareness, knowledge, and expectations survey conducted in Pennsylvania. *J. Environ. Hort.* 24(1): 53–58.
- Krejcie, R.V. and D. Morgan. 1970. Determining sample size for research activities. *Educ. Psychol. Meas.* 30:607–610.
- Krystallis, A. and G. Chrysoschoydis. 2005. Consumers’ willingness to pay for organic food: Factors that affect it and variation per organic product type. *Brit. Food J.* 107(5):320–343.

- Likert, R. 1967. The method of constructing an attitude scale, p. 90–95. In: M. Fishbein (ed.). *Readings in attitude theory and measurement*. Wiley, New York, NY.
- Little, R., D. Maye, and B. Ilbery. 2010. Collective purchase: Moving local and organic foods beyond the niche market. *Environ. Plan.* 42(8):1797–1813.
- Lüthje, C. and C. Herstatt. 2004. The lead user method: An outline of empirical findings and issues for future research. *R & D Mgt.* 34(5):553–568.
- Mazoyer, M. and L. Roudart. 2006. A history of world agriculture: From the neolithic age to the current crisis (translated by J. Membrez). *Monthly Rev. Press*, New York, NY.
- Mennella, J., Y. Pepino, and D. Reed. 2005. Genetic and environmental determinants of bitter perception and sweet preferences. *Pediatrics* 115(2):e216–e222.
- Morse, J.M. 2000. Determining sample size. *Qual. Health Res.* 10(1):3–5.
- Morse, D.E. 2009. *Native American Medicinal Plants*. Timber Press, Portland, OR.
- Nie, C. and L. Zepeda. 2011. Lifestyle segmentation of US food shoppers to examine organic and local food consumption. *Appetite* 57(1):28–37.
- Oxford English Dictionary. 2012. “adaptation, n.” 22 Mar. 2012. <<http://www.oed.com/view/Entry/2115?redirectedFrom=adaptation>>.
- Pomper, K.W., D.R. Layne, and R.N. Peterson. 1999. The pawpaw regional variety trial, p.353–357. In: J. Janick (ed.). *Perspectives on new crops and new uses*. ASHS Press, Alexandria, VA.
- Robinson, R. and C. Smith. 2000. Psychosocial and demographic variables associated with consumer intention to purchase sustainably produced foods as defined by the midwest food alliance. *J. Nutr. Educ. Behav.* 34(6):316–325.
- Sampliner, D. and A. Miller. 2009. Ethnobotany of horseradish (*Armoracia rusticana*, Brassicaceae) and its wild relatives (*Armoracia* spp.): Reproductive biology and local uses in their native ranges. *Econ. Bot.* 63(3):303–313.
- Schreier, M., S. Oberhauser, and R. Prögl. 2007. Lead users and the adoption and diffusion of new products: Insights from two extreme sports communities. *Mktg. Lett.* 18(1/2):15–30.
- Schubert, F., J. Kandampully, D. Solnet, and A. Kralj. 2010. Exploring consumer perceptions of green restaurants in the US. *Tourism Hospitality Res.* 10(4):286–300.
- Schwartz, M. 1997. Defining native plants, p. 8–11. In: J. Luken and J. Theiret (eds.). *Assessment and management of plant invasions*. Springer, New York, NY.
- Starling, S. 2007. Superfruits: Superheroes of functionality. *Functional Foods Nutraceuticals*. 64:22–26.
- Stonewall County Courier. 2012. Climate experts and local officials agree, “Worst drought in Texas history.” *Stonewall County Courier*, Aspermont, TX.
- Templeton, S.B., M. Marlette, K. Pomper, and S. Jones. 2003. Favorable taste ratings for several pawpaw products. *HortTechnology* 13:445–448.
- Texas Comptroller of Public Accounts. 2012. The impact of the 2011 drought and beyond. 11 Oct. 2013. <<http://www.window.state.tx.us/specialrpt/drought/pdf/96-1704-Drought.pdf>>.
- Turner, M.W. 2009. *Remarkable plants of Texas*. Univ. Texas Press, Austin, TX.
- U.S. Census Bureau. 2012a. State & county Quickfacts: Austin (city), TX. 8 Apr. 2012. <<http://quickfacts.census.gov/qfd/states/48/4805000.html>>.
- U.S. Census Bureau. 2012b. State & county Quickfacts: Bastrop (city), TX. 8 Apr. 2012. <<http://quickfacts.census.gov/qfd/states/48/4805864.html>>.
- U.S. Census Bureau. 2012c. State & county Quickfacts: New Braunfels (city), TX. 8 Apr. 2012. <<http://quickfacts.census.gov/qfd/states/48/4850820.html>>.
- U.S. Census Bureau. 2012d. State & county Quickfacts: San Marcos (city), TX. 8 Apr. 2012. <<http://quickfacts.census.gov/qfd/states/48/4865600.html>>.
- van Kleef, E., H. van Trijp, and P. Luning. 2005. Consumer research in the early stages of new product development: A critical review of methods and techniques. *Food Qual. Prefer.* 16(3):181–201.
- Wolf, M.M., A. Spittler, and J. Ahern. 2005. A profile of farmers’ market consumers and the perceived advantages of produce sold at farmers’ markets. *J. Food Distrib. Res.* 36(1):192–201.
- Wrede, J. 2010. *Trees, shrubs, and vines of the Texas hill country*. Texas A&M Univ. Press, College Station, TX.