Journal of Extension
www.joe.org

December 2008
Volume 46 Number 6
Article Number 6RIB7

Return to Current Issue

Influencing Consumer Awareness Through the Missouri Chestnut Roast

Mihaela M. Cernusca
Research Associate, Marketing Specialist
cernuscam@missouri.edu

Michael A. Gold
Associate Professor, Associate Director
goldm@missouri.edu

Larry D. Godsey
Research Associate, UMCA Economist
godseyl@missouri.edu

University of Missouri Center for Agroforestry
Columbia, Missouri

Abstract: *Results are presented from a longitudinal study conducted during the Missouri Chestnut Roast Festival in 2003, 2004, and 2006 assessing participants' familiarity with and essential knowledge about chestnuts. Familiarity with chestnuts increased over time. Compared to first-time visitors, repeat visitors revealed an increase in frequency of consumption, familiarity with roasting chestnuts, and an increase in knowledge. The likelihood people would buy chestnuts more often and eat them roasted or in recipes also increased. Results demonstrate the positive impact of the event on participants' knowledge of, familiarity with, and interest in chestnuts. Thus, Extension professionals can use community festivals as an effective educational tool.*

Introduction

Chestnuts are an unfamiliar crop for U.S. producers (less than 1% of world production) and an unknown food for U.S. consumers. At present, U.S. consumers eat 0.1 lb of chestnut per capita, while Europeans average 1.0 lb per capita. Koreans are the world's largest chestnut consumers at 4.0 lbs per capita (Bodet, 2001). Using a consumer-based pull strategy (i.e., communication is directed at customers, who ask retailers for the product, creating demand that pulls the product through the channel; Nickels & Wood, 1997), an increase in domestic consumption up to European levels will create the opportunity to stimulate domestic

production, replace imports, and meet increased demand.

Chestnuts have favorable nutritive characteristics. Chestnuts are high in complex carbohydrates and have low glycaemic index (GI), are cholesterol free and contain one-third the calorie content of peanuts and cashews and as much vitamin C as an equal weight of lemons. Nutritionally, chestnuts are similar to brown rice, described as "a grain that grows on tree." Chestnut flour is sweet, nutty, and gluten free, making it attractive to people with celiac disease (UMCA, 2006).

European and Chinese chestnuts are experiencing a surge in popularity in many European countries, Australia, New Zealand, and the U.S. (Kelley & Behe, 2002) and an increase in production in Asia, New Zealand, Australia, and the U.S. (Bodet, 2001). In the U.S., demand for locally grown chestnuts exceeds limited supply (Gold, Cernusca, & Godsey, 2006), which is offset by imports. According to the United States Department of Agriculture Foreign Agricultural Service (FAS, 2006), imports are increasing (e.g., $11.6 million in 2006 in a continuous increasing trend since 2003), especially from Europe (82% of total imports in 2006). The main importer is Italy (55% of total imports in 2006), followed by China (23%) and Korea (15%).

In response to this trend and to the fact that the U.S. consumer has an increased interest in both new and healthy foods, efforts are in progress to revitalize chestnut production and consumption throughout the U.S.

The University of Missouri Center for Agroforestry (UMCA) is working to establish a viable chestnut industry, focusing its efforts on three key areas: testing and identifying the best chestnut cultivars and production techniques, conducting national market research, and working toward an increase in consumer awareness and demand. The long-term goal is to develop a thriving domestic chestnut industry.

Research on the consumer side demonstrated that quality, locally grown, and nutrition-diet-health were perceived as the most important attributes that influence the decision to purchase chestnuts, while price was considered the least important attribute (Gold, Cernusca, & Godsey, 2005). New research (Aguilar, Cernusca, & Gold, in press) shows that the most important attribute influencing the purchase decision is the label of origin. Consumers are 10 times more likely to purchase chestnuts produced in Missouri and five times more likely to select chestnuts produced in USA as compared to imported ones.

Consumers have a 1.9 fold preference for medium and large chestnuts and are 1.3 times more likely to select chestnuts that are organically certified over those conventionally produced. The least important attribute is price. Consumers are 0.19 times less likely to purchase higher priced chestnuts than lower priced (Aguilar, Cernusca, & Gold, in press). A recent study on the U.S. chestnut market revealed that consumers prefer to buy chestnuts from grocery stores and farmers markets and that organic, brand name and chestnuts produced from cultivars obtain a premium price (Gold, Cernusca, & Godsey, 2006).

In support of its long-term goal, UMCA created the Missouri Chestnut Roast in 2003, a festival organized to expose the general public to chestnuts, pecans, black walnuts, and other value-added, niche, locally produced agricultural products. The Missouri Chestnut Roast is held annually in October, at the University of Missouri's Horticulture and Agroforestry Research Center (HARC) in the Missouri River Hills adjacent to New Franklin, Missouri (pop. 1,145). HARC is a 660-acre research farm located 26 miles from Columbia,

Missouri (pop. =~ 100,000), the largest city in the surrounding area. The festival creates the opportunity to introduce families and landowners to chestnuts as a nutritious and healthy food, as well as a possible new agricultural crop.

The first Chestnut Roast attracted around 1,000 people, most of whom tasted roasted chestnuts for the first time. The following years, the festival attracted more participants (about 3,000 in 2004; 3,500 in 2005, and 4,000 in 2006), with more people exposed to chestnuts and their benefits.

The purpose of the study reported here was to determine if consumers' familiarity and knowledge about chestnuts increased due to the annual Missouri Chestnut Roast festival. Specifically, the study had the following objectives:

- Assess participants' familiarity with chestnuts
    - Frequency of consumption (how often have people consumed chestnuts)
    - Familiarity with cooking chestnuts (familiarity with roasting and familiarity with preparing chestnuts using recipes)
- Test participants' basic knowledge about chestnuts (e.g., refrigeration needs, fat content, and gluten free).

Methodology

The annual Missouri Chestnut Roast festival has allowed UMCA to perform a longitudinal study on changes in consumers' attitudes towards chestnuts. At the beginning of the study in 2003 (the first year of the festival), we administered a questionnaire to festival participants to obtain baseline information about participants' familiarity with chestnuts, pecans, and eastern black walnuts. For each nut species, survey questions covered frequency of consumption and familiarity with cooking. An additional question tested participants' basic knowledge about chestnuts (e.g., need for refrigeration and fat content).

We repeated the survey in 2004 and 2006 with a focus exclusively on chestnuts. The first question asked the participants if they had attended this event in the previous year(s). Subsequent questions addressed frequency of consumption and familiarity with cooking. A final three-part question tested the participants' basic knowledge about chestnuts (i.e., need for refrigeration, fat content, gluten free characteristic).

The questionnaires were constructed following Dillman's (2000) recommendations. Familiarity with chestnuts in general was assessed using a three-item Likert-type scale: frequency of consumption, familiarity with roasting, and familiarity with preparing chestnuts using recipes. The scale was tested for reliability and provided a Cronbach alpha coefficient of 0.87, which surpasses the 0.70 threshold recommended for the test of scale reliability. We assessed basic knowledge about chestnuts (need for refrigeration, fat content, and gluten free characteristic) with yes/no/I don't know questions. Demographics included age, gender, marital status, education, and household income. Each questionnaire was pre-tested before administration.

Respondents were selected using the intercept method following the tailored design

procedure for in-person delivered questionnaires recommended by Dillman (2000). Interviewers randomly selected festival attendees, explained the purpose of the study, and asked for their participation. Those who agreed to participate completed the survey on site. The sample generated by this method is representative for festival participants but implies caution in generalizing the results to the whole population of consumers in Missouri.

We analyzed each year's results independently and also compared them across years to validate previous results and determine if there were any changes in consumers' familiarity and interest in chestnuts. For 2006, we compared responses of repeat visitors with new visitors to document any changes in behavior or gain in knowledge. We treated blank data as missing and reported valid percentages.

Using SPSS 14.0 statistical software (SPSS, 2005), frequency distribution, cross tabulation, and one-way ANOVA were employed to analyze collected data.

Results

We collected 232 questionnaires in 2003, 217 in 2004, and 487 in 2006. Table 1 reflects the demographic characteristics of festival participants.

Table 1.
Demographic Characteristics of Festival Participants

	2003	**2004**	**2006**
N	232	217	487
Age	**Percent of respondents (%)**		
under 25	9	6	4
26-35	8	19	13
36-45	13	18	14
46-55	23	23	27
56-65	24	16	20
over 65	23	18	22
Household income	**%**		
Less than $35,000	-*	26	31
$35,000-$50,000	-*	27	14
$50,000-$75,000	-*	27	31
$75,000-$100,000	-*	16	14
>$100,000	-*	4	10
Gender	**%**		

Male	40	-*	38
Female	60	-*	62
Marital status		**%**	
Married	77	-*	74
Unmarried	23	-*	26
Education		**%**	
High school	25	16	25
Technical school	7	8	7
College	52	61	34
Graduate	-*	-*	30
Other	16	15	3
* Question was not offered in survey			

In addition to new participants, the festival also attracted repeat visitors (17% in 2004 and 25% in 2006). Multiple-year participation provided UMCA the chance to repeatedly reinforce information offered about all aspects of chestnut consumption and production.

Frequency of Consumption

Respondents indicated an increase in chestnut consumption from 2003 to 2006. The percentage of participants that have never tasted a chestnut decreased from 67% in 2003, to 46% in 2004 and 45% in 2006. On a scale of 1 to 3, 1 - never consumed a chestnut before, 2 â€" consumed chestnuts rarely or once a yearand 3- consumed chestnuts more than once a year, the mean response increased from 1.46 in 2003 to 1.63 in 2004 and 1.71 in 2006 (Table 2). One-way ANOVA revealed a significant difference between the means, $F(2, 912) = 8.98$, $p<.001$. Contrasts showed that the frequency of consumption was significantly lower in 2003 than in 2004 , $t(912) = -2.35$, $p<0.05$ and in 2006, $t(912) = -4.23$, $p<0.001$.

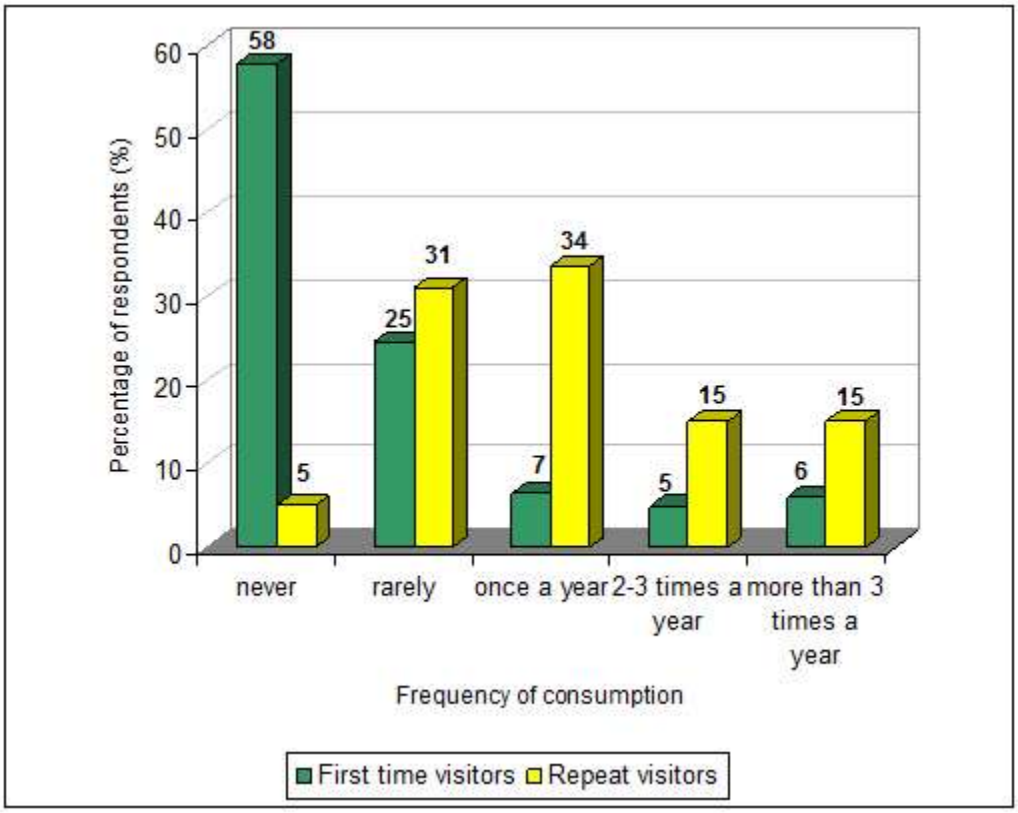
Table 2.
Frequency of Consumption Among Festival Participants in Three Consecutive Years

Year	N	Mean	SD
2003	218	1.47	0.73
2004	212	1.63	0.64
2006	485	1.71	0.72

Comparing first-time Missouri Chestnut Roast visitors to repeat visitors revealed an

important difference in frequency of chestnut consumption. Fifty-eight percent of first-time visitors had never eaten chestnuts compared to 5% of repeat visitors. Only 7% of first-time visitors consumed chestnuts once a year compared to 34% of repeat visitors (Figure 1).

Figure 1.
Frequency of Consumption in 2006: First-Time (*n*= 367) Versus Repeat Visitors (*n*=119)



From these results we can infer that increased exposure to chestnuts (the festival in itself and information about chestnuts received during the event) persuaded participants to seek out chestnuts and consume them more often.

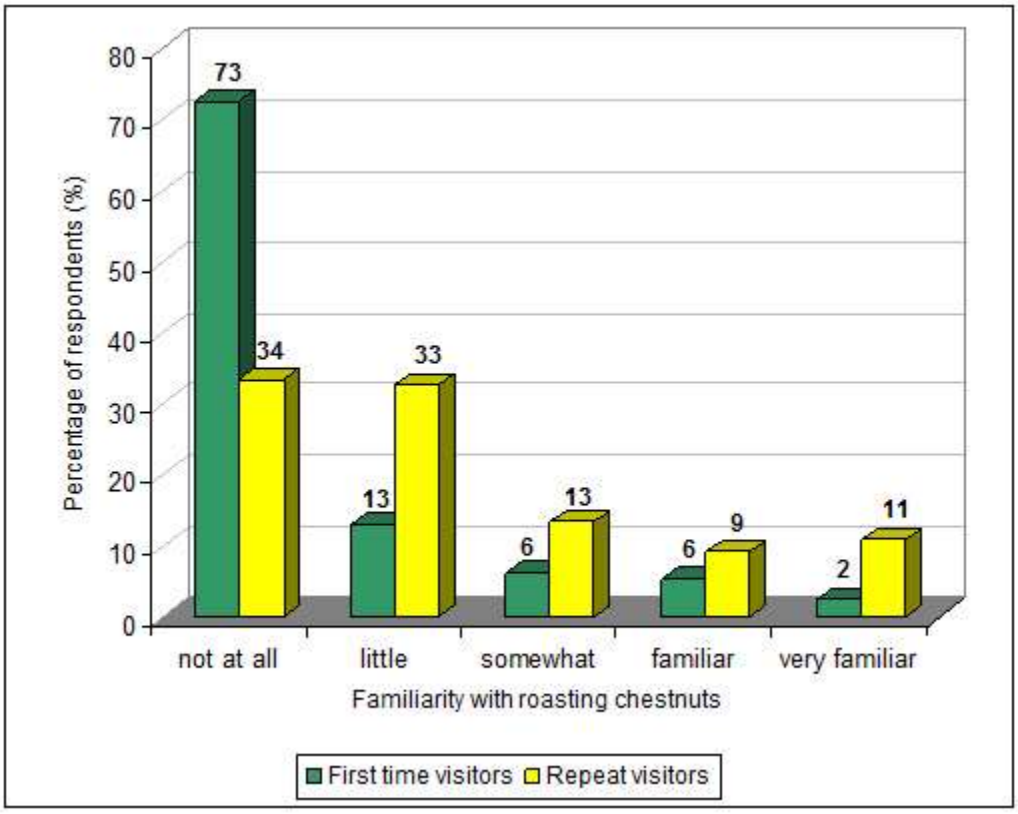
Familiarity with Cooking Chestnuts

In 2003, familiarity with cooking or preparing chestnuts was very low (74% not at all familiar). In 2004 and 2006, two questions addressed this subject: familiarity with roasting chestnuts and familiarity with cooking chestnuts using recipes. Results indicated that in 2004 and 2006, the overall familiarity with cooking remained low, but people became more familiar with roasting (=~ 70% not at all familiar with cooking compared with =~60% not at all familiar with roasting).

Based on 2006 data, return visitors were more familiar with roasting chestnuts than first-time visitors (Figure 2). Seventy-three percent of first-time participants were not at all familiar with roasting chestnuts, compared with 34% of return visitors. Two percent of first-

time visitors were very familiar with roasting chestnuts, compared to 11% of return visitors. The results are not surprising considering that we provided free samples of roasted chestnuts during the festival along with information and demonstrations on how to roast chestnuts.

Figure 2.
Familiarity with Roasting Chestnuts in 2006: First-Time(*n*=367) Versus Repeat Visitors (*n*=119)

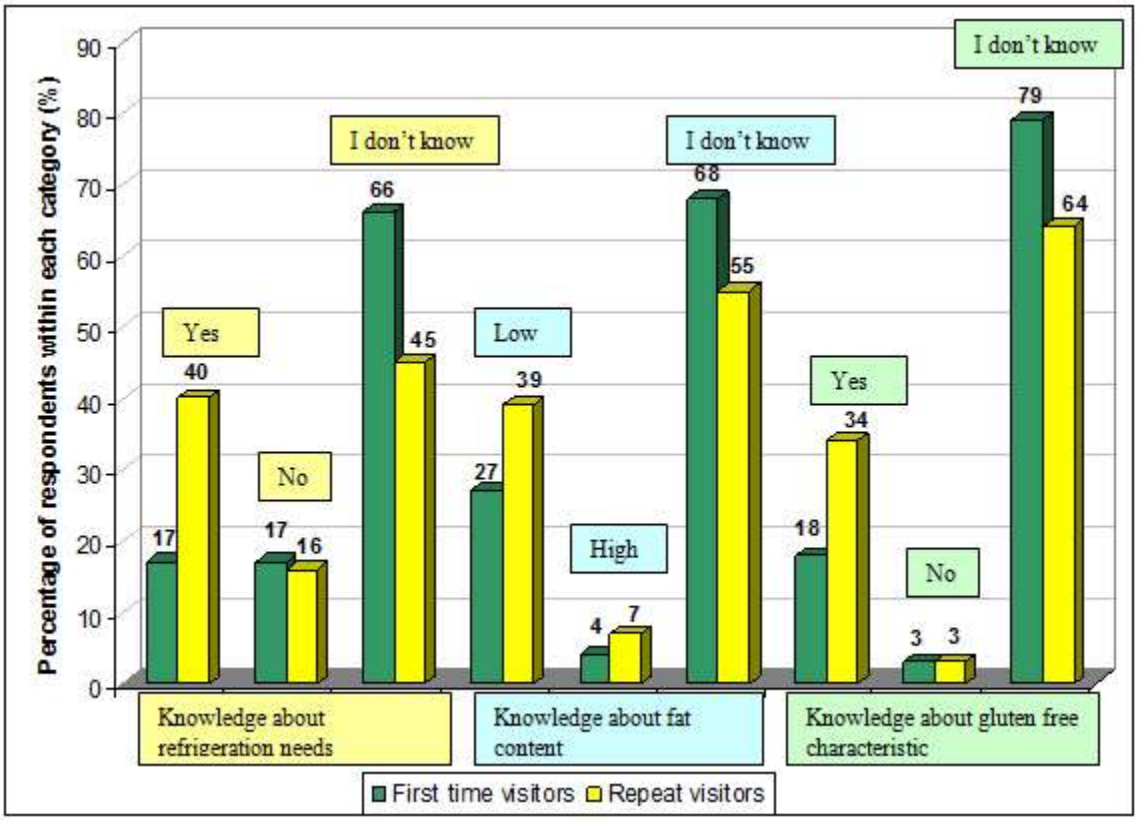


Essential Knowledge: What Respondents Know About Chestnuts.

To test the participants' knowledge about chestnuts, two basic facts (i.e., need for refrigeration and fat content) were presented as yes/no questions in 2003. Most of respondents (72%) did not know that fresh chestnuts must always be refrigerated due to high moisture content, while 63% did not know that chestnuts are very low in fat. In contrast with other nuts, these are two important attributes unique to chestnuts and important aspects for consumers, wholesalers, and retailers to know in contrast with other nuts. The results in 2004 and 2006 were similar to those obtained in 2003. The knowledge about fat content, refrigeration, and the fact that chestnut flour is gluten free was tested in three multiple-choice questions. Seventy-three percent of respondents in 2004 and 70% in 2006 did not know that chestnuts are low in fat; 85% in 2004 and 77% in 2006 did not know that chestnuts need refrigeration; and 77% in 2004 and 78% in 2006 did not know that chestnut flour is gluten free.

In 2006, we compared knowledge of first-time visitors against knowledge of repeat visitors. People who had participated in previous Chestnut Roasts were expected to know more about chestnuts. Cross tabulation data results confirmed this expectation and demonstrated that essential messages about chestnuts are getting through to consumers (Figure 3).

Figure 3.
Knowledge About Chestnuts in 2006: First-Time (*n*=367) Versus Return Visitors (*n*=119)



Conclusions and Recommendations

Three-year results confirmed that familiarity with chestnuts increased over time. Missouri Chestnut Roast participants were not very familiar with chestnuts, but return visitors consumed chestnuts more often and were more familiar with roasting chestnuts.

Compared to first-time visitors, repeat visitors demonstrated a gain in knowledge regarding three key chestnut attributes: refrigeration, fat content, and a source of gluten free flour. The Missouri Chestnut Roast provided a forum for interested people to ask questions and receive pertinent written information that the consumer could take home and read, furthering the education process.

These results demonstrate that the Missouri Chestnut Roast is having an impact on consumers' familiarity with and interest in chestnuts and that this public event is an effective tool to educate consumers and help create a viable chestnut industry in the region.

This example shows that Extension professionals can use community festivals as an effective educational tool.

References

Aguilar, F. X., Cernusca, M. M., & Gold, M. A. (in press). Exploratory assessment of consumer preferences for chestnut attributes. *HortTechnology*.

Bodet, L. (2001). *The international marketing situation. A summary of the literature and existing data*. M. Ernst, D. Allan, & T. Woods (Eds). Univ. of Kentucky, Dept. of Agricultural Economics.

Dillman, D. A. (2000). *Mail and Internet surveys. The tailored survey method*. John Wiley & Sons. Inc. N.Y.

Gold, M. A., Cernusca, M. M. & Godsey, L. D. (2004). Comparing consumer preferences for chestnuts with eastern black walnuts and pecans. *HortTechnology, 14*(4), 583-589.

Gold, M. A., Cernusca, M. M. & Godsey, L. D. (2005). Update on consumers' preferences for chestnuts. *HortTechnology*, *15*(4), 904-906.

Gold, M. A., Cernusca, M. S. & Godsey, L. D. (2006). Competitive market analysis: Chestnut producers. *HortTechnology*, *16*(2), 360-369.

Kelley, K. M., & Behe, B. K. (2002). Chefs' perceptions and uses of 'Colossal' chestnuts. *HortTechnology*, *12*(1), 172.

Nickels, W. G., & Wood, M. B. (1997). *Marketing: Relationships, quality, value*. Worth Publ., Irving Place, N.Y.

SPSS, Inc. (2005). SPSS for Windows, Release 14.0. SPSS, Inc., Chicago, Illinois, USA.

This article is online at http://www.joe.org/joe/2008december/rb7.shtml.
