Predicting Willingness-to-Pay a Premium for Integrated Pest Management Produce: A Logistic Approach

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Pesticide residue has repeatedly been documented as a leading source of food safety concern among consumers. While many studies have presented aggregate, descriptive illustrations of consumer response to Integrated Pest Management (IPM), consumer willingness-to-pay a premium for IPM produce and the factors that determine such willingness have received relatively little research attention. Such information is critical in the marketing of IPM produce.

This study empirically evaluates the demographic characteristics that influence consumers to pay a premium for IPM grown produce. Results indicate that females, those with higher annual incomes, younger individuals, and those who frequently purchase organic produce are all more likely to pay a premium for IPM produce.

Synthetic chemical pesticides were first marketed in the United States in the late 1940s. Since then, pesticide usage has facilitated a dramatic increase in the productivity of labor and other agricultural inputs. Pesticide usage by fruit and vegetable growers has been nearly seven times as much as by growers of other agricultural products (Fernandez-Cornejo et al. 1994). Given the tendency of consumers to purchase these products fresh, such high chemical usage may pose health and other problems associated with ingestion of chemical residues.

Numerous studies have placed pesticide residues as a top concern for consumers relative to other food safety issues (Govindasamy, Italia and Liptak 1997; Byrne et al. 1991; NFO Research 1989; Misra, Huang and Ott 1991). Regardless of whether these fears are legitimate or exaggerated, public perceptions of the risk posed by pesticides can translate into very real effects in the marketplace (Dunlap and Beus 1992). For example, within days of a *60 Minutes* program reporting the risks of Alar, a pesticide that was used in the production of apples, farmers, agribusinesses, and the Washington State apple industry experienced the devastating effects of public "anti-apple" sentiment. A similar incident involving Chilean grapes was also highly publicized.

Rising concerns about pesticide residues in recent years have brought about a renewed interest in several forms of chemical residue reduced agriculture. Accordingly, organic produce is now commonly found in most major supermarkets. Organic farmers also report high demand for their products at a variety of direct marketing outlets. Integrated Pest Management (IPM) has also received increasing public and research attention. Even so, the majority of growers still rely heavily on pesticides as their primary defense against insect damage.

IPM is a system of pest control which has been developed to address health and environmental concerns by decreasing the net chemical pesticide inputs to agriculture. IPM utilizes a system of highly balanced substitutive and natural ap-

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proaches to pest control, which together, minimize the dependence on chemical pest control. Conceptually, IPM falls between conventional and organic agriculture. Conventional growers typically rely on a fixed number of chemical pesticide applications per year based on the calendar which do not take into account fluctuations in pest populations (Prostak). Conversely, organic growers use no synthetic pesticides or fertilizers. In addition to being highly labor intensive, without the benefits of chemical pesticides, organic agriculture may often result in lower yield and produce quality. The introduction of IPM presents a feasible and cost effective alternative to both conventional and organic agriculture. IPM has been demonstrated in many cases to reduce chemical usage and cost while not affecting productivity substantially (Hamilton 1995; Greene 1991; Robson et al. 1995; Hollingsworth et al. 1993).

Much empirical and econometric analysis has been conducted on consumer preference for organic produce (Buzby et al. 1995; Misra et al. 1991). However, less than 1% of all produce grown in this country can currently be considered organic (Sauber 1994). In contrast, growers who have adopted IPM make up a significant and rapidly growing share of the agricultural sector because of the significant success of IPM in lowering pesticides use at reduced costs. The Federal Government has set a national goal of 75% of the nation's farmland to begin using IPM techniques by the year 2000 (Cate and Hinkle 1994). When polled, 74% of fruit and vegetable growers preferred an emphasis on IPM research over organic research. Even 64% of growers who use at least some organic production methods preferred an emphasis on IPM research (Anderson 1993).

The fact that IPM produced products offer farmers environmental and financial benefits does not imply that consumers will automatically view such products from a win-win perspective. Various studies have shown the limits placed on the success of newly emerging products by habit, comfort with existing products, lack of understanding about new technology (e.g. IPM) and uncertainty. For example, despite findings about the safety of rbGH produced milk and the possible opportunities it offers farmers, consumers and indeed some milk processors have been reluctant to accept such products (Grobe and Douthitt 1995; Hoban and Woodrum 1990). Before policy makers and producers move in full force to promote and adopt IPM, there is a need to examine consumer acceptance of such products.

Extensive marketing and related research for organic agriculture has been undertaken (Weaver et al. 1992; Misra et al. 1991). However, with the exception of Underhill and Figueroa (1996) and Govindasamy and Italia (1998b), there has been relatively little econometric research on the marketability of IPM produce. The majority of existing studies on consumer demand for IPM produce present descriptive statistics and aggregate results. If IPM produce is to be successfully marketed side by side with conventional and organic produce, it will be necessary to identify and isolate the market segments that would be willing to purchase it. This study attempts to decompose the effect which several consumer characteristics and demographic variables have in influencing the willingness-to-pay a premium for IPM grown produce.

Background

Many factors have been found to affect consumer risk aversions to synthetic pesticide residues (Govindasamy, Italia and Adelaja 1998; Govindasamy and Italia 1998[a]). In most cases, gender and income have been found to be among the most significant determinants of willingness-to-pay for low-input produce such as organic fruits and vegetables (Misra et al 1991; Underhill and Figuroa 1996). While few studies have explicitly focused on willingness-to-pay for IPM grown produce, previous research into consumer response to organic and chemical reduced produce may provide the best indication of consumer response to IPM grown fruits and vegetables. In general, while income is usually found to be significant in estimating willingness-to-pay for pesticide risk reduction, conflicting findings have been reported. Numerous studies have found that willingness-to-pay for food risk reduction increases with income (Elnagheeb and Jordon 1992, van Ravenswaay and Hoehn 1991). Paradoxically, however, many studies have found food safety concerns decrease as income increases (Buzby et al. 1995; Byrne et al. 1991; Dunlap and Beus 1992; Jussaume and Judson 1992). Education has also been found by some studies to contribute positively and in other studies contribute negatively to pesticide risk concerns (Buzby et al. 1995) and willingness-to-pay for food risk reduction.

Several studies have reported that a majority of consumers indicated some level of willingness-to-pay more for chemical residue-free produce (Huang 1993, Morris et al. 1993; Ott, Huang and Misra 1991). Females (Govindasamy and Italia 1997 and Huang 1993) and younger individuals (Govindasamy and Italia 1997) appear to be among

those more likely to pay a premium for chemically reduced input produce.

In one of the few marketing surveys of IPM, Hollingsworth et al. (1993) found that most consumers (61%) had not heard of IPM. Consumers are not likely to purchase what they are not sure about. Burgess et al. (1994) also found that few respondents (27%) had heard of IPM but when the concept was explained to them, they were receptive to the point of being willing to spend 10% to 25% more for produce grown using IPM techniques. Many respondents indicated that they might even be willing to switch supermarkets to obtain IPM produce.

Hollingsworth et al. (1993) reported that the majority of 549 respondents (63%) believed that IPM grown produce would be safer than non-IPM produce and 78% believed that IPM techniques helped to protect the environment. Furthermore, most respondents (75%) indicated that they would purchase IPM-labeled produce over non-labeled produce if it cost the same and 40% were willing to buy IPM-labeled produce if it cost slightly more than non-labeled produce. Underhill and Figueroa (1996) is among the only attempts to statistically isolate differences in willingness-to-pay for IPM produce by consumer socio-demographic characteristics. Their study reported that younger individuals, higher earning individuals, and those who live in urban settings were the most likely to pay more for certified IPM produce.

Data Description

The data for this analysis was collected from a short consumer survey conducted by Rutgers Cooperative Extension. The survey was administered at five grocery retailers throughout New Jersey and was completed in March of 1997. The retail locations included three corporate supermarkets of various sizes, one independent supermarket, and a privately owned direct market establishment. The survey was conducted during both weekend and weekday periods throughout the morning and afternoon hours. Respondents were approached at random while entering the retail establishment. Participants read and completed the questionnaire individually with no assistance from the survey administrator.

To minimize bias, the study was presented to participants as a "survey of consumers of fresh vegetables" with no mention of pesticides or organically or IPM grown produce made prior to handing out the questionnaire. In total 291 completed responses were obtained from grocery shoppers. Topics in the survey questionnaire were based on an amalgamation of several surveys developed for assessing the demand for organic produce. In addition to attitudes and preferences, the questionnaire included items relating to demographic information such as age, gender, income, education, and household size. Questions related to consumer risk perceptions and the premium price that consumers would be willing to pay for IPM produce were a primary focus of the survey. In administering the questionnaire, the major food purchaser for the household was encouraged to be the study participant.

Because the majority (over 67%) of the respondents had no prior knowledge of IPM, care was taken in selecting a suitable definition of IPM that would not introduce a bias to the survey participants. The definition of Integrated Pest Management was adopted from a 1989 survey conducted by the New York State IPM Program. For the purpose of introducing IPM to unfamiliar consumers and also for serving as a base of reference for those who had prior knowledge of it, IPM was defined as:

> a crop production program in which a combination of pest control techniques are used. The farmer does not rely completely on the regular scheduled use of chemical pesticides. Other methods are used such as resistant plants, natural enemies and destruction of places where pests breed. Only when those other methods fail to control pests does the farmer use chemical pesticides as a last resort. With IPM, farmers typically reduce their usage of chemical pesticides by one-third or more.

Before distribution, the survey was pre-tested by a group of randomly selected individuals. The pre-tested surveys were not included in the final data set.

In addition to data on direct consumer response to IPM, questions were also included to ascertain perceptions of pesticide use and pesticide concern levels. Of the 291 participants that responded, 60% felt that pesticides posed a very serious risk to human health while only 3% felt they were not hazardous (table 1). The majority of respondents (58%) believed that there was a difference in the safety of consuming conventional produce compared to IPM and organic produce and also believed (66%) that the use of synthetic pesticides had a negative effect on the environment (table 1).

Collectively, the survey participants were more willing to pay a premium for IPM produce than for organic produce. This is an interesting finding since the survey explicitly explained that IPM pro-

Table 1. Descriptive Survey Findings

How hazardous do you believe synthetic pesticide residues are to human health?		
171	60%	A serious hazard
107	37%	Somewhat hazardous
9	3%	Not hazardous
Do you believe that conventionally grown produce is generally safe to consumer?		
159	55%	Agreed
31	11%	Disagreed
97	34%	Unsure
Do you believe there is a significant difference in the safety of conventional, IPM, and organic produce?		
165	58%	Agreed
29	10%	Disagreed
90	32%	Unsure
Do you believe that synthetic pesticides are damaging to the environment?		
187	66%	Agreed
70	26%	Disagreed
28	9%	Unsure
If IPM produce was labeled as such in your supermarket, do you think that you . . .		
207	71%	Would buy
13	5%	Would not buy
71	24%	Not sure

duce contained some pesticide residues while organic produce contained no synthetic residues. Respondents were asked if they would be willing to pay a premium of at least 10% over the price of conventional produce in order to purchase IPM produce. Overall, 38% of the respondents indicated they were willing to pay at least a 10% premium for IPM produce while 62% reported they were willing to pay less than that amount. A premium of 10% was chosen based on the findings of several other studies. For instance, Ott, Huang and Misra (1991) 54% of those who indicated that pesticide usage was a food concern were willing to pay more to obtain pesticide free produce, only about one tenth of the sample indicated they would be willing to pay more than 10% extra.

Table 2 provides a descriptive tabulation of the explanatory variables used in this analysis. Approximately 66% of respondents were female and 83% had completed at least some college. About 58% of the participants were 49 years of age or below, while approximately 37% of the respondents had annual household incomes of less than $39,999. Approximately 33% purchased groceries for children who lived in their household. Roughly 15% of the respondents were single, 78% were married or widowed, and 7% were separated or divorced. About 13% lived in rural areas while 8% lived in urban areas and 79% lived in suburban areas.

Methodology

The logit model was selected as the regression method in this analysis because its asymptotic characteristic constrains the predicted probabilities to a range of zero to one. The logit model is commonly used in a settings where the dependent variable is binary. Because the data source provided individual rather than aggregate observations, the common estimation method of choice was the maximum likelihood method (Gujarati 1992). Among the beneficial characteristics of MLE are that the parameter estimates are consistent and efficient asymptotically (Pindyck and Rubinfeld 1991).

The empirical model assumes that the probability of paying or willingness-to-pay a premium for IPM produce, P_i, is dependent on a vector of independent variables (X_{ij}) associated with consumer i and variable j, and a vector of unknown parameters β. The likelihood of observing the dependent variable was tested as a function of variables which included socio-demographic and consumption characteristics.

$$(1) \quad P_i = F(Z_i) = F(\alpha + \beta X_i) = 1/[1 + \exp(-Z_i)]$$

where:

$F(Z_i)$ = represents the value of the logistic cumulative density function associated with each possible value of the underlying index Z_i.
P_i = The probability that an individual would be willing to pay at least 10% premium to obtain IPM grown produce given the independent variables X_is
Z_i = The underlying index number of $\alpha + \beta X_i$
α = the intercept

And βX_i is a linear combination of independent variables so that:

$$(2) \quad Z_i = \log[P_i/(1 - P_i)] = \alpha_i + \beta_{i1}X_{i1} + \beta_{i2}X_{i2} + \ldots + \beta_{in}X_{in} + \varepsilon_i$$

where:

i = 1,2, . . . , n are observations
X_n = the nth explanatory variable for the ith observation
β = the parameters to be estimated
ε = the error or disturbance term

The parameter estimates do not directly represent the effect of the independent variables. To obtain the estimators for discrete variables such as the explanatory variables used in this study, the

Table 2. Descriptive Tabulation of Explanatory Variables

Variable		N	Percentage	Std Dev
Gender				
(Male)	Male	100	34.4%	0.4757
	Female*	191	65.6%	0.4757
Age				
(Age 1)	Less than 36 years of age*	68	23.4%	0.4239
(Age 2)	36–50 years of age	103	35.4%	0.4790
(Age 3)	51–65 years of age	69	23.7%	0.4260
(Age 4)	Over 65 years of age	51	17.5%	0.3808
Annual household income				
(Income 1)	$29,999 or less	48	16.5%	0.3718
(Income 2)	$30,000 to $49,999	58	19.9%	0.4001
(Income 3)	$50,000 to $69,999	58	19.9%	0.4001
(Income 4)	$70,000 or more*	127	43.6%	0.4968
Education				
(Education 1)	High School Degree	43	14.8%	0.3555
(Education 2)	Some College—Some Graduate School	169	58.1%	0.4942
(Education 3)	Masters or Doctoral Degree*	79	27.1%	0.4455
Do you usually purchase organic produce?				
(Organic)	Yes	99	34.0%	0.4746
	No*	192	66.0%	0.4746
Have you visited a farmers' market in the past five years?				
(Visit)	Yes	257	0.883	0.3218
	No*	34	0.117	0.3218
Are you the primary household grocery shopper?				
(Prime)	Yes	244	83.8%	0.3686
	No*	47	16.2%	0.3686
Are there children residing in the household?				
(Kids)	Yes	97	33.3%	0.4722
	No*	194	66.7%	0.4722
Do you regularly shop at more than one food store?				
(Shop-Many)	Yes	113	38.8%	0.4882
	No*	178	61.2%	0.4882
Do you usually make use of food advertisements?				
(Media)	Yes	64	22.0%	0.4149
	No*	227	78.0%	0.4149
Did you have knowledge of IPM prior to taking this survey?				
(Heard-of-IPM)	Yes	94	32.3%	0.4684
	No	197	67.7%	0.4684
Do you believe residues from pesticide pose a very serious hazard?				
(Risk)	Yes	175	60.1%	0.4905
	No*	116	39.9%	0.4905
Household size				
(Hsize)	Four or more individuals	67	77.0%	0.4217
	Less than four individuals*	224	23.0%	0.4217

*Refers to category that was omitted in the logit analysis to prevent perfect collinearity.

changes in the probability P_i that $Y_i = 1$ brought by the independent variable X_{ij} is given by:

$$(3)\quad (\Delta P_i/\Delta X_{ij}) = P_i(Y_i{:}X_{ij} = 1) - P_i(Y_i{:}X_{ij} = 0)$$

The change in probability for each explanatory variable was measured at the mean of all other independent variables. The following model was developed to predict the likelihood of paying a premium for IPM grown produce. The model was tested under the specification:

$$\begin{aligned}\text{PAY-IPM} = {} & \beta_0 + \beta_1\,\text{Male} + \beta_2\,\text{Age2} + \beta_3\,\text{Age3} \\ & + \beta_4\,\text{Age4} + \beta_5\,\text{Income1} \\ & + \beta_6\,\text{Income2} + \beta_7\,\text{Income3} \\ & + \beta_8\,\text{Education1} + \beta_9\,\text{Education2} \\ & + \beta_{10}\,\text{Organic} + \beta_{11}\,\text{Prime} \\ & + \beta_{12}\,\text{Visit} + \beta_{13}\,\text{Risk} + \beta_{14}\,\text{Kids} \\ & + \beta_{15}\,\text{Heard-of-IPM} + \beta_{16}\,\text{Hsize} \\ & + \beta_{17}\,\text{Shop-many} + \beta_{18}\,\text{Media} \\ & + \beta_{19}\,(\text{Age} \times \text{Edu}) + \beta_{20}\,(\text{Income} \\ & \times \text{Edu}) + \beta_{21}\,(\text{Urban} \times \text{Male}) \\ & + \beta_{22}\,(\text{Suburban} \times \text{Male}) \\ & + \beta_{23}\,(\text{Urban} \times \text{Age})\end{aligned}$$

where:

PAY-IPM = 1 if the individual indicated a willingness-to-pay at least a 10% premium to obtain IPM grown produce and 0 otherwise

Male = 1 if the individual is male and 0 otherwise

Age2 = 1 if the invidiaul is between 35 and 50 years of ages and 0 otherwise

Age3 = 1 if the individual is between 51 to 65 years of age and 0 otherwise

Age4 = 1 if the individual is older than 65 years of age and 0 otherwise

Income1 = 1 if the household income was $29,999 or less and 0 otherwise

Income2 = 1 if the household income was between $30,000 and $49,999 and 0 otherwise

Income3 = 1 if the household income was between $50,000 and $69,999 and 0 otherwise

Education1 = 1 if highest level of education attained by the participant was a high school degree and 0 otherwise

Education2 = 1 if highest level of education attained by the participant was higher than a high school degree but less than a Masters Degree and 0 otherwise

Organic = 1 if the participant regularly purchases organic produce and 0 otherwise

Prime = 1 if the participant was the primary household grocery shopper and 0 otherwise

Visit = 1 if the individual indicated they had visited a farmers' market within the past five years and 0 otherwise

Risk = 1 if the participant believed that the use of synthetic pesticide posed a very serious health risk and 0 otherwise

Kids = 1 if one or more children under the age of 17 reside in the household and 0 otherwise

Heard-of-IPM = 1 if the participant had knowledge of IPM prior to taking the survey and 0 otherwise

Hsize = 1 if 4 or more individuals presently reside in the household and 0 otherwise

Shop-Many = 1 if the individual regularly shops at many food stores to purchase advertised specials and 0 otherwise

Media = 1 if the participant makes frequent use of food advertisements when selecting fresh fruits and vegetables and 0 otherwise

Age × Edu = 1 if the individual was in the oldest ages and highest educational groups and 0 otherwise

Income × Edu = 1 if the individual was in both the highest income and highest educational groups and 0 otherwise

Urban × Male = 1 if the individual lived in an urban area and was male and 0 otherwise

Sub × Male = 1 if the individual lived in a suburban area and was male and 0 otherwise

Urban × Age = 1 if the individual lived in an urban area and was in the oldest age group and 0 otherwise

For estimation purposes, one classification was eliminated from each group of variables to prevent perfect collinearity. Females, higher income households, and those with high risk aversions toward synthetic pesticides were initially expected to exhibit a greater willingness-to-pay a premium for IPM produce. For an applicable utility theoretic framework, see Misra, Huang and Ott, 1991 or Eom, 1994.

Empirical Results

The maximum likelihood estimates for the willingness-to-pay a premium are presented in table 3. The model exhibited a McFadden's R^2 statistic of 0.17, which is consistent with the generally low R^2 value observed in cross sectional models. The calculated chi-square statistic rejected the global null hypothesis that all coefficients of the explanatory variables were zero at the 0.0001 level. Predictive accuracy of the model is presented in table 4.

The dummy variable for gender (MALE) was significant and had a negative coefficient. Males were found to be 14% less likely to pay the 10% premium for IPM produce than females. This finding is consistent with the majority of food safety studies that have documented a gender significance in food risk perceptions and food purchasing behavior. Males have been found to generally exhibit lower risk aversions toward food safety risks and

Table 3. Regression Results

Variable	Estimate	Standard Error	Change in Probability
Intercept	0.9099	0.9021	
Male**	−0.6429	0.3400	−0.1406
Age 4**	−1.0891	0.5554	−0.2143
Age 3***	−1.4454	0.4622	−0.2789
Age 2***	−0.9978	0.4056	−0.2132
Income 1***	−1.2410	0.5203	−0.2369
Income 2***	−1.4412	0.4691	−0.2721
Income 3**	−0.9112	0.4362	−0.1859
Education 1	−0.7484	0.6005	−0.1538
Education 2	−0.7466	0.4826	−0.1710
Organic***	1.0608	0.2974	0.2471
Prime	0.5296	0.4141	0.1128
Visit	−0.0880	0.4631	−0.0202
Risk***	0.7457	0.3191	0.1642
Kids	0.0790	0.3923	0.0180
Heard-of-IPM	0.1709	0.3055	0.0392
Hsize**	−0.8166	0.4120	−0.1705
Shop-Many	−0.3282	0.3177	−0.0749
Media	−0.3407	0.3662	−0.0749
Age × Education	−1.0736	1.0321	−0.1970
Income × Education	−0.3174	0.6372	−0.0695
Urban × Male**	1.6499	0.8294	0.3890
Suburban × Male	0.6271	1.6532	0.1519
Urban × Age**	−2.1231	0.9457	−0.3000

McFadden's R^2: 0.17.
Ratio of nonzero observations to the total number of observations: 0.378.
*: significant at the .10 level.
**: significant at the .05 level.
***: significant at the .01 level.

lower willingness-to-pay for food borne risk reduction than females (Huang; and Ott and Maligaya, for example).

All three age variables were statistically significant and were estimated with negative coefficients when compared to the youngest age group. Those over the age of 65 were 21% less likely to pay the premium for IPM produce than those under the age of 36. Similarly, those between the ages of 51 and 65 were 28% less likely and those between the ages of 36 and 50 were 21% less likely to pay the premium for IPM than the youngest age group. The fact that the lowest likelihood is found in the 51 to 65 age group while the highest likelihood is found in the under 36 age group suggests that IPM may gain acceptance over time. The negative effect of age is consistent with the findings of Underhill and Figueroa (1996).

Table 4. Predictive Accuracy of Logit Model

		Predicted	
		0	1
Actual	0	141	59
	1	40	51

Number of correct predictions: 192.
Percentage of correct predictions: 66.0.

Whereas the youngest age group was the most willing to pay the premium, it was the highest income group that was the most willing to purchase IPM at a premium. This is consistent with the findings of Misra et al. (1991). Govindasamy and Italia (1998[b]) also found higher earning households to exhibit a higher willingness-to-purchase IPM grown produce. All three of the included income variables were highly significant. Those with annual household incomes below $29,999 (INCOME1) were 24% less likely to pay a premium for IPM produce than those with an annual income over $70,000. Similarly, those with annual incomes between $30,000 and $49,999 (INCOME2) were 27% less likely and those with annual incomes between $50,000 and $69,999 (INCOME3) were 19% less likely to pay the premium than the highest earning group (INCOME4).

The variable for household size (HSIZE) was significant at the 0.05 level. Households with four or more residents were 17% less likely to pay the 10% premium for IPM produce than were smaller households. This is consistent with the findings of Buzby et al. (1995). Larger households may generally have less discretionary income per resident than smaller households and may consider paying a premium for IPM produce a luxury. If so, the negative effect of household size may be consistent with the estimates for income.

Those who frequently purchased organic produce (ORGANIC) were 25% more likely to pay a premium for IPM produce. While it is intuitive that organic customers would also favor IPM produce, it is a significant finding because it provides a basis for distributing IPM produce through the avenues which organic produce is currently sold. However, this finding also suggests competition between IPM and organic produce and that pricing of IPM products will be important to the development of its market share. Those with high risk aversions toward pesticides were 16% more likely to pay the premium.

A series of variables was used to test for interaction effects between different demographic variables. In total, 32 combinations of gender, income, age, education, regional setting were tested yielding only two significant variables. Most of the interaction dummy variables were removed from the final model specification. Those who lived in urban areas and who were at least 65 years of age were found to be statistically less likely to pay a premium for IPM produce. Those who were both

male and who lived in urban areas were more likely to pay a premium for IPM produce than those who were not.

Dummy variables for education were insignificant in predicting willingness-to-pay the premium for IPM produce. Other variables which were found to be insignificant and were subsequently dropped from the model included marital status and region setting (i.e. rural, urban, suburban).

Conclusions

IPM is method of production that is likely to play a major role in the future of agriculture. This study determined the effect of socio-demographic factors on the willingness-to-pay a premium for IPM grown produce. As anticipated, willingness-to-pay was not constant across the population but varied among demographic segments. As IPM grown produce continues to increase in its share of the U.S. food supply, there are a number of ways and places in which it could be marketed to maximize the return to growers and retailers. The results of this study suggest that many consumers would be willing to pay a premium to obtain IPM produce; specifically, females, higher earning households, younger individuals, and those who frequently purchase organic produce appear to be among the most likely to pay a 10% premium for IPM produce. If obtaining a premium was the primary goal for a retailer introducing IPM labeled produce, affluent and suburban areas and places where organic produce is sold seem to be the most likely target areas. Two significant interaction variables also suggest that urban residents would be less likely to pay higher prices for IPM grown produce. Larger households, which are also more prevalent in urban areas, seem less likely to pay a premium for IPM grown produce. Communities which have a high population of retired individuals may have a lower willingness-to-pay for IPM than younger communities.

However, before the level of acceptance and demand evidenced by this study can be realized, some form of educational mechanism must be implemented to inform consumers of the benefits and existence of integrated pest management.

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