*AgBioForum, 8(4): 197-204.* *©2005 AgBioForum.*

# Determinants of Corn Rootworm Resistant Corn Adoption in Indiana

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Adoption of transgenic corn resistant to corn rootworm (CRW corn) was analyzed using a probit model with data from a survey of Indiana producers. Operator age, farm size, and regional and self-reported measures of rootworm pressure were all statistically significant in explaining adoption. In addition to these typical explanatory variables, market access variables, price variables, and insect resistant management plan requirements were very significant. These findings suggest that the value of CRW corn to the producer is strongly influenced by the fact that it is not yet fully approved for sale in Europe.

***Key words:*** corn rootworm corn, probit model, technology adoption.

## Introduction

Overall, the adoption of genetically modified (GM) corn with an insect-resistance trait has been extremely rapid. These insect-resistant crops produce a toxin from *Bacillus thuringiensis* and are commonly called Bt crops. The adoption of Bt corn has reached 26% of planted corn acreage in the United States in 2005, with another 9% of planted corn acreage in stacked gene hybrids that include the *Bt* gene (United States Department of Agriculture National Agricultural Statistics Service [USDA NASS], 2005). At the same time, the adoption of Bt corn was much lower in Indiana, accounting for only 11% of planted acres in 2005, with another 4% in stacked gene hybrids (USDA NASS, 2005). One reason for the lower adoption rate of Bt crops in Indiana is due to lower European corn borer (ECB) pressure and therefore lower returns to adoption of Bt corn resistant to ECB (Hyde, Martin, Preckel, & Edwards, 1999).

In contrast to ECB, corn rootworm (CRW) is a much more serious pest in Indiana.[1] The western CRW (*Diabrotica virgifera virgifera* Le Conte) is the most common variety in Indiana, and initially rotating corn with soybeans was sufficient to kill most CRW larvae. However, a behavioral variant of the western CRW has adapted by laying its eggs in soybean fields, and crop rotation is no longer an effective control option for CRW in first year corn, particularly in northwestern Indiana (Harbor & Martin, 2004). As a result, Indiana producers now routinely apply soil insecticides to control CRW. The CRW insect is often called the "billion-dollar bug," as it eats away a billion dollars of US farm profits through yield loss or control costs (Burchett, 2001). In 2003, Monsanto introduced a GM corn that is resistant to CRW (CRW corn); it produces the Bt toxin—which kills the CRW larvae—in the corn roots. Industry members and observers predict that Indiana producers will be much more likely to adopt CRW corn than transgenic corn resistant to ECB because of its relatively larger production benefits.

However, producers' adoption decisions incorporate both production benefits and price implications of the new technology. Currently, CRW corn is not approved for sale in the European Union (EU), and Indiana has a substantial number of established buyers who offer a higher price for non-GM corn for food production or export to the EU. Previous studies have shown that demand uncertainty, market access, or market price can have a significant impact on GM corn adoption and diffusion (Alexander, Fernandez-Cornejo, & Goodhue, 2003; Fernandez-Cornejo, Alexander, & Goodhue, 2002). Indiana may also have a relatively large number of producers for whom refuge requirements pose a significant barrier to GM corn adoption or who face insect pests other than CRW, which makes CRW corn less attractive. The objective of this paper is to identify the operator and farm characteristics factors that influence the adoption of CRW corn using data from a spring 2004 survey of Indiana corn producers with particular attention paid to the effects of market opportunities, refuge requirements, and insect pests other than CRW.

## GM Crop Adoption

There is a growing subset of the technology adoption literature that specifically examines the adoption of GM crops (Alexander et al., 2003; Fernandez-Cornejo, Daberkow, & McBride, 2001; Hubbell, Marra, & Carlson, 2000; Marra, Hubbell, & Carlson, 2001; Payne et

1. *Alston, Hyde, Marra, and Mitchell (2002), Payne, Fernandez-Cornejo, and Daberkow (2003), Harbor and Martin (2004), and Mitchell, Gray, and Steffey (2004) provide excellent background on the CRW corn technology.*

al., 2003; Quaim & de Janvry, 2003).[2] Most of these studies have found that GM crop adoption is positively related to farm size and education. Only a couple of studies include the producer's age, and only Payne et al. (2003) found age to be significant.

Genetically modified crops offer producers a substitute for current pest control technologies. The efficacy and cost of the current technology and the severity of the pest have a significant influence on adoption. Hubbell et al. (2000) and Marra et al. (2001) found that producers who had experienced pest resistance to chemical insecticides were significantly more likely to adopt Bt cotton. Fernandez-Cornejo et al. (2001) and Qaim and de Janvry (2003) found that Bt cotton adoption is positively related to the price of the chemical insecticides. Alexander et al. (2003) found that an attitudinal variable capturing producer concern about yield damage from ECB was positively related to adoption of Bt corn resistant to ECB. Payne et al. (2003) found that adoption of CRW-resistant Bt corn is positively related to producer beliefs about the yield damage due to CRW.

Information about GM crop performance, depending on the source of information, can significantly influence adoption. Marra et al. (2001) found that previous own-farm yield experience was very important in the adoption of Bt cotton. Similarly, Qaim and de Janvry (2003) found that farmers in Argentina with first-hand technical information about Bt cotton were willing to pay more for the technology.

One characteristic of Bt crops is the insect resistance management requirements promulgated by the Environmental Protection Agency: Producers must plant a minimum of 20 percent of their crop acreage to a non-Bt crop. Even though Hyde, Martin, Preckel, Dobbins, and Edwards (2000) found that the additional planting costs associated with implementing the refuge would be minimal for Bt corn resistant to ECB, these requirements may pose a barrier to adoption.[3] Hubbell et al. (2000) found that 40% of producers view the insect resistance management requirements as a "somewhat or very important barrier to adoption" for Bt cotton, but they did not include this concern in their adoption model.

## Model

Farmers will choose whether or not to adopt CRW corn based on their beliefs about the expected utility of the new technology relative to the current technology. The farmer will choose to adopt the new seed if he believes that the expected utility associated with the new technology is greater than the current technology given the specific characteristics of his operation: $E[U_1] > E[U_0]$. The farmers' beliefs about the expected utility $E[U(x_1)]$ ($i$ = 1 if CRW corn is adopted and 0 otherwise) of the technology is a function of the characteristics of the farm and farmer and the information available to the farmer, $x$.

This paper examines farmers' decisions to adopt CRW corn in 2004. Farmers make their adoption decisions based on their beliefs about the expected utility of the CRW corn, which is a latent variable, $y^* = E[U(x_1)] - E[U(x_0)]$:

$$y_t^* = \mathbf{x}_t + \varepsilon_t, \tag{1}$$

where $y_t^*$ represents the farmer's beliefs about the expected utility of the seed, $\mathbf{x}_t$ is a vector of independent variables which explain adoption,  is a vector of unknown parameters, and $\varepsilon_t$ is a disturbance term that accounts for errors in perception and measurement and unobserved preferences and characteristics assumed to be normally distributed.

The farmer's observed adoption decision is a binary variable. If the farmer believes that CRW corn is unprofitable, then he will not adopt it. Alternatively, if the farmer believes that CRW corn is more profitable than his best alternative, then he will adopt CRW corn:

$$y_t = \begin{cases} 0 \text{ if } y_t^* \le 0 \\ 1 \text{ if } 0 \le y_t^* \end{cases}. \tag{2}$$

The farmer's adoption decision is estimated using a probit model.

## Data

Mail surveys were sent to 4,000 Indiana producers who grow at least 200 acres of corn. The random sample was restricted to farms of 200 acres of corn or more in order to focus on the farms that produce the majority of the

2. *For a comprehensive look at the technology adoption literature see Feder, Just, and Zilberman (1985) and Sunding and Zilberman (2001).*

3. *The primary cost of planting a refuge is the forgone profits associated with planting a lower yielding hybrid in the refuge. This cost would not affect the producer's decision to adopt Bt corn; the producer's adoption decision should be whether a crop with 80% Bt corn is profitable. There are no additional handling and segregation costs, because producers cannot maintain the purity of the refuge crop due to pollen drift. Instead, the refuge crop is commingled with the Bt crop.*

**Table 1. Variable definitions and means.**

| Variable | Definition | Mean[a] |
|---|---|---|
| **Age** | Age of the operator (years) | 51.38 |
| **Age_sq** | Operator age squared | 2743.53 |
| **College** | Education dummy (1 if operator has at least some college) | 0.60 |
| **Corn_farm** | Corn specialization dummy (1 if corn represents more than 50% of production) | 0.47 |
| **Size** | Size of farm (thousands of acres in corn) | 0.60 |
| **Size_sq** | Size of farm squared | 0.63 |
| **Rootworm** | Insecticide dummy (1 if insecticide is used for CRW in 2003) | 0.75 |
| **Exploss** | Expected CRW losses (bushels/year) | 6.05 |
| **High** | High-risk region for western CRW variant | 0.50 |
| **Moderate** | Moderate-risk region for western CRW variant | 0.35 |
| **Off_farm** | Operator primary occupation is off farm | 0.09 |
| **Cont_corn** | Continuous corn dummy (1 if operation has some acreage in continuous corn) | 0.21 |
| **ECB03** | ECB dummy (1 if operation used Bt corn for European Corn Borer in 2003) | 0.26 |
| **Difficult** | Agreement with "I anticipate that it will be very difficult to find a buyer for corn that is not approved for sale in Europe." (1–5 Likert scale) | 2.48 |
| **Segregate** | Agreement with "I cannot segregate my corn." (1–5 Likert scale) | 3.04 |
| **Pollen drift** | Agreement with "I am concerned about pollen drift contaminating adjacent fields." (1–5 Likert scale) | 3.61 |
| **All** | Agreement with "I would plant all of my acres to a corn rootworm resistant variety if there were no marketing restrictions." (1–5 Likert scale) | 2.63 |
| **Refuge** | Agreement with "I will not plant a corn rootworm resistant variety because of the refuge requirement." (1–5 Likert scale) | 2.46 |
| **Buyers** | Number of available buyers that accept corn not approved for sale in Europe | 1.39 |
| **Feed** | Percent of corn production feed to livestock on-farm | 0.07 |
| **Secondary pests** | Number of secondary pests controlled through soil insecticides | 2.27 |

[a] *For dummy variables, the mean is the percentage of respondents with that attribute.*

corn in Indiana. Farms of 250 acres of corn or more account for 26% of Indiana corn farms and produced 77% of the 2002 Indiana corn crop (USDA NASS, 2004). The survey was mailed in early March 2004. A follow-up phone survey of nonrespondents was conducted. Once mail survey respondents who did not grow row crops in 2003 were eliminated, there were 794 usable surveys, for a mail response rate of 20%. There were 128 phone survey respondents, and of these surveys 127 were usable. The total response rate for the mail and phone survey combined was 24%. In Indiana, there are approximately 7,000 producers who grow at least 200 acres of corn (Indiana Agricultural Statistics Service, 2004). This survey sampled over half of these producers, and the 921 respondents represent 13% of this population.

Three focus groups were conducted with Indiana corn producers during early March 2005. Two focus groups were conducted in the region at high risk for the western CRW variant: Tippecanoe County and Cass County. The third focus group was conducted in Allen County, which is in the region at moderate risk for the western CRW variant.

The explanatory variables that are hypothesized to influence the producer's decision to adopt CRW corn are chosen based on previous research and focus group discussions with Indiana corn producers (Table 1). The first set of variables was chosen to match the explanatory variables used by Payne et al. (2003) as closely as our dataset would allow. The human capital variables include age, age squared, and education. According to Huffman (2001), the quality of schooling can vary over time, and these schooling vintage effects can be captured by either the farmer's year of graduation or the combination of farmer's age and age squared. The farm characteristics include acres of corn production, acres squared, and whether the farm specializes in corn production. Producers who perceive a large benefit to better CRW control will be more likely to adopt CRW corn or at least use it on a trial basis. As a measure of benefit from better CRW control, we include: whether the producer used insecticides for CRW control in 2003; the expected yield loss due to CRW damage when a soil insecticide is applied; a location dummy if the producer is in the area at high risk for the western CRW variant; a location dummy if the producer is in the area at moderate risk for the western CRW variant; and a dummy for continuous corn production because is more likely to face high CRW pressure every year. We include a dummy if the producer used Bt corn that is resistant to ECB in 2003; producers who have experience with Bt corn will be familiar with the seed technology, have more information about the insect resistant management (IRM) plans or refuge requirements for Bt crops, and possibly have more knowledge about managing pollen drift and finding buyers.

Another set of variables was chosen based on additional decision factors identified in the focus group discussions with Indiana corn producers. The corn producers in the high-risk region were very concerned about their ability to market CRW corn, which is not approved for sale in Europe. In order to capture issues of market access, we include the producer's assessment of the number of buyers that accept corn not approved for sale in Europe and the percent of corn production fed to livestock on-farm. The more important marketing issue for producers was price—the buyers of corn approved for sale in Europe frequently offer an explicit premium, and some have a stronger basis (higher spot price than other nearby cash markets). We include four attitudinal variables that capture the producers' perception of the difficulty of finding a buyer, difficulty of segregating corn, concern about pollen drift, and impact of marketing restrictions on planting decisions.

In the focus groups, producers said that their CRW control decision is influenced by their other insect problems. A number of producers said that they always use soil insecticide because of pests such as white grubs, and that CRW control is a lesser concern. Because they are applying insecticide already, these producers said they would continue to use soil insecticide, rather than adopting CRW corn, to control CRW. In order to capture the impact of secondary pests on the CRW corn adoption decision, we include the number of secondary pests the producer is controlling with soil insecticide applications.

Most of the focus group participants said that the refuge requirements do not affect their decision to plant CRW corn. However, a couple of producers said that their field configurations or planting equipment prevent them from being able to implement the refuge requirements. We include an attitudinal variable to capture the impact of the refuge requirements on the producer's decision to plant CRW corn.

**Table 2. Maximum likelihood parameter estimates of probit model of CRW corn adoption in 2004.**

| Variable | Parameter estimates | Standard error | z-statistics |
|---|---|---|---|
| **Intercept** | -3.892*** | 1.142 | -3.41 |
| **Age** | 0.075* | 0.044 | 1.70 |
| **Age_sq** | -0.001* | 0.000 | -1.80 |
| **College** | 0.090 | 0.122 | 0.74 |
| **Corn_farm** | -0.033 | 0.123 | -0.27 |
| **Size** | -0.066 | 0.262 | -0.25 |
| **Size_sq** | 0.071 | 0.081 | 0.89 |
| **Rootworm** | 0.493** | 0.227 | 2.17 |
| **Exploss** | -0.004 | 0.010 | -0.45 |
| **High** | 0.688*** | 0.242 | 2.84 |
| **Moderate** | 0.540** | 0.251 | 2.15 |
| **Off_farm** | -0.019 | 0.227 | -0.08 |
| **Cont_corn** | 0.027 | 0.143 | 0.19 |
| **ECB03** | 0.613*** | 0.121 | 5.08 |
| **Number of obs.** | 705 | | |
| **LR $\chi$2(13)** | 59.02 | | |
| **Percent predicted correctly** | 82% | | |

**p < .01. **p < .05. ***p < .1.*

## Results

We present the results of two adoption models. The first model (Table 2) includes only the first set of explanatory variables that were also used by Payne et al. (2003).[4] The second model (Table 3) includes all of the variables. The likelihood ratio test of the global null hypothesis—that all the coefficients on the explanatory variables are zero—is strongly rejected at the 1% level for both adoption models. The predicted value of the dependent vari-

4. *We did not have exactly the same variables as Payne et al. (2003). We include a dummy variable for at least some college education instead of a dummy for at least a high school degree. Instead of a dummy variable for location in an area with the western CRW variant, we include dummy variables for areas with high variant pressure and moderate variant pressure. Instead of hours of off-farm labor, we include a dummy variable if the operator's principal occupation is off-farm. We did not have information on producer's tillage practices so we could not include a dummy for operations using no-till. Because Indiana is in the Eastern Corn Belt, we do not include a dummy variable for location in the Eastern Corn Belt.*

**Table 3. Maximum likelihood parameter estimates of probit model of CRW corn adoption in 2004.**

| Variable | Parameter estimates | Standard error | z-statistics |
|---|---|---|---|
| Intercept | -3.319** | 1.408 | -2.36 |
| Age | 0.096* | 0.054 | 1.77 |
| Age_sq | -0.001* | 0.001 | -1.82 |
| College | -0.060 | 0.145 | -0.42 |
| Corn_farm | 0.062 | 0.144 | 0.43 |
| Size | -0.066 | 0.337 | -0.2 |
| Size_sq | 0.026 | 0.110 | 0.23 |
| Rootworm | 0.269 | 0.289 | 0.93 |
| Exploss | -0.021* | 0.012 | -1.79 |
| High | 0.827*** | 0.281 | 2.95 |
| Moderate | 0.606** | 0.288 | 2.1 |
| Off_farm | 0.192 | 0.262 | 0.73 |
| Cont_corn | -0.073 | 0.169 | -0.44 |
| ECB03 | 0.410*** | 0.142 | 2.89 |
| Difficult | -0.138** | 0.062 | -2.23 |
| Segregate | -0.014 | 0.048 | -0.29 |
| Pollen drift | -0.211*** | 0.060 | -3.49 |
| All | 0.145*** | 0.056 | 2.61 |
| Refuge | -0.288*** | 0.063 | -4.53 |
| Buyers | 0.228** | 0.094 | 2.43 |
| Feed | 0.540* | 0.315 | 1.71 |
| Secondary pests | 0.080** | 0.036 | 2.2 |
| Number of obs. | 594 | | |
| LR $\chi 2(21)$ | 120.65 | | |
| Percent predicted correctly | 83% | | |

*$p < .01$. **$p < .05$. ***$p < .1$.*

able correctly matches actual behavior 82–83% of the time, though both models predict lower levels of adoption than actually observed. A likelihood ratio test of the restricted model compared to the full model ($LR\chi^2(8) = 148.8 > 20.09$, the critical value at 99% confidence level) strongly rejects the null hypothesis that the coefficients on the additional explanatory variables are zero.

In the base adoption model, the only operator characteristic that has a significant effect on adoption of CRW corn is age; education and an off-farm occupation were not significant. For the operator's age, the linear coefficient is positively related and the quadratic coefficient is negatively related to adoption. This indicates that CRW corn adoption increases with age for younger operators as they gain experience and build human capital, but it declines with age for older operators who are closer to retirement and have a shorter time horizon in which to receive returns from investing in new technology. This switching point occurs around 48 years of age.

None of the general farm characteristics that typically explain adoption, such as farm size and specialization in corn production, are significant. Instead, the significant farm characteristics are those that affect the perception of or directly affect the benefits and costs of adopting CRW corn. Prior experience with Bt corn resistant to ECB was the most significant factor in adoption of CRW corn. These producers are already familiar with the seed technology and refuge requirements and therefore may face substantially lower costs of adopting CRW corn. In addition, seed dealers may be more likely to promote CRW corn to producers who have shown a willingness to adopt GM corn. Producers who used insecticides to manage CRW in 2003 are significantly more likely to adopt CRW corn. Those producers who are located in the high-risk region for western CRW variant activity and those in the moderate-risk region are significantly more likely to adopt CRW corn. Producers' perception of yield loss due to CRW damage when using insecticides was not significant. As in Payne et al. (2003), planting continuous corn was not a significant adoption factor.

In the full adoption model, age, planting Bt corn resistant to ECB, location in the high risk region, and location in the moderate risk region continue to have the expected sign and be significant. The dummy variable on using insecticides to control CRW in 2003 is no longer significant. Instead, producers' perception of yield loss due to CRW damage when using insecticides is significant and negatively related to adoption. This variable measures the perceived value of a substitute control technology; those producers who perceive that soil insecticides are effective (i.e., that they face relatively little yield damage due to CRW when using soil insecticides) will be less likely to adopt a new, unfamiliar, technology for controlling CRW.

Most of the marketing variables are significant in explaining adoption of CRW corn. CRW corn adoption is significantly more likely as the number of available buyers who accept corn not approved for sale in Europe increases, and as the share of corn fed on-farm to livestock increases. Producers who agree that it will be difficult to find a buyer for corn that is not approved for sale in Europe, and producers who are very concerned about pollen drift contaminating adjacent fields, are significantly less likely to adopt CRW corn. Producers who agree that they would plant all of their acres to CRW corn if there were no marketing restrictions are significantly more likely to adopt CRW corn. The only variable that is not significantly related to adoption is producers' agreement that they cannot segregate their corn, indicating that the need to segregate CRW corn on-farm is not a barrier to adoption.

Surprisingly, the requirement to have an IRM plan (i.e., plant a refuge) was significantly and negatively related to CRW corn adoption. In focus group discussions with producers, all of the producers said that refuges are relatively easy to implement and would not deter them from planting CRW corn. However, based on the discussions, planting equipment and field configurations greatly affect the producer's ability to plant a refuge. For instance, a couple of producers were considering buying planters with one seed bin, which they said would greatly increase the difficulty of planting two types of seed in one field; unfortunately, the survey did not ask about planting equipment, which clearly affects the ease of implementing refuges. In addition, some of the producers indicated that they have some fields where they could not plant a refuge due to the field configuration (e.g., 10 acre or smaller fields that are surrounded by woods).

Finally, the number of secondary pests that are also controlled by the soil insecticide that is used to control CRW is positively and significantly related to CRW corn adoption. This finding is contrary to our expectations. In the focus group discussions, several producers said that they would not adopt CRW corn because they have to apply soil insecticides regardless in order to control other pests such as white grubs. Because adopting CRW corn would not eliminate the need to use soil insecticides, these producers said that the CRW corn would not save time, and would increase their costs. One possible explanation for the incorrect sign is that the number of secondary pests controlled does not capture the severity of the problems posed by other pests, thereby missing the critical information for the soil insecticide decision.

## Summary and Conclusions

As with Bt corn resistant to ECB, the level of CRW corn adoption in Indiana is lower than that found or predicted for the United States as a whole. Based on the Indiana survey, 9.5% of respondents adopted CRW corn in 2003, and 16% intended to adopt CRW corn in 2004. In contrast, Alston et al. (2002) found that initial adoption of CRW corn nationwide could be around 30%, while Payne et al. (2003) found that 35% of US producers reported they were likely or very likely to use CRW corn.

The results of this analysis suggest several possible explanations for the lower level of CRW corn adoption in Indiana. First, five of the six marketing variables were significant in explaining CRW adoption, and they demonstrate that Indiana producers are strongly influenced by the restrictions on marketing CRW corn. The results highlight two reasons why the marketing restrictions affect CRW adoption. The first reason is that Indiana producers have greater access to export markets and food processors than producers in the western Corn Belt, and thus may receive a larger premium for conventional over Bt corn. Several producers in the focus groups said that they would not plant CRW corn because they would not be able to deliver it to a local buyer who offers a much higher price than other buyers who accept CRW corn. The second reason is due to a perceived lack of buyers of corn not approved for sale in Europe. Twelve percent of the survey respondents said they do not have access to any buyers of corn not approved for sale in Europe, although in reality all producers in Indiana are within 50 miles of a buyer of corn not approved for sale in Europe. This finding suggests that there is a continued need for the Market Choices information campaign conducted by corn grower organizations, grain and feed associations, farmer-owned cooperatives, and land-grant university extension programs. Market Choices is designed to inform producers about which traits are not approved for sale in Europe and to assist these producers in locating buyers for their grain.

Second, producers who had experience with Bt corn resistant to ECB were much more likely to adopt CRW corn. Because Indiana producers have been much less likely than the average US producer to adopt Bt corn resistant to ECB, this lack of experience may also explain the lower level of CRW corn adoption. This finding also suggests that the diffusion of CRW corn may be slower in Indiana until producers become familiar with the Bt technology.

Third, the adoption model results suggested IRM plans that require the farmer to plant a refuge provide a barrier to adoption for at least some producers. Based on focus group discussions, specific types of planting equipment can greatly increase the difficulty of implementing refuges, even to the point of making refuges prohibitively expensive. A second explanation is based on the lower level of Bt corn adoption, which means that Indiana producers have less experience with IRM plans. Producers unfamiliar with IRM plans may overestimate the time and costs involved in implementing refuges.

One limitation of this study is that the data are only from Indiana producers, and although these findings can be extrapolated to the eastern Corn Belt, producers in the western Corn Belt face very different circumstances. For instance, continuous corn rotations are uncommon in Indiana but are much more common in the western Corn Belt, and CRW pressure is much higher in the western Corn Belt. In addition, there are fewer marketing restrictions in the western Corn Belt. A second limitation is that the survey did not elicit information about planting equipment, which clearly influences the cost and time associated with planting refuges and thus influences adoption.

The primary contribution of this paper is to highlight the impact of marketing restrictions on CRW corn adoption to date. Looking forward, the EU has already approved the import of MON 863 YieldGard Rootworm corn grain and its use in animal feed, processed feed, and additives; approval for use in food products is expect by spring 2006. As the restrictions on marketing CRW corn in the EU are lifted, the major barrier to producer adoption of CRW corn will be eliminated, and the findings of this paper suggest that producer adoption of CRW corn could increase dramatically.

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## Acknowledgments

The authors would like thank Jay Pershing, Terry Semmel, John Goette, Larry Bledsoe, Will Masters, Jess Lowenberg-DeBoer, and Marshall Martin for their comments and feedback. The authors gratefully acknowledge financial support from Monsanto Inc.