

**PLANTING TROUBLE: ARE FARMERS SQUANDERING  
BT CORN TECHNOLOGY?**

**AN ANALYSIS OF USDA DATA SHOWING SIGNIFICANT NONCOMPLIANCE WITH EPA'S  
REFUGE REQUIREMENTS**

by Gregory Jaffe  
Director, Biotechnology Project

CENTER FOR SCIENCE IN THE PUBLIC INTEREST  
1875 Connecticut Avenue, NW, Suite 300  
Washington, DC 20009-5728  
Phone: (202) 332-9110

[www.cspinet.org](http://www.cspinet.org)

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary .....	i
I. Introduction.....	1
II. Background on EPA’s Regulation of Bt Corn .....	1
III. Industry Survey on Grower Compliance with IRM Refuge Obligations .....	2
IV. CSPI’s FOIA Request to USDA .....	3
V. The NASS Data .....	4
VI. Conclusions from NASS Data .....	5
VII. Recommendations .....	5
VIII. Figures and Tables	
A. Figure 1: US Corn Acreage 2002 .....	9
B. Figure 2: US Bt Corn Acreage 2002 .....	10
C. Table 4: Percentage of Iowa Farms Growing Bt Corn 2002.....	11
D. Table 5: Percentage of Corn Acreage Devoted to Bt Corn (Among Iowa Farms that Planted Bt Corn in 2002).....	11
E. Table 6: Percentage of Minnesota Farms Growing Bt Corn 2002 .....	12
F. Table 7: Percentage of Corn Acreage Devoted to Bt Corn (Among MN Farms that Planted Bt Corn in 2002).....	12
G. Table 8: Percentage of Nebraska Farms Growing Bt Corn 2002 .....	13
H. Table 9: Percentage of Corn Acreage Devoted to Bt Corn (Among NE Farms that Planted Bt Corn in 2002).....	13
I. Table 10: Bt Corn Farms in IA, MN, and NE That Planted More than 80% of Corn Acreage with Bt Corn Varieties.....	14
J. Table 11: Bt Corn Farms in IA, MN, and NE That Planted Only Bt Corn Varieties (i.e. No Refuge of Non-Bt Corn) .....	15
IX. Attachments	
A. FOIA Request Letter from Author to USDA NASS.....	16
B. USDA NASS Response to FOIA Request.....	19
1. Table 1: NASS FOIA Response, Iowa Bt Statistics 2002 .....	21
2. Table 2: NASS FOIA Response, Minnesota Bt Statistics 2002.....	22
3. Table 3: NASS FOIA Response, Nebraska Bt Statistics 2002 .....	23

## EXECUTIVE SUMMARY

Last year, millions of acres of genetically engineered corn were planted in the US. The farmers who planted those corn varieties were required to comply with government-imposed conditions put in place to protect both the longevity of the technology and the overall health of our environment.

Data obtained from the United States Department of Agriculture (USDA) for Iowa (IA), Minnesota (MN), and Nebraska (NE) provide an independent basis for assessing farmers' compliance with the Environmental Protection Agency's (EPA) requirement that *Bt* corn farms plant a 20 percent refuge of non-*Bt* corn. That data identify significantly more violating farms than the biotechnology industry's telephone survey currently relied upon by EPA, especially among small corn farms. The USDA data show that 19 percent of all farms growing *Bt* corn in those states (or almost 10,000 farms) violated EPA's requirement in 2002. Thirteen percent of all *Bt* corn farms (6,600 farms) planted 100 percent of their corn with *Bt* varieties (i.e. planting no refuge at all) while almost 23 percent of small *Bt*-corn farms (less than 200 acres of corn) planted 100 percent of their corn with *Bt* varieties. Noncompliance was highest in Nebraska, with 22 percent of all *Bt* farms and 37 percent of small farms not planting the required 20 percent refuge.

The USDA data show that current compliance with government-imposed refuge obligations is woefully inadequate. If EPA believes that protecting insect susceptibility to *Bt* is a "public good" and that all farmers must comply with refuge requirements to delay the onset of resistance to *Bt*, then the USDA data should be a wake-up call to EPA that its regulatory system is not working and that its goal may not be achieved.

The high degree of noncompliance more than three years after imposition of an obligation to plant a modest 20 percent refuge raises serious questions about whether the regulatory system can adequately manage biotechnology's next generation of products. If farmers don't comply with refuges for current *Bt*-corn varieties, will they comply with similar refuge requirements for corn engineered to kill corn rootworm, where the benefits of pesticide reduction will likely be greater but where insect resistance may also develop faster? Will the government be able to ensure farmer compliance with on-farm restrictions for plants producing pharmaceuticals or crops with enhanced qualities destined for specialty markets? EPA and the registrants must work harder to ensure compliance with growing restrictions or they jeopardize the environmental benefits of the current products as well as the public's confidence in the regulatory system's ability to safeguard more complex, and potentially more dangerous, applications of biotechnology.

Based on the report's conclusions, EPA must establish a multi-prong strategy to increase farmer compliance with refuge requirements. EPA should rely upon USDA's data and other independent data sources to assess farmer compliance, instead of relying solely upon the industry's survey. EPA should require the *Bt*-corn registrants to conduct regular on-site inspections to assess compliance and require that farmers provide registrants with maps identifying locations for their *Bt* and non-*Bt* corn fields and seed purchase records. Finally, EPA must make the registrants accountable for farmer noncompliance; if noncompliance rates remain high in a geographic area, *Bt* corn seed sales should be restricted or denied.

## I. INTRODUCTION

In 2002, U.S. corn farmers could purchase seeds genetically engineered with a gene from a *Bacillus thuringiensis* (*Bt*) microorganism expressing a toxin that kills European Corn Borer pests. Of the approximately 79 million acres of corn grown in 2002 (Figure 1), 24 percent of those acres (almost 19 million acres) were planted with a variety that contained a *Bt* gene (Figure 2).

Before farmers could purchase *Bt* seeds, EPA approved those corn varieties as safe pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). EPA began approving *Bt* corn varieties in 1996 and extended their registrations for seven years through a re-registration process completed in October, 2001. In EPA's approval process, EPA imposed several conditions on growing *Bt* corn varieties, including a requirement that farmers plant no more than 80 percent of their corn acres with *Bt* corn. The corn acres planted with a non-*Bt* variety would act as a "refuge" for the pests susceptible to *Bt* and delay the onset of resistance.

To determine compliance with EPA's 20 percent refuge requirement, the *Bt* corn registrants (Monsanto, Dow AgroSciences, Syngenta, and Pioneer Hi-Bred) submitted to EPA the results of a telephone survey identifying farmer compliance with the 20 percent refuge obligation. That survey found that, in the 2002 growing season, 86 percent of *Bt* corn growers planted at least a 20 percent refuge of non-*Bt* corn and that 92 percent of *Bt* corn growers planted at least a 10 percent non-*Bt* corn refuge ("Insect Resistance Management Grower Survey for *Bt* Field Corn, 2002 Growing Season" December 19, 2002; EPA Docket: OPP# 00678B).

This report uses data from USDA's National Agricultural Statistics Service (NASS) to determine whether corn farmers who plant *Bt* corn are complying with the requirement to plant a 20 percent refuge. It also assesses whether the industry survey is an accurate representation of farmer noncompliance. The NASS data was obtained under a Freedom of Information Act (FOIA) request for information collected in NASS's 2002 Annual Acreage Survey.

## II. BACKGROUND ON EPA'S REGULATION OF BT CORN

On October 15, 2001, EPA re-registered four *Bt* corn varieties containing the Cry 1 Ab or Cry 1 F genes. EPA determined that those products would not "significantly increase the risk of unreasonable adverse effects on the environment" nor "pose risks to human health or to non-target species." EPA did conclude, however, that *Bt* corn raised "concerns with respect to insect resistance management" and specifically restricted the manner in which those products could be grown to "adequately mitigate" insect resistance.<sup>1</sup>

---

<sup>1</sup> There are important environmental and human health reasons for delaying insect resistance. First, *Bt* crops act as alternatives to broad-spectrum insecticides or to prevent yield loss. Unlike *Bt* engineered into corn, those broad spectrum insecticides can harm both the environment and farm workers. Thus, if *Bt* corn becomes ineffective against corn pests, some farmers will need to turn back to more harmful alternatives or risk a yield loss. Second, microbial *Bt* insecticides are currently used by farmers throughout the US, including organic producers. Resistance to *Bt* corn might also result in resistance to those microbial sprays, limiting their effectiveness as a relatively environmentally benign insecticide that controls crop pests. Finally, the next generation of *Bt*-corn products, such as the *Bt*-corn engineered to kill corn rootworm pests, will require greater adherence to IRM requirements because their

Insect resistance management (IRM) is used to describe practices that reduce the potential for insect pests to become resistant to a pesticide. According to EPA, “sound IRM will prolong the life of *Bt* pesticides and adherence to the plans is to the advantage of growers, producers, researchers and the American public.” (EPA Registration Action Document, Oct. 15, 2001, p. IID2). EPA’s rationale for its IRM requirements for *Bt* corn is summarized as follows:

*Bt* IRM is of great importance because of the threat insect resistance poses to the future use of *Bt* plant-pesticides and *Bt* technology as a whole. **EPA considers protection of insect (pest) susceptibility of *Bt* to be in the “public good.”** EPA has determined that development of resistant insects would constitute an adverse environmental effect. In order to delay the development of insect resistance of *Bt* field corn by maintaining insect susceptibility, growers “**must choose at least one of [the] structured refuge** (a portion of the total acreage using non-*Bt* seed) options ....” (Emphasis added). (EPA Registration Action Document, Oct. 15, 2001, p. VI2).

To ensure insect susceptibility and to protect the environment, EPA determined that farmers needed to: (1) plant a 20 percent non-*Bt* corn refuge in the Corn-Belt states,<sup>2</sup> and (2) plant their refuge within one-half mile of the *Bt* corn. EPA found that those requirements are “scientifically-sound, protective, feasible, sustainable, and practical to growers.” (EPA Registration Document, Oct. 15, 2002, p. VI5). Both those specific refuge requirements went into effect in 2000, and if either one is not adhered to, the farmer is considered noncompliant.<sup>3</sup>

To implement EPA’s IRM refuge requirements, the registrants enter into a contractual agreement with every farmer who buys *Bt* corn that obligates the farmer to plant the appropriate refuge. EPA also requires the registrants, among other things, to educate growers about their IRM refuge obligations, to survey growers to determine rates of compliance with refuge requirements, and to establish a compliance assurance monitoring program (CAP) to identify and address noncompliant farmers. EPA requires that any farmer not meeting the IRM refuge requirements two years in a row loses the ability to purchase *Bt* seeds the following year.

### III. INDUSTRY SURVEY ON GROWER COMPLIANCE WITH IRM REFUGE OBLIGATIONS

On December 19, 2002, the *Bt* corn registrants provided EPA with the results of their survey of grower compliance with refuge requirements. The July 2002 survey involved a

---

lower effective dose of the *Bt* protein may make susceptibility to resistance much greater than the currently planted *Bt* varieties.

<sup>2</sup> EPA’s requirements included a 50 percent refuge for *Bt* corn varieties grown in areas where *Bt* cotton is also grown. Since the three states discussed in this report have no farmers growing *Bt* cotton, this report only discusses compliance with the 20 percent refuge requirement.

<sup>3</sup> Whether farmers have complied with the distance requirement of the IRM refuge obligations is not the subject of this report. The telephone survey by the registrants found that 89 percent of *Bt* corn growers planted all their *Bt* corn fields within the required ½-mile of a non-*Bt* refuge. Given that the data in this report finds significantly more noncompliance with the 20 percent refuge requirement than the industry survey, it is likely that the industry survey also overreports compliance with the ½-mile obligation.

telephone survey of 551 *Bt* corn growers, with the results weighted to reflect the distribution of corn acres in different parts of the country. “Respondents were identified as decisionmakers who farmed a minimum of 200 acres of corn (100 acres in the South) and 25 acres of *Bt* corn in 2002.” According to the industry:

The survey questionnaire sequentially assessed the grower’s actual refuge implementation practices, recall of specific refuge requirements on an unaided basis, aided awareness of the requirements with prompting, and feedback on information sources. It was professionally designed to provide an unbiased and statistically robust evaluation of adherence by *Bt* corn growers to the IRM requirements. (Industry Survey, Dec. 19, 2002, at page 4, EPA Docket OPP# 00678B).

The survey asked each farmer how many acres of corn they planted and how many acres of *Bt* corn they planted. Based on the answers to those questions, the survey found that 86 percent of *Bt* corn growers planted at least the minimum required refuge size and 92 percent of the *Bt* corn growers had a least a 10 percent non-*Bt* refuge.

The industry survey also attempted to determine farmers’ knowledge about the EPA refuge requirements. When asked an open-ended question about what farmers recalled about IRM requirements (without a prompted response), only 30 percent recalled the requirement to plant a 20 percent refuge. Similarly, when farmers were asked “what is the minimum size of the non-*Bt* corn refuge that must be planted on a farm”, only 42 percent answered that the refuge size should be 20 percent; 15 percent answered that the refuge size should be 5 percent, 10 percent, or 15 percent; and the remainder (43 percent of the farmers) answered either 50 percent, “other,” “not aware,” or “don’t know.”

#### **IV. CSPI’s FOIA REQUEST TO USDA**

In June 2002, NASS conducted its Annual Agricultural Survey of U.S. farmers. In that survey, NASS collects information about the number of acres of field corn planted that year (Section 2, Question 2a),<sup>4</sup> the number of acres of *Bt* corn planted that year (Section 2a, Question 1a(1)),<sup>5</sup> and the number of acres of a stacked gene variety (*Bt* corn that also has a gene for herbicide resistance) planted that year (Section 2a, Question 1a(3)).

On March 6, 2003, CSPI sent USDA a FOIA request for the responses to the questions identified above for farmers surveyed in Iowa. On March 21, 2003, USDA responded to the request, stating that the requested information was confidential. On May 2, 2003, CSPI sent

---

<sup>4</sup> Section 2, Question 2a reads: “2. For corn, please report acres planted and to be planted for all purposes this spring or summer, and acres to be harvested for either grain or seed in the 2002 Crop Year. 2a. Corn? (Excluding popcorn and sweet corn.) (1) Intended for harvest as grain? (2) Intended for harvest as seed?” (A copy of the complete survey is available from CSPI Biotechnology Project).

<sup>5</sup> Section 2a, Question 1a reads: “1a. How many of the total Corn acres, were or will be planted with a genetically modified: (1) *Bt* only variety? (2) herbicide resistant only variety? (Exclude non-genetically modified herbicide resistant varieties) (3) stacked gene variety?”

USDA a letter appealing the FOIA request denial (Attachment A). CSPI proposed a compromise to obtaining the raw data, in which NASS would provide summary tables that identified the number of farms that planted 100 percent of their corn acres with *Bt* varieties, farms that planted 91-100 percent of their corn with *Bt* varieties, farms that planted 81-90 percent of their corn with *Bt* varieties, and so forth.

NASS provided the data requested for IA, NE, and MN on June 13, 2003 (Attachment B). Those states were chosen because together they represent over half of the *Bt*-corn acres in the U.S. NASS provided the surveyed farms that planted different percentages of *Bt* corn as well as a weighted average for the total farms in each state that grew each different percentage of *Bt* corn (the “expanded # farms” column). NASS also provided the percentage *Bt* corn for both small and large farms (defined as growing less than or more than 200 acres of corn).

## V. THE NASS DATA

According to the 2002 NASS survey,<sup>6</sup> almost 79 million acres of corn were planted in the US (Figure 1). Corn acreage in IA accounted for 15 percent of total U.S. corn grown, while NE and MN accounted for 11 percent and 9 percent respectively. Thus, IA, MN, and NE accounted for 35 percent of all corn grown in the U.S. in 2002.

The NASS survey found that 24 percent of corn acreage, or approximately 19 million acres, was planted with a variety engineered with a *Bt* gene (Figure 2). The three states addressed in this report had larger than average adoption of those *Bt* varieties by their corn farmers (IA – 34 percent; NE – 38 percent; and MN – 33 percent). In fact, although IA, MN, and NE only accounted for 35 percent of all corn acreage, they accounted for 51 percent of all *Bt* corn acreage.

The data received in response to the FOIA request show that more than half of the farms in the three states did not plant any *Bt* corn variety (51 percent in NE; 55 percent in IA; and 61 percent in MN) (Tables 4, 6, and 8). Of the farms that did plant a *Bt* corn variety, 19 percent of the farms (or almost 10,000 farms) did not comply with EPA’s refuge requirement and instead planted more than 80 percent of their corn acres with *Bt* corn variety (Tables 5, 7, 9, and 10). In IA and MN, 18 percent of the farms that planted *Bt* varieties planted more than 80 percent of their corn acres with those varieties while the percentage in NE was 22.5 percent (Table 10).

The NASS data also identify how many farms in the three states that grew *Bt* corn varieties planted absolutely no refuge at all. The survey found that in the three states combined, 13 percent of *Bt*-corn farmers (or over 6,600 farms) planted 100 percent of their corn acreage with *Bt* varieties (Table 8). The rates at which farmers planted no refuge ranged from 12.5 percent in IA to 14 percent in NE (Tables 5, 7, and 9). Overall, about two-thirds of the farms that violated EPA requirements planted only *Bt* corn and no refuge at all.

---

<sup>6</sup> More information about the methodology of the NASS June Agricultural Survey can be found at the NASS website at <http://www.usda.gov/nass/nassinfo/surveyprograms/tables1.htm#acreage>. The reports can be found at <http://usda.mannlib.cornell.edu/reports/nassr/field/pcp-bba/>.

The NASS data also analyzed the percentage of *Bt* corn grown by small and large corn farmers. That data showed that small farmers who grew *Bt* corn varieties were less likely to comply with the 20 percent refuge requirement. Although total noncompliance with the 20 percent refuge requirement was 19 percent in the three states, total noncompliance among small farms in those states was 28 percent (Table 7). Noncompliance among small farmers in Nebraska was over 37 percent (Table 10). Similarly, the percentage of farmers that planted no refuge whatsoever (i.e., planted 100 percent of their corn crop with *Bt* varieties) was higher for small farmers, ranging from 20 percent in IA and MN to almost 34 percent in Nebraska (Table 11). For the three states combined, almost 23 percent of small farms planted no refuge at all (Table 11). Stated another way, over 80 percent (22.7 percent divided by 28.1 percent) of the noncompliant small farmers planted no refuge at all.

## **VI. CONCLUSIONS FROM THE DATA**

Based on the 2002 NASS data, the following conclusions can be reached about compliance with EPA's 20 percent refuge requirement:

1. 19 percent of *Bt* corn farms in IA, NE, and MN are violating the 20 percent refuge requirement, and 13 percent of *Bt* farms do not plant any refuge at all. Those significant levels of noncompliance, which are approximately 40 percent greater than the levels found by the industry survey, jeopardize the long term viability of *Bt* corn technology.
2. Noncompliance is especially high among farms that plant less than 200 acres of corn. 28 percent of those farms plant more than 80 percent of their corn acres with *Bt* corn varieties and almost 23 percent of them plant no refuge at all.
3. Nebraska has the highest rate of *Bt*-corn adoption (38 percent) among the five largest corn growing states. Similarly, noncompliance with the 20 percent refuge requirement is significantly higher in Nebraska, especially for small farms. 22.5 percent of *Bt* farms in Nebraska were in violation of EPA's 20 percent refuge requirement and small farm noncompliance was 37 percent. Almost 34 percent of small farms in Nebraska planted no refuge at all.
4. The industry survey significantly overestimates compliance by *Bt* farms. The NASS data identifies 19 percent noncompliance while the industry survey only found 14 percent noncompliance. Similarly, the industry survey found 8 percent of farms planted less than a 10 percent refuge while NASS data finds 13 percent of farms planted no refuge at all. One reason the industry survey may underreport levels of noncompliance is that it specifically exempts small farms (less than 200 acres), which show higher levels of noncompliance than large farms. If one eliminates the small farms from the NASS data, the remaining NASS data has similar noncompliance rates to the industry's telephone survey.

5. The industry's belief that educating farmers will lead to compliance is not supported by the NASS data nor the industry's survey. After more than three years of education by the industry, noncompliance is still high, especially for farms that grow less than 200 acres of corn. In addition, when the industry survey asked detailed questions about the 20 percent refuge requirements, a majority of farmers did not even recall that obligation nor could identify the proper size for the refuge. That suggests that many farmers are not aware of the 20 percent refuge requirement but happen to comply with it in the normal management of their farming operations.

6. The levels of noncompliance found in IA, MN, and NE increase the likelihood *Bt*-resistant strains of pests. EPA found in 2001 that if the refuge options were deployed correctly, "there is a very limited chance of insect resistance evolving over the next seven years of the registration of these products." (EPA Registration Action Document, Oct. 15, 2001, p. VI6). Almost 20 percent noncompliance cannot be what EPA anticipated.

## VII. RECOMMENDATIONS

*Bt*-corn varieties that kill corn-borer pests are the first generation of agricultural biotechnology products that many farmers will plant. To protect the effectiveness of those products and to safeguard microbial *Bt* insecticides, EPA imposed upon farmers a simple condition – only plant 80 percent of your corn acres with a *Bt* variety. Despite extensive education about refuge requirements and at least three years to get used to them, almost one in five *Bt* corn farmers violates the government-imposed obligation.

Unless EPA and the registrants significantly lower those levels of noncompliance, the public may lose the current benefits of using *Bt* corn and the future benefits of *Bt* corn engineered to kill corn rootworm. If the government cannot ensure that simple restrictions are complied with, it will also call into question whether the regulatory system can adequately oversee the growing of genetically engineered crops. Therefore, CSPI makes the following recommendations to EPA to safeguard *Bt* technology for future generations:

1. The first step to addressing farmer compliance with the 20 percent refuge requirement is to assess the true levels of noncompliance. EPA should request from NASS the same *Bt* corn data for the whole country that CSPI received for IA, MN, and NE. EPA should also request data on the number of noncompliant acres as well as their specific locations. With that data, EPA will have a more complete and more accurate picture of farmer compliance with IRM requirements than it currently gets from the industry survey. EPA should enter into an agreement with NASS to obtain that data for 2002, 2003 and all future years.<sup>7</sup>

2. EPA should reassess whether the industry compliance survey should continue since it grossly underestimates noncompliance. If EPA continues to require survey data on compliance from the industry, EPA should require the registrants to include small farms that grow less than

---

<sup>7</sup> EPA should also consider getting the same data for the 2000 and 2001 growing seasons. This would allow EPA to analyze whether there are any compliance trends worth exploring.

200 acres of corn. Without the inclusion of those small farms, the industry survey will continue to significantly overestimate compliance.

3. To obtain the best possible refuge compliance data, EPA should require the registrants to conduct regular on-site visits to farms to assess compliance. The best way to assess compliance is a field inspection with in-person review of seed purchase records, site maps, and farmer interviews. Despite the fact that EPA's current registration of *Bt* corn requires on-site compliance visits, the registrants have performed almost no such visits.

4. Farmers will be more likely to comply if they are required to send the registrants an annual certificate affirming their actual compliance and documenting how they complied. EPA should require that every farmer planting *Bt* corn certify each June that he or she has planted a 20 percent refuge and provide (1) a map identifying the *Bt* and non-*Bt* fields on the farm and (2) seed purchase records to show that non-*Bt* seed corn was purchased.

5. To achieve higher compliance levels, EPA should require the registrants and farmers to use all available strategies and technologies that might further compliance. For example, EPA could require the registrants to give small corn farmers a coupon with every bag of *Bt* corn seed that allows that farmer to purchase non-*Bt* corn seed at a discount. That would provide an economic incentive for those farmers to plant the required refuge. Similarly, EPA could require that large farmers institute geographic information technologies ("GIS") to manage the refuges on their farms. That technology is being widely applied to agriculture and has been found to greatly help farmers manage their crops. Finally, EPA could explore whether technologies such as remote sensing and satellite imaging can be used EPA and the registrants to determine whether farmers are complying with refuge requirements.

6. Although the registrants should continue educating farmers about refuge requirements, education will not prevent some farmers from ignoring their obligation and violating EPA's requirements. Those farmers who do not comply with refuge requirements jeopardize the continued use of *Bt* corn for responsible farmers and must be denied access to *Bt* technology. To date, the registrants have not restricted *Bt* seed sales to any noncompliant farmer as required by EPA's registration, yet noncompliance is widespread. The registrants must deter noncompliance by punishing noncomplying farmers. If the registrants don't do this, then EPA should begin to restrict the number of seeds a registrant can sell until compliance rates reach an acceptable level.<sup>8</sup>

7. EPA should require the registrants to revise their education and compliance strategy to address the higher levels of noncompliance found with small farms. The registrants should invest significantly more resources to working with that segment of the corn grower population.

---

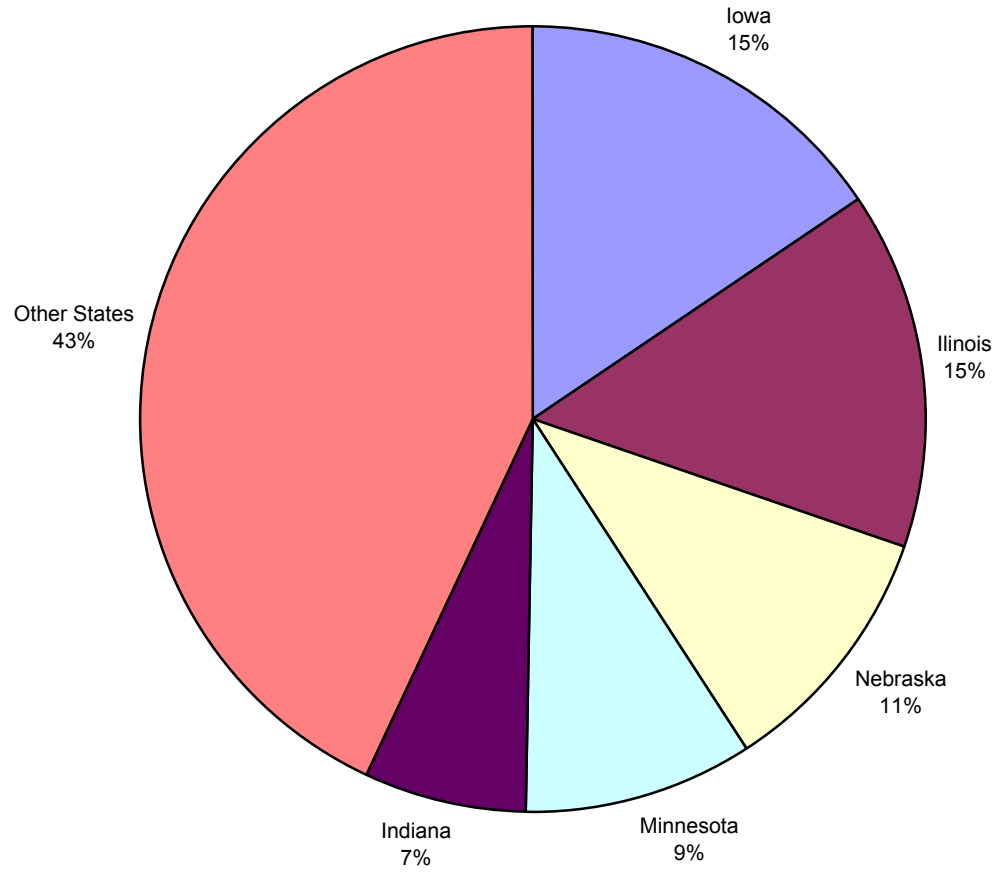
<sup>8</sup> Although the biotechnology industry has refused to take enforcement actions against farmers who don't comply with refuge requirements, the industry has had no problem protecting its intellectual property. Monsanto alone spends over \$10 million a year in protecting its seed traits, including numerous legal actions against farmers who save seed. If the biotechnology industry valued refuge compliance in a similar manner and allocated similar resources, compliance rates would surely increase substantially.

8. EPA should require the registrants to investigate the higher levels of noncompliance on both big and small farms in Nebraska. Those registrants should propose a strategy to address that compliance and then implement it for the 2004 growing season. If compliance rates are not significantly lowered after the strategy is implemented, EPA should restrict seed sales in portions of Nebraska with continued high noncompliance.

9. EPA should explore with farmers the reasons why they have not complied with the 20 percent refuge requirement. With such information, EPA and the registrants might be better able to target remediation of noncompliance and address any inherent difficulties with farmer compliance. If less than half of the *Bt* corn farmers have specific knowledge of the 20 percent refuge requirement as the industry survey suggests, then additional obligations (in addition to the grower agreements) such as annual certifications may be needed to make more farmers aware of the requirements.

**Figure 1: US Corn Acreage 2002**

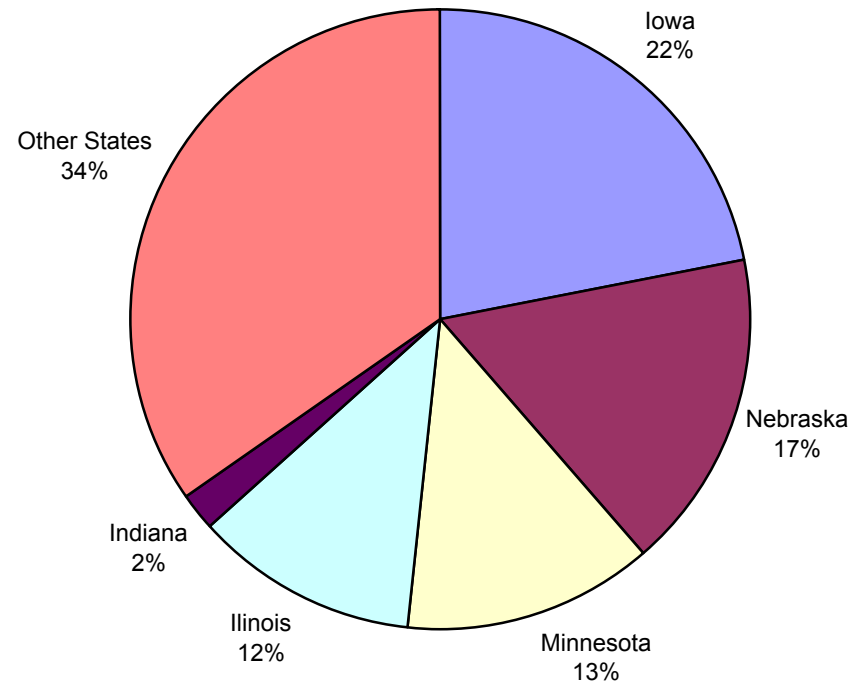
State	Area Planted with Corn (1000 Acres)
Iowa	12,200
Illinois	11,600
Nebraska	8,400
Minnesota	7,400
Indiana	5,400
Other States	33,947
<b>Total</b>	<b>78,947</b>



Source: USDA NASS  
June Agricultural  
Survey, Acreage  
Study (2002)

**Figure 2: US *Bt* Corn Acreage 2002**

State	Percentage of <i>Bt</i> Corn in Total State Corn Crop*	Total Acreage <i>Bt</i> Corn (1000 Acres)	Percentage of US <i>Bt</i> Corn Acreage
Iowa	34	4,148	22
Nebraska	38	3,192	17
Minnesota	33	2,442	13
Illinois	19	2,204	12
Indiana	7	378	2
Other States		6,583	34
Total US	24	18,947	100



\* These percentages include corn with a *Bt* gene and corn containing a *Bt* gene as well as a gene that confers resistance to an herbicide.

Source: USDA NASS June Agricultural Survey, Acreage Study (2002)

**Table 4: Percentage of Iowa Farms Growing *Bt* Corn 2002**

	ALL FARMS WITH CORN		FARMS WITH >200 ACRES CORN		FARMS WITH <200 ACRES CORN	
	NUMBER OF FARMS	% TOTAL CORN FARMS	NUMBER OF FARMS	% TOTAL CORN FARMS	NUMBER OF FARMS	% TOTAL CORN FARMS
No <i>Bt</i> Corn	30590	55	8220	35.7	22370	68.6
<i>Bt</i> Corn	25030	45	14800	64.3	10230	31.4

Source: NASS FOIA Response Table 1 (See Attachment B)

**Table 5: Percentage of Corn Acreage Devoted to *Bt* Corn (Among Iowa Farms that Planted *Bt* Corn in 2002)**

Percentage of <i>Bt</i> Corn Acres	ALL FARMS WITH <i>Bt</i> CORN		FARMS WITH >200 ACRES CORN		FARMS WITH <200 ACRES CORN	
	NUMBER OF <i>Bt</i> FARMS	% OF TOTAL <i>Bt</i> CORN FARMS	NUMBER OF <i>Bt</i> FARMS	% OF TOTAL <i>Bt</i> CORN FARMS	NUMBER OF <i>Bt</i> FARMS	% OF TOTAL <i>Bt</i> CORN FARMS
11%-50%	13840	55.3	7910	53.4	5130	50.1
51%-80%	6630	26.5	4480	30.3	2150	21.0
<b>81%-90%</b>	<b>1220</b>	<b>4.9</b>	<b>540</b>	<b>3.6</b>	<b>680</b>	<b>6.6</b>
<b>91%-99%</b>	<b>180</b>	<b>0.7</b>				
<b>100%</b>	<b>3160</b>	<b>12.6</b>	<b>1090</b>	<b>7.4</b>	<b>2070</b>	<b>20.2</b>
Total	25030	100	14800		10230	

Source: NASS FOIA Response Table 1 (See Attachment B)

\* Farms not in compliance with EPA 20% refuge requirement are identified in bold face.

**Table 6: Percentage of Minnesota Farms Growing *Bt* Corn 2002**

	ALL FARMS WITH CORN		FARMS WITH >200 ACRES CORN		FARMS WITH <200 ACRES CORN	
	NUMBER OF FARMS	% TOTAL CORN FARMS	NUMBER OF FARMS	% TOTAL CORN FARMS	NUMBER OF FARMS	% TOTAL CORN FARMS
No <i>Bt</i> Corn	20310	61.1	3040	29	17270	75.9
<i>Bt</i> Corn	12920	38.9	7450	71	5470	24.1

Source: NASS FOIA Response Table 2 (See Attachment B)

**Table 7: Percentage of Corn Acreage Devoted to *Bt* Corn (Among MN Farms that Planted *Bt* Corn in 2002)**

Percentage of <i>Bt</i> Corn Acres	ALL FARMS WITH <i>Bt</i> CORN		FARMS WITH >200 ACRES CORN		FARMS WITH <200 ACRES CORN	
	NUMBER OF <i>Bt</i> FARMS	% OF TOTAL <i>Bt</i> CORN FARMS	NUMBER OF <i>Bt</i> FARMS	% OF TOTAL <i>Bt</i> CORN FARMS	NUMBER OF <i>Bt</i> FARMS	% OF TOTAL <i>Bt</i> CORN FARMS
11%-50%	6790	52.6	3590	48.2	2820	51.6
51%-80%	3770	29.2	2480	33.3	1290	23.6
<b>81%-90%</b>	<b>610</b>	<b>4.7</b>	<b>380</b>	<b>5.1</b>	<b>230</b>	<b>4.2</b>
<b>91%-99%</b>	<b>70</b>	<b>0.5</b>				
<b>100%</b>	<b>1680</b>	<b>13.0</b>	<b>560</b>	<b>7.5</b>	<b>1120</b>	<b>20.5</b>
Total	12920	100	7450		5470	

Source: NASS FOIA Response Table 2 (See Attachment B)

\* Farms not in compliance with EPA 20% refuge requirement are identified in bold face.

**Table 8: Percentage of Nebraska Farms Growing *Bt* Corn 2002**

	ALL FARMS WITH CORN		FARMS WITH >200 ACRES CORN		FARMS WITH <200 ACRES CORN	
	NUMBER OF FARMS	% TOTAL CORN FARMS	NUMBER OF FARMS	% TOTAL CORN FARMS	NUMBER OF FARMS	% TOTAL CORN FARMS
No <i>Bt</i> Corn	13430	51.1	4860	33.7	8570	72.1
<i>Bt</i> Corn	12860	48.9	9540	66.3	3320	27.9

Source: NASS FOIA Response Table 3 (See Attachment B)

**Table 9: Percentage of Corn Acreage Devoted to *Bt* Corn (Among NE Farms that Planted *Bt* Corn in 2002)**

Percentage of <i>Bt</i> Corn Acres	ALL FARMS WITH <i>Bt</i> CORN		FARMS WITH >200 ACRES CORN		FARMS WITH <200 ACRES CORN	
	NUMBER OF <i>Bt</i> FARMS	% OF TOTAL <i>Bt</i> CORN FARMS	NUMBER OF <i>Bt</i> FARMS	% OF TOTAL <i>Bt</i> CORN FARMS	NUMBER OF <i>Bt</i> FARMS	% OF TOTAL <i>Bt</i> CORN FARMS
11%-50%	6260	48.7	4360	45.7	1260	38.0
51%-80%	3710	28.8	3040	31.9	670	20.2
<b>81%-90%</b>	<b>940</b>	<b>7.3</b>	<b>820</b>	<b>8.6</b>	<b>120</b>	<b>3.6</b>
<b>91%-99%</b>	<b>140</b>	<b>1.1</b>				
<b>100%</b>	<b>1810</b>	<b>14.1</b>	<b>690</b>	<b>7.2</b>	<b>1120</b>	<b>33.7</b>
Total	12860	100	9540		3320	

Source: NASS FOIA Response Table 3 (See Attachment B)

\* Farms not in compliance with EPA 20% refuge requirement are identified in bold face.

**Table 10: *Bt* Corn Farms in IA, MN and NE That Planted More than 80% of Corn Acreage with *Bt* Corn Varieties**

STATE	ALL <i>Bt</i> CORN FARMS		<i>Bt</i> FARMS WITH >200 ACRES CORN		<i>Bt</i> FARMS WITH <200 ACRES CORN	
	Number of Farms	% of All Farms with >80% of Acreage Planted with <i>Bt</i> Corn	Number of Farms	% of All Farms with >80% of Acreage Planted with <i>Bt</i> Corn	Number of Farms	% of All Farms with >80% of Acreage Planted with <i>Bt</i> Corn
Iowa	4560	18.2	1630	11.0	2750	26.9
Minnesota	2360	18.3	940	12.6	1350	24.7
Nebraska	2890	22.5	1510	15.8	1240	37.3
<b>Total</b>	<b>9810</b>	<b>19.3</b>	<b>4080</b>	<b>12.8</b>	<b>5340</b>	<b>28.1</b>

Source: Data Compiled from Tables 2, 4, and 6.

**Table 11: *Bt* Corn Farms in IA, MN and NE That Planted Only *Bt* Corn Varieties (i.e. No Refuge of Non-*Bt* Corn)**

STATE	ALL <i>Bt</i> CORN FARMS		<i>Bt</i> FARMS WITH >200 ACRES CORN		<i>Bt</i> FARMS WITH <200 ACRES CORN	
	Number of Farms	% of All Farms with 100% <i>Bt</i> Corn	Number of Farms	% of All Farms with 100% <i>Bt</i> Corn	Number of Farms	% of All Farms with 100% <i>Bt</i> Corn
Iowa	3160	12.6	1090	7.4	2070	20.2
Minnesota	1680	13.0	560	7.5	1120	20.5
Nebraska	1810	14.1	690	7.2	1120	33.7
<b>Total</b>	<b>6650</b>	<b>13.1</b>	<b>2340</b>	<b>7.4</b>	<b>4310</b>	<b>22.7</b>

Source: Data Compiled from Tables 2, 4, and 6.

May 2, 2003

By FAX and Regular Mail  
Administrator Raymond Ronald Bosecker  
National Agricultural Statistics Service  
USDA, Rm 4117  
South Agriculture Building  
1400 Independence Ave., SW  
Washington, DC 20250

Re: FOIA APPEAL of FOIA Log. NO. 03-085.

Dear Administrator Bosecker:

I am writing this letter to formally appeal your agency's denial of my FOIA request that has been assigned FOIA Log. No. 03-085. I believe that your agency is legally required to provide me with the information I have requested for the reasons set forth below. Thus, I ask that you overturn the denial of my request set forth in a letter to me dated March 21, 2003, and provide the requested information in an expedited manner.

Background on FOIA Request

The FOIA that your office received on March 6, 2003 and that your office has identified as Log. No. 03-085 requests specific information collected in the Agricultural Survey for 2002. In particular, it requests that for each farmer surveyed in Iowa, I be provided with the number of corn acres that the farmer planted (answer to question 2a in Section 2 on page 4) and number of acres of corn planted with a Bt variety (answers to questions 1a (1) and (3) of Section 2a on page 6). No information that might identify the farmer was requested (such as name, address, county where farm was located, other crops grown on farm, etc...).

The Requested Information is Not Specifically Exempted By Law

By letter dated March 21, 2003, your office refused to provide me the information requested, stating that it was specifically exempted from disclosure by statute. A plain reading of the statute cited, however, does not support exempting the limited information requested.

In order for 7 U.S.C. 2276 to apply, the information requested must be covered by one of the applicable laws identified in 7 U.S.C. 2276(d). When I asked Ms. Herberger to identify which law in subsection (d) applied, she said that the information collected was covered by 7

U.S.C. 2204(a). That provision, 7 U.S.C. 2204(a) is a general duties provision for the Secretary of Agriculture, whereas other provisions in 7 U.S.C. 2276(d) are specific authorizations by Congress to collect agricultural information. The 2002 Agricultural Survey is not spelled out as a duty covered by 7 U.S.C. 2204(a) and there is no reference that Congress contemplated that it would be covered by that provision. The only way to include the 2002 Agricultural Survey data as covered by 7 U.S.C. 2204(a) is to read that provision so broadly that it includes virtually any piece of information that the Secretary obtains about agriculture. If one broadly reads 7 U.S.C. 2204(a) to include any information on agriculture collected by the Secretary, however, then why would Congress have needed to identify the other ten statutes in 7 U.S.C. 2276(d). Clearly, Congress did not intend that all information concerning agriculture in the Secretary's possession was exempt from FOIA nor did it expect that the inclusion of 7 U.S.C. 2204(a) would make unnecessary its specific references in 7 U.S.C. 2276(d) (1)- (10). Thus, the interpretation that the 2002 Agriculture Survey falls within the exemption provided in 7 U.S.C. 2204(a) is not consistent with a plain reading of 7 U.S.C. 2276 and would not withstand a court challenge. Therefore, the information requested cannot be denied based on that exemption.

Even if 7 U.S.C. 2204(a) does apply to the information requested in the 2002 Agricultural Survey, the disclosure of the requested information is authorized by 7 U.S.C. 2276(a)(2). As stated above, the FOIA request does not request any information that would allow for the identification of the person who supplied the particular information. The sample size (all Iowa farmers surveyed) is sufficiently large that it would be impossible to identify individual farmers or farms from the answers to the two questions about corn acres. Thus, the information requested qualifies as information that has been "transformed into a statistical or aggregate form" that prevents identification of the farmer who supplied the information. Answers to the two questions requested constitutes a statistical or aggregate form that **is authorized for disclosure** by Congress.

Finally, I note that the information I have requested information not available from any other source, even at the state level. The information is needed to calculate the percentage of corn acres on individual farms that have been planted with a Bt variety. The Secretary has collected such information and yet has not provided that information to the public. Clearly, Congress did not contemplate that USDA could avoid release of information under 7 U.S.C. 2276 by not transforming it into statistical or aggregate forms that would be of interest to the public. USDA should not be able to avoid disclosure under FOIA solely because the information has not been aggregated.

As a compromise solution to my FOIA request, instead of the individual answers to the questions identified above, USDA could satisfy the FOIA request by providing to me the following information: the number of farmers surveyed in Iowa who planted 100% of their corn acres with Bt varieties; the number of farmers surveyed in Iowa who planted 91-100% of their corn acres with Bt varieties; the number of farmers surveyed in Iowa who planted 81-90% of their corn acres with Bt varieties; the number of farmers surveyed in Iowa who planted 71-80% of their corn acres with Bt varieties; and so forth to with data entries for 61-70%, 51-60%, 41-50%, 31-40%, 21-30%, 11-20%, 1-10%, and 0%.

I appreciate your consideration of my appeal. If you have any questions, I can be reached at 202-332-9110, Ext. 369.

Sincerely,

Gregory Jaffe  
Director, Biotechnology Project

Gregory Jaffe  
Director, Biotechnology Project  
Center for Science in the Public Interest  
1875 Connecticut Avenue, N.W. Suite 300  
Washington, DC 20009-5728

RE: FOIA Request Concerning Bt Corn Acres

Dear Mr. Jaffe:

In March, you submitted a Freedom of Information Request (Log. No. 03-085) to the National Agricultural Statistics Service asking for individual producer information on planted acres of corn and acres planted to Bt and stacked gene varieties of corn from the 2002 June Agricultural Survey in Iowa. NASS did not provide that information, indicating that the request for individual producer information was specifically exempted from disclosure by statute. You appealed our denial in a letter dated May 2, 2003.

In your letter you suggested a compromise solution. In subsequent phone conversations and emails, you and I worked through specifics of a tabulation of data that would meet your information needs, in lieu of the original FOIA request. I have completed and attach that tabulation, with separate tables for Iowa, Minnesota and Nebraska. They show the numbers of farms with corn (both in the sample and expanded by the sample weights) categorized by the proportion of corn acres planted to Bt or stacked gene varieties. Each state table shows columns for all farms with corn, and also separately for small and large farms (based on 200 acres of corn).

A few of the cells in the tables were intentionally suppressed. We do this when there are so few responses (samples) within a cell that the resulting cell estimate would be statistically unstable (have a very large confidence interval) or could lead to a potential disclosure of individual respondent information. In these tables, this situation occurred when we divided all farms with (.9, 1.0) proportion of Bt varieties into small and large categories. When we suppress a single row of data (primary suppression), we also have to suppress a second row (secondary suppression). Otherwise, one would be able to calculate the originally suppressed row using the column totals. We suppressed the data cells in the (0, .1] row as secondary suppression.

We consider this letter and attachment as satisfying the information need covered by your FOIA request, and are closing that FOIA file. Please contact me if you have any disagreement or concerns. Also, call if you have questions about the tabulation. I enjoyed working with you and am glad we were able to provide you the information you need.

Sincerely,

Carol C. House  
Etc.

Cc: Valerie Herberger  
Attachment

TABLE 1. Sampled and Expanded Counts of Iowa Farms with Corn, Categorized by the Proportion on Corn Acres Planted to Bt or Stacked Gene Genetically Modified Varieties. Tabulated for All Farms With Corn, and Separately For Farms With 200+ Acres of Corn and For Farms With < 200 Acres of Corn.

PROPORTION OF Bt OR STACKED GENE CORN ACRES / ALL CORN ACRES	ALL FARMS WITH CORN			FARMS WITH 200+ ACRES OF CORN			FARMS WITH < 200 ACRES OF CORN		
	# FARMS IN SAMPLE	EXPANDED # FARMS	EXPANDED # FARMS AS % OF TOTAL	# FARMS IN SAMPLE	EXPANDED # FARMS	EXPANDED # FARMS AS % OF TOTAL	# FARMS IN SAMPLE	EXPANDED # FARMS	EXPANDED # FARMS AS % OF TOTAL
0	634	30,590	55.0	212	8,220	35.7	422	22,370	68.6
(0, .1]	23	800	1.4						
(.1, .2]	65	3,190	5.7	44	1,970	8.6	21	1,220	3.7
(.2, .3]	66	2,540	4.6	37	1,690	7.3	29	850	2.6
(.3, .4]	89	3,390	6.1	67	2,410	10.5	22	980	3.0
(.4, .5]	91	3,920	7.0	55	1,840	8.0	36	2,080	6.4
(.5, .6]	46	1,860	3.3	29	960	4.2	17	900	2.8
(.6, .7]	43	1,970	3.5	31	1,560	6.8	12	410	1.3
(.7, .8]	60	2,800	5.0	46	1,960	8.5	14	840	2.6
(.8, .9]	23	1,220	2.2	14	540	2.3	9	680	2.1
(.9, 1.0)	4	180	0.3						
1	65	3,160	5.7	25	1,090	4.7	40	2,070	6.3
TOTAL	1,209	55,620	100.0	583	23,020	100.0	626	32,600	100.0

SOURCE: NATIONAL AGRICULTURAL STATISTICS SERVICE. U. S. DEPARTMENT OF AGRICULTURE . Based on the 2002 June Agricultural Survey.

TABLE 2. Sampled and Expanded Counts of Minnesota Farms with Corn, Categorized by the Proportion on Corn Acres Planted to Bt or Stacked Gene Genetically Modified Varieties. Tabulated for All Farms With Corn, and Separately For Farms With 200+ Acres of Corn and For Farms With < 200 Acres of Corn.

PROPORTION OF Bt OR STACKED GENE CORN ACRES / ALL CORN ACRES	ALL FARMS WITH CORN			FARMS WITH 200+ ACRES OF CORN			FARMS WITH < 200 ACRES OF CORN		
	# FARMS IN SAMPLE	EXPANDED # FARMS	EXPANDED # FARMS AS % OF TOTAL	# FARMS IN SAMPLE	EXPANDED # FARMS	EXPANDED # FARMS AS % OF TOTAL	# FARMS IN SAMPLE	EXPANDED # FARMS	EXPANDED # FARMS AS % OF TOTAL
0	433	20,310	61.1	101	3,040	29.0	332	17,270	75.9
(0, .1]	9	380	1.1						
(.1, .2]	31	830	2.5	23	540	5.1	8	290	1.3
(.2, .3]	35	1,030	3.1	27	720	6.9	8	310	1.4
(.3, .4]	40	2,420	7.3	23	1,070	10.2	17	1,350	5.9
(.4, .5]	51	2,130	6.4	36	1,260	12.0	15	870	3.8
(.5, .6]	20	740	2.2	15	430	4.1	5	310	1.4
(.6, .7]	34	1,420	4.3	23	760	7.2	11	660	2.9
(.7, .8]	44	1,610	4.8	36	1,290	12.3	8	320	1.4
(.8, .9]	18	610	1.8	13	380	3.6	5	230	1.0
(.9, 1.0)	6	70	0.2						
1	50	1,680	5.1	18	560	5.3	32	1,120	4.9
TOTAL	771	33,230	100.0	327	10,490	100.0	444	22,740	100.0

SOURCE: NATIONAL AGRICULTURAL STATISTICS SERVICE. U. S. DEPARTMENT OF AGRICULTURE . Based on the 2002 June Agricultural Survey.

TABLE 3. Sampled and Expanded Counts of Nebraska Farms with Corn, Categorized by the Proportion on Corn Acres Planted to Bt or Stacked Gene Genetically Modified Varieties. Tabulated for All Farms With Corn, and Separately For Farms With 200+ Acres of Corn and For Farms With < 200 Acres of Corn.

PROPORTION OF Bt OR STACKED GENE CORN ACRES / ALL CORN ACRES	ALL FARMS WITH CORN			FARMS WITH 200+ ACRES OF CORN			FARMS WITH < 200 ACRES OF CORN		
	# FARMS IN SAMPLE	EXPANDED # FARMS	EXPANDED # FARMS AS % OF TOTAL	# FARMS IN SAMPLE	EXPANDED # FARMS	EXPANDED # FARMS AS % OF TOTAL	# FARMS IN SAMPLE	EXPANDED # FARMS	EXPANDED # FARMS AS % OF TOTAL
0	538	13,430	51.1	279	4,860	33.7	259	8,570	72.1
(0, .1]	34	640	2.4						
(.1, .2]	51	860	3.3	47	700	4.9	4	160	1.3
(.2, .3]	42	960	3.7	36	770	5.3	6	190	1.6
(.3, .4]	48	1,100	4.2	40	880	6.1	8	220	1.9
(.4, .5]	97	2,700	10.3	83	2,010	14.0	14	690	5.8
(.5, .6]	34	720	2.7	30	610	4.2	4	110	0.9
(.6, .7]	43	1,030	3.9	36	820	5.7	7	210	1.8
(.7, .8]	78	1,960	7.5	69	1,610	11.2	9	350	2.9
(.8, .9]	35	940	3.6	30	820	5.7	5	120	1.0
(.9, 1.0)	8	140	0.5						
1	59	1,810	6.9	29	690	4.8	30	1,120	9.4
TOTAL	1,067	26,290	100.0	714	14,400	100.0	353	11,890	100.0

SOURCE: NATIONAL AGRICULTURAL STATISTICS SERVICE. U. S. DEPARTMENT OF AGRICULTURE . Based on the 2002 June Agricultural Survey.