65268-1 10/15/2001 1/14

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

OCT 15 2001

Mr. Jeffrey Stein
Director of Regulatory Affairs
Syngenta Seeds, Inc. -Field Crops- NAFTA
P.O. Box 12257
Research Triangle Park, NC 27709-2257

Dear Mr. Stein:

Subject: Amendment Request to Extend the Product Expiration Date for Bt11 Sweet Corn
EPA Registration 65268-1

The amendment referred to above, submitted in connection with registration under section 3(c)(7)(A) of the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, is acceptable subject to the following comments.

Expiration Date:

The subject registration will automatically expire on midnight October 15, 2008.

Data :

You must submit the following data in the time frames specified.

1. The Agency is requiring Syngenta Seeds, Inc. to submit an analytical method for the detection of Cry1Ab protein in corn grain and a thorough characterization of the antisera used in the method(s). The method must be validated by an independent laboratory. Both the method and the validation must be submitted to EPA by June 1, 2002.

2. Data comparing the amino acid sequence of the *Bt*11 Cry1Ab protein expressed in sweet corn with known toxins and allergens must be submitted to the Agency for evaluation. For allergens, these data must also include a stepwise 8 amino acid analysis of the subject protein against available allergen sequence databases. These additional data are required to augment the health effects database for Cry1Ab expressed in corn. These data must be submitted on or before March 15, 2003.

3. The Agency is requiring protein expression data in terms of dry weight, as the amount of protein present in the given tissue. Tissues for which expression data must be provided include

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leaf, root, pollen, seed, and whole plant. In addition, data for each of these tissues should be provided for young plants in rapid growth, during flowering, and mature plants before harvest when that part of the plant is present. Data are due on or before March 15, 2003.

4. The Agency is requiring testing of Cry1Ab protein in soil under a range of conditions typical of *Bt* corn cultivation. EPA requires Syngenta or Syngenta in cooperation with other registrants to submit test protocols before the studies are actually conducted. In general, the Agency anticipates that soils would be sampled from fields where *Bt* corn has been grown continuously for at least 3 years compared with fields where no *Bt* crop has been grown. These paired fields would include several locations throughout the corn growing area of the US representing different soil and climatic variations. The Agency anticipates that samples would need to be taken 2 or 3 times during the growing season. The registrant is required to submit a protocol on or before March 15. 2002. An interim report is due 12 months after the protocol is approved and a final report is due 24 months after the final protocol is approved.

5. Based upon research recently published in the Proceedings of the National Academy of Sciences and upon the response of the Agricultural Biotechnology Stewardship Technical Committee to the December 1999 *Bt* corn Data Call-in Notice, EPA has concluded that the weight of scientific data indicate that *Bt* corn poses no unreasonable adverse impact on monarch butterfly populations. However, it has been identified in one of these papers, (Stanley-Horne, et al, 2001) that the published data only cover acute exposure and longer term exposure to *Bt* corn pollen should be considered. EPA is aware that studies are underway to assess the potential for longer-term exposure to *Bt* corn pollen to adversely impact monarch populations. Syngenta must report the results of these studies to EPA as soon as the results are available publicly or Syngenta must provide valid scientific studies to address this issue by January 31, 2003. The report must be able to be made available to the public at the time it is submitted to EPA.

6. Submitted avian toxicity data on Cry1Ab *Bt* corn was scientifically sound and no treatment mortality or behavior change was observed between the dosed and control replicates. However, data from repeated exposure(s) to higher doses of *Bt* corn are needed to make a hazard assessment. A supplemental study is required. The study must be of appropriate duration to represent the starter and growing periods of the test species such as six weeks in meat-type chickens. Balanced diets should be formulated according to the National Research Council guidelines ("Nutrient Requirements of Poultry," Ninth Revised Edition, 1994) with the energy requirements of the test species being met by the inclusion of corn in the diet to assess hazards from chronic exposure of wild or domesticated fowl. A protocol for poultry studies must be submitted on or before March 15, 2002 with a final report submitted 18 months after approval of the protocol.

Insect Resistance Management:

The required IRM program for *Bt* sweet corn must have the following elements:

1] Requirements for the registrant to prepare and require *Bt* sweet corn users to sign "grower

agreements" which impose binding contractual obligations on the grower to comply with the IRM requirements;

2] Requirements for the registrant to develop, implement, and report to EPA on programs to educate growers about IRM requirements;

3] Requirements for the registrant to develop, implement, and report to EPA on programs to evaluate and promote growers' compliance with IRM requirements;

4] Requirements for the registrant to develop, implement, and report to EPA on programs to evaluate whether there are statistically significant and biologically relevant changes in target insect susceptibility to Cry1Ab protein in the target insects;

5] Requirements for the registrant to develop, and if triggered, to implement a "remedial action plan" which would contain measures the registrants would take in the event that any insect resistance was detected as well as to report on activity under the plan to EPA;

6] Submit annual reports on sales, IRM grower agreement results, compliance, and educational program on or before January 31st each year.

a. Sweet Corn Post-Harvest Requirements

Sweet corn is harvested long before field corn. Therefore, if the sweet corn stalks remaining in the field and any insects remaining in the stalks are destroyed shortly after harvest, a refuge is not needed as a part of the IRM program for sweet corn. Growers must adhere to the following types of crop destruction requirements as described in the grower guide/product use guide and/or in supplements to the grower guide/product use guide.

1. Crop destruction must occur no later than 30 days following harvest, but preferably within 14 days.

2. The allowed crop destruction methods are: rotary mowing, discing, or plow-down. Crop destruction methods should destroy any surviving resistant insects.

b. Grower Agreements

1] Persons purchasing the *Bt* corn product must sign a grower agreement. The term "grower agreement" refers to any grower purchase contract, license agreement, or similar legal document.

2] The grower agreement and/or specific stewardship documents referenced in the grower agreement must clearly set forth the terms of the current IRM program. By signing the grower agreement, a purchaser must be contractually bound to comply with the requirements of the IRM program.

3] The registrant must establish by the 2003 growing season, a system which is reasonably likely to assure that persons purchasing the *Bt* corn product will affirm annually that they are contractually bound to comply with the requirements of the IRM program. The proposed system will be submitted to EPA on or before March 15, 2002.

4] The registrant must continue to use their current grower agreement and submit to EPA by November 1, 2001 a copy of that agreement and any specific stewardship documents referenced in the grower agreement. If Syngenta wishes to change any part of the grower agreement or any specific stewardship documents referenced in the grower agreement that would affect either the content of the IRM program or the legal enforceability of the provisions of the agreement relating to the IRM program, thirty days prior to implementing a proposed change, the registrant must submit to EPA the text of such changes to ensure that it is consistent with the terms and conditions of the amendment.

5] The registrant must establish a system which is reasonably likely to assure that persons purchasing the *Bt* corn sign grower agreement(s), and must provide by January 31, 2002 a written description of that system.

6] The registrant shall maintain records of all *Bt* corn grower agreements for a period of three years from December 31 the year in which the agreement was signed.

7] Beginning on January 31, 2003 and annually thereafter, the registrant shall provide EPA with a report showing the number of units of its *Bt* corn seeds sold or shipped and not returned, and the number of such units that were sold to persons who have signed grower agreements. The report shall cover the time frame of the twelve-month period from the prior August 1 through July 31. Note: the first report shall contain the specified information for the time frame starting with the date of registration amendment and ending July 31, 2002.

8] The registrant must allow a review of the grower agreements and grower agreement records by EPA or by a State pesticide regulatory agency if the State agency can demonstrate that confidential business information, including names and personal information, will be protected.

c. IRM Education and IRM Compliance Monitoring Programs

1] Syngenta must design and implement a comprehensive, ongoing IRM education program designed to convey to *Bt* corn users the importance of complying with the IRM program. The education program shall involve the use of multiple media, e.g. face-to-face meetings, mailing written materials, EPA reviewed language on IRM requirements on the bag or bag tag, and electronic communications such as by Internet, radio, or television commercials. Copies of the materials will be provided to EPA for its records. The program shall involve at least one written communication annually to each *Bt* sweet corn user separate from the grower technical guide. The communication shall inform the user of the current IRM requirements.

2] Annually, the registrant shall revise and expand, as necessary, its education program to take

into account the information collected through the compliance survey required under paragraph 6] and from other sources. The changes shall address aspects of grower compliance that are not sufficiently high.

3] Beginning January 31, 2002 and annually thereafter, the registrants must provide a report to EPA summarizing the activities carried out under the education program for the prior year and the plans for their education program during the current year. The registrant must either submit a separate report or contribute to the report from the industry working group (Agricultural Biotechnology Stewardship Technical Committee or ABSTC).

4] The registrant must design and implement an ongoing IRM compliance assurance program designed to evaluate the extent to which customers purchasing its *Bt* corn product are complying with the IRM program and that takes such actions as are reasonably needed to assure that customers who have not complied with the program either do so in the future or lose their access to the *Bt* corn product. The registrant must prepare and submit by January 31, 2002 a written description of their compliance assurance program. Other required features of the program are described in paragraphs 5] - 15] below.

5] The registrant must establish and publicize a "phased compliance approach," i.e., a guidance document that indicates how the registrant will address instances of non-compliance with the terms of the IRM program and general criteria for choosing among options for responding to any non-compliant users. The options shall include withdrawal of the right to purchase *Bt* corn for an individual customer. An individual customer found to be significantly out of compliance two years in a row would be denied sales of the product the next year. Similarly, seed dealers who are not fulfilling their obligations to inform/educate customers of their IRM obligations will lose their opportunity to sell *Bt* sweet corn.

6] The IRM compliance assurance program shall include an annual survey of all *Bt* sweet corn customers who purchase 5 or more bags of *Bt*11 sweet corn. The survey shall measure the degree of compliance with the IRM program, identify the response rate (e.g., the percent of *Bt* sweet corn acres covered by the responses), and consider the potential impact of non-response. An independent third party will participate in the design and implementation of the survey. Data and information derived from the annual survey will be audited by an independent third party.

7] The survey shall be designed to provide an understanding of any difficulties growers encounter in implementing IRM requirements.

8] The compliance program will be designed to obtain grower feedback on the usefulness of specific educational tools and initiatives.

9] The registrant shall provide a written summary of the results of the prior year's survey (together with a description of the methodology used, and the supporting data) to EPA by January 31 of each year. The registrant shall confer with EPA on changes to the design and content of the survey prior to its implementation.

10] Annually, the registrant shall revise and expand as necessary, its compliance assurance program to take into account the information collected through the compliance survey required under paragraphs 6] through 8] , customer and dealer interactions and feedback, and from other sources. The changes shall address aspects of grower compliance that are not sufficiently high. The registrant must confer with the Agency prior to adopting any changes.

11] The registrant shall train its representatives who make on-farm visits with *Bt* corn growers to perform assessments of compliance with IRM requirements. In the event that any of these visits result in the identification of a grower who is not in compliance with the IRM program, the registrant shall take appropriate action, consistent with its "phased compliance approach," to promote compliance.

12] The registrant shall carry out a program for investigating legitimate "tips and complaints" that its growers are not in compliance with the IRM program. Whenever an investigation results in the identification of a grower who is not in compliance with the IRM program, the registrant shall take appropriate action, consistent with its "phased compliance approach."

13] If a *Bt* sweet corn purchaser was specifically identified as not being in compliance during the previous year, the registrant or the registrant's designee shall visit with the customer and evaluate whether the customer is in compliance with the IRM program for the current year.

14] Beginning January 31, 2003 and annually thereafter, the registrant shall provide a report to EPA summarizing the activities carried out under their compliance assurance program for the prior year and the plans for the compliance assurance program during the current year. The report will include information regarding grower interactions (including,.but not limited to, on-farm visits, verified tips and complaints, grower meetings and letters), the extent of non-compliance, corrective measures to address the non-compliance, and any follow-up actions taken.

15] The registrant must allow a review of the compliance records by EPA or by a State pesticide regulatory agency if the State agency can demonstrate that confidential business information, including the names and personal information the growers will be protected.

d. Insect Resistance Monitoring

The Agency is imposing the following conditions for this product:

1) The registrant will monitor for resistance and/or trends in increased Cry1Ab tolerance for *Ostrinia nubilalis* (European corn borer) and/or *Helicoverpa zea* (corn earworm). Sampling should be focused in those areas in which there is the highest risk of resistance development.

2) The ABSTC will convene an advisory panel of academic experts from NC-205, USDA, and EPA to examine the current monitoring program and methodology and to consider enhancements to the current monitoring program for implementation in 2002. Consensus changes recommended by the joint panel will be implemented as soon as possible, beginning in 2002,

including modification in the number of insects collected per site, number of sites, number of regions sampled, and/or modifications in methodology, such as field screening or F_2 screening.

3) The registrant will develop and ensure the implementation of a plan for resistance monitoring for *Spodoptera frugiperda* (fall armyworm or FAW) in counties in which Cry1Ab sweet corn acreage exceeds 5,000 acres and the pest is capable of overwintering in that county. The registrant should consult with academic and USDA experts in developing the monitoring plan and will provide EPA with a copy of its proposed resistance monitoring plan for EPA's approval prior to implementation. This proposed FAW monitoring plan must be submitted to EPA by January 31 of the year following that in which Cry1Ab sweet corn acreage exceeds the trigger specified in this requirement (i.e., greater than 5,000 acres in any county in which FAW overwinters). The proposed plan must be implemented the season following the acreage trigger being met. The proposed plan will remain in place until an EPA approved plan can be implemented.

4) The registrant shall provide to EPA a description of the ECB and CEW resistance monitoring plan by January 31, 2003. The description shall include: sampling (number of locations and samples per locations), sampling methodology, bioassay methodology, standardization procedures, detection technique and sensitivity, and the statistical analysis of the probability of detecting resistance.

5) The registrant must follow up on grower, extension specialist or consultant reports of less than expected results or control failures for the target lepidopteran pests. The registrant will instruct its customers to contact them (e.g., via a toll-free customer service number) if incidents of unexpected levels of damage occurs from these target pests. The registrant will investigate all damage reports submitted to the company or the company's representatives. See Remedial Action Plans section below.

6) A report on results of resistance monitoring and investigations of damage reports must be submitted to the Agency annually by April 30th each year for the duration of the conditional registration.

e. Remedial Action Plans

The registrant will abide by the Remedial Action Plan for Field Corn as an interim Remedial Action Plan for Sweet Corn until a plan specific for sweet corn can be approved by EPA. After consultation with sweet corn growers and academic experts, the registrant will submit a revised Remedial Action Plan by May15, 2002 for EPA's review and approval. The registrant must obtain approval from EPA before modifying the Remedial Action Plan for Sweet Corn once the Plan has been approved by EPA.

Annual Reports:

The registrant will provide annual reports to EPA on its Cry1Ab PIP expressed in corn based on

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the following table.

Report	Description	Due Date
Annual Sales	Reported by county and state summed by state	January 31st each year
Grower Agreement	Number of units of *Bt* corn seeds shipped or sold and not returned, and the number of such units that were sold to persons who have signed grower agreements	January 31st each year beginning in 2003
Grower Education	Education program completed previous year and plan for next year	January 31st each year
Proposed Compliance Plan	Written description of Compliance Assurance Program	January 31, 2002
Compliance Assurance Plan	Compliance Assurance Program Results	January 31 each year starting 2003.
Compliance	To include annual survey results and plans for the next year	January 31 each year starting 2003
Insect Resistance Monitoring	Description of the program including sampling (number of locations and samples per locations), sampling methodology, bioassay methodology, standardization procedures, detection technique and sensitivity, and the statistical analysis of the probability of detecting resistance.	January 31, 2003

Additional reports are due as described in the following table:

IRM Grower Agreements	Proposed system to assure growers sign grower agreements	January 31, 2002
IRM Affirmation Plan	System to assure annual affirmation by growers of their IRM obligations	March 15, 2002
Changes to Grower Agreement and/or IRM documents	Current grower agreement(s) and any specific stewardship documents	November 1, 2001 and at least 30 days before any changes related to IRM are expected to be imposed.

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Insect Resistance Monitoring Results	Results of monitoring and investigations of damage reports	April 30th each year

If these conditions are not complied with, the registration will be subject to cancellation in accordance with FIFRA section 6(e). Your release for shipment of Cry1Ab sweet corn and your letter of October 15, 2001 constitute acceptance of these conditions.

A stamped copy of the FIFRA label is enclosed for your records.

Sincerely,

Janet L. Andersen, Ph.D, Director
Biopesticides and Pollution
Prevention Division (7511C)

Enclosure

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Enclosure

Remedial Action Plan for Responding to Resistance in European Corn Borer
Corn Earworm and/or Southwestern Corn Borer
(October 15, 2001)

I. Definitions

Suspected resistance

EPA defines "suspected" resistance to mean, in the case of reported product failure, that:

- the corn in question has been confirmed to be *Bt* corn
- the seed used had the proper percentage of corn expressing *Bt* protein;
- the relevant plant tissues are expressing the expected level of *Bt* protein; and
- it has been ruled out that species not susceptible to the protein could be responsible for the damage, that no climatic or cultural reasons could be responsible for the damage, and that other reasonable causes for the observed product failure have been ruled out.

The Agency does not interpret "suspected resistance" to mean grower reports of possible control failures, nor does the Agency intend that extensive field studies and testing to confirm scientifically insect resistance be completed before responsive measures are undertaken.

If resistance is "suspected," the registrant must instruct growers to do the following:

- Use alternate control measures to control the pest suspected of resistance to *Bt* corn in the affected region.
- Destroy crop residues in the affected region immediately after harvest (i.e. within one month) with a technique appropriate for local production practices to minimize the possibility of resistant insects overwintering and contributing to the next season's pest population.

Confirmed Resistance

The registrant assumes responsibility for the implementation of resistance mitigation actions undertaken in response to the occurrence of resistance during the growing season. When resistance has been confirmed, the registrant must immediately stop sale and distribution of *Bt* corn in the remedial action zone (may be less than a single county, single county, or multiple counties) where the resistance has been shown until an effective local mitigation plan approved by EPA has been implemented.

A resistance event becomes confirmed if the progeny of the sampled ECB, CEW, or SWCB population would exhibit all of the following characteristics in bioassays initiated with neonates:

1. If there is > 30% survival and > 25% leaf area damaged in a 5-day bioassay using Cry1Ab-positive leaf tissue under controlled laboratory conditions.

2. If standardized laboratory bioassays using diagnostic doses for ECB (Marçon et al. 2000), SWCB (Trisyono and Chippendale 1999), or CEW/CBW (USDA/ARS/SIMRU, unpublished) demonstrate resistance has a genetic basis and survivorship in excess of 1% (gene frequency of population ≥0.1).

3. If an LC_{50} in a standard Cry1Ab diet bioassay exceeds the upper limit of the 95% confidence interval of the standard unselected laboratory population LC_{50} for susceptible ECB, SWCB, or CEW populations, as established by the ongoing baseline monitoring program.

II. Remedial Action

The registrant assumes responsibility for the implementation of resistance mitigation actions undertaken in response to the occurrence of resistance during the growing season. In cases of "confirmed" resistance, the following strategy for Cry1Ab *Bt* corn hybrids:

The registrant will report all instances of confirmed pest resistance, as defined above, to the Agency within 30 days. Upon identification of a confirmed instance of resistance, registrants will take the following immediate mitigation measures:

1. Notify customers and extension agents in the affected area,

2. Require to customers and extension agents in the affected area the use of alternative control measures to reduce or control the local target pest population,

3. Where appropriate, require to customers and extension agents in the affected area that crop residues be incorporated into the soil following harvest, to minimize the possibility of overwintering insects.

4. Immediately stop sale and distribution of *Bt* corn in the remedial action zone (may be a single or multiple counties) where the resistance has been shown until an effective local mitigation plan approved by EPA has been implemented.

Within 90 days of a confirmed instance of pest resistance, as defined above, registrants will:

1. Notify the Agency of the immediate mitigation measures that were implemented,

2. Submit to the Agency a proposed long-term resistance management action plan for the affected area,

3. Work closely with the Agency in assuring that an appropriate long-term resistance management action plan for the affected area is implemented, and

4. Implement an action plan that is approved by EPA and that consists of some or all the following elements, as warranted:

a. Informing customers and extension agents in the affected area of pest resistance,

b. Increasing monitoring in the affected area, and ensuring that local target pest populations are sampled on an annual basis,

c. Recommending alternative measures to reduce or control target pest populations in the affected area,

d. Implementing intensified local IRM measures in the affected area based on the latest research results. The implementation of such measures will be coordinated by the Agency with other registrants; and

e. The implementation of the remedial action strategy will be coordinated by the Agency with other registrants and stakeholders.

For mitigation of resistance in the growing season(s) following a confirmed resistance incident(s), use of the following procedures:

1. Maintenance of the sales suspension of all *Bt* corn hybrids (with the same protein or similar *Bt* proteins as the *Bt* corn hybrids with the resistant population) in the affected region would remain in place until an EPA-approved local resistance management plan is in place to mitigate resistance in the affected region(s).

2. The development and recommendation of alternative resistance management strategies for controlling the resistant pest(s) on corn in the affected region.

3. Notification of all relevant personnel (e.g., growers, consultants, extension agents, seed distributors, processors, university cooperators, and state/federal authorities) in the affected region of the resistance situation.

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ATTRIBUTE® INSECT PROTECTED SWEET CORN

Bt Protein
Plant-Incorporated Protectant Active Ingredient for the Control of European Corn Borer and Corn Earworm in Sweet Corn

(Pure form of the plant-incorporated protectant *Bacillus thuringiensis* Cry1Ab delta-endotoxin protein as expressed in corn cells)

Active Ingredient:

Bacillus thuringiensis Cry1Ab delta-endotoxin and the genetic material (plasmid vector pZO1502) necessary for its production in corn	0.0002 - 0.0006% by seed weight

Inert Ingredient:

Substance produced by a marker gene and its controlling sequences in corn	< 0.0000001% by seed weight

Keep Out of the Reach of Children

CAUTION

ACCEPTED
WITH COMMENTS
IN EPA LETTER DATED
OCT 15 2001

EPA Reg. No. 65268-1
EPA Est. No. 65268-1

Syngenta Seeds, Inc. – Vegetables - NAFTA
600 N. Armstrong Place
Boise, ID 83704

Directions for Use:

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. The subject registration will automatically expire at midnight October 15, 2008.

Corn has been genetically modified to produce a *Bacillus thuringiensis* Cry1Ab delta-endotoxin protein for control of certain lepidopteran pests. In sweet corn, this insecticidal protein can provide significant control of:

European corn borer	(*Ostrinia nubilalis*)
Corn earworm	*(Helicoverpa zea)*

In addition, some control or suppression of the following corn pest can be provided:

Fall armyworm	*(Spodoptera frugiperda)*

All corn seed that contains the plant-pesticide that is sold or distributed by Syngenta Seeds, Inc. – Vegetables - NAFTA or its distributors must be accompanied by informational material indicating the registration number (65268-1) and the active ingredient [*Bacillus thuringiensis* Cry1Ab delta-endotoxin and the genetic material (plasmid vector pZO1502) necessary for its production in corn], and stipulating that growers read the Grower Guide prior to planting the seed. This informational material will also include the following statements (to be modified as warranted by changes in the regulatory status of glufosinate ammonium herbicide use on tolerant sweet corn): "Attribute® Insect Protected Sweet Corn hybrids produce a protein that increases tolerance to glufosinate ammonium herbicides. Glufosinate ammonium is not registered or recommended for use on this hybrid. If you plant a glufosinate resistant crop in the next growing season, please note that volunteer plants from this sweet corn hybrid may not be controlled by a glufosinate ammonium herbicide."

A Grower Guide must be distributed to all customers using seed containing the plant-incorporated protectant that will include instructions and recommendations regarding product use, insect resistance management, and integrated pest management. The following information regarding commercial production must be included in the Grower Guide:

- Crop destruction must occur no later than 30 days following harvest, but preferably within 14 days.
- The allowed crop destruction methods are: rotary mowing, discing, or plow-down. Crop destruction methods should destroy any surviving resistant insects.