



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Washington, D.C. 20460

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

September 26, 2022

Edwards Allen, Ph.D.
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Bayer U.S. – Crop Science
700 Chesterfield Parkway West
Chesterfield, Missouri 63017

Subject: Non-PRIA Amendment - Extension of the registration expiration date and label revisions to change the company name from Monsanto to Bayer and include minor revisions to the insect resistance management directions for use
Product Name: MON 89034
EPA Registration Number: 524-575
Submission Date: January 28, 2022
OPP Case Number: 00338517

Dear Dr. Allen:

The amendment referenced above, submitted in connection with registration under Section 3(c)(5) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), is acceptable provided that you comply with the updated terms and conditions as described in this letter.

1. The subject registration will automatically expire at midnight on September 30, 2023.
2. The subject registration will be limited to *Bacillus thuringiensis* Cry1A.105 protein and the genetic material necessary for its production (vector PV-ZMIR245) in corn event MON 89034 (OECD Unique Identifier: MON-89Ø34-3), and *Bacillus thuringiensis* Cry2Ab2 protein and the genetic material necessary for its production (vector PV-ZMIR245) in corn event MON 89034 (OECD Unique Identifier: MON-89Ø34-3), for use in field or sweet corn.
3. Submit and/or cite all data required for registration or registration review of MON 89034 when the EPA requires all registrants of similar products to submit such data.
4. This plant-incorporated protectant (PIP) may be combined through conventional breeding with other registered plant-incorporated protectants that are similarly approved for use in combination, through conventional breeding, with other registered plant-incorporated protectants to produce inbred corn lines and hybrid corn varieties with combined pesticidal traits.
5. Bayer CropScience LP (Bayer) must commit to do the following Insect Resistance Management (IRM) Program, consisting of the following elements:
 - Requirements (except for sweet corn use) relating to creation of a lepidopteran refuge (consisting of corn that does not contain any *Bt* trait for lepidopteran control) in conjunction with the planting of any acreage of MON 89034 corn;

- Requirements for Bayer to prepare and require MON 89034 corn users to sign grower agreements that impose binding contractual obligations on growers to comply with the refuge requirements.
- Requirements for Bayer to develop, implement, and report to EPA on programs to educate growers about IRM requirements.
- Requirements for Bayer to develop, implement, and report to EPA on programs to evaluate and promote growers' compliance with IRM requirements.
- Requirements for Bayer to develop, implement, and report to EPA on monitoring programs to evaluate whether there are statistically significant and biologically relevant changes in susceptibility to the Cry1A.105 and Cry2Ab2 proteins in the target insects.
- Requirements for Bayer to develop, and if triggered, to implement a remedial action plan that would contain measures Bayer would take in the event that any field-relevant insect resistance to Cry1A.105 or Cry2Ab2 was detected, as well as to report on activity under the plan to EPA.
- Requirements for Bayer to maintain, and provide the Agency upon request, the number of units sold by state and county, IRM grower agreement results, and substantive changes to educational programs. Bayer is required to submit reports within three months of the Agency's request.
- Bag Tag Requirements for MON 89034 corn. Seed bags and/or bag tags for corn hybrids that contain plant-incorporated protectants produced in MON 89034 corn must display the registration number and active ingredients, and stipulate that growers read the Bayer Stewardship Guide (or equivalent guidance) prior to planting these hybrids. The refuge size requirement must be displayed on the bag or bag tag in both text and graphic format.
- Requirements for Bayer, on or before August 31st of each year, to submit reports on Cry1A.105 and Cry2Ab2 resistance monitoring.

a. Refuge Requirements for MON 89034 Field Corn

The following information must be included on the product bag or bag-tag as sold per respective region and in the Grower Guide:

These refuge requirements do not apply to seed increase/propagation of inbred and hybrid seed corn up to a total of 20,000 acres per county and up to a combined United States (U.S.) total of 250,000 acres (PIP) active ingredient per registrant per year. Furthermore, these refuge requirements do not apply to MON 89034 commercial hybrid sweet corn.

1. Corn Belt Refuge Requirements for *Bt* Corn. For MON 89034 field corn grown outside cotton-growing areas (e.g., the Corn Belt), grower agreements (also known as stewardship agreements) will specify that growers must adhere to the refuge requirements as described in the growers guide/product use guide and/or in supplements to the growers guide/product use guide.
 - i. Specifically, growers must plant a structured refuge of at least 5% non-*Bt* corn and/or non-lepidopteran resistant *Bt* corn that may be treated with insecticides as detailed below, to control

lepidopteran stalk-boring and other pests.

- ii. The refuge and MON 89034 corn should be sown on the same day, or with the shortest window possible between planting dates to ensure development is similar among varieties.
 - iii. Refuge planting options include: separate fields, blocks within fields (e.g., along the edges or headlands), and strips across the field.
 - iv. External refuges must be planted within $\frac{1}{2}$ mile of the *Bt* fields.
 - v. When planting the refuge as strips across the field or as perimeter strips, refuges must be at least 4 consecutive rows wide.
 - vi. The refuge can be protected from lepidopteran damage by use of non-*Bt* insecticides if the population of one or more target lepidopteran pests of MON 89034 in the refuge exceeds economic thresholds. Economic thresholds will be determined using methods recommended by local or regional professionals (e.g., Extension Service agents or crop consultants). Instructions to growers will specify that microbial *Bt* insecticides must not be applied to non-*Bt* corn and/or non-lepidopteran resistant *Bt* corn refuges.
2. Cotton-Growing Area Refuge Requirements for *Bt* Corn. For *Bt* field corn grown in cotton-growing areas, grower agreements (also known as stewardship agreements) will specify that growers must adhere to the refuge requirements as described in the growers guide/product use guide and/or in supplements to the growers guide/product use guide.
- i. Specifically, growers in these areas must plant a structured refuge of at least 20% non-*Bt* corn and/or non-lepidopteran resistant *Bt* corn that may be treated with insecticides as needed to control lepidopteran stalk-boring and other pests.
 - ii. The refuge and MON 89034 corn should be sown on the same day, or with the shortest window possible between planting dates to ensure development is similar among varieties.
 - iii. Refuge planting options include: separate fields, blocks within fields (e.g., along the edges or headlands), and strips across the field.
 - iv. External refuges must be planted within $\frac{1}{2}$ mile of the *Bt* fields.
 - v. When planting the refuge as strips across the field or as perimeter strips, refuges must be at least (4) consecutive rows wide.
 - vi. The refuge can be protected from lepidopteran damage by use of non-*Bt* insecticides if the population of one or more target lepidopteran pests of MON 89034 in the refuge exceeds economic thresholds. Economic thresholds will be determined using methods recommended by local or regional professionals (e.g., Extension Service agents or crop consultants). Instructions to growers will specify that microbial *Bt* insecticides must not be applied to non-*Bt* corn and/or non-lepidopteran resistant *Bt* corn refuges.
 - vii. Cotton-growing areas include the following states: Alabama, Arkansas, Florida, Georgia, Louisiana, North Carolina, Mississippi, South Carolina, Oklahoma (only the counties of

Beckham, Caddo, Comanche, Custer, Greer, Harmon, Jackson, Kay, Kiowa, Tillman, and Washita), Tennessee (only the counties of Carroll, Chester, Crockett, Dyer, Fayette, Franklin, Gibson, Hardeman, Hardin, Haywood, Lake, Lauderdale, Lincoln, Madison, Obion, Rutherford, Shelby, and Tipton), Texas (except the counties of Carson, Dallam, Hansford, Hartley, Hutchinson, Lipscomb, Moore, Ochiltree, Roberts, and Sherman), Virginia (only the counties of Dinwiddie, Franklin City, Greensville, Isle of Wight, Northampton, Southampton, Suffolk City, Surrey, and Sussex), and Missouri (only the counties of Dunklin, New Madrid, Pemiscot, Scott, and Stoddard).

b. Post-Harvest Requirements for MON 89034 Sweet Corn

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 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.

c. Grower Agreements for MON 89034 Corn

1. Persons purchasing MON 89034 corn 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 grower must be contractually bound to comply with the requirements of the IRM program.
3. Bayer must continue to integrate this registration into the current system used for its other *Bt* corn plant-incorporated protectants, which is reasonably likely to assure that persons purchasing MON 89034 corn will affirm annually that they are contractually bound to comply with the requirements of the IRM program.
4. Bayer must continue to use its current grower agreement for MON 89034 corn. If Bayer 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, then thirty (30) days prior to implementing a proposed change, Bayer must submit to EPA the text of such changes to ensure that it is consistent with the terms and conditions of this amended registration.
5. Bayer shall maintain records of all MON 89034 corn grower agreements for a period of three (3) years from December 31st of the year in which the agreement was signed.
6. Bayer shall make available to the Agency upon request records of the number of units of MON 89034 corn seed sold or shipped and not returned, and the number of such units that were sold to persons who have signed grower agreements for the previous growing season. Bayer is required to

submit reports within three months of the Agency's request.

7. Bayer 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, personal information, and grower license numbers of the growers, will be protected.

d. IRM Education and IRM Compliance Monitoring Program for MON 89034 Corn

1. Bayer must implement and enhance (as set forth in paragraph 17 of this section) a comprehensive, ongoing IRM education program designed to convey to MON 89034 corn users the importance of complying with the IRM program. The program shall include information encouraging MON 89034 corn users to pursue optional elements of the IRM program relating to refuge configuration and proximity to MON 89034 corn fields. 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. The program shall involve at least one written communication annually to each MON 89034 corn user separate from the grower technical guide. The communication shall inform the user of the current IRM requirements. Bayer shall coordinate its education program with the educational efforts of other registrants and other organizations, such as the National Corn Growers Association and state extension programs.
2. Bayer shall revise, and expand as necessary, its education program to take into account the information collected through the compliance survey, required under paragraphs 6–9 of this section, and from other sources. The changes shall address aspects of grower compliance that are not sufficiently high.
3. Upon EPA request, Bayer shall provide copies of grower education materials and information on grower education activities including any substantive changes to these materials and activities conducted either individually or as part of the industry working group Agricultural Biotechnology Stewardship Technical Committee (ABSTC). Bayer is required to submit reports within three months of the Agency's request. The required features of the compliance assurance program are described in paragraphs 4–22 of this section.
4. Bayer must implement and improve an ongoing IRM compliance assurance program designed to evaluate the extent to which growers purchasing MON 89034 corn are compliant with the IRM program, and that takes such actions as are reasonably needed to assure that growers who have not complied with the program either do so in the future or lose their access to Bayer's *Bt* corn products. Bayer shall coordinate with other *Bt* corn registrants in improving its compliance assurance program and integrate this registration into the current compliance assurance program used for its other *Bt* corn plant-incorporated protectants. Other required features of the program are described in paragraphs 5–22 of this section.
5. Bayer must maintain and publicize a phased compliance approach (i.e., a guidance document that indicates how it 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 growers after the first year of non-compliance). While recognizing that for reasons of difference in business practices there are needs for flexibility between different companies, Bayer must use a consistent set of standards for responding to non-compliance. A grower found with a second incident of significant

non-compliance with refuge requirements for MON 89034 within a five-year period will be denied access the following year to Bayer's Bt corn products for which the grower is required to plant a separate structured refuge. Similarly, seed dealers who are not fulfilling their obligations to inform/educate growers of their IRM obligations will lose their opportunity to sell *Bt* corn.

6. The IRM compliance assurance program shall include an annual survey, conducted by an independent third party, of a statistically representative sample of growers MON 89034 corn. The survey shall be conducted in odd-numbered years beginning in 2023 and shall include growers who plant 100 or more acres of corn in the Southern U.S. corn-cotton areas. Bayer may collaborate with other registrants of *Bt* corn [for example, through the industry working group the Agricultural Biotechnology Stewardship Technical Committee (ABSTC)] to conduct the survey.

In the U.S. Corn Belt, no anonymous grower survey is required for MON 89034 corn if Bayer can demonstrate that the industry-wide adoption of integrated refuge products (i.e., refuge seed blends) is equal to or greater than 70% of *Bt* corn acres in the Corn Belt. If industry-wide adoption of integrated refuge products (i.e., refuge seed blends) falls below 70% of *Bt* corn acres in the Corn Belt, an anonymous grower survey shall also be conducted in this region during the next growing season using a statistically representative sample of growers who plant 200 or more acres of corn, and grower surveys shall be continued every odd-numbered year until the industry-wide adoption of integrated refuge products (i.e., refuge seed blends) is again equal to or greater than 70% of *Bt* corn acres in this region. Bayer may collaborate with other registrants of *Bt* corn (for example, through the industry working group the ABSTC) to compile the integrated refuge adoption data and to conduct the surveys.

Alternatively, if Bayer is not a participant of an industry working group (e.g., the ABSTC) and Bayer's sales of integrated refuge products are equal to or greater than 70% of Bayer's total *Bt* corn sales in the prior year, then no anonymous grower survey is required in the U.S. Corn Belt. If Bayer's sales of integrated refuge products fall below 70% of Bayer's total *Bt* corn sales, an anonymous grower survey shall also be conducted in this region during the next growing season using a statistically representative sample of growers who plant 200 or more acres of corn, and grower surveys shall be continued every odd-numbered year until sales of integrated refuge products (i.e., refuge seed blends) are again equal to or greater than 70% of Bayer's total *Bt* corn sales in this region.

- A third party is classified as a party other than the registrant, the grower, or anyone else with a direct interest in IRM compliance for *Bt* corn.
7. The survey shall be designed to provide an understanding of any difficulties growers encounter in implementing IRM requirements. An analysis of survey results must include the reasons, extent, and potential biological significance of any implementation deviations.
 8. The survey shall be designed to obtain grower feedback on the usefulness of specific educational tools and initiatives.
 9. In years in which the survey is conducted, Bayer shall provide a final written summary of the results of the survey (together with a description of the regions, the methodology used, and the supporting data) to EPA on or before January 31st of the following year. Bayer shall confer with other registrants and EPA on the design and content of the survey prior to its implementation.

10. Bayer shall revise, and expand as necessary, its compliance assurance program to take into account the information collected through the compliance survey, required under paragraphs 6–9 of this section, and from other sources. The changes shall address aspects of grower compliance that are not sufficiently high. Bayer must confer with EPA prior to adopting any changes.
11. Bayer shall conduct and enhance an annual on-farm assessment program. Bayer shall train its representatives who make on-farm visits with MON 89034 corn growers to perform assessments of compliance with IRM requirements. There is no minimum corn acreage size for this program. Therefore, growers will be selected for this program from across all farm sizes. In the event that any of these visits result in the identification of a grower who is not in compliance with the IRM program, Bayer shall take appropriate action, consistent with its phased compliance approach, to promote compliance.
12. Bayer shall implement a program for investigating legitimate tips and complaints that MON 89034 corn 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, Bayer shall take appropriate action, consistent with its phased compliance approach.
13. If a grower, who purchases MON 89034 corn for planting, was specifically identified as not being in compliance during the previous year, Bayer shall visit with the grower and evaluate whether the grower is in compliance with the IRM program for the current year.
14. Annually, by January 31st each year, Bayer must provide a report to EPA summarizing the MON 89034 compliance assurance program activities and results for the prior year and plans for the MON 89034 compliance assurance program for the current year. Within one month of submitting this report to EPA, the registrant shall meet with EPA to discuss its findings. The report must inform EPA of the number of growers deemed ineligible to purchase *Bt* corn seed on the basis of continued non-compliance with the insect resistance management refuge requirements. Bayer may elect to coordinate information with other registrants and report collectively the results of compliance assurance programs.
15. Bayer and the seed corn dealers for Bayer 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, personal information, and grower license numbers of the growers, will be protected.
16. Bayer shall revise and expand its existing Compliance Assurance Program to include the following elements. The registrant may coordinate with other registrants in designing and implementing its Compliance Assurance Program.
17. Bayer will enhance the refuge education program throughout the seed delivery channel:
 - Ensure sales representatives, licensees, seed dealers, and growers recognize the importance of correct refuge implementation and potential consequences of failure to plant the required refuge.
 - Implement a “bag tag” that will be attached to all bags of MON 89034 seed sold and delivered. The refuge size requirement must be included on all PIP corn seed bags or bag tags. The PIP product label accepted by EPA must include how this information will be

conveyed to growers via text and graphics.

18. Bayer will focus the majority of on-farm assessments on regions with the greatest risks for resistance:

- Use *Bt* corn adoption, pest pressure information, and other available information to identify regions where the risk of resistance is greatest;
- Focus approximately two-thirds of on-farm assessments on these regions, with the remaining assessments conducted across other regions where MON 89034 is used.

19. Bayer will use its available MON 89034 sales records and other information to refine grower lists for on-farm assessments of their compliance with refuge requirements:

- Identify for potential on-farm assessment growers whose sales information indicates they have purchased MON 89034 corn product but may have purchased little or no refuge seed from the registrant, licensee, or affiliated company.

20. Bayer will contract with third parties to perform on-farm assessments of compliance with refuge requirements:

- The third-party assessors will conduct all first-time on-farm assessments as well as second-year on-farm assessments of those growers found out of compliance in a first-time assessment.

21. Bayer will annually refine the on-farm assessment program for the MON 89034 corn product to reflect the adoption rate and level of refuge compliance for the product.

22. Bayer will follow up with growers who have been found significantly out of compliance under the on-farm assessment program and are found to be back in compliance the following year:

- All growers found to be significantly out of compliance in a prior year will annually be sent additional refuge assistance information for a minimum of two years by Bayer, seed supplier, or third party assessor, after completing the assessment process;
- Bayer will conduct follow-up checks on growers found to be significantly out of compliance within three years after they are found to be back in compliance;
- A grower found with a second incident of significant non-compliance with refuge requirements for the *Bt* corn product within a five-year period will be denied access the following year to Bayer's *Bt* corn products for which the grower is required to plant a separate structured refuge. Similarly, seed dealers who are not fulfilling their obligations to inform/educate growers of their IRM obligations will lose their opportunity to sell *Bt* corn.

e. Insect Resistance Monitoring and Mitigation Plan for MON 89034 Corn

EPA is imposing the following conditions for the Cry1A.105 and Cry2Ab2 toxins expressed in MON 89034

Bayer will monitor for resistance to Cry1A.105 and Cry2Ab2 expressed in MON 89034 corn. The monitoring program shall consist of two approaches: (1) focused population sampling and laboratory testing; and (2) investigation of reports of less-than expected control of labeled insects. Should field-relevant resistance be confirmed, an appropriate resistance management action plan will be implemented.

Focused Population Sampling

Bayer shall annually sample and bioassay populations of the key target pests: *Ostrinia nubilalis* (European corn borer; ECB), *Diatraea grandiosella* (southwestern corn borer; SWCB), and *Helicoverpa zea* (corn earworm; CEW). Sampling for the target pests will be focused in areas identified as those with the highest risk of resistance development (e.g., where lepidopteran active *Bt* hybrids are planted on a high proportion of the corn acres, and where the insect species are regarded as key pests of corn). Bioassay methods must be appropriate for the goal of detecting field-relevant shifts in population response to MON 89034 corn and/or changes in resistance allele frequency in response to the use of MON 89034 corn and, as far as possible, should be consistent across sampling years to enable comparisons with historical data.

The number of populations to be collected shall reflect the regional importance of the insect species as a pest, and specific collection regions will be identified for each pest. For ECB, a minimum of twelve (12) populations across the sampling region will be targeted for collection at each annual sampling. For SWCB, the target will be a minimum of six (6) populations. For CEW, the target will be a minimum of ten (10) populations. Pest populations should be collected from multiple corn-growing states reflective of different geographies and agronomic conditions. To obtain sufficient sensitivity to detect resistance alleles before they become common enough to cause measurable field damage, each population collection shall attempt to target 400 insect genomes (egg masses, larvae, mated females, and/or mixed-sex adults), but a successful population collection will contain a minimum of 100 genomes. It is recognized that it may not be possible to collect the target number of insect populations or genomes due to factors such as natural fluctuations in pest density, environmental conditions, and area-wide pest suppression.

The sampling program and geographic range of collections may be modified as appropriate based on changes in pest importance and for the adoption levels of MON 89034 corn. EPA shall be consulted prior to the implementation of such modifications.

Bayer will report to EPA, on or before August 31st of each year, the results of the population sampling and bioassay monitoring program.

Any incidence of unusually low sensitivity to the Cry1A.105 or Cry2Ab2 proteins in bioassays shall be investigated as soon as possible to understand any field relevance of such a finding. Such investigations shall proceed in a stepwise manner until the field relevance can be either confirmed or refuted, and results of these shall be reported to EPA annually on or before August 31st. The investigative steps will include the following:

- i. Re-test progeny of the collected population to determine whether the unusual bioassay response is reproducible and heritable. If it is not reproducible and heritable, no further action is required.
- ii. If the unusual response is reproducible and heritable, progeny of insects that survive the diagnostic concentration will be tested using methods that are representative of exposure to MON 89034 corn under field conditions. If progeny do not survive to adulthood, any suspected resistance is not field relevant and no further action is required.
- iii. If insects survive steps 1 and 2, resistance is confirmed, and further steps will be taken to evaluate the resistance. These steps may include the following:
 - a. Determining the nature of the resistance (i.e., recessive or dominant, and the level of functional dominance);
 - b. Estimating the resistance allele frequency in the original population;
 - c. Determining whether the resistance allele frequency is increasing by analyzing field collections in subsequent years sampled from the same site where the resistance allele(s) was originally collected;
 - d. Determining the geographic distribution of the resistance allele by analyzing field collections in subsequent years from sites surrounding the site where the resistance allele(s) was originally collected.

Should field-relevant resistance be confirmed, and the resistance appears to be increasing or spreading, Bayer will consult with EPA to develop and implement a case-specific resistance management action plan.

Investigation of Reports of Unexpected Levels of Damage by the Target Pests

Bayer will follow up on grower, extension specialist, or consultant reports of unexpected levels of damage by the lepidopteran pests listed on the pesticide label. Bayer will instruct its customers to contact them if such incidents occur. Bayer will investigate all legitimate reports submitted to the company or the company's representatives.

If reports of unexpected levels of damage lead to the suspicion of resistance in any of the key target pests (ECB, SWCB, and CEW), Bayer will implement the actions described below, based on the following definitions of *suspected resistance* and *confirmed resistance*.

Suspected Resistance

EPA defines *suspected resistance* to mean field reports of unexpected levels of insect-feeding damage for which:

- The corn in question has been confirmed to be lepidopteran-active *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 there could be no other reasonable causes for the damage.

EPA does not interpret *suspected resistance* to mean grower reports of possible control failures or suspicious results from annual insect monitoring assays, nor does EPA intend that extensive field studies and testing be undertaken to confirm scientifically the presence of insects resistant to MON 89034 corn in commercial production fields before responsive measures are undertaken.

If resistance is *suspected*, Bayer will instruct growers to do the following:

- Use alternative control measures in MON 89034 corn fields in the affected region to control the target pest during the immediate growing season.
- Destroy MON 89034 corn crop residues in the affected region within one (1) month after harvest with a technique appropriate for local production practices to minimize the possibility of resistant insects over-wintering and contributing to the next season's target pest population.

Additionally, if possible, and prior to the application of alternative control measures or destruction of crop residues, Bayer will collect samples of the insect population in the affected fields for laboratory rearing and testing. Such rearing and testing shall be conducted as expeditiously as practical.

Confirmed Resistance

EPA defines *confirmed resistance* to mean, in the case of field reports of unexpected levels of damage from the key target pests, that all the following criteria are met:

- There is >30% insect survival and commensurate insect feeding in a bioassay, initiated with neonate larvae, that uses methods that are representative of exposure to *Bt* corn hybrids under field conditions (ECB and SWCB only).
- In standardized laboratory bioassays using diagnostic concentrations of the *Bt* protein suited to the target pest in question, the pest exhibits resistance that has a genetic basis and the level of survivorship indicates that there may be a resistance allele frequency of ≥ 0.1 in the sampled population.
- In standardized laboratory bioassays, the LC_{50} exceeds the upper limit of the 95% confidence interval of the LC_{50} for susceptible populations surveyed both in the original baselines developed for this pest species and in previous years of field monitoring.

Response to Confirmed Resistance in a Key Target Pest as the Cause of Unexpected Levels of Damage in the Field

When field resistance is *confirmed* (as defined above), the following steps will be taken by Bayer:

- EPA will receive notification within 30 days of resistance confirmation;

- Affected customers and extension agents will be notified about confirmed resistance within 30 days;
- Monitoring will be increased in the affected area and local target pest populations will be sampled annually to determine the extent and impact of resistance;
- If appropriate (depending on the resistant pest species, the extent of resistance, the timing of resistance, and the nature of resistance, and the availability of suitable alternative control measures), alternative control measures will be employed to reduce or control target pest populations in the affected area. Alternative control measures may include advising customers and extension agents in the affected area to incorporate crop residues into the soil following harvest to minimize the possibility of over-wintering insects, and/or applications of chemical insecticides;
- Unless otherwise agreed with EPA, stop sale and distribution of the relevant lepidopteran-active *Bt* corn hybrids in the affected area immediately until an effective local mitigation plan, approved by EPA, has been implemented;
- Bayer will develop a case-specific resistance management action plan within 90 days according to the characteristics of the resistance event and local agronomic needs. Bayer will consult with appropriate stakeholders in the development of the action plan, and the details of such a plan shall be approved by EPA prior to implementation;
- Bayer will notify affected parties (e.g., growers, consultants, extension agents, seed distributors, university cooperators, and state/federal authorities as appropriate) in the region of the resistance situation and approved action plan; and
- In subsequent growing seasons, maintain sales suspension and alternative resistance management strategies in the affected region(s) for the *Bt* corn hybrids that are affected by the resistant population until an EPA-approved local resistance management plan is in place to mitigate the resistance.

A report on results of resistance monitoring and investigations of damage reports must be submitted to EPA, on or before August 31st of each year, for the duration of the registration.

f. Annual Reporting Requirements for MON 89034 corn

The following annual reports must be submitted:

1. Compliance Assurance Plan: Compliance Assurance Program activities, including IRM Grower Survey (only for years in which the survey was conducted) results and on-farm assessment results for the prior year and plans for the compliance assurance program for the current year, on or before January 31st each year.
2. Insect Resistance Monitoring Results (Cry1A.105 and Cry2Ab2 only): Results of monitoring and investigations of damage reports, August 31st of each year.

Should you wish to add/retain a reference to your company's website on your label, then please be aware that the website becomes labeling under FIFRA and is subject to review by the EPA. If the website is false or misleading, the product will be considered to be misbranded and sale or distribution of the product is unlawful under FIFRA section 12(a)(1)(E). 40 CFR § 156.10(a)(5) lists examples of statements the EPA may consider false or misleading. In addition, regardless of whether a website is referenced on your product's label, claims made on the website may not substantially differ from those claims approved through the registration process. Therefore, should the EPA find or if it is brought to our attention that a website contains false or misleading statements or claims substantially differing from the EPA-approved registration, the website will be referred to the EPA's Office of Enforcement and Compliance Assurance.

Your release for shipment of this product constitutes acceptance of these conditions. If you fail to satisfy these terms and conditions, the EPA will consider appropriate regulatory action including, among other things, cancellation under FIFRA section 6(e).

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

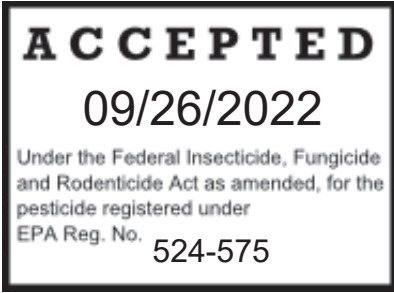
If you have any questions, please contact Matt Weiner of my team via email at weiner.matthew@epa.gov or by phone at (202) 566-1509.

Sincerely,

A handwritten signature in black ink, appearing to read 'Alan Reynolds', written in a cursive style.

Alan Reynolds, Team Leader
Emerging Technologies Branch
Biopesticides and Pollution
Prevention Division (7511M)
Office of Pesticide Programs

Enclosure: Stamped Label



Plant-Incorporated Protectant Label

MON 89034

Lepidopteran-Protected Corn
(OECD Unique Identifier : MON-89034-3)

Active Ingredients:

Bacillus thuringiensis Cry1A.105 protein and the genetic material (Vector PV-ZMIR245)
necessary for its production in MON 89034 (OECD Unique Identifier: MON-89034-3)...
..... ≤ 0.0056%*

Bacillus thuringiensis Cry2Ab2 protein and the genetic material (Vector PV-ZMIR245)
necessary for its production in MON 89034 (OECD Unique Identifier: MON-89034-3)...
..... ≤ 0.0055%*

*Percentage (wt/wt) on a dry weight basis for whole plant (forage)

KEEP OUT OF REACH OF CHILDREN

CAUTION

NET CONTENTS _____

EPA Registration No. 524-575

EPA Establishment No. 524-MO-002

Bayer Crop Science LP
800 North Lindbergh Blvd.
St. Louis, MO 63167

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling. Information regarding commercial production as specified in the terms and conditions of this registration must be included in the Technology Use.

MON 89034 can be used to protect corn plants from leaf, stalk, and ear damage caused by corn borers. In order to minimize the risk of corn borers developing resistance to MON 89034 field corn, an insect resistance management (IRM) plan must be implemented which includes planting of a structured refuge. Growers who fail to comply with the IRM requirements risk losing access to Bayer's corn plant-incorporated protectant (PIP) products.

This PIP may be combined through conventional breeding with other registered plant-incorporated protectants that are similarly approved for use in combination, through conventional breeding, with other registered plant-incorporated protectants to produce inbred corn lines and hybrid corn varieties with combined pesticidal traits.

1) Refuge Requirements for MON 89034 Field Corn

In order to minimize the risk of corn borers developing resistance to MON 89034 field corn, an IRM plan must be implemented which includes planting of a structured refuge.

These refuge requirements do not apply to seed increase/propagation of inbred and hybrid seed corn up to a total of 20,000 acres per county and up to a combined United States (U.S.) total of 250,000 acres per PIP active ingredient per registrant per year. Furthermore, these refuge requirements do not apply to MON 89034 commercial hybrid sweet corn.

a) Corn-Belt/Non-Cotton Growing Area Refuge Requirements

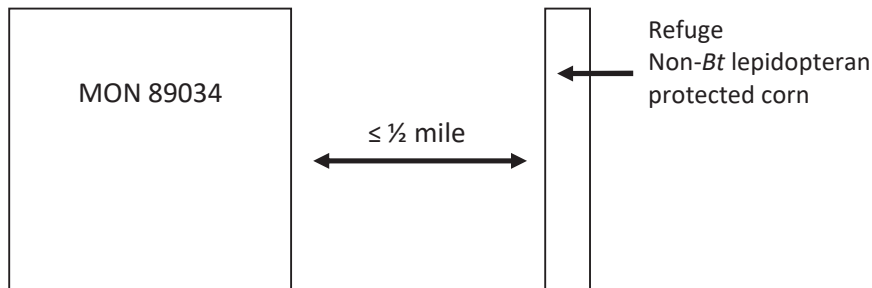
For MON 89034 field corn grown outside cotton-growing areas (e.g., the Corn Belt), grower guides must specify that growers must adhere to the following refuge requirements.

Growers must plant a structured refuge of at least 5% corn, which is not a lepidopteran-protected *B.t.* corn hybrid. The refuge may be treated with insecticides, as detailed below, to control lepidopteran stalk-boring and other pests.

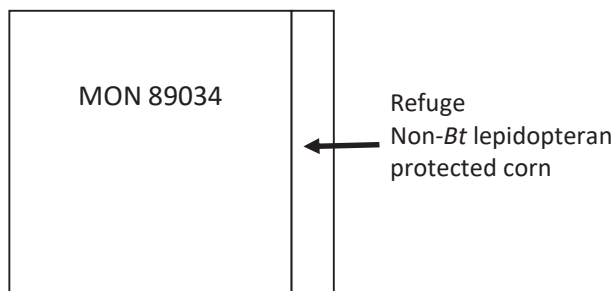
The refuge can be protected from lepidopteran damage by use of non-*B.t.* insecticides if the population of one or more target lepidopteran pests of MON 89034 in the refuge exceeds economic threshold. Economic thresholds will be determined using methods recommended by local or regional professionals (e.g., Extension Service agents or crop consultants). Instructions to growers will specify that microbial *B.t.* insecticides must not be applied to non-*B.t.* corn refuges.

Refuge planting options include : separate fields, blocks within fields (e.g., along the edges or headlands), and strips across the field.

External refuges must be planted within $\frac{1}{2}$ mile. A schematic of one refuge option with the refuge planted within a $\frac{1}{2}$ mile of the MON 89034 field is shown below:



When planting the refuge in strips across the field, refuges must be at least 4 consecutive rows wide.



b) Cotton-Growing Area Refuge Requirements

Cotton-growing areas include the following states: Alabama, Arkansas, Georgia, Florida, Louisiana, North Carolina, Mississippi, South Carolina, Oklahoma (only the counties of Beckham, Caddo, Comanche, Custer, Greer, Harmon, Jackson, Kay, Kiowa, Tillman, Washita), Tennessee (only the counties of Carroll, Chester, Crockett, Dyer, Fayette, Franklin, Gibson, Hardeman, Hardin, Haywood, Lake, Lauderdale, Lincoln, Madison, Obion, Rutherford, Shelby, and Tipton), Texas (except the counties of Carson, Dallam, Hansford, Hartley, Hutchinson, Lipscomb, Moore, Ochiltree, Roberts, and Sherman), Virginia (only the counties of Dinwiddie, Franklin City, Greensville, Isle of Wight, Northampton, Southampton, Suffolk City, Surrey, Sussex), and Missouri (only the counties of Dunklin, New Madrid, Pemiscot, Scott, Stoddard).

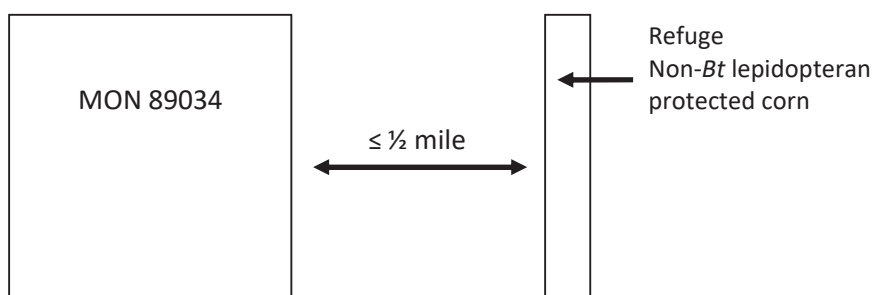
For MON 89034 field corn grown in cotton-growing areas, grower guides must specify that growers must adhere to the following refuge requirements.

Growers must plant a structured refuge of at least 20% corn which is not a lepidopteran-protected *B.t.* corn hybrid. The refuge may be treated with insecticides, as detailed below, to control lepidopteran stalk-boring and other pests.

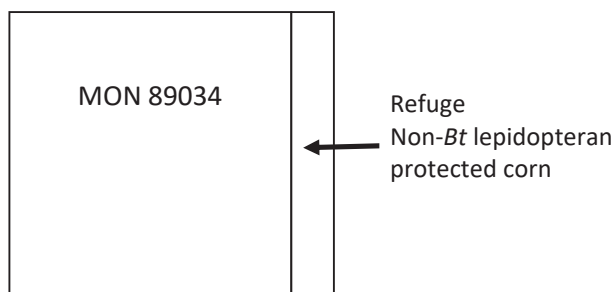
The refuge can be protected from lepidopteran damage by use of non-*B.t.* insecticides if the population of one or more target lepidopteran pests of MON 89034 in the refuge exceeds economic threshold. Economic thresholds will be determined using methods recommended by local or regional professionals (e.g., Extension Service agents, crop consultants). Instructions to growers will specify that microbial *B.t.* insecticides must not be applied to non-*B.t.* corn refuges.

Refuge planting options include: separate fields, blocks within fields (e.g., along the edges or headlands), and strips across the field.

External refuges must be planted within ½ mile. A schematic of one refuge option with the refuge planted within a ½ mile of the MON 89034 field is shown below:



When planting the refuge in strips across the field, refuges must be at least four (4) consecutive rows wide.



2) Post-Harvest Requirements for MON 89034 Sweet Corn

For MON 89034 sweet corn, growers are required to destroy any MON 89034 sweet corn stalks that remain in the field following harvest via rotary mowing, discing, or plow-down within one (1) month of harvest.

Corn Insects Controlled or Suppressed

European corn borer	<i>Ostrinia nubilalis</i>
Southwestern corn borer	<i>Diatraea grandiosella</i>
Southern cornstalk borer	<i>Diatraea crambidoides</i>
Corn earworm	<i>Helicoverpa zea</i>
Fall armyworm	<i>Spodoptera frugiperda</i>
Stalk borer	<i>Papaipema nebris</i>
Lesser corn stalk borer	<i>Elasmopalpus lignosellus</i>
Sugarcane borer	<i>Diatraea saccharalis</i>

Sales of corn hybrids that contain Bayer's *B.t.* corn plant-incorporated protectant must be accompanied by a Grower Guide which includes information on planting, production, and insect resistance management and notes that routine applications of insecticides to control these insects are usually unnecessary when corn containing the *B.t.* proteins is planted.

MON 89034 is a product of Bayer's research program offering unique genetic characteristics for specific grower needs and may be protected by one or more of the following U.S. patents that can be found at <http://www.monsantotechnology.com>