

29964-16

3/27/2014

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

MAR 27 2014

Mr. Jamie Staley
Pioneer Hi-Bred International, Inc.
7100 N.W. 62nd Avenue
P.O. Box 1000
Johnston, Iowa 50131-1000

Subject: Optimum® AcreMax® XTreme
EPA Reg. No. 29964-16
Amendment dated January 21, 2014 to extend expiration date;
Amendment dated September 23, 2013 to revise reporting requirements

Dear Mr. Staley:

The amendments referred to above, submitted in connection with registration under FIFRA Section 3(c)(7)(A) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended, are acceptable subject to the following terms and conditions.

- 1] The subject registration will automatically expire on midnight April 1, 2016.
- 2] The subject registration will be limited to a seed mix of Cry1F [*Bacillus thuringiensis* Cry1F protein and the genetic material (plasmid insert PHI8999A) necessary for its production in corn event OECD Unique Identifier DAS-Ø15Ø7-1] x Cry34Ab1 [*Bacillus thuringiensis* Cry34Ab1 protein and the genetic material (PHP-17662 T-DNA) necessary for its production in corn event OECD Unique Identifier DAS-59122-7] x Cry35Ab1 [*Bacillus thuringiensis* Cry35Ab1 protein and the genetic material (PHP-17662 T-DNA) necessary for its production in corn event OECD Unique Identifier DAS-59122-7] x Cry1Ab [*Bacillus thuringiensis* Cry1Ab protein and the genetic material (vector PV-ZMBKØ7) necessary for its production in corn event OECD Unique Identifier MON ØØ81Ø-6] x mCry3A [*Bacillus thuringiensis* mCry3A protein and the genetic material (via elements of pZM26) necessary for its production in corn event OECD Unique Identifier SYN-IR6Ø4-5] corn seed blended with not less than 5% non-Bt corn seed.
- 3] Submit/cite all data required for registration of your product under FIFRA § 3(c)(5) when the Agency requires registrants of similar products to submit such data.
- 4] Submit or cite all data required to support Optimum® AcreMax® XTreme within the timeframes required by the terms and conditions of EPA Registration Numbers 29964-8 and 29964-11.

CONCURRENCES

SYMBOL	7511P	7511P	7511P					
SURNAME	Schopf	Reynolds	Reynolds					
DATE	3/27/14	3/27/14	3/27/14					

5] In order to improve the strength of modeling, you must address and incorporate the following uncertainties (as described in the 2/15/2012 J. Martinez insect resistance management review) into your ECB and CRW model and into a new CEW model. The ECB data have been submitted and are in review.

CRW & ECB Modeling

- BPPD concludes that the benchmark parameter assumption for IRAF (0.001) should have been set more conservatively based on prior use history for MIR604 and 59122. The SAP (2009) stated in their report that “there was no rigorous evidence in the reported data [of Lefko et al. 2008] that the frequency of major genes of resistance [for 59122] was very low”. Likewise, a more conservative IRAF could have been chosen for worst case assumptions. Typically, lower initial resistance allele frequencies in simulation models have the effect of extending the estimated durability of a product. This would typically increase the estimated durability of pyramids compared to block refuges with single toxins.
- Grower non-compliance with refuge planting was incorporated by Pioneer/DuPont and explored in the sensitivity analysis based on realistic assumptions (0-30%). It was unclear, however, from the applicant’s write-up what the benchmark assumptions were for non-compliance in their block simulations.
- Adult CRW movement has shown to be a sensitive parameter in other models (BPPD 2010b), and greater pre-ovipositional dispersal extended the durability of PIPs planted with block refuges. Pioneer/DuPont’s latest modeling submission incorporated a small degree of CRW pre-ovipositional dispersal of 5% although there is evidence for this percentage to possibly be as high as 25%. A sensitivity analysis for this parameter in applicant’s submission would have been informative and provided a comparison to other CRW modeling conducted in the past.
- The applicant modeled adult ‘cell-to-cell’ movement in their model in such a fashion that adults leaving a cell were replaced by the same number of adults of the same genotype from neighboring cells. Adult movement of this type should be equivalent to ‘no gene flow’ occurring between cells because genotypic frequencies never change based on adult movement. The power of dispersal (or gene flow) in nature is that it can change allelic/genotypic frequencies in different subpopulations or populations (or introduce rare alleles) and therefore, lead to differentiation (or homogenization) between different subpopulations. If dispersal is modeled so that equal genotypes and numbers of individuals are replaced between different cells in the model, no genetic changes are occurring in space based on dispersal alone in the 100 years modeled. A resistant gene cannot spread in such a system but would have to evolve independently in each cell of the landscape. Such a scenario seems very unrealistic here. It is unclear by how much this approach of modeling adult dispersal lowered the durability estimates for block refuges; however, it has been demonstrated that greater adult CRW dispersal tends to favor block refuges over seed blends (BPPD 2010b). The applicant could improve this part of their model by incorporating a frequency based probability of dispersal for each genotype.
- The applicant conducted an extensive sensitivity analysis for parameters deemed important (*i.e.* having a strong effect on product durability). In this analysis, grower non-compliance with refuge planting affected the durability of the blocks and the rate of resistance evolution only slightly. BPPD notes that this result was somewhat surprising. Non-compliance has been shown to be a highly sensitive and significant parameter in block refuge simulations conducted with other models (BPPD 2010a).
- Other corn PIPs expressing Cry1Ab and two Bt cotton PIPs expressing Cry1Ac (Bollgard II) and Cry1F (WideStrike) were not included in the landscape. The model should incorporate a mosaic of single and pyramided PIP cotton and corn to more accurately represent the current Bt landscape in cotton growing regions.
- In Pioneer/DuPont’s model, CEW larval movement rates ranged from 0 (best case assumption) to 0.5 (worst case assumption) with the greater value representing their most conservative assumption for immature movement. The public literature indicates, however, that CEW move greatly between non-Bt hosts and are more likely to leave a transgenic plant than non-Bt plant (Gould 1998; Men et al. 2004; Gore et al. 2002). For example, Men et al.

(2004) showed that the frequency of interplant movement of 4th instar larvae on Bt cotton increased by 37.1% compared to larvae that were on non-Bt plants and demonstrated that larval movement was not independent of plant type. BPPD notes in light of these studies documenting extensive larval movement of *Heliothines* that a movement rate of 0.5 is not sufficient to explore effects of CEW larval movement on the durability of TC1507 x MON810.

- Pioneer/DuPont modeled larval movement rate independent of genotype. Prasifka et al. (2010) showed that resistant genotypes of another Lepidopteran pest of corn, (neonate) ECB, moved less and increased their localized search behavior while susceptible genotypes moved more (distance and % time) and decreased their localized search behavior when placed on Cry1Ab diet. BPPD notes that the applicant's assumption that movement is independent of genotype may not be realistic and could overestimate the durability of the seed blend.

CEW Modeling

- CEW can have up to six generations per year in the southern U.S., yet Pioneer/DuPont modeled only two generations on corn and neglected to include the remaining four generations of which the latter two feed on cotton. Using Pioneer/DuPont's model structures, limited analysis, and assumptions, their worst case scenario for product durability should not be much lower if they had considered more CEW generations per year.
- CEW will encounter a mosaic of *Bt* expression in kernels of refuge corn ear as well as in *Bt* corn ear. Seed blends containing *Bt* and non-*Bt* seeds may actually accelerate resistance in ear feeding Lepidoptera including corn earworm and fall armyworm. *Bt* ingestion has shown to promote wandering in larvae, and individuals that receive a sub-lethal dose may move to another kernel. Horner et al. 2003 evaluated feeding patterns of CEW in MON810 and non-*Bt* maize and determined that larvae had greater movement on *Bt* ears and essentially sampled kernels at greater frequency, than their counterparts who fed exclusively and in a more compact fashion on non-*Bt* corn ears. This ability to move to another source of kernel in this mosaic of toxins (lethal vs. sublethal) and non-toxin environment will give heterozygous individuals a great fitness advantage; the functional dominance of the resistance allele will increase (Porter 2011, personal communication).
- Horner and Dively (2003) found that CEW exposed to Cry1Ab had reduced cannibalistic behavior which, they hypothesize, could "result in partially resistant larvae feeding on nontoxic food [their fellow intoxicated larvae], thus temporarily providing escape from exposure to the *Bt* endotoxin". They further concluded that this change in behavior could serve as a mechanism to increase the selective differential between susceptible and resistant CEW and essentially lead to greater resistance evolution.
- CEW development on *Bt* corn is delayed (Sims et al. 1996, Storer et al. 2001). This could enable a fraction of adult CEW to mate with CEW emerging from *Bt* cotton. Discretely breeding populations could become continuously breeding for part of the year in this scenario. This may be an important aspect to incorporate into IRM models of the south where corn and cotton are host plants of the same pest. Theoretical explorations are needed to assess effects of this delayed development on corn on the resistance evolution in CEW.

6] Pioneer must continue to implement and enhance the Insect Resistance Management Program consisting of the following elements:

Requirements relating to a refuge assurance program for ensuring the correct refuge blend percentage.

Requirements relating to creation of a lepidopteran refuge (consisting of corn that does not contain any *Bt* trait for lepidopteran control) in cotton growing regions in conjunction with the planting of any acreage of Optimum® AcreMax® XTreme corn;

Requirements for Pioneer to prepare and require Optimum® AcreMax® XTreme corn users to sign "grower agreements," that impose binding contractual obligation on the grower to comply with the refuge requirements in cotton growing regions;

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Requirements regarding programs to educate growers about IRM requirements for seed blends;

Requirements regarding programs to evaluate and promote growers' compliance with IRM requirements;

Requirements regarding monitoring programs to evaluate whether there are statistically significant and biologically relevant changes in target insect susceptibility to Cry1F, Cry1Ab, mCry3A and Cry34Ab1/Cry35Ab1 proteins in the target insects;

Requirements regarding a "remedial action plan," that contains measures Pioneer would take in the event that any field-relevant insect resistance was detected as well as to report on activity under the plan to EPA;

Requirements for Pioneer 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. The registrant is required to submit reports within three months of the Agency's request;

Requirements for Pioneer, on or before August 31st of each year (beginning in 2014), to submit reports on resistance monitoring.

Bag Tag Requirements for Optimum® AcreMax® XTreme:

Seed bags and/or bag tags for corn hybrids that contain plant-incorporated protectants produced in Optimum® AcreMax® XTreme must display the registration number and active ingredients, and stipulate that growers read the Pioneer Stewardship Guide (or equivalent guidance) prior to planting these hybrids and remind growers for Optimum® AcreMax® XTreme products require a separate 20% lepidopteran refuge in cotton-growing areas. The refuge size requirement in cotton-growing areas must be displayed on the bag or bag tag in both text and graphic format.

a) Refuge requirements for Optimum® AcreMax® XTreme

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

Corn-Belt/Non-Cotton Growing Areas

Optimum® AcreMax® XTreme contains a Lepidopteran and corn rootworm refuge that is "in the bag" and is automatically implemented when the grower plants the product. No additional refuge is required when planting this product.

Foliar insecticide treatments for control of European corn borer, corn earworm, southwestern corn borer, fall armyworm, black cutworm, western bean cutworm, lesser corn stalk borer, southern corn stalk borer, stalk borer and sugarcane borer may be applied only if economic thresholds are reached for one or more of these target pests. Foliar insecticide treatments are also permitted for control of corn rootworm adults if economic thresholds are reached. Economic thresholds will be determined using methods recommended by local or regional professionals (e.g., Extension Service agents, crop consultants).

Cotton-Growing Region Refuge Requirements

In cotton-growing regions where corn earworm is a significant pest:

- The 20% refuge must be planted with non-*Bt* corn hybrids.
- Optimum® AcreMax® XTreme and the 20% non-*Bt* refuge should be sown on the same day, or with the shortest window possible between planting dates
- External refuges may be planted as an in-field or adjacent (e.g., across the road) refuge or as a separate block within 1/2 mile of the Optimum® AcreMax® XTreme corn field.
- In field refuge options include: blocks, perimeter strips (i.e., along the edges or headlands), or in-field strips.
- When planting the refuge in strips across the field, refuges must be at least four (4) rows wide.
- Insecticide treatments for control of European corn borer, corn earworm, southwestern corn borer, fall armyworm, black cutworm, western bean cutworm, lesser corn stalk borer, southern corn stalk borer, stalk borer and sugarcane borer may be applied only if economic thresholds are reached for one or more of these target pests. Economic thresholds will be determined using methods recommended by local or regional professionals (e.g., Extension Service agents, crop consultants). Microbial *Bt* insecticides must not be applied to non-*Bt* corn refuge plants.
- 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, Ochilree, Roberts, and Sherman), Virginia (only the counties of Dinwiddie, Franklin City, Greenville, Isle of Wight, Northampton, Southampton, Suffolk City, Surrey, Sussex) and Missouri (only the counties of Dunklin, New Madrid, Pemiscot, Scott, Stoddard).

When on-farm assessments identify non-compliance with refuge requirements for one or more *Bt* corn products, additional educational material and assistance are provided by Pioneer to help these growers meet the refuge requirements across their farming operations.

b) Grower Agreement for Optimum® AcreMax® XTreme Corn

1. Persons purchasing Optimum® AcreMax® XTreme corn must sign grower agreement(s). 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. Pioneer must continue to implement and enhance the current system for Pioneer *Bt* corn products, which is reasonably likely to assure that persons purchasing Optimum® AcreMax®

XTreme corn will affirm annually that they are contractually bound to comply with the requirements of the IRM program.

4. Pioneer must continue to use a grower agreement for Optimum® AcreMax® XTreme corn. If Pioneer 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, 30 days prior to implementing a proposed change, Pioneer must submit to EPA the text of such changes to ensure it is consistent with the terms and conditions of this registration.
5. Pioneer shall maintain records of all Optimum® AcreMax® XTreme corn grower agreements for a period of three years from December 31st of the year in which the agreement was signed.
6. Pioneer shall make available to the Agency upon request records of the number of units of Optimum® AcreMax® XTreme 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. Pioneer is required to submit reports within three months of the Agency's request.
7. Pioneer 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 number, will be protected.

c) IRM Education and IRM Compliance Monitoring Program for Optimum® AcreMax® XTreme Corn in EPA-designated cotton counties

1. Pioneer must continue to implement and enhance (as set forth in paragraph 17 of this section a comprehensive, ongoing IRM education program designed to convey to Optimum® AcreMax® Xtreme corn users the importance of complying with the IRM program, as well as seed blend product performance expectations and guidance to growers on actions to take when unexpected damage occurs.. The program shall include information encouraging to Optimum® AcreMax® Xtreme corn users to pursue optional elements of the IRM program relating to refuge configuration and proximity to to Optimum® AcreMax® Xtreme 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. Copies of the materials will be provided to EPA for their records. The program shall involve at least one written communication annually to each Optimum® AcreMax® Xtreme corn user separate from the grower technical guide. The communication shall inform the user of the current IRM requirements and specifically the need to plant a lepidopteran refuge in cotton growing regions. Pioneer 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. Annually, Pioneer 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, Pioneer 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). Pioneer 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. Pioneer must continue to implement and improve an ongoing IRM compliance assurance program designed to evaluate the extent to which growers purchasing Optimum® AcreMax® Xtreme corn are compliant with the requirement of a 20% refuge for lepidopteran pests in cotton growing areas, 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 Pioneer's *Bt* corn products. Pioneer 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. Pioneer must continue to 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, Pioneer must use a consistent set of standards for responding to non-compliance. An individual grower found to be significantly out of compliance two (2) years in a row would be denied access the next year to Pioneer'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 Optimum® AcreMax® Xtreme corn who plant the vast majority of all corn in the United States and in areas in which the selection intensity is greatest. The survey shall consider only those growers who plant 200 or more acres of corn in the Corn Belt and who plant 100 or more acres of corn in corn-cotton areas. The survey shall measure the degree of compliance with the IRM program by growers in different regions of the country and consider the potential impact of non-response. The sample size and geographical resolution may be adjusted annually, based upon input from independent marketing research firms and academic scientists, to allow analysis of compliance behavior within regions or between regions. The sample size must provide a reasonable sensitivity for comparing results across the United States.
 - i. 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. Pioneer shall provide a final written summary of the results of the prior year's survey (together with a description of the regions, the methodology used, and the supporting data) to EPA on or before January 31st of each year. Pioneer shall confer with other registrants and EPA on the design and content of the survey prior to its implementation.
10. Annually, Pioneer 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. Pioneer must confer with EPA prior to adopting any changes.
11. Pioneer shall continue to conduct and enhance an annual on-farm assessment program. Pioneer shall train its representatives who make on-farm visits with Optimum® AcreMax® Xtreme 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, Pioneer shall take appropriate action, consistent with its phased compliance approach, to promote compliance.
12. Pioneer shall continue to implement a program for investigating legitimate tips and complaints that Optimum® AcreMax® Xtreme 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, Pioneer shall take appropriate action, consistent with its phased compliance approach.
13. If a grower, who purchases Optimum® AcreMax® corn for planting, was specifically identified as not being in compliance during the previous year, Pioneer 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 31 each year, Pioneer must provide a report to EPA summarizing the Optimum® Acremax® Xtreme compliance assurance program activities and results for the prior year and plans for the Optimum® Acremax® Xtreme 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. Pioneer may elect to coordinate information with other registrants and report collectively the results of compliance assurance programs.
15. Pioneer and the seed corn dealers for Pioneer 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. Pioneer shall revise and expand its existing Compliance Assurance Program to include the following elements. Pioneer must prepare and submit a written description of its revised Compliance Assurance Program. The registrant may coordinate with other registrants in

designing and implementing its Compliance Assurance Program. This CAP Report has been submitted.

17. Pioneer will enhance the refuge education program throughout the seed delivery channel:

- i. 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;
- ii. Continue to implement a "bag tag" that will be attached to all bags of Optimum® Acremax® Xtreme seed sold and delivered. The purpose of this bag tag is to remind growers that Optimum® Acremax® Xtreme products require a separate 20% lepidopteran refuge in cotton growing areas. The PIP product label accepted by EPA must include how this information will be conveyed to growers via text and graphics.

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

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

19. Pioneer will use its available Optimum® Acremax® Xtreme sales records and other information to refine grower lists for on-farm assessments of their compliance with refuge requirement:

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

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

- i. 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. Pioneer will annually refine the on-farm assessment program for Optimum® Acremax® Xtreme corn product to reflect the adoption rate and level of refuge compliance for the product.

22. Pioneer 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:

- i. 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 the registrant, seed supplier, or third party assessor, after completing the assessment process;
- ii. The registrant 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;

iii. 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 to Pioneer Hi-Bred's *Bt* corn products the next year. 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.

d) Insect Resistance Monitoring and Remedial Action Plan for Optimum® AcreMax® XTreme Corn

EPA is imposing the following conditions for the CryIF and CryIAb toxins expressed in Optimum AcreMax XTreme corn:

Pioneer will monitor for resistance to its lepidopteran-resistant *Bt* 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.

(1) Focused Population Sampling

The registrant shall annually sample and bioassay populations of the key target pests *Ostrinia nubilalis* (European corn borer; ECB), *Diatraea grandiosella* (Southwestern corn borer; S WCB), 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 lepidopteran resistant *Bt* corn and/or changes in resistance allele frequency in response to the use of *Bt* 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 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 populations. For CEW, the target will be a minimum of 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 lepidopteran-resistant *Bt* corn. The Agency shall be consulted prior to the implementation of such modifications.

The registrant will report to the Agency before August 31 each year the results of the population sampling and bioassay monitoring program.

Any incidence of unusually low sensitivity to the *Bt* protein 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 the Agency annually before August 31. The investigative steps will include:

1. 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.
2. 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 *Bt* corn hybrids under field conditions. If progeny do not survive to adulthood, any suspected resistance is not field relevant and no further action is required.
3. If insects survive steps 1 and 2, resistance is confirmed, and further steps will be taken to evaluate the resistance. These steps may include:
 - determining the nature of the resistance (*i.e.*, recessive or dominant, and the level of functional dominance);
 - estimating the resistance-allele frequency in the original population;
 - 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;
 - 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, the registrant will consult with the Agency to develop and implement a case-specific resistance management action plan.

(2) Investigation of Reports of Unexpected Levels of Damage by the Target Pests:

The registrant will follow up on grower, extension specialist or consultant reports of unexpected levels of damage by the lepidopteran pests listed on the pesticide label. The registrant will instruct its customers to contact them if such incidents occur. The registrant 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), the registrant 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.

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

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

- Use alternative control measures in the *Bt* corn fields in the affected region to control the target pest during the immediate growing season.
- Destroy *Bt* corn crop residues in the affected region within one 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 residue, the registrant 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.

(3) 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 the registrant:

- 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;
- The registrant will develop a case-specific resistance management action plan within 90 days according to the characteristics of the resistance event and local agronomic needs. The registrant 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;
- 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 the Agency annually by August 31st each year for the duration of the conditional registration.

EPA is imposing the following conditions for the mCry3A and Cry34Ab1 and Cry35Ab1 toxins expressed in Optimum AcreMax XTreme:

In addition to the existing two-pronged approach to insect resistance monitoring (monitoring insect populations using the diet bioassay and investigations of field reports) that are required for Cry34/35 for Herculex Rootworm Insect Protection (29964-4) and Herculex XTRA Insect Protection (29964-5), Pioneer must also conduct enhanced monitoring using the Sublethal Seedling Assay as a complement to the diet bioassay method.

Within one year of this registration, you must submit an enhanced rootworm resistance monitoring plan for 1507 x 59122 x MON810 x MIR604 that accounts for reports of suspected and/or confirmed resistance. The rootworm resistance monitoring plan and the revised definitions for suspected and confirmed resistance for 1507 x 59122 x MON810 x MIR604 must be found acceptable to BPPD and utilized by Pioneer beginning in the 2013 season. This enhanced monitoring program should:

- Be practical and adaptable and provide information on relevant changes in corn rootworm population sensitivity to 1507 x 59122 x MON810 x MIR604;
- Be focused on areas where the potential for resistance is greatest for 1507 x 59122 x MON810 x MIR604 and for the corn rootworm active single event components of 1507 x 59122 x MON810 x

MIR604 (mCry3A and Cry34Ab1/Cry35Ab1), based on available information on historical pest pressure, unexpected performance issues, historical suspected and/or confirmed resistance incidents as currently defined or as modified in EPA accepted enhanced monitoring programs, prevailing agronomic practices (e.g. crop rotation versus continuous corn), and academic and extension publications on Bt corn field performance;

- Involve coordination to the extent possible with other stakeholders, such as academic and extension experts in the states where corn rootworm is a major pest, and other registrants of similar products, as appropriate;
- Be responsive to incidents of suspected or confirmed resistance to the registrant's other products containing the same active ingredient(s), as well as to publicly available reports of suspected or confirmed resistance to other *Bt* protein toxins in 1507 x 59122 x MON810 x MIR604.

e) Remedial Action Plan for Corn Rootworm and Optimum® Acremax® Xtreme Corn

By October 1, 2014, Pioneer must submit an enhanced remedial action plan for Optimum® Acremax® Xtreme corn that includes actions to be taken in response to both suspected and confirmed resistance. This remedial action plan must include a description of steps to be taken in response to customer product performance inquiries and annual reporting to the agency on the outcomes of investigations into any such inquiries that might indicate potential resistance. The program must include revised definitions of unexpected damage to Optimum® Acremax® Xtreme Corn that could indicate potential suspected resistance. The enhanced remedial action plan must be found acceptable to BPPD utilized by Pioneer beginning in the 2013 season.

The remedial action plan is designed as a tiered approach for mitigating western and northern corn rootworm resistance development specifically due to the commercialization of Optimum® Acremax® Xtreme corn. The following program summary describes, in order of events, the steps that must be taken to implement a remedial action plan if resistance to target pests is confirmed.

1. Suspected Resistance from Population Monitoring

Definition of Suspected Resistance - Resistance will be suspected if investigations of target pest injury potential to Optimum® Acremax® Xtreme maize from the Sublethal Seedling Assay show that:

- Injury potential of a target pest population obtained as part of the annual insect monitoring program has increased to a level representative of product failure in field conditions;
- The seeds used in the investigation of this population's injury potential contain Cry34/Cry35Ab1 and mCry3A at levels representative of (and in the same genetic background as) the benchmark study; and
- The change in injury potential has been documented as a heritable characteristic of the target pest population and not a result of experimental error.

If resistance is "suspected", Pioneer will inform growers in the area of the potential benefit of augmenting CRW control such as adulticide treatment and/or crop rotation or use of soil or seed-applied insecticides at rates providing corn rootworm control the following year. These measures are intended to educate growers of the potential for change in efficacy, reduce the possibility of grower loss from change in efficacy and reduce potentially resistant insects contributing to the following year's pest population.

2. Confirmed Resistance from Population Monitoring

Definition of Confirmed Resistance - Resistance will be confirmed if all of the following criteria are met by progeny from a subsequent rootworm population collected from the area of "suspected resistance" the following year:

- Injury potential of the subsequent field-collected rootworm population feeding on
- plants containing Cry34/Cry35Ab1 and mCry3A remains at a level likely to produce repeated product failure in field conditions;
- The change in injury potential has been documented as a heritable characteristic of the target pest population;
- Greenhouse node-injury evaluation confirms product failure;
- Subsequent populations collected from the area and assayed show that the results are repeatable; and
- Continued monitoring of the area suggests that the change is spreading.

3. Suspected Resistance – Investigation of Field Reports

Pioneer will follow up on grower, extension specialist or consultant reports of unexpected product performance due to corn rootworm species listed on the label. Pioneer will instruct its customers to contact them if such incidents occur. Pioneer will investigate all such reports submitted to the company or the company's representatives.

- Confirm the corn in question is rootworm-active *Bt* corn;
- Confirm the field in question contains the correct blend rate of refuge corn;
- Confirm that species not susceptible to the protein are not responsible for the damage, that no climatic or cultural reasons could be responsible for the damage, and that all other reasonable causes based on historical experience for the observed root damage have been ruled out;
- If not due to other reasons, the registrant will conduct a thorough investigation of the factors known to affect the manifestation of corn rootworm feeding damage.

The Agency recognizes that large corn rootworm populations, environmental conditions, and protein expression levels can influence corn root damage and may affect the definition of suspected CRW resistance. The Agency plans to work with the registrants to refine the definition of suspected resistance based on these factors. Until such time that the Agency accepts a modified definition of suspected resistance to corn rootworm, resistance will be suspected in cases where the average root damage in the 1507 x 59122 x MON810 x MIR604 field is > 0.5 on the nodal injury scale (NIS) and the frequency of 1507 x 59122 x MON810 x MIR604 with > 0.5 nodes destroyed exceeds 50% of the sampled plants.

If resistance is "suspected", Pioneer will inform growers in the area of the potential benefit of augmenting CRW control such as adulticide treatment, crop rotation the following year or use of soil or seed insecticides the following year. These measures are intended to educate growers of the potential for change in efficacy, reduce

the possibility of grower loss from change in efficacy and reduce potentially resistant insects contributing to the following year's pest population.

Pioneer will collect insects as soon as possible from the area for laboratory studies to test for resistance by comparing with benchmark susceptibility data. These studies will be performed following the same laboratory protocols as used for the benchmark determination and monitoring programs.

4. Confirmed Resistance – Investigation of Field Reports

- Injury potential of the field-collected rootworm population feeding on plants containing Cry34/Cry35Ab1 and mCry3A remains at a level likely to produce repeated product failure in field conditions;
- Subsequent populations collected from the area and assayed show that the results are repeatable;
- The change in injury potential has been documented as a heritable characteristic of the target pest population;
- Greenhouse node-injury evaluation confirms product failure; and
- Continued monitoring of the area suggests that the change is spreading.

5. Remedial Action

When resistance is "confirmed", the following steps will be taken:

- The EPA will receive notification within 30 days of confirmed resistance;
- Affected customers and Extension specialists will be immediately notified about confirmed resistance;
- Affected customers and Extension specialists will be strongly encouraged to implement alternative CRW control measures such as adulticide treatment, crop rotation the following year, or use of soil or seed insecticides the following year;
- Sale and distribution of Optimum® AcreMax® XTreme in the affected area will cease immediately until an effective mitigation plan has been approved by EPA.

f) Remedial Action Plan for lepidopteran pests and Optimum® AcreMax® XTreme Corn

When field resistance is confirmed (as previously defined), the following steps will be taken by the registrant:

- 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

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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;
- The registrant will develop a case-specific resistance management action plan within 90 days according to the characteristics of the resistance event and local agronomic needs. The registrant 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;
- 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 the Agency annually by August 31st each year for the duration of the conditional registration.

g) Refuge Assurance Program for Optimum® AcreMax® XTreme Corn

Pioneer must implement a Blended Seed Refuge Assurance Program designed to ensure Optimum® Acremax® Xtreme products are formulated with the appropriate rate of refuge seeds. The program must include the following four elements:

1. Trait purity check on seed lots prior to blending;
 2. ISO 9000 Standard Operating Procedures for the blending process;
 3. Calibration of blending equipment; and
 4. Records and data retention records for seed blend products.
- Calibration records - Pioneer will retain documentation for a specified period of time on the equipment calibration including the procedure, when it was conducted and the results.
 - Blend proportion records (weight and kernel based) - Pioneer will retain documentation for a specified period of time on the kernel per pound data of the components, the calculations to determine the proportions based on weight and the actual weights that are blended together to make up an Optimum® AcreMax® XTreme corn product by seed lot.

All records must be maintained at the Pioneer blending facility and must be available for the EPA review upon request.

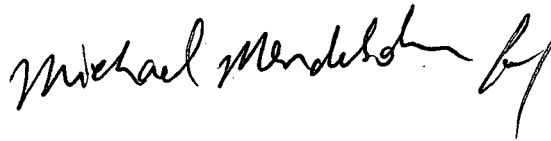
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h) Annual Reporting Requirements for Optimum® AcreMax® XTreme Corn

1. Compliance Assurance Program: Compliance Assurance Program activities, including IRM Grower Survey 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: results of monitoring and investigations of damage reports, August 31st each year.

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

Sincerely,



Kimberly Nesci, Chief
Microbial Pesticides Branch
Biopesticides and Pollution Prevention Division (7511P)

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Optimum[®] AcreMax[®] XTreme

(OECD Unique Identifier: DAS-Ø15Ø7-1xDAS-59122-7x MON-ØØ81Ø-6x SYN-IR6Ø4-5)

Active Ingredients

- Bacillus thuringiensis* Cry1F protein and the genetic material (plasmid insert PHI8999A) necessary for its production in corn event DAS-Ø15Ø7-1 ≤0.0018%*
- Bacillus thuringiensis* Cry34Ab1 protein and the genetic material (PHP17662 T-DNA) necessary for its production in corn event DAS-59122-7 ≤0.0082%*
- Bacillus thuringiensis* Cry35Ab1 protein and the genetic material (PHP17662 T-DNA) necessary for its production in corn event DAS-59122-7 ≤0.0060%*
- Bacillus thuringiensis* Cry1Ab protein and the genetic material (vector PV-ZMBK07) necessary for its production in corn event MON-ØØ81Ø-6 ≤0.0011%*
- Bacillus thuringiensis* mCry3A protein and the genetic material (via elements of pZM26) necessary for its production in corn event SYN-IR6Ø4-5 ≤0.0018%*

Inert Ingredients

- Phosphinothricin acetyltransferase (PAT) protein and the genetic material (plasmid insert PHI8999A and PHP17662 T-DNA) necessary for its production in corn events DAS-Ø15Ø7-1 and DAS-59122-7 ≤0.0024%*
- Phosphomannose isomerase (PMI) protein and the genetic material (via elements of pZM26) necessary for its production in corn event SYN-IR6Ø4-5 ≤0.00084%*

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

KEEP OUT OF REACH OF CHILDREN

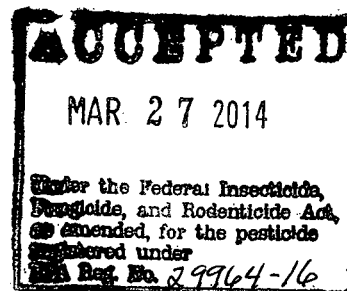
CAUTION

NET CONTENTS _____

EPA REGISTRATION NUMBER: 29964-16

EPA ESTABLISHMENT NUMBER: 029964-IA-001

Pioneer Hi-Bred International, Inc.
7300 NW 62nd Avenue
Johnston, IA 50131



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DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

The plant-incorporated protectant must be used as specified in the terms and conditions of the registration.

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.

Optimum[®] AcreMax[®] XTreme (AMXT) consists of 95% 1507x59122xMON810xMIR604 and 5% non-*Bt* seed blended together in a bag of seed. This product controls above- and below-ground pests of maize, and the blended non-*Bt* plants provide refuge for both lepidopteran and corn rootworm pests.

INSECT RESISTANCE MANAGEMENT

Growers are instructed to read information on insect resistance management.

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 plant-incorporated protectant active ingredient per registrant per year.

The following information regarding commercial production must be included in the grower guides for cotton and non-cotton growing areas:

Corn seed bags or bag tags for products containing AMXT must include the refuge size requirement in text and graphical format.

A. Non-Cotton Growing Areas

AMXT contains a lepidopteran and corn rootworm refuge that is "in the bag" and is automatically implemented when the grower plants the product. No additional refuge is required when planting this product where corn earworm is not a significant pest. An external 20% lepidopteran refuge is required in cotton-growing regions where corn earworm is a significant pest.

Foliar insecticide treatments for control of European corn borer, corn earworm, southwestern corn borer, fall armyworm, black cutworm, western bean cutworm, lesser corn stalk borer, southern corn stalk borer, and sugarcane borer may be applied only if economic thresholds are reached for one or more of these target pests. Foliar insecticide treatments are also permitted for control of corn rootworm adults if economic thresholds are reached. Economic thresholds will be determined using methods recommended by local or regional professionals (e.g. Extension Service agents, crop consultants).

B. Cotton-Growing Region Refuge Requirements

In cotton-growing regions where corn earworm is a significant pest:

- An additional 20% structured refuge must be planted with non-*Bt* corn hybrids.
- AMXT and the 20% non-*Bt* refuge should be sown on the same day, or with the shortest window possible between planting dates.

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- External refuges may be planted as an in-field or adjacent (e.g., across the road) refuge or as a separate block within 1/2 mile of the AMXT corn field(s).
- In field refuge options include: blocks, perimeter strips (i.e., along the edges or headlands), or in-field strips.
- When planting the refuge in strips across the field, refuges must be at least four (4) rows wide.
- Insecticide treatments for control of European corn borer, corn earworm, southwestern corn borer, fall armyworm, black cutworm, western bean cutworm, lesser corn stalk borer, southern corn stalk borer, and sugarcane borer may be applied only if economic thresholds are reached for one or more of these target pests. In addition, the refuge can be protected from CRW damage by an appropriate seed treatment or soil insecticide; however, insecticides labeled for adult CRW control must be avoided in the refuge during the period of CRW adult emergence. Economic thresholds will be determined using methods recommended by local or regional professionals (e.g., Extension Service agents, crop consultants). Microbial *Bt* insecticides must not be applied to non-*Bt* corn refuge plants.
- 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).

Use Pattern

Crop	Pests
Field corn	black cutworm corn earworm European corn borer fall armyworm lesser corn stalk borer southern corn stalk borer southwestern corn borer sugarcane borer stalk borer western bean cutworm western corn rootworm northern corn rootworm Mexican corn rootworm