Consumer Product Safety

Re-evaluation Note REV2016-03, Value Assessment of Corn and Soybean Seed Treatment Use of Clothianidin, Imidacloprid and Thiamethoxam

Pest Management Regulatory Agency
6 January 2015
ISSN: 1925-0649 (PDF version)
Catalogue number: H113-5/2016-3E-PDF (PDF version)

This page is a summary of the consultation document. If you would like to comment, please request the full consultation document.

To obtain a full copy of Re-evaluation Note REV2016-03, *Value Assessment of Corn and Soybean Seed Treatment Use of Clothianidin, Imidacloprid and Thiamethoxam* please contact our publications office.

Should you require further information please contact the Pest Management Information Service

Executive Summary

The purpose of this document is to present the current value assessment of neonicotinoid corn and soybean seed treatment use in Canada and to seek additional information for consideration in the re-evaluation. This additional information would help clarify the situations in which neonicotinoid corn and soybean seed treatments are needed by Canadian growers.

A value assessment is normally conducted as a part of the overall assessment of any pesticide under re-evaluation. All pest control products, which are regulated under the*Pest Control Products Act*, are required to have value; in other words, they have an actual or potential contribution to pest management. The assessment is typically used to confirm how a product is currently being used and to determine its contribution to pest management. This value assessment has been conducted as a part of the Re-evaluation of the Neonicotinoid Insecticides, which is being carried out in close collaboration with the United States Environmental Protection Agency (USEPA), and examines how these pesticides assist agricultural practices as well as the economic benefits of neonicotinoid seed treatments on corn and soybean production in the current Canadian agricultural environment. There was very little reported use of imidacloprid on corn and soybean in Canada prior to 2013. As a result this value discussion focuses on clothianidin and thiamethoxam.

With respect to agricultural practice, it was found that clothianidin and thiamethoxam seed treatments contribute to insect pest management in agriculture in Canada. For example, neonicotinoid seed treatments control important pests and have replaced some older pesticides that were phased out due to health and environmental risk concerns. Neonicotinoid seed treatments also complement current crop production practices such as the use of reduced tillage or no-till and earlier planting for corn and soybean.

The economic benefit of neonicotinoid seed treatments to the Canadian corn and soybean industries depends in part on whether pest pressures are at a level that warrants the use of treated seeds and whether the economic return exceeds the cost associated with their use. However, identifying pest pressure poses considerable challenges for growers.

Using currently available quantitative and qualitative information collected from a variety of sources, neonicotinoid seed treatments are estimated to be of economic benefit to the Canadian corn industry with benefits varying by province. They are estimated to be of economic benefit to the Canadian crushing soybean industry in Manitoba and Ontario and to the Ontario Identity Preserved (IP) and food grade soybean industry in particular. It is apparent that at the farm level, the need for the use of an insecticide seed treatment on corn and soybean is highly dependent on local pest pressure and the value of these seed treatments could be substantial for affected growers.

Health Canada's Pest Management Regulatory Agency (PMRA) acknowledges that a variety of models exist to estimate the value of neonicotinoid seed

treatment use on corn and soybeans and that various assumptions are used by each model, which may lead to a wide range of conclusions.

Health Canada's PMRA used provincial surveys, information from registrants, professional agronomists, AgInfomatics and the Conference Board of Canada along with a number of assumptions in preparing its value assessment of the economic benefits derived from neonicotinoids. Health Canada's PMRA is now seeking additional information to validate these assumptions and finalize the value assessment.

Overview

As part of the Re-evaluation of the Neonicotinoid Insecticides, Health Canada's PMRA has conducted an assessment of the value of clothianidin, imidacloprid and thiamethoxam when used to treat corn and soybean seed.

At the time of the initial registration over ten years ago, value (based primarily on efficacy and effect on host organisms) was demonstrated to be acceptable. In light of the linkages between bee incidents and the planting of neonicotinoid-treated corn and soybean seeds, and in order to understand the current context of neonicotinoid use, this value assessment includes the agronomic benefits which address the contribution of neonicotinoids to insect pest management practices, and the economic benefit of neonicotinoid seed treatments on corn and soybean production in the current Canadian agricultural environment.

As of 2013, virtually all field corn planted in Canada was treated with either thiamethoxam or clothianidin and greater than half the soybean seeds planted in Canada were treated with thiamethoxam. There is very little reported use of imidacloprid on corn or soybean seed in Canada. As a result this value discussion focuses on clothianidin and thiamethoxam.

The value assessment includes an analysis of the contribution of neonicotinoid seed treatments to insect pest management under current crop production practices and estimates the direct economic benefits to the corn and soybean industries in Canada. The value assessment is based on information provided by provincial governments, Canadian grower associations, professional agronomists, registrants and other stakeholders, as well as proprietary use information, published scientific journal articles and considers published reports by the Conference Board of Canada, AgInfomatics and the USEPA. These information sources are variable in nature and the reports have used different types of information including

sometimes unique assumptions. The PMRA's economic estimates are at the industry level (in other words, the aggregate farm gate value) rather than individual farm level and are based upon currently available information. As a result, they are considered approximations. The estimates provided by the provinces are based primarily upon surveys, monitoring and field studies and upon extensive practical experience in extension work with growers. As a result, some of the information provided was qualitative in nature.

The economic benefit analysis is based upon the estimated revenue lost as a result of decreased yield to the corn and soybean crop area estimated to be affected by pest pressure above economic thresholds[Footnote1] and the cost for pest management. For Ontario, the cost for pest management includes the difference in the cost of using alternative pest control products compared to the neonicotinoid seed treatments (when they are available). For Manitoba, Québec and the Atlantic provinces, the cost of pest management is based upon grower expenses on seed treatments. Health Canada assumed that the entire crop area realizing a yield benefit from using a neonicotinoid seed treatment is harvested and therefore captures the complete net economic benefit. The estimates do not attempt to quantify revenue benefits attributable to the advantages derived from using the seed treatment application method as information required for these assessments was not available. In addition, the assessment did not attempt to quantify the economic impacts to other industries affected by changes in revenue to the corn and soybean industries.

The economic benefit analysis was conducted at the industry level because quantifying the economic impact at the farm level is extremely difficult as the potential economic loss at the farm level is determined by many factors such as crop, variety/hybrid, soil type, crop rotation and past pest pressure. The potential economic benefits from using a neonicotinoid corn or soybean seed treatment at the farm level can be qualified as minimal when there is little pest pressure, to being critical to crop production in cases where pest pressures would require the producer to replant the entire crop, or when several pests are present in a given field, or where the pest affects end product marketability (for example, cereal leaf beetle in seed and sweet corn; bean leaf beetle in IP/food grade soybean).

This assessment indicates clothianidin and thiamethoxam seed treatments complement current corn and soybean production practices such as the use of reduced tillage and no-till and the earlier planting of corn and soybean, while providing several pest management benefits for the control of soil insect pests. However, the economic return from the use of neonicotinoid

seed treatments is correlated to the prevalence of insect pest populations at levels that exceed economic thresholds.

Based on currently available information, the PMRA economic benefit analysis for the corn seed treatment suggests a national economic benefit for the corn industry of approximately $74.2 to $83.3 million or about 3.2% to 3.6% of the national farm gate value for corn in 2013. The majority of these benefits appeared to be realized in Ontario, and vary depending on the type of corn grown (in other words, grain, sweet, seed or forage). In Manitoba, using neonicotinoid corn seed treatments appeared to also prevent economic loss in the forage corn industry (estimated at $0.21 to $1.4 million for 2013). For field corn in Manitoba, the benefits ranged from about $0.1 million, up to a benefit of $3.5 million. In Québec grower expenses on neonicotinoid treated corn seeds were estimated to exceed the yield returns. In all other provinces, at the industry level, grower expenses related to neonicotinoid treated corn seeds were estimated to exceed the yield returns, or information was not available to estimate the economic value.

The economic benefit analysis determined that the national economic value of neonicotinoid seed treatment to the soybean industry results in an estimated economic benefit of about 1.5% to 2.1% of the national farm gate value for 2013 (about $37.3 to 51million). This economic benefit appears to be primarily to the Manitoba and Ontario soybean industries.

In Québec, grower expenses on neonicotinoid treated soybean seeds were estimated to exceed the yield returns. For other provinces, grower expenses at the industry level on neonicotinoid seed treatments on soybean were estimated to exceed the yield returns, or data was not available to estimate the economic value.

Seed corn and sweet corn are of greater value per tonne than field corn. This is also the case for IP/food grade soybean which is of greater value per tonne than soybean for crushing. These high value crops require high quality seeds that are free from plant pathogens such as Stewart's wilt (corn) and bean pod mottle virus (soybean). These pathogens are not acceptable to importing countries and if present would effectively close the export markets for infected corn and soybean seed. The estimates do not attempt to quantify the revenue impacts from market access issues as this information was not available. However, it is recognized that the export market contributes to these industries and access to export markets due to seed quality impact these industries significantly.

This assessment did however include the economic impact from quality loss for Ontario soybeans as a result of downgrading IP/food grade seeds to crushing quality. Information on the economic impacts resulting from quality loss for IP/food grade soybean production was not available for Québec and therefore was not included in this assessment. There is little IP/food grade soybean production in the other provinces. As a result neonicotinoid seed treatments are expected to have a greater economic value for these specialised corn and soybean crops.

The PMRA's economic benefit analyses are based upon the available information and are greater (1.5% to 2.1%) than the preliminary estimate reported by the USEPA for soybean (0.14%) and, when standardized for similar pest pressure, the PMRA's estimate for the value of neonicotinoid seed treatments to the corn and soybean industries in Ontario (2.9%) is slightly lower than the estimates provided by the Conference Board of Canada (3.0% to 4.5%).

AgInfomatics assessed the economic value of various insect management practices (including neonicotinoid seed treatments) to corn and soybean growers through a grower survey (in other words, an econometric valuation approach). The results indicate the estimated national benefits from the use of neonicotinoid insecticide seed treatments were $36 million for corn and $47 million for soybean in 2013. This represents 1.5% of the Canadian corn industry value in 2013 and 1.9% of the Canadian soybean industry value in 2013.

The estimates from AgInfomatics are based upon a very different approach than that used by the Conference Board of Canada, the USEPA and Health Canada which are based primarily upon estimates of pest pressure and yield loss. Despite the differing approaches, the national industry level economic value estimates from the different sources are within a small range.

In order to fully assess the economic value of clothianidin and thiamethoxam seed treatments to the Canadian corn and soybean industries, quantitative, more real-world information on typical pest population levels relative to economic thresholds is needed.

The PMRA is seeking additional information to finalize the value assessment for both the corn and soybean seed treatments uses. Stakeholders and interested parties are invited to provide written comments on this document as well as additional information up to 60 days from the date of publication.

Next Steps

The PMRA will accept written comments for up to 60 days from the date of publication of Re-evaluation Note REV2016-03, *Value Assessment of Corn and Soybean Seed Treatment Use of Clothianidin, Imidacloprid and Thiamethoxam*. Please e-mail all comments toPublications.

Additional Information

Guidance on minimizing exposure to bees during corn and soybean seed planting can be found on the Pollinator Protection webpage.

PMRA documents can be found on the Pesticides and Pest Management portion of Health Canada's website. PMRA documents are also available through the Pest Management Information Service.

Footnotes

Footnote 1

The density of an increasing pest population at which control should be initiated to prevent damage that exceeds the cost of control measures.