



FACT SHEET

The Value of Neonicotinoid Insecticides in North American Agriculture

A Meta-Analysis Approach to Estimating the Yield Effects of Neonicotinoids

Summary

A comprehensive economic analysis of more than 1,500 field studies conducted over 20 years finds that neonicotinoid insecticides provided average yield increases ranging from 3.6 to 71.3 percent in eight major crops across North America. This research indicates the average yield benefit of using neonicotinoids far exceeds the cost of treatment and delivers a substantial economic return on investment to the farmer.

Background

- Studies recently conducted by AgInfomatics, LLC, examined the value neonicotinoids bring to agriculture, but were focused on benefits other than yield.
- Non-yield related benefits of neonicotinoids include lower direct costs, superior pest control, ease of use and importance to integrated pest management (IPM) programs.
- Many efficacy experiments conducted by university researchers contain data useful for yield determination, but are typically not published in academic journals because they are considered routine.
- In the latest research, Dr. Paul Mitchell, AgInfomatics consultant and associate professor, Department of Agricultural and Applied Economics, at the University of Wisconsin-Madison, investigated the overall yield benefits of neonicotinoids using multiple data sources.

Methodology

- The research used a meta-analysis approach to assemble existing data from more than 1,500 field studies conducted over 20 years in eight major crops across North America.
- The crops included corn, soybean, wheat, cotton, sorghum, canola, potato and tomato.
- The primary focus was on U.S. crops, but data were also collected from Canada (the number of observations from Canada did not exceed 10 percent for any one crop).
- The data for this study were collected from three primary sources:
 - Results from the Entomological Society of America's *Arthropod Management Tests (AMT)*
 - Registrant databases of public efficacy experiments conducted by university researchers
 - Published literature from peer-reviewed journals and other university reports
- Data were collected from AMT studies conducted on these crops from 1996 to 2011 and from registrant databases and published literature ranging from 1993 to 2014.

- The analysis focused on the nitroguanidine neonicotinoid insecticides clothianidin, dinotefuran, imidacloprid and thiamethoxam, which are among the most widely used neonicotinoid active ingredients in Canada and the United States.
- For this research the insecticide active ingredients were not differentiated, but were evaluated either as “neonicotinoid” or “non-neonicotinoid.”

Key Findings

- When compared to untreated controls, the research showed that neonicotinoids provided a substantial (and statistically significant) yield increase in all eight crops examined.
 - With the exception of soybeans, all of the crops evaluated showed a double-digit percentage increase in yield when neonicotinoids were used.
 - The highest average yield increase was found in potatoes (71%), while the lowest average increase was found in soybeans (3.6%).
 - Soybean yield benefit exceeded \$20 per acre, based on today’s market prices, representing nearly a 3 to 1 return on investment.
- When compared with non-neonicotinoid insecticides, the average yield benefits of neonicotinoids were higher than those treated with other insecticides.
 - In corn, canola, wheat, sorghum and potato comparisons, these differences were statistically significant.

Crop	Neonicotinoids Compared to Untreated Control		Neonicotinoids Compared to Non-Neonicotinoid Insecticide	
	Total No. of Observations	Average Yield Benefit (%)	Total No. of Observations	Average Yield Benefit (%)
Corn	774	17.4%	429	4.4%
Soybean	718	3.6%	216	0.2%
Wheat	396	16.8%	122	2.4%
Cotton	746	16.9%	591	0.7%
Canola	178	34.8%	111	9.7%
Sorghum	162	20.1%	77	5.9%
Potato	306	71.3%	109	12.6%
Tomato	63	23.2%	--	--

Note: Data for tomato competitive comparisons were unavailable

- This study clearly demonstrates that neonicotinoids deliver substantial yield benefits to growers across a variety of commodity and specialty crops.

Report References

The Value of Neonicotinoid Insecticides in North American Agriculture: Value of Insect Pest Management to U.S. and Canadian Corn, Soybean and Canola Farmers

This report is one of a series recently undertaken to provide a comprehensive evaluation of the economic and societal benefits of neonicotinoid insecticides in North America. The research was conducted by AgInforomatics, a consulting firm of independent agricultural economists and scientists, and jointly commissioned and sponsored by Bayer CropScience, Syngenta and Valent U.S.A. For questions or information concerning this research and reports, please contact the Porter Novelli address identified below.

All reports will be published online at: www.GrowingMatters.org.

About Growing Matters

Growing Matters is a coalition of organizations and individuals committed to scientific discourse on the stewardship, benefits and alternatives of neonicotinoid insecticides in North America. [Bayer CropScience](#), [Syngenta](#) and [Valent U.S.A. Corporation](#) are leading this coalition with support from Mitsui Chemicals Agro, Inc.

Agriculture and horticulture are key to nourishing families and communities. Feeding a growing population, enhancing the beauty of our surroundings, and sustaining a commitment to environmental protection are fundamental needs that matter. Crop protection products, both natural and synthetic, are important tools that protect plants from tough and invasive pests that can devastate crops and urban landscapes.

Go to www.GrowingMatters.org for the latest information, reports, videos and infographics on the benefits of neonicotinoid insecticides or to show your support.

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