Neonicotinoid Seed Coatings & Pollinators Science & Stewardship

Syngenta - February 2, 2022

Neonicotinoid Seed Coatings & Pollinators - Science & Stewardship

- **Science**
  - Bee Stressors
  - EPA Risk Assessment
  - Seed Coating

Neonicotinoid Seed Treatments

Benefits

Protects the seed & seedling from insect damage

Increase in plant survival & healthier plants

Increase in yield

May reduce the number of foliar insecticide applications during the season

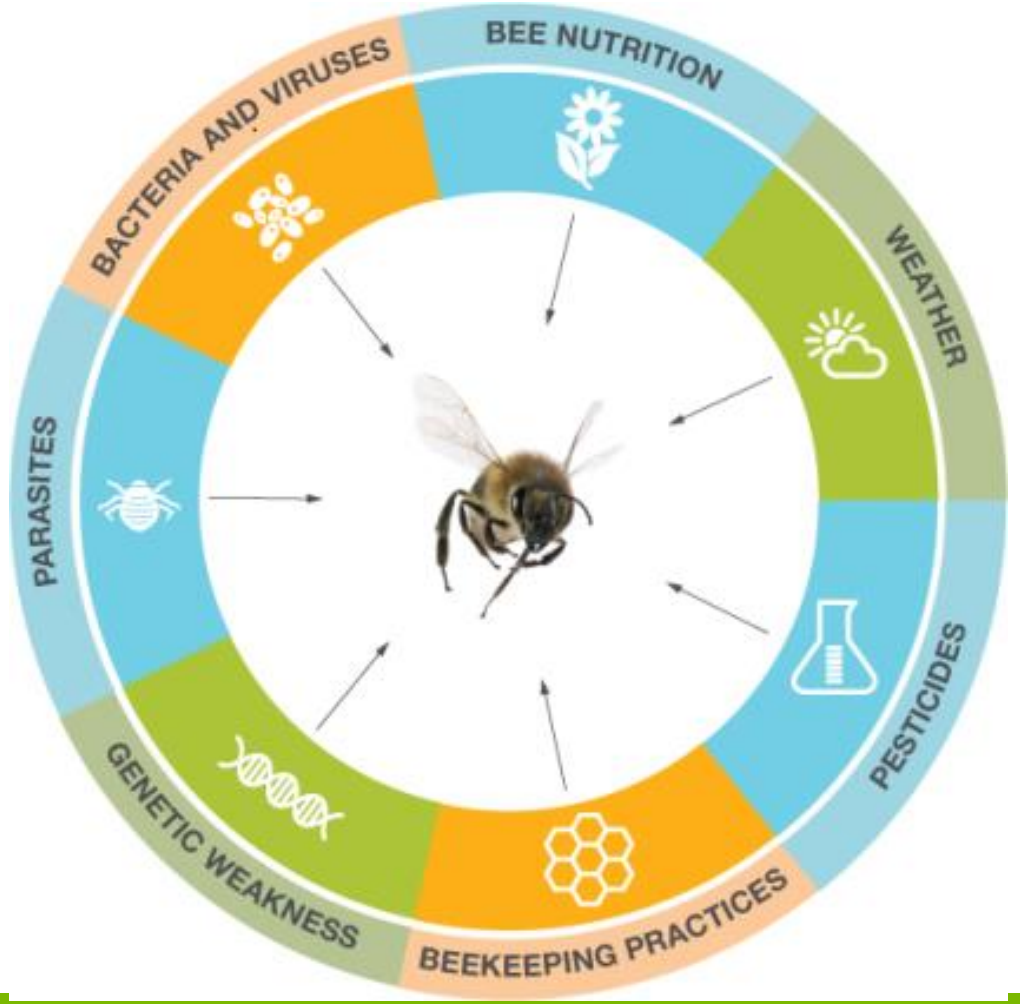
Concerns

Potential impact on honey bees

- Pollen and Nectar
- Dust Exposure

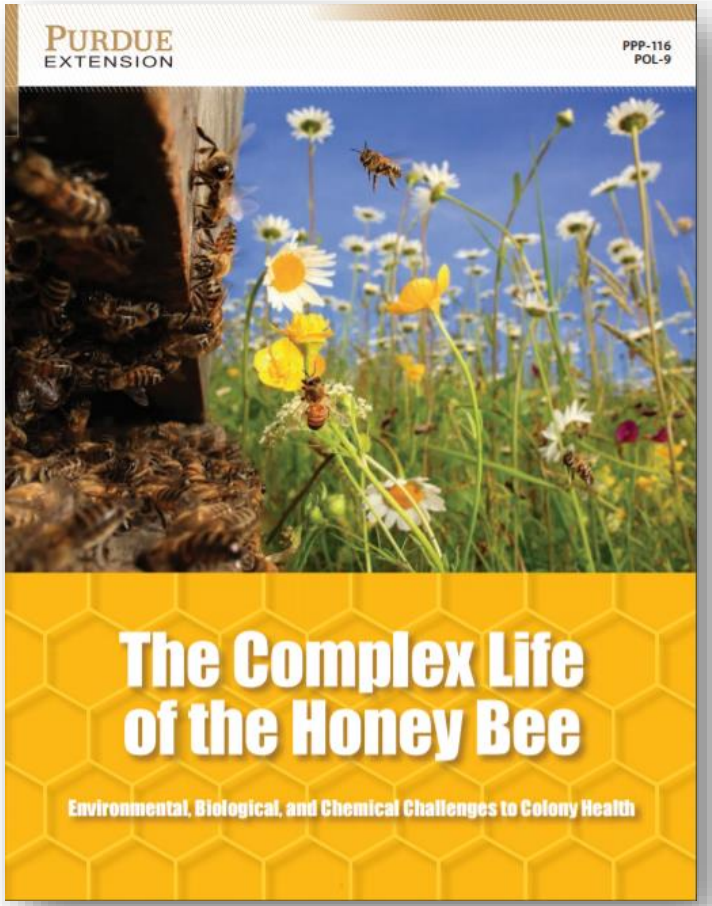
Scientists are focusing on the interaction of multiple stressors that are affecting honey bee health.

- Parasites (*Varroa* mites)
- Diseases (*Nosema*, bacteria and viruses)
- Poor Bee Nutrition
  - Lack of varied diet
  - Lack of suitable habitats
- Weather patterns and changing climate
- Pesticides (used in hives as well as in agriculture)
- Beekeeping management practices
- Genetic characteristics
- Queen issues



Crop Protection Industry has collaborated with Purdue University on The Complex Life of the Honey Bee

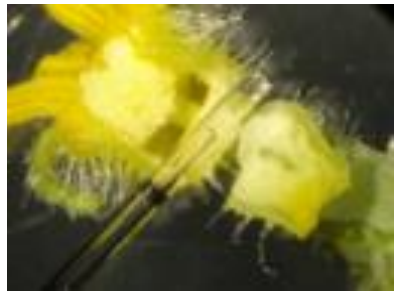
- Information about Bees
- Routes of Pesticide Exposure
- EPA Risk Assessment Process
- Comparing Exposure & Effects in a Tiered Approach
- Risk Quotient
- Registration Decisions
- Label – Risk Assessment & Beyond



https://ppp.purdue.edu/resources/ppp-publications/the-complex-life-of-the-honey-bee/

Products are thoroughly studied prior to registration to determine toxicity levels and safe use patterns for pollinators

- As science evolves, new data must be generated.
- Effects at a colony level need to be understood.
- Tiered approach for bee data generation.

Laboratory → Exposure Refinement → Semi-Field → Full Field




Seedcare™

syngenta

Data for informing EPA's Pesticide Risk Assessment Process for Bees is much more detailed than in the past

Guidance for Assessing Pesticide Risks to Bees

Office of Pesticide Programs
United States Environmental Protection Agency
Washington, D.C. 20460

Health Canada Pest Management Regulatory Agency
Ottawa, ON, Canada

California Department of Pesticide Regulation*
Sacramento, CA

*Currently, due to resource limitations, the California Department of Pesticide Regulation does not conduct full ecological risk assessments, but reserves the right to do so in the future.

June 19, 2014

Changed data requirements for all

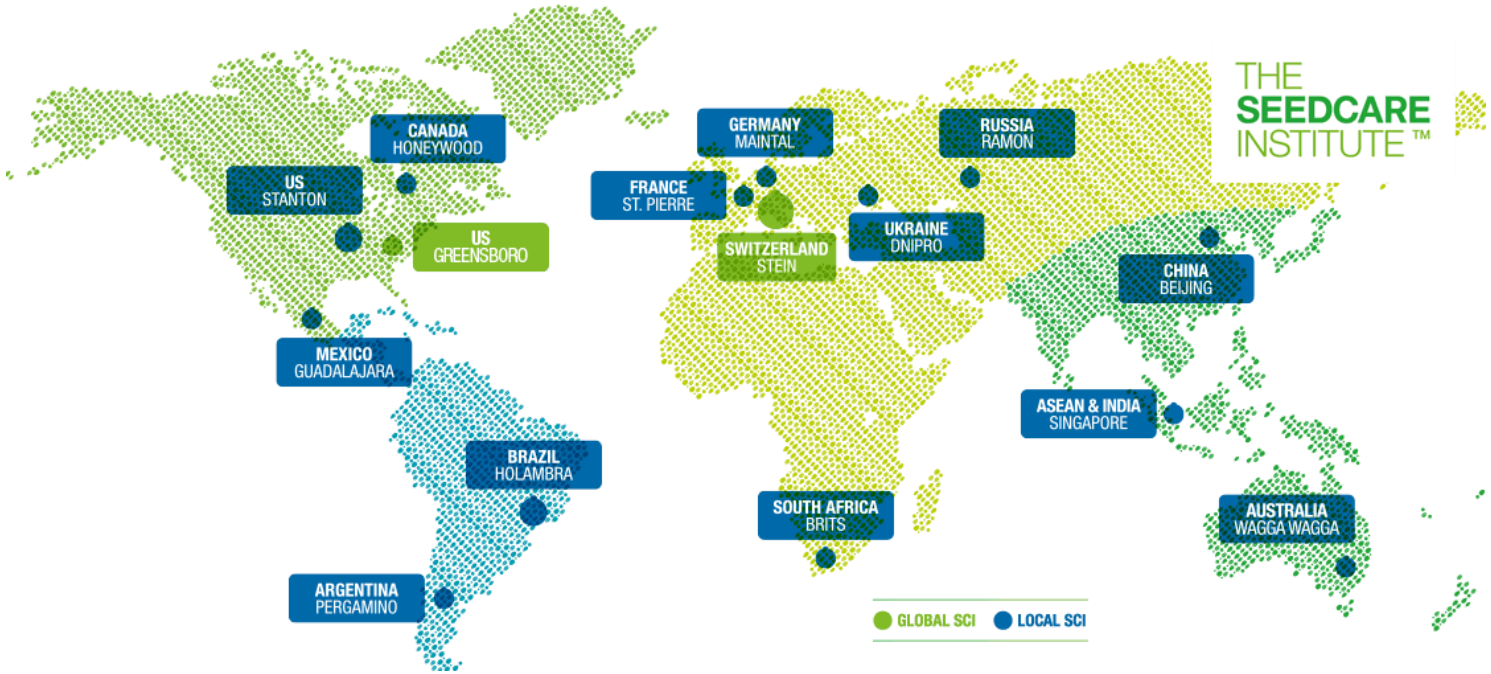
Honey bee adult acute oral toxicity	I	Laboratory test that identifies the oral dose that is lethal to half of the test population (LD_{50}) by oral ingestion.
Honey bee larvae acute oral toxicity	I	Laboratory test that identifies the dose that is lethal to half of the larval test population (LD_{50}).
Honey bee adult chronic oral toxicity	I	Laboratory test that identifies effects following repeat exposures (e.g., 10-day) to the test compound.
Honey bee larvae chronic oral toxicity	I	Laboratory test that identifies effects on larvae following repeat exposure to the test compound.
Honey bee toxicity of residues on foliage	I	Provides information on the amount of time during which contact exposure to weathered residues of the test compound remains toxic to >25% of the adult bees.
Semi-field testing for pollinators	II	Field-level test, where exposure to bee colonies is conducted within enclosures; study provides information on exposure as well as effects on a whole colony.
Field feeding study	II	Field-level test where bee colonies are located in an open field setting, but exposure is delivered at predetermined concentrations in either sucrose solution or a pollen supplement. Field feeding studies can provide information on long-term effects.

Neonicotinoids – Pollinator Risk Assessments

- **EPA Registration review of neonicotinoids**
  - Pollinator risk assessment
    - Thiamethoxam – January 2020
- **Thiamethoxam Seed Treatment**
  - EPA Risk Conclusions – Low Risk to bees for all seed treatment uses (pollen/nectar residue data available in bold):
    - Root and tuber vegetables (carrot, potato, sugar beet), bulb vegetables, leafy vegetables, brassica leafy vegetables, legume vegetables (**soybean**), cucurbit vegetables, cereal grains (**corn**), forage/straw/hay (alfalfa), oilseed (**canola and cotton**) and peanuts
  - Risk mitigations focused primarily on foliar and soil crop uses

https://www.epa.gov/pollinator-protection/schedule-review-neonicotinoid-pesticides

THE SEEDCARE INSTITUTE ™

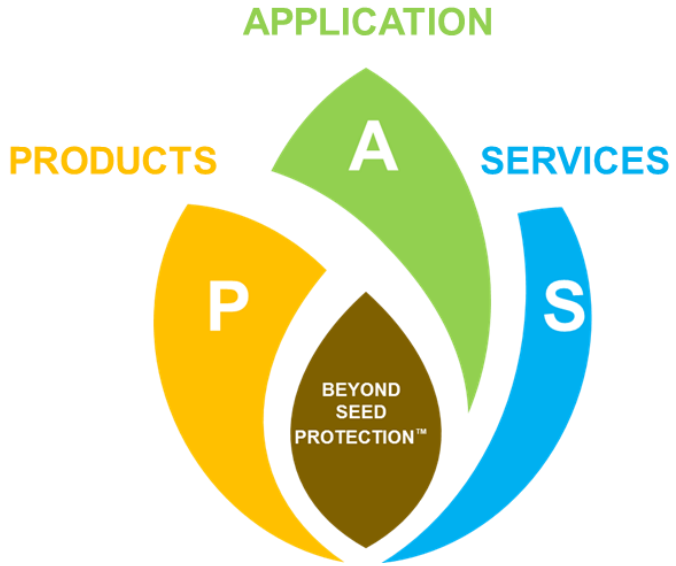


Seedcare™

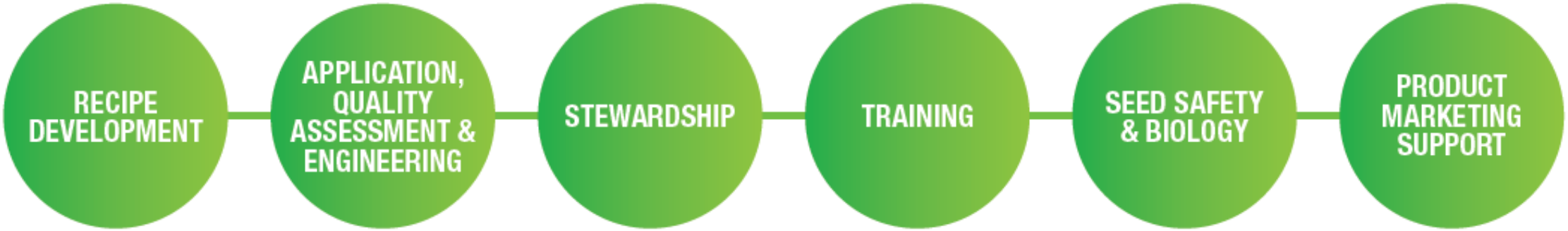
syngenta®

THE SEEDCARE INSTITUTE ™

Going Beyond Seed Protection™



The Seedcare Institute™ provides high quality end-to-end services under six pillars:

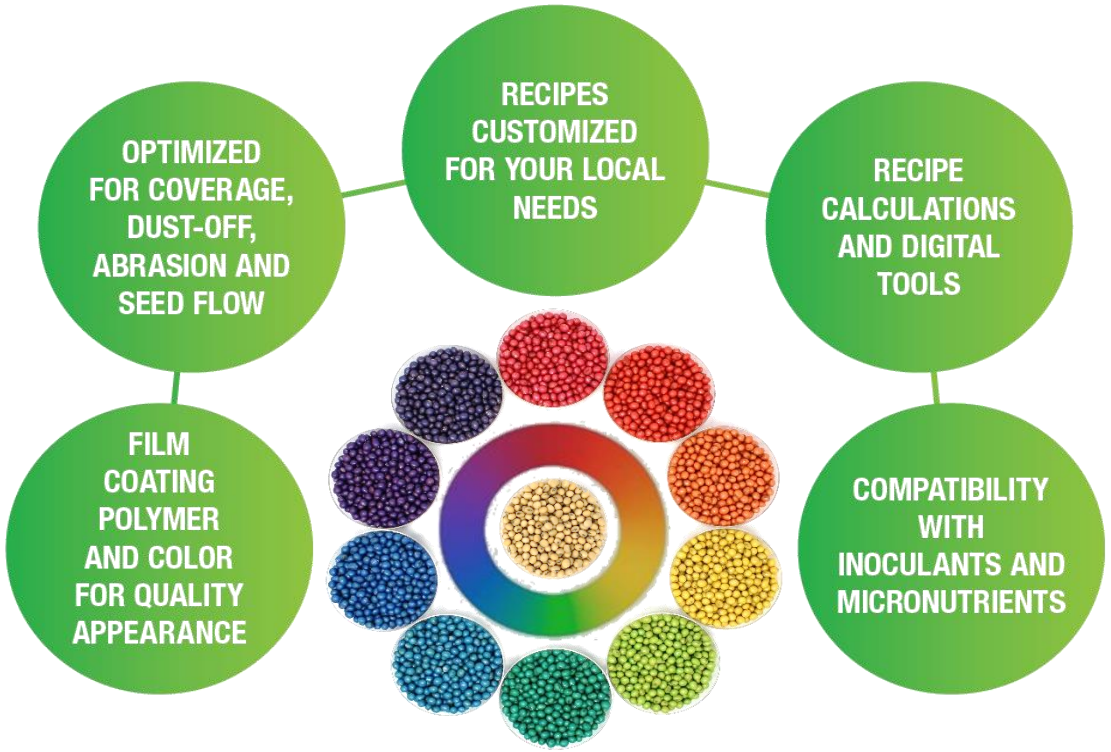


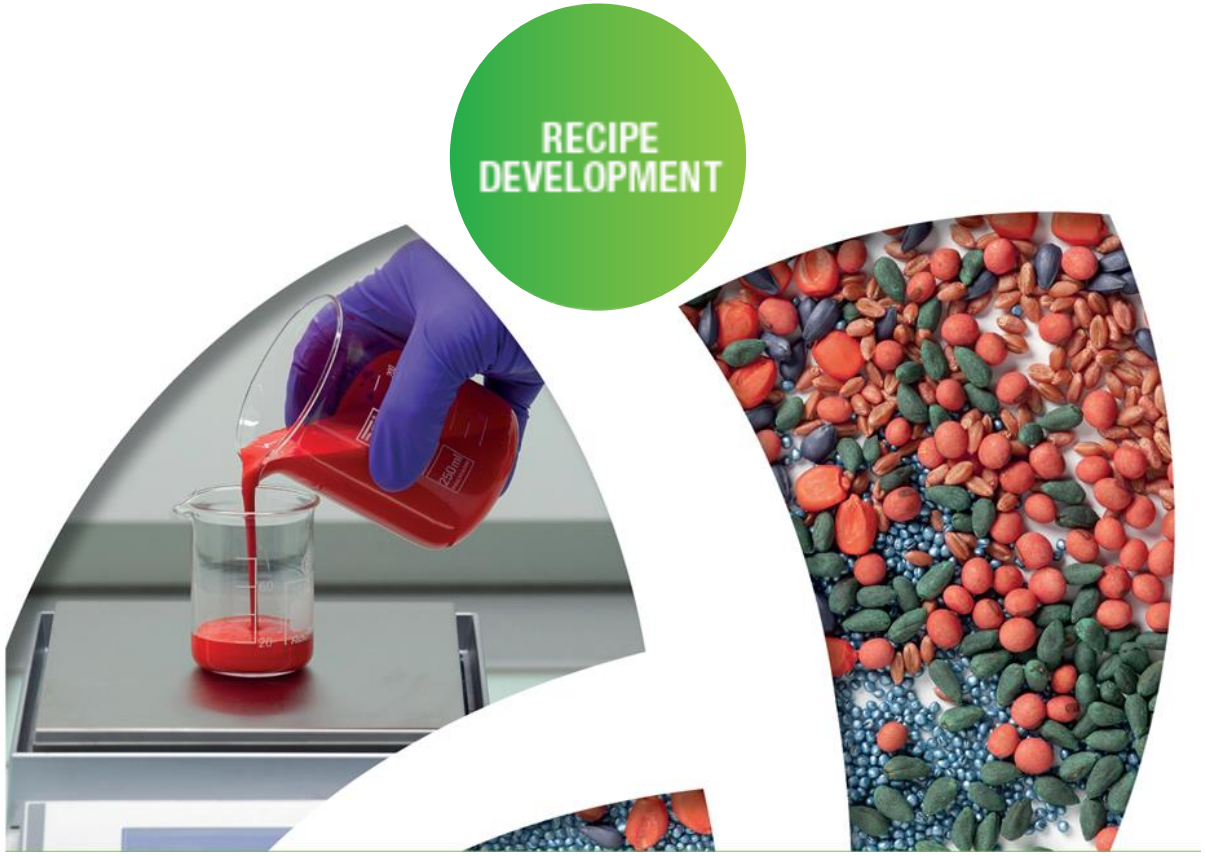
Seedcare™

syngenta

THE SEEDCARE INSTITUTE ™

Customized recipes help deliver high quality seeds





Seedcare™

syngenta®

Neonicotinoid Seed Coatings & Pollinators - Science & Stewardship

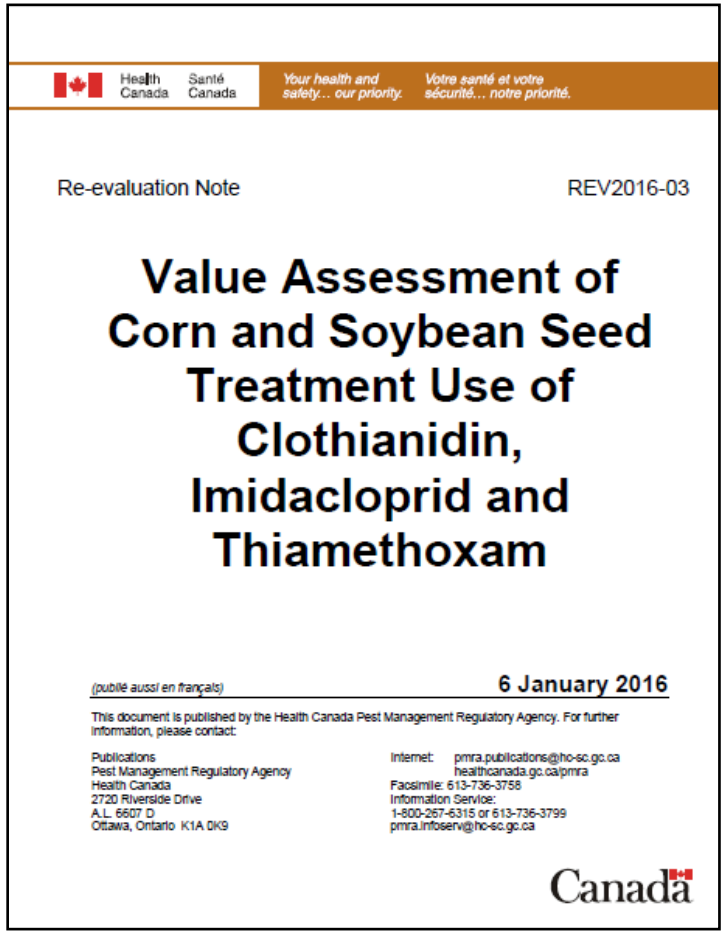
- **Pollinator Stewardship**
  - Pest Management
  - BeSure! Campaign
  - Operation Pollinator

Integrated Pest Management – Seed Treatments

- Economical level of risk management
- Protection from early-season pests
  - Limited local information on scouting and economic thresholds levels
  - Single vs. multiple pests causing damage
- Reduces the need for rescue treatments or re-planting a failed crop
- Allows for stronger, more uniform stands and healthier plants
- Minimizes the need for foliar applications

Health Canada Pest Management Regulatory Agency - 2016
IPM in corn and soybeans seed treatments – Grower Challenges

- **Identifying pest pressure and implementing IPM**
  - Difficulty in pest identification
  - Determination of potential pest pressure
  - Lack of economic thresholds
- **Pest Monitoring Implementation**
  - Monitoring activities – costly & labor intensive
  - Large crop fields & variable pest spatial distribution
  - Monitoring timing versus seed purchase timing
- **Risk Management**
  - Avoid conditions that increase damage risk
  - Unavoidable - cool wet weather or soil type



Health Canada Santé Canada | Your health and safety... our priority. Votre santé et votre sécurité... notre priorité.

Re-evaluation Note REV2016-03

Value Assessment of Corn and Soybean Seed Treatment Use of Clothianidin, Imidacloprid and Thiamethoxam

(publié aussi en français) **6 January 2016**

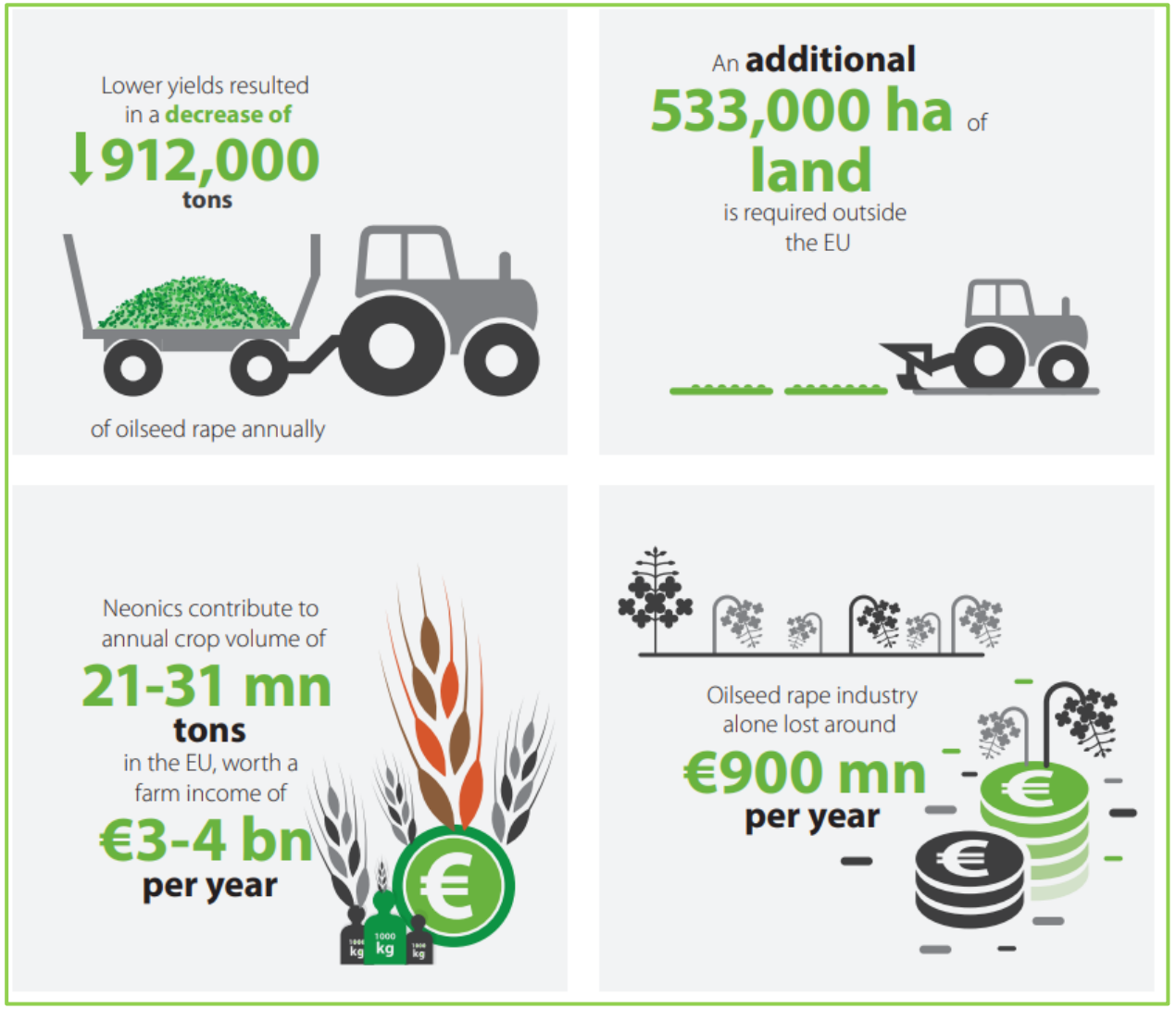
This document is published by the Health Canada Pest Management Regulatory Agency. For further information, please contact:

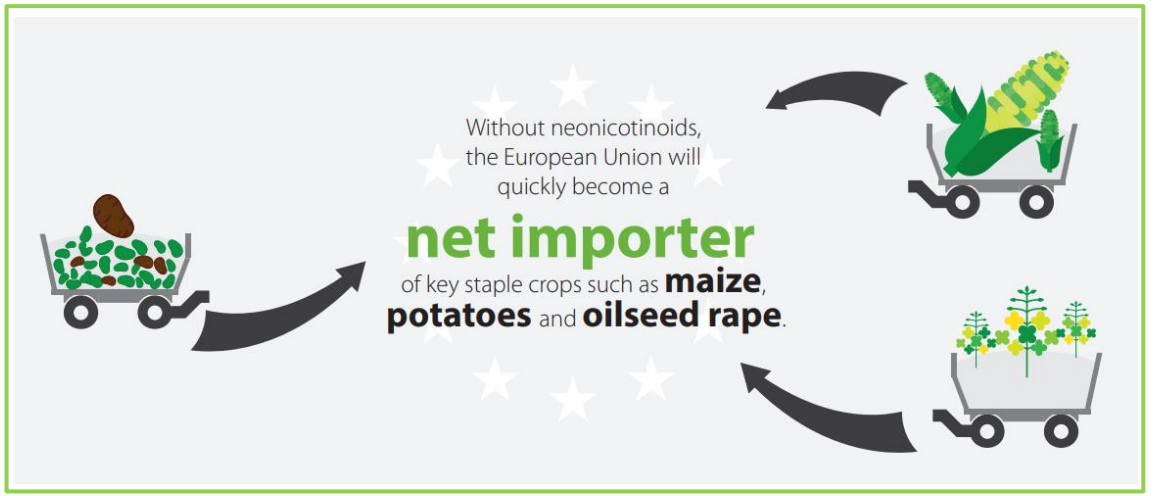
Publications
Pest Management Regulatory Agency
Health Canada
2720 Riverside Drive
A.L. 6607 D
Ottawa, Ontario K1A 0K9

Internet: pmra.publications@hc-sc.gc.ca
healthcanada.gc.ca/pmra
Facsimile: 613-736-3758
Information Service:
1-800-267-6315 or 613-736-3799
pmra.infoserv@hc-sc.gc.ca

Canada

Impact of the Neonicotinoid Restrictions in Europe – 5 Impact Studies, 2017





copa cogeca
european farmers european agri-cooperatives

European Crop Protection

ESA

Sources ADAS (2016): "The impact of the neonicotinoid withdrawal on the EU oilseed rape and maize industries", GOL(16)798:2. Unpublished Briefing Paper. ESA (European Seed Association) (2016): Impact of the restriction on the neonicotinoids on winter OSR. ESA survey 2015. Brussels: ESA. HFFA (2017): "Banning neonicotinoids in the European Union: An ex-post assessment of economic and environmental costs". Research Paper 01/2017. This research paper was financed by Bayer Division Crop Science and Syngenta. Kathage, J., Castañera, P., Alonso-Prados, J. L., Gómez-Barbero, M. and Rodríguez-Cerezo, E. (), The impact of restrictions on neonicotinoid and fipronil insecticides on pest management in maize, oilseed rape and sunflower in eight EU regions. Pest. Manag. Sci.. Accepted Author Manuscript. doi:10.1002/ps.4715. Accepted manuscript online: 26 August 2017 Steward Redqueen (2016): "Cumulative impact of hazard-based legislation on crop protection products in Europe". Brussels: ECPA.

Seedcare™

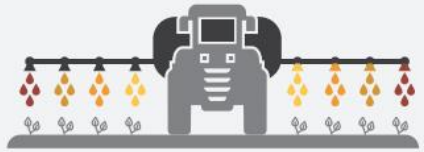
syngenta

Impact of the Neonicotinoid Restrictions in Europe – 5 Impact Studies, 2017

The neonicotinoid restrictions have **negative implications** for **biodiversity** and the environment worldwide, such as an ↑ in greenhouse gas emissions

Due to the European restrictions on neonicotinoids, an ↑ of **1.3 bn m³ of water** will be used **globally**, while within the **EU** it will require **1.4 million m³ more water.**

Pest management has become significantly more **time and cost intensive,** which leaves farmers less competitive



Many farmers chose to apply **additional insecticide treatments**, with a **3 to 4 fold increase** reported in the UK for 2015

Lack of effective and diverse insecticidal modes of action will **accelerate** **pest resistance** thereby rendering the limited tools ineffective.

copa*cogeca european farmers european agri-cooperatives

European Crop Protection

ESA

Sources ADAS (2016): "The impact of the neonicotinoid withdrawal on the EU oilseed rape and maize industries", GOL(16)798:2. Unpublished Briefing Paper. ESA (European Seed Association) (2016): Impact of the restriction on the neonicotinoids on winter OSR. ESA survey 2015. Brussels: ESA. HFFA (2017): "Banning neonicotinoids in the European Union: An ex-post assessment of economic and environmental costs". Research Paper 01/2017. This research paper was financed by Bayer Division Crop Science and Syngenta. Kathage, J., Castañera, P., Alonso-Prados, J. L., Gómez-Barbero, M. and Rodríguez-Cerezo, E. (), The impact of restrictions on neonicotinoid and fipronil insecticides on pest management in maize, oilseed rape and sunflower in eight EU regions. Pest. Manag. Sci.. Accepted Author Manuscript. doi:10.1002/ps.4715. Accepted manuscript online: 26 August 2017 Steward Redqueen (2016): "Cumulative impact of hazard-based legislation on crop protection products in Europe". Brussels: ECPA.

Seedcare™

syngenta

BeSure! Product Stewardship Outreach

Growing Matters

- BASF, Bayer, Mitsui Chemicals Agro, Syngenta and Valent U.S.A., Corteva, Gowan, PBI Gordon
- Visit **growingmatters.org/besure**

BeSure! Objectives

- Increase grower and applicator awareness of best management practices (BMPs)
  - When handling and planting seeds or when making foliar applications
  - Neonicotinoids are the drivers, however BMPs are useful for other insecticides.

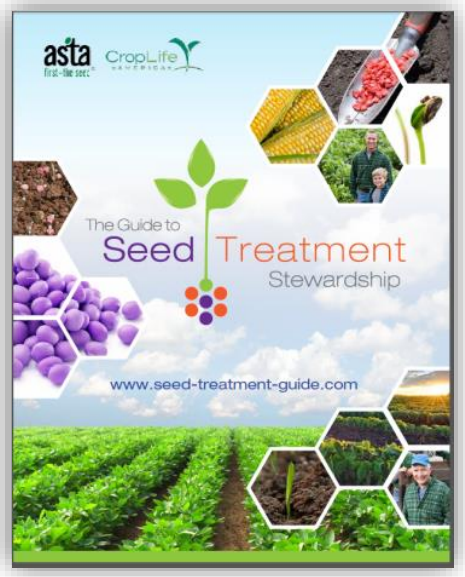
Seedcare™ syngenta

Pollinator and Product Stewardship

Insect Pollinators and Pesticide Stewardship

Guide to Seed Treatment Stewardship

- **Proper pesticide use starts with reading and following pesticide label directions and precautions**.
- **Reduce potential harm to insect pollinators**
  - Use Integrated Pest Management
  - Follow Good Stewardship Practices
  - Seed Handling, Storage, Disposal
  - Communication & Outreach



Seedcare™

syngenta

Handling, Planting and Disposal of Treated Seed

5 Steps for Stewardship

1. Follow label directions
2. Eliminate weeds in the field
3. Use advanced seed flow lubricants that minimize dust.
4. Cover with soil or remove any spilled seeds.
5. Be aware of honey bees and hives located near the field.

Operation Pollinator – Global Overview

Started in 2000

21
countries implemented worldwide

>400,000
acres of farmland provided with ecosystem services

Help biodiversity flourish

Part of our Good Growth Plan biodiversity commitment

Demonstrates that commercial farming and positive environmental management practices can co-exist

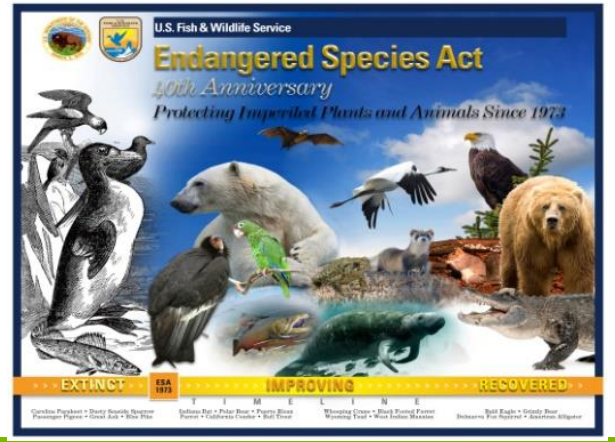
Seedcare™

syngenta

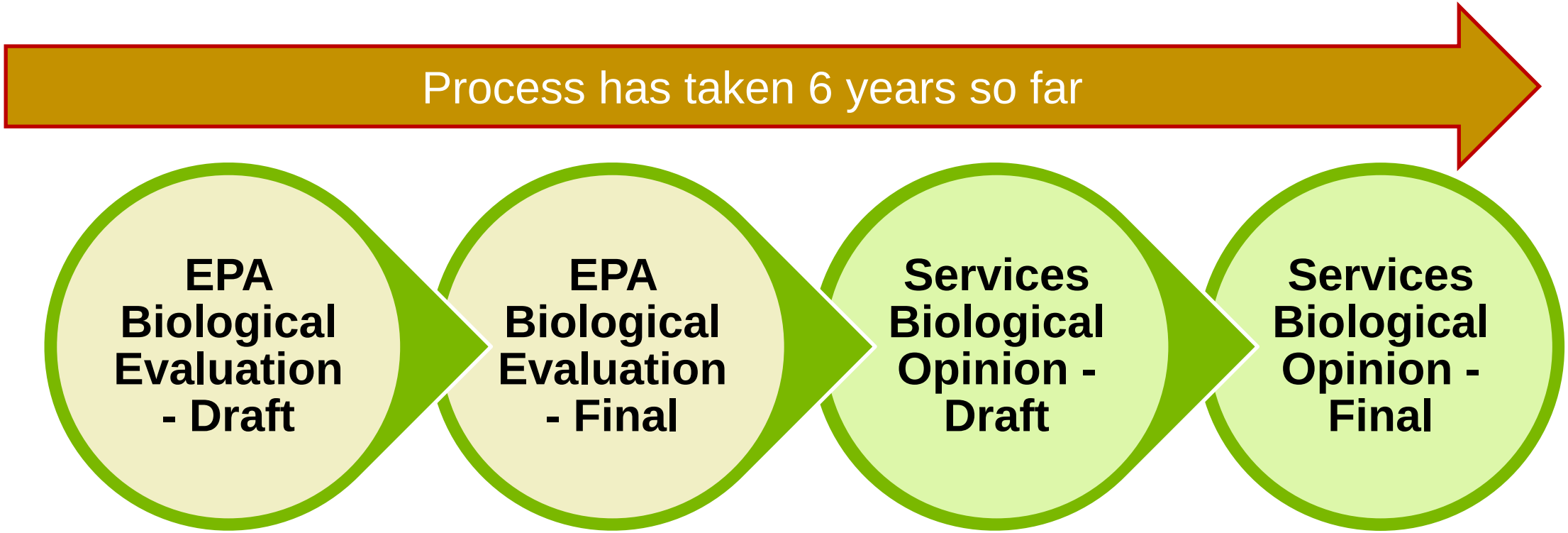
Endangered Species Act – Section 7 Consultation Process

- **EPA Information – Draft Neonicotinoid Biological Evaluation**
- **Why are the "Likely to Adversely Affect" (LAA) Numbers so high for species and critical habitats?**
  - "LAA threshold for a BE is very conservative as the likely "take" of even one individual of a species triggers LAA (even if species is almost recovered." *
  - "An LAA determination - should not be interpreted to mean that EPA has made a determination that the neonicotinoid is putting a species in jeopardy."*

*From EPA Thiamethoxam Executive Summary for Draft Biological Evaluation https://www.epa.gov/endangered-species/draft-national-level-listed-species-biological-evaluation-thiamethoxam



Malathion ESA Consultation Process Example*



- **March 2016**

- **January 2017**
- **LAA**
  - 1778 Species
  - 784 Critical Habitats

- **April 2021**
- **Jeopardy**
  - 78 Species
  - 23 Critical Habitats

- **2022**??

*U.S. EPA evaluates risk to endangered or threatened **individual of a species**

Discussion

Bringing plant potential to life

Seedcare™

syngenta®

Important: Always read and follow all bag tag and label instructions before buying or using Syngenta products. The instructions contain important conditions of sale, including limitations of warranty and remedy. Some crop protection products and seed treatments may not be registered for sale or use in all states or counties. Please check with your state or local extension service before buying or using Syngenta products.

For more information, visit www.Syngenta-US.com or contact your local Syngenta reseller or representative.