

Insecticides - The good the bad and the ugly

Introduction to Neonicotinoid Insecticides

- ⊙ They have been around since the mid 1990's
- ⊙ The plant absorbs the chemical.
- ⊙ The chemical protects the plant from sap sucking insects
- ⊙ Less toxic to birds and mammals.
- ⊙ The chemical is present in nectar and pollen.
- ⊙ Seven different types
- ⊙ Six are found in products for plants
- ⊙ Applied as:
 - ⊙ Spray
 - ⊙ Soil drench
 - ⊙ Direct injection
 - ⊙ Used on field and orchard crops
 - ⊙ Ornamental plants
 - ⊙ Trees
 - ⊙ Seed treatment
 - ⊙ Protection for youngest seedlings
- ⊙ Can exist for months and years after a single application.
- ⊙ Have been found in plants up to six years.
- ⊙ Untreated plants may absorb the chemical left over from previous years.
- ⊙ The chemical may make the honey bee susceptible to parasites and pathogens
- ⊙ The pesticides sold to homeowners do not have any mention of the risks to honey bees.

Type of neonicotinoids

- ⊙ Imidacloprid
- ⊙ Thiamethoxam
- ⊙ Clothianidin
- ⊙ Acetamiprid
- ⊙ Thiacloprid
- ⊙ Dinotefuran

- ⊙ Nitenpyram
- ⊙ Non Neonicotinoids
 - Fipronil
 - Spinosad

Imidacloprid

Synthetic derivatives of nicotine found in leaves of many plants.

Registered by EPA in 1994

Uses:

Control sucking insects

Chewing insects

Termites, soil insects, fleas on pets.

Applied to structures, crops, soil and seed treatment

Effects on Honey Bees

Nervous system

The binding process is irreversible

Dinotefuran

- ⊙ To be used on
 - Leafy vegetables
 - Turf management
 - Professional ornamental production
 - Residential indoor,
 - Pet, law and garden markets
- ⊙ Affects the nervous and immune systems.

Fipronil

- ⊙ An insecticide from the phenylpyrazole chemical family.
- ⊙ Kills ants, beetles, cockroaches, fleas, ticks, mole crickets and weevils
- ⊙ 50 registered product on the market
- ⊙ Works on the nervous system

Spinosad

A product of bacterial fermentation

Naturally derived

Kills insects with stomach poison and contact.

Used on fruits, vegetables, grains, almonds, and pistachios.

Works on worms, caterpillars, peach twig borers, leafminers, beetles and thrips.

What effect does neonicotinoids have on honey bees?

- ⦿ University of Nottingham (UK) conducted an experiment on honey bees using Imidacloprid
- ⦿ Two parts per billion of Imidacloprid in one gallon of sugar water had the following effect:
 - Effects the genes
 - That breakdown toxins,
 - Provide energy for flights
 - And the inability of foraging honey bees to find their way home.

Name	Company	Product Name	Turnover in Million US\$
Imidacloprid EU Band	Bayer Crop Science	Confidor, Admire, Gaucho	1991
Thiamethoxam EU Band	Syngenta	Actara, Platinum, Cruiser	627
Clothianidin EU Band	Bayer Crop Science	Poncho, Dantosu, Dantop	439
Acetamiprid	Nippon Soda	Mospilan, Assail, Chipco Tristar	276
Thiacloprid	Bayer Crop Science	Calypso	112

Dinotefuran	Mitsui Chemicals	Starkle, Safari, Venom	79
Nitenpyram	Sumitomo Chemical	Capstar, Bestguard	8