Cornell University | Cornell University Cooperative Extension of Suffolk County | NEW YORK STATE OF OPPORTUNITY Department of Environmental Conservation

IMIDACLOPRID: Reducing Risks to Groundwater from Agricultural Uses: Potatoes

Practical Approaches for Users

Introduction. The pesticide imidacloprid (Admire Pro, Advise, Alias, Couraze, Leverage, etc.), commonly used in agricultural production and landscapes, is showing up in Long Island's groundwater. This fact sheet was prepared to help potato growers use imidacloprid more conservatively while continuing to effectively manage pests and protect Long Island's groundwater.

This and other factsheets are part of The Long Island Pesticide Pollution Prevention Strategy, which became effective July 2014. The strategy was developed by the NYS Department of Environmental Conservation (DEC) in collaboration with numerous stakeholders. The goal of the strategy is to protect groundwater and surface water from pesticide related contamination while continuing to meet the region's pest management needs.

A profile of a Long Island's sandy/gravelly subsoil.

Protect Our Drinking Water

The Long Island aquifer is used by nearly three million people as a source of high-quality potable water. The aquifer is an underground water source that yields over 300 million gallons of water every day. The characteristics that allow the aquifer to reliably supply this much water also make it vulnerable to contamination from above ground. This is especially important for materials like imidacloprid that have widespread use and can move easily through soil to the underlying groundwater. For these reasons, commercial potato growers need to exercise careful environmental stewardship when using imidacloprid.

Modify Practices (Best Management Practices)

To reduce or eliminate the risk of imidacloprid movement to Long Island's groundwater, potato growers should modify day-to-day practices especially where soil applications are used:

Application Rates – When applying imidacloprid as a soil or seedpiece treatment use the lowest label rate which can reduce the amount used per acre by 34 – 50%. Labels allow for a range of rates when making soil applications. There may be reduced efficacy against primary target pests Colorado potato beetle (CPB), aphids, and leafhoppers. With widespread resistance in CPB other choices are to be more consistently effective. Always stay below the maximum allowable use per crop season (soil: 0.31 lbs active ingredient = 8.7 fl oz/A Admire Pro; foliar: 0.2 lbs ai = 5.6 fl oz/A Admire Pro, e.g.).

Application Timing and Application Methods –Imidacloprid is used as a seedpiece, soil, or foliar treatment in potatoes. *Seedpiece treatment* concentrates material around each plant for best uptake and not in spaces between. Some products are sprayed directly on seed; others require special equipment (http://www.gov.pe.ca/photos/original/env_seed_train.pdf). Where used *at planting*, spray (rather than dribble or stream) a 2-4" band in-furrow, spray surface at cracking over the row at hilling then cover with soil, or apply as subsurface side-dress on either side of the row then cover with soil. *Foliar sprays* can be used for aphids, leafhoppers, and CPB. Include a wetting agent especially for melon aphid. Efficacy against CPB on Long Island will be only moderate and for best results should target small larvae. Do NOT use foliar applications of imidacloprid or Assail following a soil application of imidacloprid. Avoid making soil applications when heavy rain is predicted within 24 hr or where soil is frozen or saturated. Take care to avoid runoff and drift to storm drains and waterways.

KEY POINTS

Three key practice modifications can be applied to reduce risk of imidacloprid movement to groundwater:

- Use lowest label rates
- Use other effective insecticides or practices
- Use foliar sprays instead of soil application to reduce leaching potential

Some Alternative Insecticides

Other insecticides approved for use on Long Island control many of the same pests. Some are summarized below for target species including organic (^), reduced-risk (*) and conventional options. Note imidacloprid is not effective against mites and most caterpillars – use other products or methods if needed for these pests. Use insecticides selectively and as a last resort to help maintain biological controls.

Pest	Insecticide	Active Ingredient	Notes
Aphids & potato leafhoper	*Assail	acetamiprid	Foliar spray as needed
	*Fulfill	pymetrozine	Foliar spray as needed
	Beleaf	flonicamid	Foliar spray as needed
	Lannate	methomyl	Foliar spray as needed; melon aphid only
	*Movento	spirotetramat	Foliar spray as needed
	Pyrethroids (Baythroid XL, Tombstone, Asana XL, Warrior II, Perm-Up, Mustang Maxx, etc.)	various	Leafhoppers only. Foliar spray as needed
	^BioCeres[1], ^Mycotrol, BotaniGard	*Beauveria bassiana*	[1]Aphids only. Foliar spray as needed
	^PFR-97 20% WDG	*Isaria fumosorosea*	Aphids only. Foliar spray as needed
	^SuffOil-X[1], BioCover UL, Glacial Spray Fluid, SunSpray Ultra-Fine, TriTek[1], Ultra-Pure Oil	mineral oil (paraffinic horticultural oil)	[1]Aphids only. Foliar spray as needed; good contact essential. Incompatible with some fungicides
	^M-Pede	insecticidal soap (potassium salts of fatty acids)	Foliar spray as needed; good contact essential. Incompatible with sulfur and some other materials – see label
Colorado potato beetle	*Assail	acetamiprid	Foliar spray as needed
	Agri-Mek, generic	abamectin	Foliar spray as needed; target young larvae
	*Avaunt + PBO	Indoxacarb + piperonyl butoxide	Foliar spray as needed; young larvae only
	Rimon 0.83EC (SLN label in NY)	novaluron	Foliar spray for small larvae in spring; use 12 oz rate, two applications @ 7-day interval
	^Radiant[1], ^Blackhawk[2], ^*Entrust[2]	Spinetoram[1], spinosad[2]	Foliar spray as needed
	Biocover UL, Glacial Spray Fluid, SunSpray Ultra-Fine, Ultra-Pure Oil	mineral oil (paraffinic horticultural oil)	Larvae only. Foliar spray as needed; good contact essential
	^Azera, Azatin O, Azasol, AzaGuard, Ecozin Plus, Molt-X, Neemix 4.5	azadirachtin (plus pyrethrins in Azera)	Foliar spray; target small larvae shortly after hatch

Integrated Pest Management Practices

The following non-pesticide practices can be utilized as part of an IPM program to manage pests targeted by imidacloprid. If not sure of the pest or cause of a plant problem submit samples to a diagnostic laboratory for identification.

Aphids: Starting mid-June, check 10 sites around the field, 5 plants/site and 1 leaf/plant. Avoid use of broad-spectrum pyrethroids especially early in production, which impact aphid natural enemies.

Suggested treatment thresholds for aphids

Species	pre-tuber initiation	tuber initiation to 2 weeks to vine kill	within 2 weeks to vine kill
Green peach & potato	2/leaf	4/leaf	10/leaf
Melon	1/leaf	2/leaf	5/leaf

Potato leafhopper: start scouting when plants reach 12- 14". For nymphs, check same leaves as for aphids choosing non-senescing leaves from lower 1/3, one leaf per plant. For adults, brush 2 five-foot sections of row at each site for aphids (a sweep net can be used or count adults disturbed by brushing). Note any adults observed while walking the field. Thresholds are 15 nymphs/50 leaves and/or 1 adult per 5' of row.

Colorado potato beetle: Trench traps or 1 - 2 trap crop (e.g. potatoes, treated & planted 20-30 days ahead) rows between hedgerows and transplants can prevent damage from overwintering CPB. Rotate fields ¼ - ½ mile from previous host crops. Scout fields regularly especially along borders for adult beetles, larvae and egg masses checking 5 vines at 10 sites. In smaller plantings, hand-remove beetles where practical.

Suggested treatment thresholds for CPB

Egg masses	Adults	Small larvae	Large larvae
≥16	≥ 16	≥ 76	≥ 31

Trade names used in this publication are for convenience only. No endorsement of products is intended, nor is criticism of unnamed products implied.

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For more information or electronic copies of this factsheet go to http://ccesuffolk.org
Cornell Cooperative Extension of Suffolk County Diagnostic Lab website: http://ccesuffolk.org/agriculture/horticulture-diagnostic-labs
For more information about the Long Island Pesticide Pollution Prevention Strategy go to http://www.dec.ny.gov/chemical/87125.html.

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