

SEED-BASED CONTROL of INSECTS

The following tables show seed treatments and transgenic options available for insect control. Many commercial seed treatment contain combinations of ingredients (particularly fungicides to control diseases) to provide a broader spectrum of protection. Transgenic seed also is usually treated with insecticide and/ or fungicide.

DRY BEAN Seed Treatments

Seed treatment protects seeds before germination from early season pests such as maggots and wireworm. Maggot damage can occur under cool, wet conditions that delay germination, particularly in soils with decaying green material (for example, working in a cover crop). Wireworm damage can occur when planting into fallow ground.

Trade name	Common name	Contains a fungicide?	Signal word	Seedcorn maggot	Wireworm	Beetles (Bean leaf Mex bean)	Potato leafhopper	REI hrs	Notes
Attendant 600	imidacloprid		Caution	1.6 to 3.2 oz per 100 lbs seed				12	
Cruiser 5FS	thiamethoxam	no	Caution	1.28 oz per 100 lbs seed Beetle & PLH protection runs out early in season.				12	For use only by commercial seed -treaters.
Enhance AW	imidacloprid	captan vitavax	Danger	5 oz per 100 lbs seed				--	
Gauche 480	imidacloprid	no	Caution	2 to 4 oz per 100 lbs seed			May provide early protection.	12	Provides early-season protection against injury. For use only by commercial seed-treaters.
Lorsban 30F	chlorpyrifos	no	Danger	2.75 oz per 100 lbs seed	--	--	--	--	Applied as a slurry by a commercial seed-treater
Lorsban 50W	chlorpyrifos	no	Danger	2.0 oz per 100 lbs seed	--	--	--	--	Sold in 1 lb water soluble packets. Applied as a slurry by a commercial seed-treater.

FIELD CORN Seed Treatments

Seed treatment for seedcorn maggot is recommended when planting seed into cool, wet soil that delays germination and exposes the seed to extended insect damage, and also when planting into a field with decaying green plant material (for ex a plowed-in cover crop). Seed treatment for wireworm and grubs is recommended when planting into established fallow areas or sod, or in fields that have a history of infestation. Seed treatment for corn rootworm control is an alternative to granular insecticides at-planting. Only a limited number of seed treatments provide acceptable rootworm control, and the rate is greater than for control of other soil pests. Do not feed left-over treated seed to wildlife or burn in corn stove.

Trade name	Insecticide common name	Contains a fungicide?	Signal word	Corn rootworm	Seedcorn maggot	White grubs	Wireworm	REI hrs
Acceleron IC-609	clothianidin	no	caution	5.54 oz/ 80,000-seed unit	0.72 (low) to 2.7 (hi) oz/ 80,000-seed unit			--
Attendant 600	imidacloprid	no	caution	--	1.34 oz per 100 lbs			12
Concur	imidacloprid	metalaxyl	caution	-	3.6 oz per 100 lbs			24
Cruiser 5FS	thiamethoxam	no	caution	5.1-9.0 oz/ 100 lbs	1.28-5.1 oz per 100 lbs			12
Cruiser Extreme	thiamethoxam	fludioxonil mefenoxam azoxystrobin	caution	1.25 mg a.i. per kernel	0.25 mg a.i. per kernel			48
Diazinon 50W CleanCrop	diazinon	no	caution	--	0.5 oz/ bushel	--	--	--
Gaucho 600	imidacloprid	no	caution	--	0.16-1.34 mg per kernel			12
Kernel Guard Supreme	permethrin	vitavax	caution	--	2 oz/ bushel	--	2 oz/ bushel	12
Kickstart	diazinon,lindane	carboxin	caution	--	2 oz/ bushel	--	2 oz/ bushel	12
Latitude	imidacloprid	carboxin metalaxyl	caution	--	3.6 oz/ 100 lbs	--	3.6 oz/ 100 lbs	24
Lorsban 50W (1 lb water soluble packets)	chlorpyrifos	no	danger	--	2 oz/ 100 lbs	--	--	--
Poncho 250 & 1250	clothianidin	no	caution	1.25 mg ai/ kernel	0.25 mg ai/ kernel			

FIELD CORN TRANSGENIC OPTIONS - TERMINOLOGY

Transgenic options are available to control European corn borer and corn rootworm. These options contain genes for selective toxins derived from *Bacillus thuringiensis* (Bt), a soil bacteria. Bt protection is available alone or stacked with genes for tolerance to Roundup (glyphosate) or Liberty herbicides. Biotech seed to control rootworm is seed treated to control soil insects at planting.

The terminology of transgenic traits is confusing and differs from company to company. When purchasing seed, make sure:

** You understand which Bt traits you are buying and the limitations of each.

** When seed is delivered, check the delivery paperwork and bag tags against your original order.

** Confirm when ordering, reconfirm at delivery, and confirm again before spraying is the seed herbicide tolerant, and if so, which herbicide? If your fields are commercially sprayed, get written confirmation of which herbicide will be sprayed, and where.

** Save seed tags for the season, to aid in tracing back problems later in the season.

8

Product Line	Company	Corn borer hybrid is called:	Rootworm hybrid is called	Stacked borer & rootworm hybrid is called	Notes
Agrisure	Syngenta –Garst, Golden Harvest, NK	CB	RW	CB/ RW	CB trait also controls corn earworm & suppresses fall armyworm.
Yieldgard	Monsanto – Asgrow, Dekalb	Yieldgard corn borer	Yieldgard ‘rootworm’ ‘VT’	‘plus’ ‘VT triple’	VT stands for Vector-stack Transformation. Monsanto says the VT process improves gene insertion, creating a better product. Yieldgard corn borer suppresses armyworm and earworm.
Genuity	Monsanto			SmartStax Vt Triple Pro	Genuity is a recently introduced rebranding of Monsanto traits to replace the YieldGard brand.
Herculex	Dow AgroSci - Pioneer	Herculex I	Herculex RW	Herc XTRA	Herculex I also controls western bean cutworm , armyworm, black cutworm, and suppresses corn earworm, although the control is not as complete as with corn borer.

Refuge Requirements for Bt corn

Producers using transgenic corn must follow an Insect Resistance Management (IRM) plan to delay the formation of resistance to Bt. IRM plans define the amount and placement of a non-Bt ‘refuge’ that produces insects which were not exposed to Bt. In theory, susceptible insects mate with the few resistant insects emerging from the Bt field, diluting resistance genes and delaying resistance.

Refuge details differ with the type of corn. Your neighbor is NEVER your refuge.

For the first time. In 2010 refuge size for Bt corn will **DIFFER BY BRAND**. Hybrids containing gene pyramids (ie. Different genes targeted against the same pest) will have a small overall refuge than hybrids with single genes or stacks of multiple genes for different pests.

Type of Corn	Refuge Size (% of acres or area)	Can the refuge be treated for the target pest?	Location of the refuge compared to the Bt field:	Refuge placement in field				
				Block within	Head-lands	Strips in field	Block outside	Seed mixture
Bt corn for ECB (Most)	20%	Yes, but cannot use a Bt spray	In field, adjacent, or within ½ mile	Yes	Yes	Yes, 4-row min. (6 preferred)	Yes	No
Bt corn for ECB (SmartStax)	5%	Yes, but cannot use a Bt spray	In field, adjacent, or within ½ mile	Yes	Yes		Yes	No
Bt corn for CRW	20%	Yes - Soil insecticide or seed treatment	In field or adjacent - for ex, across a road or ditch	Yes	Yes	Yes, 4-row min. (6 preferred)	Yes adjacent	No

SOYBEAN Seed Treatments

Several new seed treatments are registered for soybean to protect seeds from seedcorn maggot and wireworm. Maggot damage occurs under cool, wet conditions that delay germination, particularly in soils with decaying green material (for example, working in a cover crop). Wireworm damage may occur when planting into fallow ground. Cruiser and Gaucho are systemic, and move up into the growing plant to protect against certain foliar pests. However, the above-ground protection lasts a limited time – generally 35 to 40 days after planting – and infestation and damage can occur after the product runs out.

Trade name	Common name	Contains a fungicide?	Signal word	Seedcorn maggot	Wireworm	Soybean aphid	Bean leaf beetle	White grub	REI hrs	Notes
Acceleron 1X-409	imidacloprid	no	caution	1.6-3.2 oz/ 100 lbs		1.6-3.2 oz/ 100 lbs “reduces damage”			12	
Attendant 600	imidacloprid	no	caution	1.6-3.2 oz/ 100 lbs		1.6-3.2 oz/ 100 lbs			12	Use higher rate for heavier insect pressure.
Cruiser 5FS & Maxx Pak	thiamethoxam	Apron, if purchasing Maxx Pak	caution	1.28 oz per 100 lbs					12	Check label for plant back restrictions.
Enhance AW	imidacloprid	captan vitavax	danger	5 oz per 100 lbs seed						
Gaucho SB Flowable & 480 Flowable	imidacloprid	no	caution	2-4 oz/ 100 lbs	--	2-4 oz / 100 lbs “reduces damage”	--		12	Check label for plant-back restrictions.
Gaucho 600	imidacloprid	no	caution	1.6-3.2 oz/ 100 lbs	--	1.6-3.2 oz/ 100 lbs	--		12	

10

WHEAT (and barley) Seed Treatments

Trade name	Common name	Contains a fungicide?	Signal word	Aphids (fall)	Wireworm	REI hrs	Notes
Attendant 600	imidacloprid	no	caution	0.8 – 2.4 oz/ 100 lbs	0.13 – 0.26 oz/ 100 lbs (suppression only)	12	
Cruiser 5FS	thiamethoxam	no	caution	0.75 to 1.33 oz/ 100 lbs	0.19 to 0.25 oz/100 lbs	12	Protection in the fall (winter wheat) or early spring (barley)
Enhance AW	imidacloprid	captan vitavax	danger	4 oz per 100 lbs		--	