2010 Field Crop Insect Management Guide

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This is your reference copy of the 2010 edition of the NORTH DAKOTA INSECT MANAGEMENT GUIDE. The recommendations conform to the current federal and state laws and regulations relating to pesticidal chemicals at the time of printing. However, since pesticide recommendations are frequently subject to change, and inasmuch as this publication is revised only once each year, it is extremely important that you keep in contact with North Dakota State University for up-to-date information on possible changes in certain insecticide use patterns.

The Federal Insecticide, Fungicide and Rodenticide Act, as amended, makes it illegal to use any pesticides in a manner inconsistent with the label. Therefore, it is of the utmost importance that insecticide users READ, UNDERSTAND and FOLLOW all label directions and precautions.

Trade names have been used in some cases for simplicity and their usage does not imply endorsement of one product over another nor discrimination against any product by the North Dakota State University Extension Service. Some compounds have been omitted because they are not available, present unnecessary hazards to the user, or there is a lack of efficacy when compared to other available products.

CAUTION!!!

The entomology staff at North Dakota State University believes that the recommendations in the guide are essentially accurate. However, since we do not exercise control over their use and the manner or conditions under which they are used, we assume no responsibility for personal injury, property damage or other types of loss resulting from the handling or use of the pesticides listed herein. PLEASE DISCARD ALL EARLIER EDITIONS OF THE NORTH DAKOTA INSECT MANAGEMENT GUIDE.

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INSECTICIDE CONTROL RECOMMENDATIONS

The following recommendations include only the application of chemicals for the control of some of the important insect and mite pests. Keep in mind that the most effective and economical controls for many of these pests involve a complete program of cultural and mechanical as well as chemical operations.

For more complete information on any particular pest, consult reference material, such as textbooks, bulletins, circulars and leaflets covering the specific problem.

Some recommendations for the use of insecticides are given in terms of pounds or ounces of actual toxicant per acre or as percent of actual toxicant in the finished spray. This is necessary because of the wide variety of insecticide formulations and of equipment for applying them.

Insecticides usually are available as emulsifiable concentrates, wettable powders, dusts, granules or solutions. Each is designed for a specific method of application. For example, dusts are formulated to be applied dry; wettable powders are designed mainly for high gallonage pressure sprayers as used for spraying livestock; the emulsifiable concentrates, when diluted with water, form emulsions which may be used in low gallonage, low pressure sprayers. The job to be done and the equipment to be used will govern the type of formulation to recommend.

Actual Toxicant Per Acre

Most applications to cereal and field crops are made in the form of sprays using emulsifiable concentrates or dusts. With dusts, it is relatively simple to determine the amount of dust to apply per acre. If the recommendation calls for 2 pounds of actual insecticide per acre and a 5 percent dust is used, then 40 pounds of the dust would have to be put on each acre to get 2 pounds of actual insecticide per acre.

When using emulsifiable concentrates, read the label on the container to determine the amount of actual toxicant, or active ingredient, per gallon. Generally, for 25 percent concentrates, there are 2 pounds of actual toxicant per gallon; for 45 percent concentrates, there are 4 pounds of actual toxicant per gallon, etc.

The following tables may be used for determining the amount of material to use per acre. It is important to calibrate sprayers so that applications will be made accurately. This will ensure effectiveness and will tend to avoid waste of chemicals and accumulations of possibly dangerous residues.

Tolerance and Preharvest Intervals

A "tolerance" is the maximum amount of pesticide residue that may lawfully remain in or on food. Some pesticides, because of their chemical structure, leave no residue at all. Others are not harmful to humans when present in minute quantities. Still others are known to be harmful when present in food and so cannot be present even in minute quantities.

A preharvest interval is the time required between applications and harvest which will ensure conformance with the tolerance. The preharvest intervals established vary with the pesticide and the ultimate usage of it. In many instances, a pesticide cannot be used simply because it is not possible to adhere to the recommended preharvest interval.

ABBREVIATIONS USED THROUGHOUT THIS DOCUMENT

A	=	acre	FM	=	flowable microencapsulated	RUP	=	Restricted Use Pesticide
AI	=	active ingredient	G	=	granular	sol	=	solution
bu	=	bushel	GPA	=	gallons per acre	SP	=	soluble powder
D	=	dust	gal	=	gallon	ST	=	Seed Treatment
EC	=	emulsifiable concentrate	lb	=	pound	sq ft	=	square feet
F	=	flowable	oz	=	ounce	T	=	tablespoon
fl	=	fluid	PHI	=	pre-harvest interval	t	=	teaspoon
fl oz	=	fluid ounce	pt	=	pint	ULV	=	ultra low volume
			qt	=	quart	WP	=	wettable powder

North Dakota

Pesticide Poison Information

Toll - Free Number

(800) 222 - 1222

INSECTICIDE CLASSES

Insecticides can be classified in a number of ways. The following table provides a listing of some common insecticide products used in North Dakota with their chemical classification designated.

Alternating the class of insecticide used for controlling insects can delay or even prevent resistance to those chemicals. Reliance on a single chemical or a group of chemicals in the same class of insecticides could lead to development of resistance at a faster rate.

Resistance develops when survivors of a chemical application are able to pass on the genetic trait responsible for survival to their offspring. If a control failure occurs with a chemical, do not use it in a follow-up treatment, nor should a chemical from the same class be used (cross-resistance).

Trade Name	Active Ingredient	Insecticide Class [1]
Abamectin E-AG	abamectin	M
Acephate	acephate	OP
Actara	thiamethoxam	N
Actellic	pirimiphos-methyl	OP
Adjourn	esfenvalerate	P
Admire	imidacloprid	N
Agrimek	abamectin	M
Ambush	permethrin	P
Apistan	fluvalinate	P
Arctic	permethrin	P
Assail	acetamiprid	N
Asana XL	esfenvalerate	P
Attendant 600	imidacloprid	N
Avaunt	indoxacarb	O
Aztec	cyfluthrin + tebupirimiphos	P + OP
Bt	*Bacillus thuringiensis*	M
Baythroid XL	beta-cyfluthrin	P
Belay	clothianidin	N
Beleaf	flonicamid	PC
Bifenture	bifenthrin	P
Brigade	bifenthrin	P
Brigadier	imidacloprid + bifenthrin	N + P
Capture	bifenthrin	P
Chlorpyrifos 4E AG	chlorpyrifos	OP
Colbalt	chlorpyrifos + gamma cyhalothrin	OP + P
Concur	imidacloprid	N
Counter	terbufos	OP
Coragen	chlorantraniliprole	AD
Cruiser	thiamethoxam	N
Cygon	dimethoate	OP
Danitol	fenpropathrin	P
Delta Gold	deltamethrin	P
Di-Syston	disulfoton	OP
Diacon II	methoprene	IGR
Dibrom	naled	OP
Digon	dimethoate	OP
Dimethoate	dimethoate	OP
Dimilin	diflubenzuron	IGR
Dyna Shield Imidacloprid 5	imidacloprid	N
Dipel	*Bacillus thuringiensis*	M
Epi-mek	abamectin	M
Endigo ZC	lambda-cyhalothrin + thiamethoxam	P + N
Enhance EW	imidacloprid	N
Lattitude	imidacloprid	N
Leverage	imidacloprid + cyfluthrin	N + P
Lorsban	chlorpyrifos	OP
Lorsban Advanced	chlorpyrifos	OP
Malathion	malathion	OP
Mana Alias	imidacloprid	N
Margosan-O	azadirachtin	B
Marlate	methoxychlor	CH
Mavrik	fluvalinate	P
Mesurol	methiocarb	C
Methyl Parathion	methyl parathion	OP
Mocap	ethoprop	OP
Monitor	methamidophos	OP
Movento	spirotetramat	TA
Mustang Max	zeta-cypermethrin	P
Mustang Max EC	zeta-cypermethrin	P
NipsIT Inside	clothianidin	N
Nolobait	*Nosema locustae*	M
Nuprid	imidacloprid	N
Orthene	acephate	OP
Parathion	ethyl parathion	OP
Penncap-M	methyl parathion	OP
Permethrin	Permethrin	P
Perm-Up	Permethrin	P
Platinum	thiamethoxam	N
Poncho	clothianidin	N
Poncho Beta	chothianidin	N
Pounce	permethrin	P
Proaxis	gamma-cyhalothrin	P
Prosper	clothianidin	N
Provado	imidacloprid	CN
Pydrin	fenvalerate	P
Radiant SC	spinetoram	S
Regent	fipronil	PP
Reldan	chlorpyrifos-methyl	OP
Respect	zeta-cypermethrin	P
Rimon	novaluron	IGR
Scourge	resmethrin	P
Senator 600	imidacloprid	N
Sevin	carbaryl	C
Silencer	lambda-cyhalothrin	P
Sniper	bifenthrin	P
Steward	Indoxacarb	O

Trade Name	Active Ingredient	Insecticide Class [1]
Fanfare	bifenthrin	P
Force	tefluthrin	P
Fortress	chlorethoxyfos	OP
Fullfill	pymetrozine	PA
Furadan	carbofuran	C
Gaucho 600	imidacloprid	N
Grizzly Z	lambda-cyhalothrin	P
Guthion	azinphos-methyl	OP
Govern	chlorpyrifos	OP
Helix	thiamethoxam	N
Hero	zeta-cypermethrin + bifenthrin	P
Imidan	phosmet	OP
Inteprid	methoxyfenozide	IGR
Kaiso	lambda-cyhalothrin	P
Karate	lambda-cyhalothrin	P
Kelthane	dicofol	CH
Kryocide	cryolite	IC
Lambda-Cy	lambda-cyhalothrin	P
Lannate	methomyl	C
Larvin	thiodicarb	C
Storcide	chlorpyrifos-methyl + cyfluthrin	OP + P
Success	spinosad	S
Temik	aldicarb	C
Tempo	cyfluthrin	P
Temprano	abamectin	M
Thimet	phorate	OP
Tiguvon	fenthion	OP
Tombstone	cyfluthrin	P
Tombstone Helios	cyfluthrin	P
Tracer	spinosad	S
Triumph	isazophos	OP
Tundra	bifenthrin	P
Voliam Xpress	lambda-cyhalothrin + chlorantraniliprole	P + AD
Voliam Flexi	thiamethoxam +	N + AD
Warbex	famphur	OP
Warhawk	chlorpyrifos	OP
Warrior II	lambda cyhalothrin	P
Whirlwind	chlorpyrifos	OP
Yuma 4E	chlorpyrifos	OP

[1] AD=anthranillic diamide; B=botanical; C=carbamate; CD=cyclodiene; CH=chlorinated hydrocarbon; IC = inorganic compound, IGR=insect growth regulator; O = oxadiazine; OP=organophosphate; P=pyrethroid; PA=pyridine azomethines, PC = pyridine carboxamide, PP = phenylpyrazole; M=microbial; N=neonicotinoid; S=spinosyn; TA=tetramic acid.

TOXICITY OF INSECTICIDES

All insecticides are classified as poisons, although there are considerable variations in the degree of toxicity to warm-blooded animals and fish. Toxicity refers to the degree to which a specific insecticide is poisonous to animals. Toxicity is classified as acute (severe) or chronic (long term) and it varies with the species, age, sex and method of administration to animals, nutritional state, and the type of insecticide formulation used.

Poisoning with insecticides may occur through the mouth and nose (oral) or through skin contact (dermal). Poisoning through the mouth usually requires less insecticide to kill, although the greatest potential for occupational hazard in the use of insecticides is more closely associated with skin contamination.

The tests used to determine the toxicity of insecticides involve laboratory animals. Toxicity is expressed as LD_{50} which means the lethal dosage required to kill 50 percent of the test animal population. The amount of material needed to produce a lethal dose is expressed as milligrams of toxicant per kilogram of live animal weight (mg/kg).

CLASSIFICATION OF ACUTE ORAL TOXICITY FOR DIFFERENT CHEMICALS AND LETHAL DOSAGE FOR 150 POUND MAN

Class	Signal Word	LD_{50}, mg/kg	Lethal Dose For 150 Pound Man
Highly toxic	Danger / Poison	50 & below	few drops to 1 teaspoon
Moderately toxic	Warning	above 50 - 500	1 teaspoon to 1 ounce
Toxic	Caution	above 500 - 5,000	1 ounce to 1 pint or 1 pound
Non-toxic	Caution	above 5,000	1 pint to more than 1 quart

THE EFFECT OF WATER PH ON INSECTICIDES

In recent years, another consideration in the application of insecticides is the pH of the water to be used for spraying. This is particularly important when organophosphate and carbamate insecticides such as Guthion, parathion, malathion, carbaryl and others are to be used. Experience in the Red River Valley area of North Dakota indicates that water with a pH of 8.0 - 8.2 or higher will cause rather rapid degradation of these insecticides while in solution. Buffering effects occur while the insecticide is in the spray solution, from mixing, through storage in the tank and continues until the water has evaporated from the spray droplet lying on the leaf.

Half-Life* of Some Insecticides At Different Water pH

Insecticide Product	Buffering Advised	Optimum pH	Half-Life for given pH					
			9.0	8.0	7.0	6.0	5.0	4.0
Actara		7.0	Susceptible to alkaline hydrolysis in pH<9.0					
Actellic		7.0		12 days	35 days		7 days	
Admire		6.0	355 days		Fully stable at a pH of 5 and 7			
Ambush (permethrin)		7.0		Stable at pH 6.0 - 8.0				
Asana XL		7.0	Stable over a pH 5.0 - 9.0 range					
Di-Syston	●	5.0	7.2 hours			32 hours	60 hours	
Diazinon		7.0	29 days		70 days		14 days	
Dibrom	●	5.0	Hydrolized in 48 hours In pH > 7					
Dimethoate / Digon	●	5.0	48 min.			12 hours		20 hours
Dipel (*Bac.*		6.0	Unstable in pH>8.0					
Furadan	●	5.0	78 hours			8 days		
Guthion	●	5.5	12 hours		10 days		17 days	
Imidan	●	5.0		4 hours	12 hours			13 days
Lannate		6.5				stable in slightly acidic water		
Lindane			11 days		27 weeks			
Lorsban		7.0		1.5 days	35 days		63 days	
Malathion	●	5.0	5 hours	19 hours	3 days	8 days		
Monitor	●	5.5	Decomposes rapidly at pH > 7					
Orthene (acephate)		7.0	16 days		46 days		40 days	
Pounce (permethrin)		7.0			Stable at pH 6.0 - 8.0			
Provado		7.0	Stable over wide range of pH					
Reldan		7.0		3 days		38 days		10 days
Sevin (carbaryl)	●	7.0	24 hours	2.5 days	12 days			
Spintor		7.0	Stable in pH from 6.0 to 11.0				12 hours	
Thiodan		6.5	some alkaline hydrolosis					
Vydate	●	5.0	3 hours		8 days		stable at 4.7 pH	
Warrior II		6.0			stable in pH 4.5 - 7.5			

* Half-life is the time it takes for 50% of the chemical to decompose.

REPORTING DAMAGE DUE TO PESTICIDE APPLICATIONS

Effective April 3, 2007

AN ACT to create and enact a new section to chapter 4-35 of the North Dakota Century Code, relating to notification of alleged pesticide damage; to repeal sections 4-35-21, 4-35-21.1, and 4-35-21.2 of the North Dakota Century Code, relating to reports of loss resulting from pesticide application; and to declare an emergency.

A new section to chapter 4-35 of the North Dakota Century Code is created
and enacted as follows:

Pesticide application - Alleged property damage - Notification of applicator.

1. a. Before a person may file a civil action seeking reimbursement for property damage allegedly stemming from the application of a pesticide, the person shall notify by certified mail the pesticide applicator of the alleged damage within the earlier of:
(1) Twenty-eight days from the date the person first knew or should have known of the alleged damage; or
(2) Before twenty percent of the crop or field allegedly damaged is harvested or destroyed.
b. Subdivision a does not apply if the person seeking reimbursement for property damage was the applicator of the pesticide.

2. Upon notifying the applicator as required under subsection 1, the person seeking reimbursement for the alleged property damage shall permit the applicator and up to four representatives of the applicator to enter the person's property for the purpose of observing and examining the alleged damage. If the person fails to allow entry, the person is barrefrom asserting a claim against the applicator.

SECTION 2. REPEAL. Sections 4-35-21, 4-35-21.1, and 4-

35-21.2 of the North Dakota Century Code are repealed. SECTION 3. EMERGENCY. This Act is declared to be an emergency measure.

Further inquiries should be directed to:

Department of Agriculture
State Capitol Building
Bismarck, North Dakota 58505

Phone: 1-800-242-7535

North Dakota Department of Agriculture

http://www.agdepartment.com

NORTH DAKOTA FIELD POSTING REQUIREMENTS

Effective July 1, 2004, North Dakota no longer has additional posting requirements for pesticides that are more demanding than federal labeling requirements. However, all pesticides that require posting on the label under the Environmental Protection Agency worker protection standard must be posted according to the Environmental Protection Agency worker protection standard.

MANAGING INSECTICIDES TO PREVENT GROUNDWATER CONTAMINATION

The potential for insecticide movement into groundwater exists wherever insecticides are used, but the extent varies with the chemical nature of the insecticide, the soil and other factors such as volatilization (with subsequent loss to the atmosphere), decomposition, soil retention and transport by water. Volatilization and decomposition reduce the total amounts of insecticides available for downward movement, soil retention decreases the availability of the insecticide for downward movement, and transport by water relates to the movement of insecticides with soil water. In addition, small quantities of insecticides are removed from the land in agricultural products.

The amount of insecticide applied affects the potential for groundwater contamination. The potential movement to groundwater of relatively mobile water-soluble insecticides may be much increased where large amounts have entered the soil, such as areas fused for fill stations, tank rinsing and equipment washing. In most areas, these practices should be carried out on concrete pads (or pads made from other impermeable material) and the liquid should be collected for disposal.

Organochlorines such as DDT and endrin were among the early synthetic organic insecticides. Low water solubility and a strong tendency to adsorb to soil have virtually precluded their appearance as groundwater contaminants resulting from agricultural applications.

Organophosphorus insecticides present a wide spectrum of both physiochemical properties and agricultural uses. They are generally less persistent than organochlorines and have been used to replace some organochlorine insecticides no longer registered in the United States. Breakdown in soil typically begins from reaction with water by natural and microbial hydrolysis. Examples of organophosphorus compounds include mevinphos, malathion and methyl parathion, listed in order of increasing persistence. This class of insecticides has not been detected in groundwater.

Three important members of the carbamate group are carbaryl, carbofuran and aldicarb. These are listed in order of increasing mobility, susceptibility to hydrolysis, and mammalian toxicity. Aldicarb (used also as a nematicide) is readily oxidized in soil. Aldicarb, aldicarb metabolites, and carbofuran have all been detected in groundwater.

Pyrethroids include natural products and the newer family of synthetic derivatives, e.g., permethrin, cypermethrin, esfenvalerate and lambda cyhalothrin. They are usually degraded quickly in soil and are unlikely to leach.

The following table gives the relative persistence and mobility of insecticides used in North Dakota. Bear in mind that the persistence and mobility classification assigned to each insecticide is approximate because environmental variation will influence persistence and mobility. Whenever several insecticide options exist for the pest/site to be treated, this data will help pesticide users and advisors select the insecticide that presents the least potential for movement to groundwater. This is particularly true when insecticide applications are anticipated in areas with a high risk for groundwater contamination.

Summary of Groundwater Contamination Potential As Influenced by Water, Pesticide and Soil Characteristics

	Low Risk	High Risk
Pesticide Characteristics		
water solubility	low solubility	high solubility
soil adsorption	highly adsorbed	poorly adsorbed
persistence	short half-life (a few days)	long half-life (several weeks)
Soil Characteristics		
texture	fine clay	coarse sand
organic matter	high O.M.	low O.M.
macropores	few, small	many, large
depth to groundwater	deep (20+ ft)	shallow (<10 ft)
Water Volume		
rain/irrigation	small volumes at infrequent intervals	large volumes at frequent intervals

Relative Persistence and Mobility of Insecticides in Soils

Insecticide	Persistence[a]	Mobility[b]
acephate (Orthene)	M	VM
aldicarb (Temik)	M	MM
azinphos-methyl (Guthion)	N	NI
carbaryl (Sevin)	N	NI
carbofuran (Furadan)	M	MM
chlorpyrifos (Lorsban, Dursban)	N	NI
diazinon	M	SM
dimethoate (Digon)	N	MM
disulfoton (Di-Syston)	N	NI
endosulfan	N	NI
esfenvalerate (Asana)	M	I
fenvalerate (Pydrin)	M	I
fonofos (Dyfonate)	M	NM
malathion (Cythion)	N	NI
methomyl (Lannate)	N	SM
methyl parathion (Penncap-M)	N	I
methidathion (Supracide)	N	SM
monocrotophos (Azodrin)	N	MM
parathion	N	I
permethrin (Ambush, Pounce)	N	I
phorate (Thimet)	N	NI
phosphamidon (Dimecron)	N	MM
terbufos (Counter)	N	NI
tralomethrin (Scout)	M	I
trichlorfon (Dylox)	N	VM
trimethacarb (Broot)	M	NI

[a] P = persistent; M = moderately persistent; N = nonpersistent;

[b] VM = very mobile; MM = moderately mobile; SM = slightly mobile; NI = nearly immobile; I = immobile

Summary of Suggested Pesticide Management Practices to Prevent Groundwater Contamination

Since site conditions, pest and crop patterns, and agricultural practices vary widely, specific recommendations for practices to reduce the risk of pesticide contamination must be specific and cannot be appropriate for all situations. However, measures to protect groundwater from pesticides generally involve the following objectives:

- Reduce the quantity of pesticide used (use the lowest effective rate).
- Use pesticides with less potential to leach.
- Use pesticides that are not persistent.
- Avoid pesticide application if conditions favor leaching.
- Prevent spills leading to a concentration of pesticide at a site which can leach to groundwater.
- Prevent back-siphoning or direct movement of pesticides down a well.

Protecting Your Groundwater Through Farmstead Assessment: There are numerous NDSU Extension circulars which address the issue of protecting groundwater from agricultural products. A listing and access to these circulars can be found on the Internet at: **http://www.ext.nodak.edu/extpubs/watgrnd.htm**

INSECTICIDE SEED TREATMENTS

Seed or planter box treatments are used on a wide variety of North Dakota crops for protection from **seedcorn maggot, seedcorn beetle and/or wireworms**. The following tables highlight labeled crops and composition of common seed treatments. Always follow label directions. Protective clothing and equipment for mixing and handling are specified on the label. Mix thoroughly to ensure adequate protection. Treat only enough seed needed for immediate use. Do not store treated seed near feed or foodstuffs. Do not feed to livestock. Dispose of excess treated seed as specified on the label (usually burial).

Slurry Seed Treatment: Seed treatments may be applied as a slurry as seed is being augered into a drill, planter or truck. The treating equipment meters chemical into an auger conveyor where it is mixed with seed. The equipment is designed to mount to a truck bed, bin or transport augers and drill fill augers. Treaters consist of a metered pump, hoses and tank. The equipment is commonly used in bulk seed operations, providing uniform application of chemical to seed which enhances seed treatment performance.

Planter-box Treatment: Seed treatments should be thoroughly mixed with seed to ensure sufficient coverage. Recommendations for maximizing the effectiveness of planter-box seed treatments are as follows:

1. Fill box half full of seed.
2. Add half of required amount of product and mix thoroughly with paddle or stick.
3. Add remainder of seed to planter-box and the rest of product.
4. Mix well - thorough coverage is essential.
5. At end of day, clean planter population monitors.

Inoculants in Combination with Seed Treatments*:*
Do not confuse seed inoculation with chemical seed treatment. Most seed disinfectants, including fungicides, are toxic to *Rhizobia* bacteria. Do not apply inoculum to seeds that are treated with a bactericide, such as streptomycin, unless you use a resistant strain of the *Rhizobia*. Although some *Rhizobia* species are slightly tolerant to certain chemical compounds, inoculating chemically treated legume seed requires special precautions. Check with the inoculum manufacturer regarding compatibility when considering combining products.

The following are some general guidelines when using seed treatments and inoculants:

- Insecticides are more toxic than fungicides, which are more toxic than herbicides.
- In-furrow inoculant applications are preferred when seed treatments have been used.

- If a seed treatment and inoculant are combined on the seed, minimize exposure time; less than 4 hours is best. Some *Rhizobia* may be killed immediately; check compatibility charts prior to use. The 2005 Fungicide Guide also has information about fungicide seed treatment effects on inoculants.
- If liquid pesticides are used, apply first and allow to dry before inoculant is applied.
- Powder-based inoculants protect *Rhizobia* better than liquid-based inoculants.
- When using pre-treated seed, check with the inoculant formulator for comments on compatibility.

Seed Treatments Approved by Crop

Seed Treatment	Corn	Wheat	Barley	Soybean	Sunflower	Dry Bean	Peas	Sugarbeet	Potato	Canola	Mustard	Lentils	Chickpeas	Safflowers	Flax
Planter-Box Treatments															
Assault 25	●			●											
Concur	●														
Enhance AW		●	●	●		●	●					●	●		
Latitude	●			●											
Commercial Seed Treatments															
Attendant 600**	●	●	●	●		●	●			●	●	●	●		
Belay 2.13SC									●						
Cruiser 5FS*	●	●	●	●	●	●	●		●			●	●	●	●
Cruiser MAXX Beans*				●		●	●					●	●		
Cruiser MAXX Cereals*		●	●												
Cruiser MAXX Potatoes*									●						
Dyna-Shield Imidacloprid 5**	●	●	●	●	●			●		●	●			●	●
Force ST *	●														
Gaucho 600*	●	●	●	●	●	●	●	●			●	●	●	●	●
Gaucho XT, Grande*		●	●												
Gaucho MZ									●						
Helix Lite *										●					
Helix XTra*										●					
Lorsban 30 *						●	●								
Lorsban 50SL*						●	●								
NipsIT Inside								●		●					
Poncho Beta*								●							
Poncho 600 *	●									●					
Profound *	*for commercial treatment of numerous vegetable seed types, refer to label for listing*														
Prosper FX*										●					
Regent TS*	●														
Raxil MD-W **		●	●												
Senator 600**	●	●	●	●		●	●	●		●	●	●	●		

*Available only through commercial seed treatment.
**This product is for commercial or on-farm application.

Insecticide/Fungicide Composition (% ai) of Seed Treatments

	beta-Cyfluthrin	Chlorpyrifos	Permethrin	Tefluthrin	Imidacloprid	Thiamethoxam	Clothianidin	Fipronil	Carboxin	Captan	Metalaxyl	Tebuconazol	Difenoconazol	Mefanoxam	Fludioxonil	Mancozeb	Trifloxystrobin
Seed Treatment	**Insecticides**								**Fungicides**								
Assault 25	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Attendant 600 FS**	-	-	-	-	48.7	-	-	-	-	-	-	-	-	-	-	-	-
Belay 2.13SC**	-	-	-	-	-	-	23.6	-	-	-	-	-	-	-	-	-	-
Concur	-	-	-	-	25	-	-	-	-	-	1	-	-	-	-	-	-
Cruiser 5FS *	-	-	-	-	-	47.6	-	-	-	-	-	-	-	-	-	-	-
Cruiser MAXX *	-	-	-	-	-	22.61	-	-	-	-	-	-	-	1.70	1.12	-	-
Cruiser MAXX Cereals*	-	-	-	-	-	2.8	-	-	-	-	-	-	3.36	0.56	-	-	-
Cruiser MAXX Potatoes *	-	-	-	-	-	28		-	-	-	-	-	-	-	7	-	-
Diazinon 50W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dyna-Shield Imidacloprid 5**	-	-	-	-	48.7	-	-	-	-	-	-	-	-	-	-	-	-
Enhance AW	-	-	-	-	20	-	-	-	20	20	-	-	-	-	-	-	-
Force ST *	-	-	-	26.8	-	-	-	-	-	-	-	-	-	-	-	-	-
Gaucho Grande *	-	-	-	-	48.7	-	-	-	-	-	-	-	-	-	-	-	-
Gaucho XT	-	-	-	-	75	-	-	-	-	-	0.8	0.62	-	-	-	-	-
Gaucho 600 *	-	-	-	-	48.7	-	-	-	-	-	-	-	-	-	-	-	-
Gaucho MZ	-	-	-	-	1.25	-	-	-	-	-	-	-	-	-	-	6	-
Helix Lite *	-	-	-	-	-	10.3	-	-	-	-	-	-	1.24	0.4	0.13	-	-
Helix Xtra *	-	-	-	-	-	20.7	-	-	-	-	-	-	1.25	0.4	0.13	-	-
Kernel Guard Supreme	-	-	10.4	-	-	-	-	-	14.4	-	-	-	-	-	-	-	-
Latitude	-	-	-	-	25	-	-	-	14	-	1	-	-	-	-	-	-
Lorsban 30 *	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lorsban 50SL*	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NipsIT Inside	-	-	-	-	-	-	47.8	-	-	-	-	-	-	-	-	-	-
Poncho Beta*	4.6	-	-	-	-	-	34.3	-	-	-	-	-	-	-	-	-	-
Poncho 600 *	-	-	-	-	-	-	48.0	-	-	-	-	-	-	-	-	-	-
Profound	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prosper FX*	-	-	-	-	-	-	21.75	-	3.81	-	0.4	-	-	-	-	-	9.5
Raxil MD-W**	-	-	-	-	1.5	-	-	-	-	-	0.6	0.46	-	-	-	-	-
Regent TS*	-	-	-	-	-	-	-	56	-	-	-	-	-	-	-	-	-
Senator 600**	-	-	-	-	48.7	-	-	-	-	-	-	-	-	-	-	-	-

*Available only through commercial seed treatment.
**This product is for commercial or on-farm application.