

2008 Field Crop Insect Management Guide

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This is your reference copy of the 2008 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	sq ft = square feet
EC = emulsifiable concentrate	lb = pound	T = tablespoon
F = flowable	oz = ounce	t = teaspoon
fl = fluid	PHI = pre-harvest interval	ULV = ultra low volume
fl oz = fluid ounce	pt = pint	WP = wettable powder
	qt = quart	

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 compounds. Reliance on a single compound or a group of compounds 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 compound, do not use it in a follow-up treatment, nor should a compound from the same class be used (cross-resistance).

INSECTICIDE CLASSES

Trade Name	Active Ingredient	Insecticide Class ¹	Trade Name	Active Ingredient	Insecticide Class ¹
Acephate	acephate	P	Larvin	thiodicarb	C
Actara	thiamethoxam	N	Latitude	imidacloprid	N
Actellic	pirimiphos-methyl	OP	Lorsban	chlorpyrifos	OP
Admire	imidacloprid	N	Malathion	malathion	OP
Agrimek	abamectin	M	Margosan-O	azadirachtin	B
Ambush	permethrin	P	Marlate	methoxychlor	CH
Apistan	fluralinate	P	Mavrik	fluralinate	P
Arctic	permethrin	P	MesuroI	methiocarb	C
Assail	acetamiprid	N	Methyl Parathion	methyl parathion	OP
Asana XL	esfenvalerate	P	Mocap	ethoprop	OP
Avaunt	indoxacarb	O	Monitor	methamidophos	OP
Aztec	cyfluthrin + tebufos	P + OP	Mustang Max	zeta-cypermethrin	P
<i>Bt</i>	<i>Bacillus thuringiensis</i>	M	Nolobait	<i>Nosema locustae</i>	M
Baythroid	beta-cyfluthrin	P	Nuprid	imidacloprid	N
Beleaf	Flonicamid	PC	Orthene	acephate	OP
Bifenture	bifenthrin	P	Parathion	ethyl parathion	OP
Brigade	bifenthrin	P	PennCap-M	methyl parathion	OP
Brigadier	imidacloprid + bifenthrin	N + P	Permethrin	Permethrin	P
Capture	bifenthrin	P	Perm-Up	Permethrin	P
Colbalt	chlorpyrifos + gamma cyhalothrin	OP + P	Platinum	thiamethoxam	N
Concur	imidacloprid	N	Pounce	permethrin	P
Counter	terbufos	OP	Proaxis	gamma-cyhalothrin	P
Cruiser	thiamethoxam	N	Prosper	clothianidin	N
Cygon	dimethoate	OP	Provado	imidacloprid	CN
Danitol	fenpropathrin	P	Pydrin	fenvalerate	P
Delta Gold	deltamethrin	P	Regent	flupyrifos	PP
Di-Syston	disulfoton	OP	Reldan	chlorpyrifos-methyl	OP
Diacon II	methoprene	IGR	Rimon	novaluron	IGR
Dibrom	naled	OP	Scourge	resmethrin	P
Digon	dimethoate	OP	Sevin	carbaryl	C
Dimethoate	dimethoate	OP	Sniper	bifenthrin	P
Dimilin	diflubenzuron	IGR	SpinTor	spinosad	S
Dipel	<i>Bacillus thuringiensis</i>	M	Steward	Indoxacarb	O
Epi-mek	abamectin	M	Storicide	chlorpyrifos-methyl + cyfluthrin	OP + P
Force	tefluthrin	P	Success	spinosad	S
Fortress	chlorethoxyfos	OP	Taiga Z	lambda-cyhalothrin	P
Fullfill	pymetrozine	PA	Temik	aldicarb	C
Furadan	carbofuran	C	Tempo	cyfluthrin	P
Gaicho	imidacloprid	N	Thimet	phorate	OP
Guthion	azinphos-methyl	OP	Tiguvon	fenthion	OP
Helix	thiamethoxam	N	Tombstone	cyfluthrin	P
Hero	zeta-cypermethrin + bifenthrin	P	Tombstone Helios	cyfluthrin	P
Imidan	phosmet	OP	Tracer	spinosad	S
Intrepid	methoxyfenozide	IGR	Triumph	isazophos	OP
Karate	lambda-cyhalothrin	P	Tundra	bifenthrin	P
Kelthane	dicofol	CH	Warbex	famphur	OP
Kryocide	cryolite	IC	Warhawk	chlorpyrifos	OP
Lambda-Cy	lambda-cyhalothrin	P	Warrior	lambda cyhalothrin	P
Lannate	methomyl	C	Yuma 4E	chlorpyrifos	OP

¹ 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.

TOXICITY OF INSECTICIDES

All insecticides are classified as poisons, although there are considerable variations in the degree of toxicity to warm-blooded animals. 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 insecticidal formulation used.

Poisoning with insecticides may occur through the mouth and nose (oral) or through skin contact (dermal). It usually requires less insecticide to kill when administered

through the mouth, 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 LD₅₀ 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	LD₅₀, 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

North Dakota Pesticide Poison Information Toll - Free Number **(800) 222 - 1222**

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	Hydrolyzed 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	

Insecticide Product	Buffering Advised	Optimum pH	Half-Life for given pH						
			9.0	8.0	7.0	6.0	5.0	4.0	
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 hydrolysis						
Vydate	•	5.0	3 hours		8 days		stable at 4.7 pH		
Warrior		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

The filing of the "Report of Loss" is required by North Dakota Century Code, Chapter 4-35, prior to any civil action proceedings regarding pesticide loss. This is merely a reporting procedure and any civil action must be pursued by you. The completed "Report of Loss" form must be filed with the following:

1. Commissioner of Agriculture
2. Operator or applicator allegedly responsible
3. Person contracting the work other than yourself

The "Report of Loss" form must be filed with the Commissioner of Agriculture within 60 (sixty) days from the occurrence of such loss or prior to the time when 50% of the crop was harvested. If, however, the applicant does not inform the claimant of the legal requirements for the claimant to file a verified report of loss, the claimant shall have one year from the date of the incident to file a verified report of loss. It is recommended that you establish evidence by pictures and/or by using an expert in the pesticide drift field. This verification is necessary in a court of law.

The "Proof of Service" form should be served upon (1) the operator or applicator, and (2) the person who has contracted the work. As you notice, the form can be served by a county sheriff or a disinterested person of legal age. Should you request the sheriff's service, there will be a cost

to you. The "Proof of Service" form should also be filed with the Commissioner of Agriculture within the specified time frame.

Any applicator receiving alleged pesticide damage claims shall notify the claimant, by certified mail (return receipt requested) of the verified report of loss notification required by North Dakota Century Code sections 4-35-21.4, 4-35-21.1, and 4-35-21.5 and shall retain the return receipt(s) and a photocopy of the notice for a period of three years.

"Report of Loss" and "Proof of Service" forms are available from the North Dakota Department of Agriculture. Request of forms and 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 used 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 physicochemical 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 nematocide) 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

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.

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 BM = very mobile; MM = moderately mobile; SM = slightly mobile; NI = nearly immobile; I = immobile

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
Planter-Box Treatments													
Assault 25	•			•									
Concur	•												
Latitude	•												
Commercial Seed Treatments													
Cruiser 5FS*	•	•	•	•	•	•	•		•			•	•
Cruiser MAXX Beans*				•		•	•					•	•
Cruiser MAXX Potatoes*									•				
Force ST *	•												
Gaicho 480*, 600*	•	•	•	•	•	•	•	•			•		
Gaicho XT, Grande*		•	•										
Gaicho MZ									•				
Helix Lite *										•			
Helix XTra*										•			
Lorsban 30 *						•	•						
Lorsban 50SL*						•	•						
Poncho 600 *	•									•			
Profound *	<i>for commercial treatment of numerous vegetable seed types, refer to label for listing</i>												
Prosper FX*										•			
Regent TS*	•												
Raxil MD-W **		•	•										

*Available only through commercial seed treatment.

**This product is for commercial or on-farm application.

Insecticide/Fungicide Composition of Seed Treatments

	Chlorpyrifos	Permethrin	Tefluthrin	Imidacloprid	Thiamethoxam	Clothianidin	Fipronil	Carboxin	Metaxyl	Tebuconazol	Difenoconazol	Mefanoxam	Fludioxonil	Mancozeb	Trifloxystrobin
Seed Treatment															
Assault 25	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-
Concur	-	-	-	25	-	-	-	-	1	-	-	-	-	-	-
Cruiser 5FS *	-	-	-	-	47.6	-	-	-	-	-	-	-	-	-	-
CruiserMAXX *	-	-	-	-	22.61	-	-	-	-	-	-	1.70	1.12	-	-
CruiserMAXX Potatoes *	-	-	-	-	28	-	-	-	-	-	-	-	7	-	-
Diazinon 50W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Force ST *	-	-	26.8	-	-	-	-	-	-	-	-	-	-	-	-
Gaicho Grande *	-	-	-	48.7	-	-	-	-	-	-	-	-	-	-	-
Gaicho XT	-	-	-	75	-	-	-	-	0.82	0.62	-	-	-	-	-
Gaicho 480 *	-	-	-	40.7	-	-	-	-	-	-	-	-	-	-	-
Gaicho 600 *	-	-	-	48.7	-	-	-	-	-	-	-	-	-	-	-
Gaicho 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	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poncho 600 *	-	-	-	-	-	48.0	-	-	-	-	-	-	-	-	-
Profound	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-
Prosper FX*	-	-	-	-	-	21.75	-	3.81	0.41	-	-	-	-	-	9.5
Raxil MD-W**	-	-	-	1.5	-	-	-	-	0.62	0.461	-	-	-	-	-
Regent TS*	-	-	-	-	-	-	56	-	-	-	-	-	-	-	-

*Available only through commercial seed treatment.

**This product is for commercial or on-farm application.