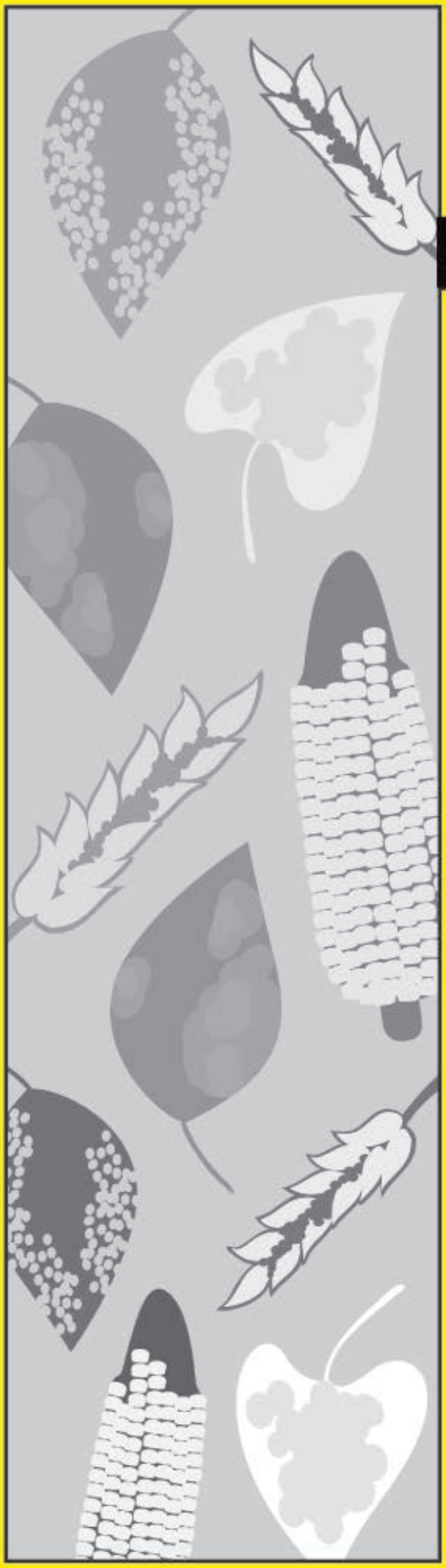

PP622-25

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2025

North Dakota Field Crop Plant Disease Management Guide

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DISCLAIMER

This plant disease management guide is based on the latest information available from the North Dakota Agricultural Experiment Station, U.S. Department of Agriculture, U.S. Environmental Protection Agency (EPA) and the agricultural chemical industry. The information conformed to federal and state regulations at the time of printing. The user should determine that the intended use is consistent with label directions. ***Designation that a product is labeled for control of a crop disease does not imply endorsement by the authors of use of that product or the degree of efficacy of that product for that use.***

Always follow the label directions. See individual fungicide labels for important information on:

- Safety recommendations and worker protection requirements
- Guidelines for ground, irrigation or aerial application
- Mixing procedures and tank mixes allowed
- Rotational and grazing restrictions
- Resistance management statements

LABEL PRECAUTIONS, RESTRICTIONS

Field re-entry, handling and loading precautions

Most fungicide labels state that workers either should not enter a sprayed field until the sprays have dried or should not enter for 24 hours unless they wear appropriate protective clothing. Information on use of protective clothing during mixing and loading also is given on the label. See the label for details.

Replant restrictions

Labels for all formulations of Ridomil have restrictions on what crops can be planted in less than a year following application of the product. These restrictions may vary somewhat depending on the formulation. Check these and all other labels **before** application to determine if replant restrictions will cause problems when determining what crop to plant next season.

Dosages

All dosages given in this guide are stated as the amount of formulated product (lb., oz., fl. oz., quarts) to use.

Restricted-use fungicides are fluids that are not available to the general public and are to be purchased and used by a certified pesticide applicator.

Fungicides containing triphenyltin hydroxide are restricted-use fungicides. These include products such as Super Tin, Agri Tin and Super Tin 4L. These are designated as RUP and Restricted-Use Pesticide in the tables.

Disclaimer

The information given herein is for educational purposes only. North Dakota State University does not endorse commercial products or companies, even though reference may be made to trade names, trademarks or service names. **Omission of labeled products is possible if information about the product was not available at the time of printing or if it had questionable efficacy. Products not normally available in North Dakota are omitted from the guide. Seed treatment chemicals that are primarily insecticides with subminimal amounts of fungicide also are omitted.**

The plant pathology faculty at North Dakota State University assume no responsibility for property damage, personal injury or other loss due to the use of fungicides listed in this publication because they have no control over the use or misuse of these products.

FUNGICIDE FORMULATIONS

Most fungicides are solids that are not soluble in water. To use them, they must be made into a formulation (preparation). Some of the more common formulations are listed below. The common abbreviation for each formulation is given in parentheses following the name.

Wettable powders (WP)

Many fungicides are wettable powders consisting of solid fungicide and a wetting agent. When mixed with water, they form a suspension. Many of these suspensions settle out quickly, so an agitator is needed in the spray tank to keep the particles in suspension.

Water-soluble pouch (WSP)

Some fungicides are available in water-soluble pouch containers. These pouches dissolve in the mixing tank and release the fungicide. This reduces the exposure of mixer and loader personnel to dust from the fungicide.

Dusts (D)

Dusts are powders that are mixed with inert ingredients to form a product with a low percent of active material. These are used around the home garden, and a few formulations are used in commercial applications.

Granules (G)

The active ingredient is incorporated into small granules of inert material such as clay. Granules are incorporated into the soil.

Emulsifiable concentrates (EC)

A fungicide that is insoluble in water is dissolved in an organic solvent. An emulsifying agent is incorporated in the formulation so an emulsion is formed when the product is mixed with water. An emulsion is a suspension of very tiny drops of the solvent/fungicide in the water. It usually has a milky appearance (milk itself is an emulsion of fats in water).

Flowables (F)

Flowables are insoluble fungicides ground into a very fine product, usually by a wet-grinding process. These particles are nearly colloidal and are suspended in water to form a thick liquid. They remain suspended in water for relatively long periods of time but should be agitated before use. They are dust-free, easy to mix, remain in suspension longer than wettable powders and also may resist washing off the plant better than the wettable powders. Examples of flowables include Champ Flowable, Kocide 4.5 LF, Vitavax 200 and Dithane F-45. They need to be protected from freezing.

Dry flowable (DF)

See dispersible granules. (Next page)

Dispersible granules (DG)

Dispersible granules also are called dry flowable formulations. They are small granules that pour from a container like a liquid but do not stick to the sides of the container and do not need to be protected from freezing. They are virtually dust-free and disperse readily in water to form a suspension. Examples include Bravo Ultrex DG, Dithane DF, Rainshield NT, Manzate 75 DF and Penncozeb DF.

Fumigants

Fumigants are liquids that turn into a gas after application. They generally are used for soil fumigation.

MODE OF ACTION OF FUNGICIDES

The action of most fungicides takes place outside the host and is called "*protection*." A fungicide that acts outside the host is called a "protectant fungicide." Most older fungicides sprayed on leaves and fruit are of this type. "*Therapy*" is chemical action inside the host. For example, fungicides are locally systemic and move into the plant at the site of deposition. Several triazole fungicides have several days of therapeutic action against wheat leaf rust and also reduce the production of viable spores; that is, spores capable of growing.

Most protectant fungicides are relatively stable by themselves. Generally, they are relatively insoluble in water and resist removal or chemical change by water, yet must be toxic to fungi. Often a chemical change is brought about by the fungus, the host or the environment before toxicity occurs. Toxicity simply means the ability to damage the fungus cells.

Fungicides may act to produce a toxic reaction in the fungus in several different ways. (1) Some may inhibit (slow down or stop) cell wall formation. (2) Some affect the permeability of the cell wall, causing a leaking of nutrient materials from the cell. (3) Some fungicides may combine with essential metals in a way that they become unavailable for normal cell functions, including the functioning of essential enzymes. (4) Other fungicides may inhibit respiration or nuclear division, or may break dormancy of spores.

Some fungicides also may be toxic to plants if applied at rates too high or if applied under unfavorable environmental conditions. This is called *phytotoxicity*. Formulations of maneb + zinc are less phytotoxic to many vegetables than formulations that contain only maneb. Sometimes the method of formulation may make a fungicide less phytotoxic.

TOXICITY OF FUNGICIDES

Effects of chemicals on humans

Fungicides have various levels of toxicity to humans. Human exposure (skin, eye, internal) to fungicides can result in mild to severe reaction. Due to high levels of toxicity, some fungicides are restricted-use only.

Symptoms associated with chemical poisoning are listed below. All symptoms are not associated with every pesticide. Some of these symptoms are described below, but consulting a physician always is wise. Avoid diagnosing the effects on yourself or others.

Eyes watering excessively
Stomach cramps
Dizziness
Vomiting
Excessive sweating
Pupils of the eye reduced in size
Rapid heart beat
Muscle tremors or convulsions
Extreme nervousness
Mental confusion, lack of coordination
Uncontrolled drooling or watering at the mouth
Severe burns of the skin
Loss of ability to use muscles
Difficulty in breathing
Unconsciousness

First aid

The following list should be considered:
Stop exposure
Call a physician
Remove contaminated and restrictive clothing
Drench contaminated area with water; flush repeatedly
Provide fresh air but prevent chilling and overheating
Avoid giving alcohol
Provide milk for patient to drink
Antidote - to be administered only by a physician

North Dakota Poison Control Center
Toll-free: (800) 732-2200

Toxicity ratings of pesticides

Pesticides generally are categorized according to acute **oral toxicity** (the toxicity when taken by mouth), but because users may absorb a significant quantity of the pesticide through their skin, **dermal toxicity** (toxicity when absorbed through the skin) is of equal or greater practical importance.

LD_{50} values generally show relative toxicities among the chemicals and are not truly representative of effects on humans, especially since they usually are obtained on rats. Actual toxicities do not constitute the only hazards associated with exposure to the chemicals. For instance, a chemical with low toxicity may be hazardous due to concentration, high volatility, careless use or effects of long-term exposure.

LD_{50} depends upon body weight. Thus, a given amount of chemical would have greater effect on a child than on an adult. LD_{50} also is proportional to the percent of active ingredient. A material only 50 percent active requires twice as much to produce a toxic effect as 100 percent pure material.

The lower the LD_{50} value, the greater the toxicity. A common standard for comparison is aspirin, which has an LD_{50} of 1,200 mg/kg and is considered slightly toxic.

The following table illustrates the various toxicity classes:

Oral Toxicity		Dermal (Skin) Toxicity	
LD_{50}-mg/kg	Toxicity Class	LD_{50}-mg/kg	Toxicity Class
1-50	High	1-200	Severe
50-500	Moderate	200-2,000	Moderate
500-5,000	Low	2,000-20,000	Mild
Over 5,000	Very Low	Over 20,000	Very Mild

Information on the LD_{50} of a specific fungicide and other toxicology information are available on the MSDS (Material Safety Data Sheet) for each product. These generally may be found at www.cdms.net.

PROTECTING GROUNDWATER

Pesticides differ in their persistence and mobility in soil. Those that are highly persistent or highly mobile are more liable to contaminate groundwater than those that are not. Areas of the state where groundwater is most at risk are areas with coarse-textured soils, are low in organic matter and have a high water table. Most fungicides are relatively immobile, especially in clay soils with high organic matter, because they are adsorbed on clay particles or on the organic matter.

A few fungicides are somewhat mobile. Take care in the use of these fungicides, particularly the application of these products through a sprinkler irrigation system in high-risk areas. Risks may be reduced by minimizing the amount of water used for application through a sprinkler system, more use of ground or aerial application instead of application through the sprinkler system, and use of a different fungicide that is less mobile.

The persistence and mobility of fungicides commonly used in North Dakota may be found in NDSU Extension Service publication EB-49, "Persistence and Mobility of Pesticides in Soil and Water."

HANDLING CHEMICALS

Avoid splashing and spilling. Wear a mask especially when handling dusts or powders. Some chemicals, when combined, have increased toxicity (potentiation).

Rinse containers several times after using chemicals. Pour rinsate into the spray tank when using the same chemical. Dispose of containers as indicated in the next section. Keep a record of plant disease control chemicals used and methods of handling.

FUNGICIDE LABELS

Fungicides are named according to their chemical composition or the *chemical name*. An example of a chemical name is a coordination production of zinc ion and manganese ethylene bisdithiocarbamate; the chemical names are required on the label. Since chemical names often are long, *common names* frequently are used; for example, the common name for the above chemical is mancozeb. Manufacturers use *trade names* to identify their specific products. For example, there are various trade names for mancozeb, such as Dithane, Manzate and Penncozeb.

In addition to the names on labels, various other required label information includes precautions in handling, antidotes or telephone contacts to use in case of accidental poisoning, recommendations for use, materials contained in the package and their percentages, the manufacturer's or distributor's name and address, and the EPA registration number.

Some fungicides are made up in various formulations for different uses or methods of application, such as wettable powders, dusts, emulsifiable concentrates, granules, flowables, dispersible granules or solutions. The nature of the chemical sometimes restricts it to one or a few of these formulations.

SEED TREATMENT

Cereals

Fungicidal seed treatment helps protect the seed from rotting and the emerging seedlings from damping off and seedling blight. These are caused by soil-borne pathogens. When seeds germinate under favorable soil conditions, the danger of seed and seedling attack from soil-borne pathogens is lessened unless seed is of poor quality. Treatment of seed with a protectant fungicide may help protect against soil-borne pathogens and thus help stand establishment when seeds are germinating under unfavorable conditions, such as cold, wet weather. Many products are available for protection against seedling blight.

Treating seeds with a fungicide also helps protect them from diseases that are seed-borne. These include the covered smuts, bunt, scab, black point and black semi-loose smut of barley, and loose smuts of wheat, barley and oats. Loose smuts of wheat and barley are internally seed-borne. Loose smut of oats is seed-borne as spores under the hulls. These smuts cannot be controlled by conventional protectant seed treatment fungicides, but are

controlled by systemic seed treatment products. The embryo test can be used by the North Dakota State Seed Department to determine if loose smut is present in barley seed. This test cannot be used for the loose smuts of oats or wheat or black semiloose smut of barley. All current barley varieties are susceptible to loose smut. An embryo test is recommended for barley seed; if infection is 2 percent or greater, seed treatment of barley with an effective fungicide seed treatment is advised.

Common (*Bipolaris, Helminthosporium* or *Cochliobolus*) root rot of wheat and barley is a chronic problem in North Dakota. Several seed treatment products are labeled for suppression of common root rot. Some seed treatments are also labeled for suppression of *Fusarium* root rot and take all root rot.

Chickpeas

Treating chickpea seed to protect against *Pythium* is essential for good emergence. A seed treatment to protect against seed-borne *Ascochyta* is important because this is a common and serious disease.

Dry beans and soybeans

Treating seed may reduce seedling blight during weather that is unfavorable for emergence. Do not use streptomycin with Rhizobium inoculant. If using captan seed treatments, in-furrow inoculant is preferable because inoculant does not survive well on captan-treated seed. Several products can be used to reduce the root rot potential, and many newer products have a broad spectrum of activity.

Flax

Treating flax seed with a fungicide helps protect against seed rot, damping off and seedling blight. Seed treatment is especially important in cases where the seed coats are broken, allowing entry of pathogens. Seed from fields heavily infected with Pasmo (*Septoria linicola*) may be susceptible to seedling blight and should be seed treated.

Potatoes

Treatment of cut-seed pieces helps protect the cut surface against seed-piece decay. Most seed treatments are fungicides that will protect against fungi such as *Pythium, Rhizoctonia, Helminthosporium* and *Fusarium*. Fungicides do not protect against bacteria such as *Erwinia* or *Clavibacter*. However, control of fungi indirectly helps control *Erwinia* bacteria because seed decay is greater in seed infected with fungi. The addition of streptomycin to fungicide has limited value because it will control only bacteria contaminating cut surfaces and may inhibit wound healing. Seed treatment will reduce or help control new infections but will not cure existing decay, prevent lenticel infection or prevent infection of roots and stolons away from the seed piece due to soil or environmental inoculum. Seed treatment is no substitute for using good, sound, healthy seed. Seed should be stored at less than 40 F during the winter. In the spring, warm the seed to 50 to 60 F for 1 1/2 to two weeks before planting or until it just begins to sprout. Do not handle the seed until it is warm. Plant the cut seed in warm (50 to 58 F at planting depth), moist soil. If cut seed must be held, store in a well-ventilated area for suberization at 50 to 60 F with a relative humidity of 85 percent. Hold for one week, then lower the temperature to 50 to 60 F. Ideally, plant when seed and soil are the same temperature; the optimum is 50 F.

Safflower

Safflower rust is both seed-borne and soil-borne. The most devastating phase of the disease is a seedling blight, and root and foot rot. Typical rust pustules develop later on the leaves. Seed-borne safflower rust is controlled by seed treatment.

Sunflower

Soil-borne downy mildew infections were controlled with metalaxyl or mefenoxam seed treatment in the past. The downy mildew fungus, however, has developed insensitivity to metalaxyl and mefenoxam in much of North Dakota, South Dakota and Minnesota, so these fungicides are not effective. Several fungicides or fungicide-insecticide combinations have received state or federal labels for seed treatment of sunflower for seed rot and seedling blights.

APPLICATION OF SEED TREATMENT

Seed may be treated commercially or it may be treated on the farm. Commercial seed treatment may use a slurry treater or various automatic seed treaters. The various automatic seed treaters differ considerably, so they cannot be discussed here. Commercial seed treatment has become more common in recent years for many crops.

On-farm treatment may use various home-type or slurry mixers. Drill-box seed treatment is popular because no extra steps are required; the seed is treated in the drill-box at planting time. Good disease control depends on uniform fungicide coverage of the seed, but this is more difficult to accomplish in drill-box treatment because the means of mixing the seed and fungicide is inadequate. For effective drill-box treatment, fill the box with one-third the quantity of seed and fungicide and mix carefully with a paddle; repeat with the next third and then the final third. The paddle should not be used for any other purpose and should be stored in a safe place, out of reach of children and animals.

On-farm auger seed treatment methods are common. The fungicide is metered into the base of the auger used to fill the drill box. This method assures fairly good mixing and coverage.

All seed treatments have certain basic precautions. Use care in handling seed treatment products; many are irritating to the eyes, nose and skin. Treated seed usually is identified by the dye used in the chemical, and treated seed should not be fed to livestock or used for human food. Pesticide containers should be disposed of properly in a landfill or buried in an area with no surface drainage to nearby waterways. If seed treatment cannot be done

outdoors, it should be done in a well-ventilated room. Commercial seed treaters should have an adequate air exhaust system for treatment rooms. Workers exposed to seed treatment chemicals for long periods of time should have an approved chemical mask. The filter should be changed frequently. Recommended rates of application should be followed carefully because higher rates may injure the seed and lower rates may not give satisfactory disease control.

Forage legume seed should be treated well in advance of planting and inoculated with nitrogen-fixing *Rhizobia* at planting time. If dry beans have been treated with streptomycin for control of externally borne blight bacteria, inoculating with *Rhizobia* is not available.

FIELD CROP FOLIAR SPRAYS

Foliar fungicides are used to control fungal disease organisms that attack the above-ground portions of plants. Fungicides are used to protect the potential yield and quality of a crop. Many fungicides protect foliage from infection; therefore, these fungicides must be on the foliage before the fungus spores germinate.

Several foliar fungicides act differently from the protectants described above. For example, benzimidazole fungicides thiabendazole and thiophanate methyl are absorbed by the plant and translocated up the plant by the conducting tissues. They are called systemic fungicides. They only move up the plant; they do not move down. Thus, to control white mold on dry beans, complete coverage of stems, lower leaves and blossoms is required. Spraying only the upper leaves is not satisfactory because the fungicide will not move down to the location where it is needed. Strobilurin and triazole fungicides are locally systemic; they have some upward mobility and translaminar movement and some limited therapeutic action. Metalaxyl will move down from potato foliage into tubers in limited amounts to provide tuber protection against metalaxyl-sensitive strains of the late blight fungus and pink rot infection.

Spray control programs to prevent disease have been developed from data through years of research. Because each disease develops in a distinct manner, the decision to use a disease prevention program is based on weather conditions, disease development, potential yield of the crop and the dollars returned to management with use of the fungicides.

Many fungicides are registered for application through a sprinkler irrigation system, as well as by a spray. If a fungicide can be applied through a sprinkler system (fungigation), this is noted under application.

Most fungicide labels contain information on field re-entry, handling and loading precautions. Most labels state that workers either should not enter a sprayed field until the sprays have dried or should not enter for 24 hours unless they wear appropriate protective clothing. Information on the use of protective clothing during mixing and loading also is given on the label.
See the label for details.

Spraying

Spraying can be done with many different types of ground and air equipment. Getting good coverage is important: At least 5 gallons per acre (gal/A) should be used for aerial application and higher gallon amounts are required for ground equipment.

Droplet size for aerial application should be 200 to 400 microns (l/64 to 1/128 inch) in diameter. Generally, if nozzles are pointed back, appropriate nozzles are used and pressures do not exceed 30 or 35 pounds per square inch (psi), the correct droplet size will result. Application should be made with the boom 8 to 10 feet above the crop.

Some plant surfaces have a waxy or hairy coating, making good coverage difficult. The spray will collect in large, erect droplets, which then run off. Wheat and cabbage leaves are good examples. Frequently, using a wetting agent improves coverage. Usually this is a spreader-sticker. Certain fungicides may work better with certain spreader-stickers than others. This type of information usually can be found on the label or in supplemental brochures. Spreader-stickers may be incorporated into some flowable formulations, so adding a spreader-sticker to the spray tank is not necessary. However, the label must be checked on each product for this use.

FUNGICIDE RESISTANT PATHOGENS IN NORTH DAKOTA

There are several pathogens in North Dakota that have reduced sensitivity and/or are resistant to fungicides. The following list provides the pathogen name, disease they cause, and FRAC groups that are no longer effective for management.

Pathogen	Disease	FRAC Group(s)
Plasmopara halstedii	Downy Mildew of Sunflower	FRAC 4
Cercospora beticola	Cercospora leaf spot	FRAC 1 and 11 (resistant) FRAC 2 and 30 (reduced sensitivity)
Ascochyta rabiei	Aschochyta blight of chickpea	FRAC 11
Peyronellaea pinodes	Ascochyta blight of field pea	FRAC 11

Pathogen	Disease	FRAC Group(s)
Cercospora sojina	Frogeye leaf spot of soybean	FRAC 11
Alternaria solani	Early blight of potato	FRAC 7 and 11
Alternaria alternate	Brown spot of Potato	FRAC 7 and 11
Phytophthora erythroseptica	Pink rot of potato	FRAC 4
Phytophthora infestans	Late blight of potato	FRAC 4
Fusarium sambucinum	Fusarium dry rot of potato	FRAC 1
Helminthosporium solani	Silver scurf of potato	FRAC 1

When managing these pathogens, make sure to follow label recommendations and guidelines from Extension and Land Grant Institutions.

FUNGICIDE GROUPS

The soil application and foliar sprays tables in this guide have a numerical or letter designation (in parentheses) for each chemical component of the listed commercial Fungicides. This number or letter code indicates the Code is developed by the Resistance Action Committee = (FRAC). The purpose of FRAC is to prolong the effectiveness of fungicides liable to encounter resistance problems and to limit crop losses should resistance appear. If field resistance is known to one member of the fungicide group, cross-resistance to other chemicals within that group may be present. This Fungicide Guide is providing information on fungicide groups so that users are aware of potential resistance problems with continued use of chemicals in the same fungicide group. The intrinsic risk for resistance to develop to a given fungicide group varies among chemistries; for example, resistance development among the strobilurins, Group 11, is much more likely than resistance development among the mancozebs or manebs, Group Y. For more information about fungicide resistance and the FRAC fungicide list, see the following Web site:

www.frac.info

The following tables are derived directly from the FRAC code, and they describe modes of action, chemical group names, common names, and FRAC Code number.

FRAC Code List© 2024 (Pages 8-22)

FRAC Code List© 2024

MOA	TARGET SITE AND CODE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
A: nucleic acids metabolism	**A1** RNA polymerase I	**PA**-fungicides (**Phenyl**A**mides**)	acylalanines	benalaxyl benalaxyl-M (=kiralaxyl) furalaxyl metalaxyl metalaxyl-M (=mefenoxam)	resistance and cross-resistance well known in various Oomycetes but mechanism unknown **High Risk** see FRAC Phenylamide Guidelines for Resistance Management	4
			oxazolidinones	oxadixyl		
			butyrolactones	ofurace		
	A2 adenosin-deaminase	hydroxy-(2-amino-) pyrimidines	hydroxy-(2-amino-) pyrimidines	bupirimate dimethirimol ethirimol	resistance and cross-resistance known in powdery mildews **Medium Risk** Resistance Management required	8
	A3 DNA/RNA synthesis (proposed)	heteroaromatics	isoxazoles	hymexazole	resistance not known	32
			isothiazolones	octhilinone		
	A4 DNA topoisomerase type II (gyrase)	carboxylic acids	carboxylic acids	oxolinic acid	bactericide, resistance known, risk in fungi unknown Resistance Management required	31
	A5 inhibition of dihydroorotate dehydrogenase within *de novo* pyrimidine biosynthesis	**DHODHI**-fungicides	phenyl-propanol	ipflufenoquin	**Medium to High Risk** Resistance Management required	52
			dihydroisoquinoline	quinofumelin		

MOA	TARGET SITE AND CODE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
B: Cytoskeleton and motor protein	B1 tubulin polymerization	**MBC**-fungicides (**M**ethyl **B**enzimidazole **C**arbamates)	benzimidazoles	benomyl carbendazim fuberidazole thiabendazole	resistance common in many fungal species, several target site mutations, mostly E198A/G/K, F200Y in β-tubulin gene positive cross-resistance between the group members, negative cross-resistance to N-phenyl carbamates **High Risk** see FRAC Benzimidazole Guidelines for Resistance Management	1
			thiophanates	thiophanate thiophanate-methyl		
	B2 tubulin polymerization	N-phenyl carbamates	N-phenyl carbamates	diethofencarb	resistance known, target site mutation E198K, negative cross-resistance to benzimidazoles **High Risk** Resistance Management required	10
	B3 tubulin polymerization	benzamides	toluamides	zoxamide	**Low to Medium Risk** Resistance Management required	22
		thiazole carboxamide	ethylamino-thiazole-carboxamide	ethaboxam		
	B4 cell division (unknown site)	phenylureas	phenylureas	pencycuron	resistance not known	20
	B5 delocalisation of spectrin-like proteins	benzamides	pyridinylmethyl-benzamides	fluopicolide fluopimomide	resistant isolates detected in grapevine downy mildew **Medium Risk** Resistance Management required	43
	B6 actin/ myosin/ fimbrin function	cyanoacrylates	aminocyanoacrylates	phenamacril	resistance known in *Fusarium graminearum*, target site mutations in the gene coding for myosin-5 found in lab studies **Medium to High Risk** Resistance Management required	47
		aryl-phenyl-ketones	benzophenone	metrafenone	less sensitive isolates detected in powdery mildews (*Blumeria* and *Sphaerotheca*) **Medium Risk** Resistance management required Reclassified from U8 in 2018	50
			benzoylpyridine	pyriofenone		
	B7 tubulin dynamics modulator	pyridazine	pyridazine	pyridachlometyl	**High risk**	53

MOA	TARGET SITE AND CODE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
C. respiration	C1 complex I NADH oxido-reductase	pyrimidinamines	pyrimidinamines	diflumetorim	resistance not known	39
		pyrazole-MET1	pyrazole-5-carboxamides	tolfenpyrad		
		Quinazoline	quinazoline	fenazaquin		
	C2 complex II: succinate-dehydro-genase	SDHI-fungicides (Succinate-dehydrogenase inhibitors)	phenyl-benzamides	benodanil flutolanil mepronil	resistance known for several fungal species in field populations and lab mutants, target site mutations in sdh gene, e.g., H/Y (or H/L) at 257, 267, 272 or P225L, dependent on fungal species Resistance Management required **Medium to High Risk** see FRAC SDHI Guidelines for Resistance Management	7
			phenyl-oxo-ethyl thiophene amide	isofetamid		
			pyridinyl-ethyl-benzamides	fluopyram		
			phenyl-cyclobutyl-pyridineamide	cyclobutrifluram		
			furan-carboxamides	fenfuram		
			oxathiin-carboxamides	carboxin oxycarboxin		
			thiazole-carboxamides	thifluzamide		
			pyrazole-4-carboxamides	benzovindiflupyr bixafen fluindapyr fluxapyroxad furametpyr inpyrfluxam isopyrazam penflufen penthiopyrad sedaxane		
			N-cyclopropyl-N-benzyl-pyrazole-carboxamides	isoflucypram		
			N-methoxy-(phenyl-ethyl)-pyrazole-carboxamides	pydiflumetofen		
			pyridine-carboxamides	boscalid		
			pyrazine-carboxamides	pyraziflumid		

MOA	TARGET SITE AND CODE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
C. respiration	C3 complex III: cytochrome bc1 (ubiquinol oxidase) at Qo site *(cyt b gene)*	**Qo**I-fungicides (**Q**uinone **o**utside **I**nhibitors)	methoxy-acrylates	azoxystrobin coumoxystrobin enoxastrobin flufenoxystrobin picoxystrobin pyraoxystrobin	resistance known in various fungal species, target site mutations in cyt b gene (G143A, F129L) and additional mechanisms cross-resistance shown between all members of the Code 11 fungicides **High Risk** see FRAC QoI Guidelines for Resistance Management	11
			methoxy-acetamide	mandestrobin		
			methoxy-carbamates	pyraclostrobin pyrametostrobin triclopyricarb		
			oximino-acetates	kresoxim-methyl trifloxystrobin		
			oximino-acetamides	dimoxystrobin fenaminstrobin metominostrobin orysastrobin		
			oxazolidine-diones	famoxadone		
			dihydro-dioxazines	fluoxastrobin		
			imidazolinones	fenamidone		
			benzyl-carbamates	pyribencarb		
		QoI-fungicides (**Q**uinone **o**utside **I**nhibitors; Subgroup A)	tetrazolinones	metyltetraprole	Resistance not known, not cross-resistant with Code 11 fungicides on G143A mutants **High Risk** see FRAC QoI Guidelines for Resistance Management	11A

MOA	TARGET SITE AND CODE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
C: respiration (continued)	**C4** complex III: cytochrome bc1 (ubiquinone reductase) at Qi site	**Qi**I-fungicides (**Q**uinone **i**nside **I**nhibitors)	cyano-imidazole	cyazofamid	resistance risk unknown but assumed to be medium to high (mutations at target site known in model organisms) Resistance Management required no spectrum overlap with the Oomycete-fungicides cyazofamid and amisulbrom	21
			sulfamoyl-triazole	amisulbrom		
			picolinamides	fenpicoxamid florylpicoxamid		
	C5 uncouplers of oxidative phos-phorylation		dinitrophenyl-crotonates	binapacryl meptyldinocap dinocap	resistance not known, also acaricidal activity	29
			2,6-dinitro-anilines	fluazinam	**Low Risk** however, resistance claimed in *Botrytis* in Japan	
			(pyr.-hydrazones)	(ferimzone)	reclassified to U 14 in 2012	
	C6 inhibitors of oxidative phos-phorylation, ATP synthase	organo tin compounds	tri-phenyl tin compounds	fentin acetate fentin chloride fentin hydroxide	some resistance cases known **Low to Medium Risk**	30
	C7 ATP transport (proposed)	thiophene-carboxamides	thiophene-carboxamides	silthiofam	resistance reported **Low Risk**	38
	C8 complex III: cytochrome bc1 (ubiq. reductase) at Qi and Qo site (stigmatellin binding mode	**QioSI fungicide** (**Q**uinone **i**nside and **o**utside **i**nhibitor, **s**tigmatellin binding mode)	triazolo-pyrimidylamine	ametoctradin	not cross-resistant to QoI fungicides, resistance risk assumed to be medium to high (single site inhibitor) Resistance Management required	45
D: amino acids and protein synthesis	**D1** methionine biosynthesis (proposed) *(cgs gene)*	**AP**-fungicides (**A**nilino-**P**yrimidines)	anilino-pyrimidines	cyprodinil mepanipyrim pyrimethanil	resistance known in *Botrytis* and *Venturia*, sporadically in *Oculimacula* **Medium Risk** see FRAC AP Guidelines for Resistance Management	9
	D2 protein synthesis (ribosome, termination step)	enopyranuronic acid antibiotic	enopyranuronic acid antibiotic	blasticidin-S	**Low to Medium Risk** Resistance Management required	23
	D3 protein synthesis (ribosome, initiation step)	hexopyranosyl antibiotic	hexopyranosyl antibiotic	kasugamycin	resistance known in fungal and bacterial (*Burkholderia glumae)* pathogens **Medium Risk** Resistance Management required	24
	D4 protein synthesis (ribosome, initiation step)	glucopyranosyl antibiotic	glucopyranosyl antibiotic	streptomycin	bactericide, resistance known **High Risk** Resistance Management required	25
	D5 protein synthesis (ribosome, elongation step)	tetracycline antibiotic	tetracycline antibiotic	oxytetracycline	bactericide, resistance known **High Risk** Resistance Management required	41
	D6 leucyl-tRNA synthetase (LeuRS)	benzoxaboroles	benzoxaboroles	tavaborole	**Low Risk** due to exclusive post-harvest use	54

MOA	TARGET SITE AND CODE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
E: signal transduction	**E1** signal transduction (mechanism unknown)	aza-naphthalenes	aryloxyquinoline	quinoxyfen	resistance to quinoxyfen known **Medium Risk** Resistance Management required cross-resistance found in *Erysiphe necator* but not in *Blumeria graminis*	13
			quinazolinone	proquinazid		
	E2 MAP/Histidine-Kinase in osmotic signal transduction *(os-2, HOG1)*	**PP**-fungicides (**P**henyl**P**yrroles)	phenylpyrroles	fenpiclonil fludioxonil	resistance found sporadically, mechanism speculative **Low to Medium Risk** Resistance Management required	12
	E3 MAP/Histidine-Kinase in osmotic signal transduction *(os-1, Daf1)*	dicarboximides	dicarboximides	chlozolinate dimethachlone iprodione procymidone vinclozolin	resistance common in *Botrytis* and some other pathogens, several mutations in OS-1, mostly I365S cross-resistance common between the group members **Medium to High Risk** see FRAC Dicarboximide Guidelines for Resistance Management	2

MOA	TARGET SITE AND CODE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
F: lipid synthesis or transport / membrane integrity or function	F1	formerly dicarboximides				
	F2 phospholipid biosynthesis, methyltransferase	phosphoro-thiolates	phosphoro-thiolates	edifenphos iprobenfos (IBP) pyrazophos	resistance known in specific fungi **Low to Medium Risk**	6
		Dithiolanes	dithiolanes	isoprothiolane	Resistance Management required if used for risky pathogens	
	F3 cell peroxidation (proposed)	**AH**-fungicides (**A**romatic **H**ydrocarbons) (chlorophenyls, nitroanilines)	aromatic hydrocarbons	biphenyl chloroneb dicloran quintozene (PCNB) tecnazene (TCNB) tolclofos-methyl	resistance known in some fungi **Low to Medium Risk** cross-resistance patterns complex due to different activity spectra	14
		heteroaromatics	1,2,4-thiadiazoles	etridiazole		
	F4 cell membrane permeability, fatty acids (proposed)	Carbamates	carbamates	iodocarb propamocarb prothiocarb	**Low to Medium Risk** Resistance Management required	28
	F5	formerly CAA-fungicides				
	F6 microbial disrupters of pathogen cell membranes	formerly *Bacillus amyloliquefaciens* strains (FRAC Code 44), reclassified to BM02 in 2020				
	F7 cell membrane disruption	formerly extract from *Melaleuca alternifolia* (tea tree oil) and plant oils (eugenol, geraniol, thymol) FRAC Code 46, reclassified to BM01 in 2021				
	F8 ergosterol binding	Polyene	amphoteric macrolide antifungal antibiotic from *Streptomyces natalensis* or *S. chattanoogensis*	natamycin (pimaricin)	resistance not known, agricultural, food and topical medical uses	48
	F9 lipid homeostasis and transfer/storage	**OSBPI**-fungicides oxysterol binding protein homologue inhibition	piperidinyl-thiazole-isoxazolines	oxathiapiprolin fluoxapiprolin	resistance risk assumed to be medium to high (single site inhibitor) Resistance Management required (previously U15)	49
	F10 interaction with lipid fraction of the cell membrane, with multiple effects on cell membrane integrity	protein fragment	polypeptide	polypeptide ASFBIOF01-02	resistance not known	51

MOA	TARGET SITE AND CODE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
G: sterol biosynthesis in membranes	**G1** C14-demethylase in sterol biosynthesis *(erg11/cyp51)*	**DMI**-fungicides (De**M**ethylation **I**nhibitors) (SBI: Class I)	piperazines	triforine	there are big differences in the activity spectra of DMI fungicides resistance is known in various fungal species, several resistance mechanisms are known incl. target site mutations in *cyp*51 (erg 11) gene, e.g., V136A, Y137F, A379G, I381V; *cyp*51 promotor; ABC transporters and others generally wise to accept that cross-resistance is present between DMI fungicides active against the same fungus DMI fungicides are Sterol Biosynthesis Inhibitors (SBIs) but show no cross-resistance to other SBI classes **Medium risk** see FRAC SBI Guidelines for Resistance Management	3
			pyridines	pyrifenox pyrisoxazole		
			pyrimidines	fenarimol nuarimol		
			imidazoles	imazalil oxpoconazole pefurazoate prochloraz triflumizole		
			triazoles	azaconazole bitertanol bromuconazole cyproconazole difenoconazole diniconazole epoxiconazole etaconazole fenbuconazole fluquinconazole flusilazole flutriafol hexaconazole imibenconazole ipconazole mefentrifluconazole metconazole myclobutanil penconazole propiconazole simeconazole tebuconazole tetraconazole triadimefon triadimenol triticonazole		
			triazolinthiones	prothioconazole		
	G2 Δ^{14}-reductase and $\Delta^{8}\rightarrow\Delta^{7}$-isomerase in sterol biosynthesis *(erg24, erg2)*	**Amines** ("morpholines") (SBI: Class II)	morpholines	aldimorph dodemorph fenpropimorph tridemorph	decreased sensitivity for powdery mildews, cross-resistance within the group generally found but not to other SBI classes **Low to Medium Risk** see FRAC SBI Guidelines for Resistance Management	5
			piperidines	fenpropidin piperalin		
			spiroketal-amines	spiroxamine		
	G3 3-keto reductase, C4-demethylation *(erg27)*	**KRI**-fungicides (**K**eto**R**eductase **I**nhibitors) (SBI: Class III)	hydroxyanilides	fenhexamid	**Low to Medium Risk** Resistance Management required	17
			amino-pyrazolinone	fenpyrazamine		
	G4 squalene-epoxidase in sterol biosynthesis *(erg1)*	(SBI class IV)	thiocarbamates	pyributicarb	resistance not known, fungicidal and herbicidal activity	18
			allylamines	naftifine terbinafine	medical fungicides only	

MOA	TARGET SITE AND CODE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
H: cell wall biosynthesis	**H3**	Formerly glucopyranosyl antibiotic (validamycin)			reclassified to U18	**26**
	H4 chitin synthase	polyoxins	peptidyl pyrimidine nucleoside	polyoxin	resistance known **Medium Risk** Resistance Management required	**19**
	H5 cellulose synthase	CAA-fungicides (Carboxylic Acid Amides)	cinnamic acid amides	dimethomorph flumorph pyrimorph	resistance known in *Plasmopara viticola* but not in *Phytophthora infestans* cross-resistance between all members of the CAA group **Low to Medium Risk** see FRAC CAA Guidelines for Resistance Management	**40**
			valinamide carbamates	benthiavalicarb iprovalicarb valifenalate		
			mandelic acid amides	mandipropamid		
I: melanin synthesis in cell wall	**I1** reductase in melanin biosynthesis	**MBI-R** (Melanin Biosynthesis Inhibitors - Reductase)	isobenzo-furanone	fthalide	resistance not known	**16.1**
			pyrrolo-quinolinone	pyroquilon		
			triazolobenzo-thiazole	tricyclazole		
	I2 dehydratase in melanin biosynthesis	**MBI-D** (Melanin Biosynthesis Inhibitors - Dehydratase)	cyclopropane-carboxamide	carpropamid	resistance known **Medium Risk** Resistance Management required	**16.2**
			carboxamide	diclocymet		
			propionamide	fenoxanil		
	I3 polyketide synthase in melanin biosynthesis	**MBI-P** (Melanin Biosynthesis Inhibitors - Polyketide synthase)	trifluoroethyl-carbamate	tolprocarb	resistance not known additional activity against bacteria and fungi through induction of host plant defence	**16.3**

MOA	TARGET SITE AND CODE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
P: host plant defence induction	**P 01** salicylate-related	benzo-thiadiazole (BTH)	benzo-thiadiazole (BTH)	acibenzolar-S-methyl	resistance not known	**P 01**
	P 02 salicylate-related	benzisothiazole	benzisothiazole	probenazole (also antibacterial and antifungal activity)	resistance not known	**P 02**
	P 03 salicylate-related	thiadiazole-carboxamide	thiadiazole-carboxamide	tiadinil isotianil	resistance not known	**P 03**
	P 04 polysaccharide elicitors	natural compound	polysaccharides	laminarin	resistance not known	**P 04**
	P 05 anthraquinone elicitors	plant extract	complex mixture, ethanol extract (anthraquinones, resveratrol)	extract from *Reynoutria sachalinensis* (giant knotweed)	resistance not known	**P 05**
	P 06 microbial elicitors	microbial	bacterial *Bacillus* spp.	*Bacillus mycoides* isolate J	resistance not known	**P 06**
			fungal *Saccharomyces* spp.	*cell walls of Saccharomyces cerevisiae* strain LAS117		
	P 07 phosphonates	phosphonates	ethyl phosphonates	fosetyl-Al	few resistance cases reported in few pathogens **Low Risk** reclassified from U33 in 2018	**P 07**
				phosphorous acid and salts		
	P 08 salicylate-related	isothiazole	isothiazolylmethyl ether	dichlobentiazox	activates SAR both up- and downstream of SA, resistance not known	**P 08**

MOA	TARGET SITE AND CODE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
U: Unknown mode of action (U numbers not appearing in the list derive from reclassified fungicides)	unknown	cyanoacetamide-oxime	cyanoacetamide-oxime	cymoxanil	resistance claims described **Low to Medium Risk** Resistance Management required	27
	formerly phosphonates (FRAC code 33), reclassified to P 07 in 2018					
	unknown	phthalamic acids	phthalamic acids	tecloftalam (Bactericide)	resistance not known	34
	unknown	benzotriazines	benzotriazines	triazoxide	resistance not known	35
	unknown	benzene-sulfonamides	benzene-sulphonamides	flusulfamide	resistance not known	36
	unknown	pyridazinones	pyridazinones	diclomezine	resistance not known	37
	formerly methasulfocarb (FRAC code 42), reclassified to M 12 in 2018					
	unknown	phenyl-acetamide	phenyl-acetamide	cyflufenamid	resistance in *Sphaerotheca* Resistance Management required	U 06
	cell membrane disruption (proposed)	guanidines	guanidines	dodine	resistance known in *Venturia inaequalis*, **Low to Medium Risk** Resistance Management recommended	U 12
	unknown	thiazolidine	cyano-methylene-thiazolidines	flutianil	resistance in *Sphaerotheca* and *Podosphaera xanthii* Resistance Management required	U 13
	unknown	pyrimidinone-hydrazones	pyrimidinone-hydrazones	ferimzone	resistance not known (previously C5)	U 14
	complex III: cytochrome bc1, unknown binding site (proposed)	4-quinolyl-acetate	4-quinolyl-acetates	tebufloquin	not cross-resistant to QoI, resistance risk unknown but assumed to be medium Resistance Management required	U 16
	unknown	tetrazolyloxime	tetrazolyloximes	picarbutrazox	resistance not known, not cross-resistant to PA, QoI, CAA	U 17
	unknown (inhibition of trehalase)	glucopyranosyl antibiotic	glucopyranosyl antibiotics	validamycin	resistance not known, induction of host plant defence by trehalose proposed (previously H3)	U 18

MOA	TARGET SITE AND CODE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
Not specified	unknown	diverse	diverse	mineral oils, organic oils, inorganic salts, material of biological origin	resistance not known	NC
M: Chemicals with multi-site activity	multi-site contact activity	inorganic (electrophiles)	inorganic	copper (different salts)	also applies to organic copper complexes	M 01
		inorganic (electrophiles)	inorganic	sulphur		M 02
		dithiocarbamates and relatives (electrophiles)	dithio-carbamates and relatives	amobam ferbam mancozeb maneb metiram propineb thiram zinc thiazole zineb ziram		M 03
		phthalimides (electrophiles)	phthalimides	captan captafol folpet		M 04
		chloronitriles (phthalonitriles) (unspecified mechanism)	chloronitriles (phthalonitriles)	chlorothalonil	generally considered as a low risk group without any signs of resistance developing to the fungicides	M 05
		sulfamides (electrophiles)	sulfamides	dichlofluanid tolylfluanid		M 06
		bis-guanidines (membrane disruptors, detergents)	bis-guanidines	guazatine iminoctadine		M 07
		triazines (unspecified mechanism)	triazines	anilazine		M 08
		quinones (anthraquinones) (electrophiles)	quinones (anthraquinones)	dithianon		M 09
		quinoxalines (electrophiles)	quinoxalines	chinomethionat / quinomethionate		M 10
		maleimide (electrophiles)	maleimide	fluoroimide		M 11
		thiocarbamate (electrophiles)	thiocarbamate	methasulfocarb	reclassified from U42 in 2018	M 12

MOA	TARGET SITE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
BM: Biologicals with multiple modes of action: Plant extracts	multiple effects on ion membrane transporters; chelating effects	plant extract	polypeptide (lectin)	extract from the cotyledons of lupine plantlets ("BLAD")	resistance not known (previously M12)	BM 01
	affects fungal spores and germ tubes, induced plant defense	plant extract	phenols, sesquiterpenes, triterpenoids, coumarins	extract from *Swinglea glutinosa*	resistance not known	
	cell membrane disruption, cell wall, induced plant defense mechanisms	plant extract	terpene hydrocarbons, terpene alcohols and terpene phenols	extract from *Melaleuca alternifolia* (tea tree oil)	resistance not known (previously F7)	
				plant oils (mixtures): eugenol, geraniol, thymol		

MOA	TARGET SITE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
BM: Biologicals with multiple modes of action: Microbial (living microbes, or extracts from microbes or metabolites)	multiple effects described (examples, not all apply to all biological groups): competition, mycoparasitism, antibiosis, membrane disruption by fungicidal lipopeptides, lytic enzymes, induced plant defence	microbial (strains of living microbes or extract, metabolites)	fungal *Trichoderma* spp.	*T. atroviride* strain I-1237 strain LU132 strain SC1 strain SKT-1 strain 77B		**BM 02**
				T. asperellum strain T34 strain kd		
				T. harzianum strain T-22		
				T. virens strain G-41		
			fungal *Clonostachys* spp.	*C. rosea* strain J1446 strain CR-7	nomenclature change from *Gliocladium catenulatum* to *Clonostachys rosea*	
			fungal *Coniothyrium* spp.	*C. minitans* strain CON/M/91-08		
			fungal *Hanseniaspora* spp.	*H. uvarum* strain BC18Y	resistance not known	
			fungal *Talaromyces* spp.	*T. flavus* strain SAY-Y-94-01		
			fungal *Saccharomyces* spp.	*S. cerevisae* strain LAS02 strain DDSF623		
			bacterial *Bacillus* spp.	*B. amyloliquefaciens* strain QST713 strain FZB24 strain MBI600 strain D747 strain F727 strain AT-332	*Bacillus amyloliquefaciens* reclassified from F6, Code 44 in 2020 synonyms for *Bacillus amyloliquefaciens* are *Bacillus subtilis* and *B. subtilis* var. *amyloliquefaciens* (previous taxonomic classification)	
				B. subtilis strain AFS032321 strain Y1336 strain HAI-0404 strain RTI477		
				B. velezensis strain RTI301		
			bacterial *Erwinia* spp. (peptide)	PHC25279		
			bacterial *Gluconobacter* spp.	*G. cerinus* strain BC18B		
			bacterial *Pseudomonas* spp.	*P. chlororaphis* strain AFS009		
			bacterial *Streptomyces* spp.	*S. griseoviridis* strain K61		

MOA	TARGET SITE	GROUP NAME	CHEMICAL OR BIOLOGICAL GROUP	(ISO) COMMON NAME	COMMENTS	FRAC GROUP CODE
BM: Purified metabolites from plant or microbial sources, or synthetic versions of these metabolites	inhibition of beta (1,3) glucan synthase and chitin synthase and resulting cell wall biosynthesis, disruption of membranes and membrane function, destruction of mitochondria and disruption of oxidative processes	purified metabolites from plant or microbial sources, or synthetic versions of these metabolites	nature-derived or nature-identical single molecules originally derived from plants (or other organisms)	cinnamaldehyde	resistance not known	**BM 03**

Tables:

Alfalfa - Clover - Small-seeded Legumes

Seed Treatment

Chemical (Fungicide Group)	Application	Dosage[1]	Control[2] of Seedling Blights[3]	Remarks
Prothioconazole (3) + Penflufen (7) + Metalaxyl (4) EverGol Energy, 7.18%; 3.59%; 5.74%	Slurry or mist	3.0 fl oz/cwt	X	For control of seed rot and damping-off caused by *Rhizoctonia*.
Mefenoxam (4) Apron XL, 33.3 % Precint, 45.3%	Slurry Mist or Slurry	0.64 fl oz/cwt 0.47 fl oz/cwt	X	For control of *Pythium* damping off and early season *Phytophthora* only.
Metalaxyl (4) Allegiance FL, 28.35% Dyna-Shield, 28.35% Sebring 318 FS, 28.35% Allegiance Dry Seed Protectant, 12.5% Belmont 2.7 FS, 28.98%	Slurry or mist Drill box Slurry or mist	0.75 fl oz/cwt 4 oz/cwt 0.75-1.5 oz/cwt	X X X	For control of *Pythium* damping off and early season *Phytophthora* only.
Thiram (M3) 42-S Thiram, 42% Signet 480 FS, 42%	Liquid or slurry	8 fl oz/cwt	X	For small-seeded legumes.
Tolclofos-methyl (14) Rizolex, 42%	Slurry or mist	0.3 fl oz/cwt	X	For control of *Rhizoctonia, Fusarium,* and other seed-borne and soil-borne diseases.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.

Alfalfa - Clover - Small-seeded Legumes
Foliar Sprays

Chemical (Fungicide Group)	Application [1]	Dosage [2]	Disease Control [3]			Remarks
			Leaf Rust	White Mold	Spring Black Stem	
***Bacillus subtilis* strain QST 713 (44)** Serenade ASO, 1.34%	Spray or fungigation	2-6 qt/A	X	X		Begin application when environmental conditions and plant stage are conducive to disease development.
***Coniothyrium minitans* strain CON/M/91-08** Contans WG, 5%	Spray or chemigation	1-4 lbs/A		X		For use to reduce/control *Sclerotinia sclerotiorum* and *Sclerotinia minor* in the soil.
Azoxystrobin (11) AZteroid FC 3.3, 34.3% Azoxystrobin SC, 22.9%	Spray or fungigation	3.9-9.7 fl oz/A	X		X	Begin applications prior to disease onset and continue throughout the year making no more than 3 consecutive applications of AZteroid FC 3.3 or other Group 11 fungicide before alternating to a fungicide with a different mode of action.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	Spray or fungigation	7.4-18.4 fl oz/A	X		X	Begin applications prior to disease onset and continue throughout the season. Use higher rate when disease pressure is high. Do not apply more than 55.2 fl oz/A per season. PHI = 14 days.
Penthiopyrad (7) Fontelis, 20.4%	Spray or fungigation	14-24 fl oz/A for 16-24 fl oz/A for white mold		X		Begin applications prior to disease development and continue on a 7-14 day interval. Use higher rate and shorter interval when disease pressure is high. Do not exceed 48 fl oz/A/year. PHI = 14 days.
Picoxystrobin (11) Aproach SC, 22.5%	Spray or fungigation	6-12 fl oz/A			X	Begin applications in the spring at green-up and when 1-3 new leaves have grown after each cutting. Do not apply more than 12 fl oz/A per cutting. Do not exceed 36 fl oz/A per year. PHI = 14 days.
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	Spray or fungigation	6-9 fl oz/A	X		X	For use in alfalfa. PHI = 14 days.
Pyraclostrobin (11) + Fluxapyroxad (7) Priaxor, 28.58%; 14.33% Everlon, 28.58%; 14.33%	Spray or fungigation	4-6.9 fl oz/A	X		X	Begin applications prior to onset of disease. Do not apply within 14 days of grazing or harvest. Do not apply more than 20.7 fl oz/A per year. Do not use on rangeland.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Barley-Oat-Rye-Wheat
Seed Treatment

Chemical (Fungicide Group)	Appl.	Dosage[1]	Disease Control[2]				Remarks
			Covered Smut	Loose Smut	Seedling Blight[3]	Common Root Rot	
Azoxystrobin (11) Dynasty, 9.6%	Slurry	0.153-0.382 fl oz/cwt			X		For wheat and barley. Also controls dwarf bunt and common bunt. Use with Dividend Extreme.
Saxony 100 FS, 9.67%	Slurry	0.1-3.75 fl oz/cwt			X		For seed-borne and soil-borne fungi causing decay, damping-off and seedling blight.
Carboxin (7) Vitavax-34, 34%	Slurry or mist	2-3 fl oz/cwt	X	X	X		Do not graze or feed livestock on treated areas for 6 weeks after planting.
Chenopodium quinoa saponins Heads Up Plant Protectant	Slurry	0.16 oz/cwt					Protection against fungal and bacteria seed diseases in wheat.
Carboxin (7) + Ipconazole (3) Rancona V100 Pro FS,35.52%; 2.22%	Slurry or mist	0.9-1.5 fl oz/cwt	X	X	X	X	For control of seed-borne and soil-borne fungi.
Carboxin (7) + Thiram (M3) Vitaflo-280, 15.59%; 13.25%	Slurry or mist	3.5-5 fl oz/cwt	X	X	X		Use high rate for control of loose smut. Do not graze or feed livestock on treated areas for 6 weeks after planting.
Difenoconazole (3) Salient 372 FS, 33.3%	Slurry or mist	0.5-1 fl oz/cwt	X (bunt)	X	X	X	All slurry mixes should be pre-tested to determine physical compatibility between formulations. Do not slurry mix with any product that bears a label prohibiting against slurry mixing.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to fungal infections of the seed such as black point and scab.

Barley-Oat-Rye-Wheat
Seed Treatment (continued)

Chemical (Fungicide Group)	Appl.	Dosage[1]	Disease Control[2]				Remarks
			Covered Smut	Loose Smut	Seedling Blight[3]	Common Root Rot	
Difenoconazole (3) + Mefenoxam (4) Dividend Extreme, 7.73%: 1.93%	Slurry	1 fl oz/cwt common bunt, loose smut, *Fusarium* seed scab	X(bunt)	X	X		For barley, oats, rye, triticale, and spring wheat. See label for winter wheat recommendations.
		2-4 fl oz/cwt as above, plus seed-borne *Septoria*, *Penicillium* and *Aspergillus* seed rots, *Pythium* damping off, early season common root rot (*Cochliobolus*) *Rhizoctonia* root rot, flag smut, early season take-all root rot	X(bunt)	X	X	X	Registered on barley to suppress root rots and covered smut, and control seedling blight, at a rate of 2-4 fl oz/cwt.
Ethaboxam (22) Intego Solo, 34.2%	Slurry or mist	0.20-0.26 fl oz/cwt			X		For control of *Pythium*.
Ethaboxam (22) + Metalaxyl (4) + Metconazole (3) + Clothianidin Intego SUITE Cereals OF, 1.4%; 0.84%, 0.42%; 2.81% Artect – FI, 1.4%; 0.84%, 0.42%; 2.81%	Slurry or mist	5.2 fl oz/cwt	X	X	X	X	For wheat, barley, and oats. Controls seed-borne and soil-borne diseases and insects. For commercial and on-farm application with mechanical, slurry, or mist-type seed treating equipment.
Fludioxonil (12) Maxim 4FS, 40.3%	Slurry	0.08-0.16 fl oz/cwt			X		For control of seed-borne and soil-borne fungi that cause seed decay, damping off and seedling blight. Cereal forage may be grazed 30 days after planting.
Spirato 480 FS	Slurry	0.08-0.16 fl oz/cwt			X		
Dyna-Shield Fludioxonil	Slurry	0.08-0.16 fl oz/cwt			X		
Fluxapyroxad (7) + Pyraclostrobin (11) + Triticonazole (3) + Metalaxyl (4) Stamina F4 Cereals 0.78%:1.57%:1.57%: 0.94%	Slurry or mist	4.6 fl oz/cwt	X	X	X	X	For commercial and on-farm use. Registered for barley, oats, rye, triticale, and wheat.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to fungal infections of the seed such as black point and scab.

Barley-Oat-Rye-Wheat
Seed Treatment (continued)

Chemical (Fungicide Group)	Appl.	Dosage[1]	Disease Control[2]				Remarks
			Covered Smut	Loose Smut	Seedling Blight[3]	Common Root Rot	
Fluxapyroxad (7) + Pyraclostrobin (11) + Triticonazole (3) + Metalaxyl (4) + Broflanilide Teraxxa F4, 0.78%:1.55%:1.55 %:0.93%; 1.55%	Slurry or Mist	4.6 fl oz/cwt	X	X	X	X	For commercial and on-farm use. Registered for barley, oats, rye, triticale, and wheat.
Ipconazole (3) Rancona 3.8 FS, 40.7%	Mist or slurry	0.051-0.085 fl oz/cwt	X	X	X	X	Does not control *Pythium*.
Ipconazole (3) + Metalaxyl (4) Rancona CTS, 2.42%; 1.94%	Mist or slurry	0.92-1.53 fl oz/cwt	X	X	X	X	Contains metalaxyl for *Pythium* control.
Rancona Summit, 0.90%; 1.44%		2.5-4.0 fl oz/cwt					
Ipconazole (3) + Metalaxyl (4) + Imidacloprid Warden Cereals HR, 0.421%: 0.562%: 14.1%	Mist or Slurry	5.0-8.33 fl oz/cwt	X	X	X	X	For protection against seedling diseases and seed rot fungi, smuts, bunts, and some insects
Rancona Crest, 0.421%: 0.562%: 14.1%	Mist or slurry	5.0-8.33 fl oz/cwt	X	X	X	X	
Mefenoxam (4) Apron XL, 33.3%	Mist or slurry	0.32-0.64 fl oz/cwt			X		For control of *Pythium* damping off. See label for Dividend-Apron XL-LS combination.
Precint, 45.3%	Mist or slurry	0.23-0.47 fl oz/cwt					

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to fungal infections of the seed such as black point and scab.

Barley-Oat-Rye-Wheat
Seed Treatment (continued)

Chemical (Fungicide Group)	Appl.	Dosage[1]	Disease Control[2]				Remarks
			Covered Smut	Loose Smut	Seedling Blight[3]	Common Root Rot	
Mefentrifluconazole (3) Relenya, 34.93%	Mist or slurry	0.2-0.4 fl oz/cwt	X (bunt)		X	X	Control of Common Root Rot, Common Bunt, Dwarf Bunt, *Fusarium*, and *Rhizoctonia solani*.
Metalaxyl (4) Allegiance FL, 28.35% Sebring 318 FS, 28.35%	Mist or slurry	0.375-0.75 fl oz/cwt			X		For control of *Pythium* damping off only.
Dyna-Shield, 28.35%	Slurry	0.75 fl oz/cwt			X		
Belmont 2.7 FS, 28.98%	Slurry or mist	0.75 fl oz/cwt			X		
Sebring 480 FS, 44.08%	Slurry or mist	0.50 fl oz/cwt			X		
Metalaxyl (4) + Metconazole (3) Metlock CT, 4.51%: 2.25%	Mist or slurry	1.0-1.5 fl oz/cwt	X	X	X	X	For control of seed-borne and soil-borne diseases.
Metalaxyl (4) + Metconazole (3) + Clothianidin Nipsit SUITE Cereals OF, 0.88%: 0.44%; 2.93% Apprise FI, 0.88%; 0.44%; 2.93% Lancaster Fnl, 0.88%; 0.44%; 2.93%	Ready to apply	5-7.5 fl oz/cwt	X	X	X	X	For control of seed and soil-borne fungi and insects. For wheat, barley and oats. For commercial and on-farm application with mechanical slurry, or mist-type seed treating equipment.
Metconazole (3) Metlock, 40%	Mist or Slurry	0.045-0.09 fl oz/cwt	X	X	X	X	For control of seed-borne and soil-borne diseases.
PCNB (Terraclor) (14) PCNB Seed Coat, 24%	Slurry	2-4 oz/bu barley, oats 2 oz/bu wheat	X		X		Not registered for rye.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to fungal infections of the seed such as black point and scab.

Barley-Oat-Rye-Wheat
Seed Treatment (continued)

Chemical (Fungicide Group)	Appl.	Dosage[1]	Disease Control[2]				Remarks
			Covered Smut	Loose Smut	Seedling Blight[3]	Common Root Rot	
Picarbutrazox (U17) Vayantis, 36%	Slurry or mist	0.05-0.2 fl oz/cwt			X		For root rot due to *Pythium* spp.
Prothioconazole (3) + Penflufen (7) + Metalaxyl (4) EverGol Energy, 7.18%: 3.59%: 5.74%	Slurry or mist	1 fl oz/cwt	X	X	X	X	Registered for barley, triticale, wheat, oats, rye and millet.
Prothioconazole (3) + Tebuconazole (3) + Metalaxyl (4) Raxil Pro MD, 1.47%; 0.29%; 0.59%	Slurry or mist	5.0-7.5 fl oz/cwt	X	X	X	X	Registered for use in all wheat, barley, oats, and triticale. Controls seed-borne and early season soil-borne diseases.
Prothioconazole (3) + Tebuconazole (3) + Metalaxyl (4) + Imidacloprid Raxil Pro Shield, 1.47%; 0.29%; 0.59%; 8.59%	Slurry or mist	5.0 fl oz/cwt	X	X	X	X	Controls seed borne and early season soil borne diseases and insects in wheat, barley and triticale.
Pydiflumetofen (7) Trebuset	Slurry or mist	0.31 fl oz/cwt			X	X	Suppression of Fusarium crown rot. Registered for wheat, barley, oats, rye, and triticale.
Pyraclostrobin (11) Stamina, 18.4%	Slurry or mist	0.4-0.8 fl oz/cwt			X		Registered for wheat, barley, oat and rye.
Sedaxane (7) Vibrance, 43.7%	Slurry	0.08-0.16 fl oz/cwt	X	X	X	X	For certain seed and seedling blight or damping off caused by certain seed and soil-borne pathogens, and certain smut diseases.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to fungal infections of the seed such as black point and scab

Barley-Oat-Rye-Wheat
Seed Treatment (continued)

Chemical (Fungicide Group)	Appl.	Dosage[1]	Disease Control[2]				Remarks
			Covered Smut	Loose Smut	Seedling Blight[3]	Common Root Rot	
Sedaxane (7) + Difenoconazole (3) + Mefenoxam (4) Vibrance Extreme 1.22%: 5.86%: 1.46% Warden Cereals, 1.22%; 5.86%; 1.46%	Slurry	2.8-5.6 fl oz/cwt	X	X	X	X	For control of seed-borne, soil-borne, and early season diseases.
Sedaxane (7) + Difenoconazole (3) + Mefenoxam (4) + Thiamethoxam Cruiser Maxx Vibrance Cereals 0.72%: 3.34%: 0.86%: 2.78%	Slurry	5-10 fl oz	X	X	X	X	For control of seed-borne and seed diseases of cereals and insects.
Sedaxane (7) + Difenoconazole (3) + Mefenoxam (4) + Fludioxonil (12) + Thiamethoxam Warden Cereals WRII 1.44%; 3.45%; 0.86%; 0.72%; 5.75%	Slurry	5.0 fl oz/cwt	X	X	X	X	Ready to apply formulation for commercial or on-farm applications. For control of seed and soil-borne diseases of cereals. Insecticide thiamethoxam for wireworm control.
Tebuconazole (3) + Metalaxyl (4) Sativa M RTU, 0.48%:0.64%	Slurry or mist	3.4-5 fl oz/cwt	X	X	X	X	Not registered for rye. Do not graze barley, wheat or oat green forage for 31, 31 and 51 days, respectively.
Sativa IM RTU 0.46%:0.615%	Slurry or mist	5-6.5 fl oz/cwt	X	X	X	X	Sativa IM Max also contains 11.4% imidacloprid for insect control.
Sativa IM Max 0.46%:0.615%	Slurry or mist	3.4-5.0 fl oz/cwt oz/cwt	X	X	X	X	Not registered for rye.
Dyna-Shield Foothold 0.499%:0.668% Dyna-Shield Foothold Extra 0.455%:0.67%	Slurry or mist	5.0-6.5 fl oz/cwt	X	X	X	X	Not registered for rye. Dyna-Shield Foothold Extra also contains 11.4% imidacloprid for insect control.

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[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to fungal infections of the seed such as black point and scab.

Barley-Oat-Rye-Wheat
Seed Treatment (continued)

Chemical (Fungicide Group)	Appl.	Dosage[1]	Disease Control[2]				Remarks
			Covered Smut	Loose Smut	Seedling Blight[3]	Common Root Rot	
Tebuconazole (3) + Metalaxyl (4) + Fludioxonil (12) + Imidacloprid Foothold Virock, 0.45%:0.60%:0.36%; 11.16%	Slurry	3.4-5 fl oz/cwt	X	X	X	X	Not registered for rye or oats.
Thiabendazole (1) Mertect 340-F, 42.3%	Slurry	1.3 fl oz/cwt for seed-borne common bunt 2.6 fl oz/cwt for soil-borne common bunt 0.17 fl oz/cwt for Fusarium seed scab 1.95-3.9 fl oz/cwt for seedling diseases	X (bunt)		X		For spring wheat and winter wheat. Also controls dwarf bunt in winter wheat.
Thiram (M3) 42-S Thiram, 42% Signet 480 FS, 42% Thiram 480 DP, 42%		2 fl oz/bu			X		Not registered for oats.
Toclofos-methyl (14) Rizolex, 42%	Slurry or mist	0.3 fl oz/cwt			X		For control of *Rhizoctonia*, *Fusarium*, and other seed-borne and soil-borne fungal pathogens causing seed decay, seedling blight, or damping off.
Tebuconazole (3) + Metalaxyl (4) + Fludioxonil (12) + Imidacloprid Sativa IMF Max, 0.45%; 0.6%; 0.36%, 11.16%	Slurry or mist	3.4-5.0 fl oz/cwt	X	X	X	X	Not registered for rye. Do not graze for 45 days. Sativa IMF Max also contains 11.2% imidacloprid for insect control.
Tebuconazole (3) + Metalaxyl (4) + Fludioxonil (12) Artect, 0.46%, 1.24%, 0.37%	Slurry or mist	3.4-5.0 fl oz/cwt	X	X	X	X	Not registered for rye. Labeled for wheat, oat, barley and triticale. Do not graze for 45 days.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to fungal infections of the seed such as black point and scab.

Barley-Oat-Rye-Wheat
Foliar Sprays

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]					Remarks
			Leaf[4] Spot	Leaf Rust	Stem Rust	Powdery Mildew	Fusarium Head Blight	
***Bacillus pumilus* strain QST 2808 (44)** Sonata, 1.38%	Spray or fungigation	1-4 qt/A	X	X		X		Begin applications when environmental conditions and plant stage are conducive to disease development.
***Bacillus subtilis* strain IAB/BS03 (44)** AVIV, 0.08%	Spray	10-30 fl oz/A	X	X				Apply preventatively or when disease symptoms first appear. Repeat applications on a 7-to-14-day interval as needed.
Hydrogen Peroxide + Peroxyacetic Acid OxiDate 5.0, 27%; 5%	Spray	50-128 fl oz/100 gallons						Label suggests management of several fungal and bacterial diseases.
Hydrogen Peroxide + Peroxyacetic Acid SaniDate 12.0, 18.5%, 12%	Chemigation	Dilution rate is 1:1000 to 40,000						Label suggests management of several fungal and bacterial diseases.
Phosphorus Acid + Hydrogen Peroxide OxiPhos, 27.1%; 14.0%	Spray	2.5-5.0 qts/A						Label suggests management of several fungal and bacterial diseases.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Leaf spot includes fungal leaf diseases such as tan spot, Septoria/Stagonospora leaf blotch for wheat and net blotch and spot blotch for barley.

Barley-Oat-Rye-Wheat
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]					Remarks
			Leaf Spot	Leaf Rust	Stem Rust	Powdery Mildew	Fusarium Head Blight	
Tea Tree Oil (46) Timorex Act, 12.5%	Spray	7-35 fl oz/A	X				X	Make applications in the early stages of plant growth when conditions favor disease. Use higher rates under higher disease pressure. Controls some bacterial diseases as well.
Azoxystrobin (11) Quadris, 22.9% Satori, 22.9% Equation, 22.9% Tetraban, 22.9% Aframe, 22.9% Azoxystrobin SC, 22.9% Arius 250, 22.93% AZteroid FC 3.3, 34.3%	Spray or fungigation	6.0-12.0 fl oz/A (12.0 fl oz/A, powdery mildew)	X	X	X	X		For wheat and barley. Registered for application up to Feekes 10.54. PHI = 45 days for wheat. PHI = 7 days for forage or hay. PHI = 14 days for grazing wheat.
		3.9-9.7 fl oz/A (9.7 fl oz/A for powdery mildew)	X	X	X	X		
Azoxystrobin (11) + Cyproconazole (3) Azure Xtra, 18.2%; 7.3% RustEase, 18.2%; 7.3%	Spray or fungigation	3.5-6.8 fl oz/A	X	X	X	X		For wheat and triticale. Apply product at 3.5 oz/A in the spring at approximately Feekes 5. Apply at 5-6.8 oz/A between Feekes 8-10.51. Do not apply more than 6.8 fl oz/A per season. PHI = 30 days for wheat. PHI = 21 days for forage and hay.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Leaf spot includes fungal leaf diseases such as tan spot, Septoria/Stagonospora leaf blotch for wheat and net blotch and spot blotch for barley.

Barley-Oat-Rye-Wheat
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]					Remarks
			Leaf Spot	Leaf Rust	Stem Rust	Powdery Mildew	Fusarium Head Blight	
Azoxystrobin (11) + Propiconazole (3) Quilt 7.0%: 11.7%	Spray or fungigation	7-14 fl oz/A	X	X	X	X		For wheat, barley and triticale. May be tank mixed with Axial and Discover herbicides. Quilt or Quilt Xcel also can be applied at 7 fl oz/A for early season disease control. Quilt is registered for application up to Feekes 10.54. Quilt Xcel may be applied through full head emergence (Feekes 10.54) for wheat; 45 days PHI for barley and triticale and 7-day PHI for forage or hay.
Quilt Xcel 13.5%:11.7% Aframe Plus, 13.5%; 11.7% Trevo P, 13.5%; 11.7%	Spray or fungigation	7-14 fl oz/A	X	X	X	X		
Azoxystrobin (11) + Tebuconazole (3) Custodia, 11.0%; 18.35%	Spray or fungigation	6.4-8.6 fl oz/A	X	X	X	X		For wheat and barley. Apply prior to disease development up to late head emergence. Do not exceed 8.6 fl oz/A per season. PHI = 45 days for wheat and barley, 14 days for forage or hay.
(11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	Spray or fungigation	Wheat: 5.1-14.7 fl oz/A Barley, oats, Rye: 7.4-14.7 fl oz/A	X	X	X	X		Begin applications prior to disease onset. Do no apply after Feekes 10.54. Do not apply more than 29.4 fl oz/A per year. PHI = 7 days.
Benzovindiflupyr (7) + Azoxystrobin (11) + Propiconazole (3) Trivapro 2.9%:10.5%:11.9%	Spray or fungigation	9.4-13.7 fl oz/A	X	X	X	X		Apply prior to disease development. Apply 9.4 oz/A at first tiller. Apply at Feekes 8-10 for flag leaf protection. Do not apply after Feekes 10.54. Do not exceed 2 applications per year. PHI = 7 days for forage

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[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Leaf spot includes fungal leaf diseases such as tan spot, Septoria/Stagonospora leaf blotch for wheat and net blotch and spot blotch for barley.

Barley-Oat-Rye-Wheat
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]					Remarks
			Leaf Spot	Leaf Rust	Stem Rust	Powdery Mildew	Fusarium Head Blight	
Copper (M1)								
Champ DP, 57.6%		1-1.33 lb/A	X					Most not registered on rye, unless otherwise noted.
Champ WG, 77%		1.5-2 lb/A	X					Make first application at early heading and follow with second spray 10 days later.
Champ Formula 2, Flowable, 37.5%		1-1.33 pt/A	X					
ChampION++ 46.1%		0.5-0.75 lb/A	X					Kocide 3000 and ChampION++can be applied as a foliar application for early season disease control and again at early heading and followed with another application 10 days later.
Cuprofix Ultra 40 Disperss 71.1%		1-1.25 lb/A	X					
Kocide 2000, DF 53.8%	Spray or fungigation	1.25-1.5 lb/A	X					Make a foliar application for early season disease control and again at early heading and followed with another application 10 days later.
Kocide 3000, DF 46.1%		0.5-0.75 lb	X					
Kocide 4.5 LF, 37.5%		1-1.33 pt/A	X					
KOP-5, 20%		0.5-1.5 pt/A	X					
MasterCop, 21.46%		0.5-1.8 pt/ A	X					
Badge SC 32.17%		0.5-1.8 lb/A	X					Labeled for rye.
Badge X2 45.31%		0.5-1.8 lb/A	X					Labeled for rye.
Cyproconazole (3) Alto, 8.9%	Spray or fungigation	1.5-5.5 fl oz/A	X	X	X	X		For wheat and triticale only. Low rate for early season leaf spot suppression. For 3.0 or 5.5 fl oz rate, apply between Feekes 8 and 10.51. PHI = 30 days.

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Leaf spot includes fungal leaf diseases such as tan spot, Septoria/Stagonospora leaf blotch for wheat and net blotch and spot blotch for barley.

Barley-Oat-Rye-Wheat
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]					Remarks
			Leaf Spot	Leaf Rust	Stem Rust	Powdery Mildew	Fusarium Head Blight	
Fluoxastrobin (11) Evito 480SC, 40.3%	Spray or fungigation	2.0-4 fl oz/A	X	X	X	X		Do not apply more than 8.0 fl oz/yr. Begin applications preventively and continue as needed on a 14-21-day interval. Applications prior to Feekes 5 suppress early season diseases. Apply up to late head emergence (Feekes 10.5).
Fluoxastrobin (11) + Flutriafol (3) Preemptor, 14.84%; 19.3%	Spray	2-6 fl oz/A	X	X	X	X		For wheat only. Apply prior to disease development and up to Feekes 10.5. Do not exceed 12 fl oz/A per season. PHI = 40 days for grain, 15 days for hay and 7 days for forage. Do not tank mix with any bromoxynil product.
Fluoxastrobin (11) + Tetraconazole (3) Zolera FX, 17.76%; 17.76%	Spray	2.5-5.0 fl oz/A	X	X	X	X		Apply from Feekes 2 up to Feekes 10.5. Do not make applications less than 14 days apart. Do not apply more than 5 fl oz/A per year.
Flutriafol (3) Topguard 11.8%	Spray or fungigation	10-14 fl oz/A	X	X	X	X		Registered for use on wheat (spring and winter) only. Do not exceed 2 applications or 28 fl oz/year. PHI = 30 days.
Fluxapyroxad (7) + Pyraclostrobin (11) Priaxor, 14.33%: 28.58% Everlon, 28.58%; 14.33%	Spray or fungigation	4-8 fl oz/A	X	X	X	X		For barley and oats: apply no later than 50% head emergence (Feekes 10.3). For wheat, rye and triticale: apply no later than beginning of flowering.

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Leaf spot includes fungal leaf diseases such as tan spot, Septoria/Stagonospora leaf blotch for wheat and net blotch and spot blotch for barley.

Barley-Oat-Rye-Wheat
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]					Remarks
			Leaf Spot	Leaf Rust	Stem Rust	Powdery Mildew	Fusarium Head Blight	
Mancozeb (M3)								
Dithane DF Rainshield NT, 75%	Spray or fungigation	2.1 lb/A	X	X				Do not make more than 3 applications of mancozeb. Do not apply mancozeb within 26 days of harvest. Do not graze livestock in treated areas prior to harvest. Addition of spreader/sticker will improve performance. 0.75 to 1-quart rate of Dithane F-45 or 1 lb rate Dithane DF Rainshield NT is for application at the tillering stage to barley and wheat in North Dakota, South Dakota and Minnesota; this is covered by a Section 2 (ee) label.
Dithane F-45, 37%	Spray or fungigation	1.6 qt/A	X	X				
Dithane M-45, 80%	Spray or fungigation	2 lb/A	X	X				
Dithane WSP, 80%	Spray or fungigation	2 lb/A	X	X				
Koverall, 75%	Spray or fungigation	2 lb/A	X	X				
Manzate Max, 37%	Spray or fungigation	1.6 qt/A	X	X				
Manzate Pro-Stick, 75%	Spray or fungigation	2 lb/A	X	X				
Penncozeb, 80 WP, 80%	Spray or fungigation	1-2 lb/A	X	X				Penncozeb labels state control of Fusarium head blight as well.
Penncozeb 75 DF, 75%	Spray or fungigation	1-2 lb/A	X	X				
Roper DF Rainshield, 75%	Spray or fungigation	2.0-lb/A	X	X				
Mancozeb (M3) + Azoxystrobin (11)								
Dexter Max, 70%; 5%	Spray or fungigation	2.1 lbs/A	X	X	X	X		Start application at onset of disease. Do not apply after Feekes 10.5. Do not apply more than 3.75 lbs of product/season. PHI = 26 days for barley, rye and oat. PHI = 45 days for wheat and triticale used for grain.

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Leaf spot includes fungal leaf diseases such as tan spot, Septoria blotch and spot blotch on wheat, and spot blotch and net blot on barley.

Barley-Oat-Rye-Wheat
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]					Remarks
			Leaf Spot	Leaf Rust	Stem Rust	Powdery Mildew	Fusarium Head Blight	
Mancozeb (M3) + Copper (M1) ManKocide, 15%:46.1%	Spray or fungigation	2-2.5 lbs/A	X					Not registered for rye. Apply at early heading and follow with second spray 10 days later. Do not apply within 26 days of harvest. Use higher rates when conditions favor disease. Do not graze livestock in treated areas prior to harvest.
Mancozeb (M3) Dithane DF Rainshield NT, 75%	Spray or fungigation	2.1 lb/A	X	X				Do not make more than 3 applications of mancozeb. Do not apply mancozeb within 26 days of harvest. Do not graze livestock in treated areas prior to harvest. Addition of spreader/sticker will improve performance. 0.75 to 1-quart rate of Dithane F-45 or 1 lb rate Dithane DF Rainshield NT is for application at the tillering stage to barley and wheat in North Dakota, South Dakota and Minnesota; this is covered by a Section 2 (ee) label.
Dithane F-45, 37%	Spray or fungigation	1.6 qt/A	X	X				
Dithane M-45, 80%	Spray or fungigation	2 lb/A	X	X				
Dithane WSP, 80%	Spray or fungigation	2 lb/A	X	X				
Koverall, 75%	Spray or fungigation	2 lb/A	X	X				
Manzate Max, 37%	Spray or fungigation	1.6 qt/A	X	X				
Manzate Pro-Stick, 75%	Spray or fungigation	2 lb/A	X	X				
Penncozeb, 80 WP, 80%	Spray or fungigation	1-2 lb/A	X	X				Penncozeb labels state control of Fusarium head blight as well.
Penncozeb 75 DF, 75%	Spray or fungigation	1-2 lb/A	X	X				
Roper DF Rainshield, 75%	Spray or fungigation	2.0-lb/A	X	X				
Mancozeb (M3) + Azoxystrobin (11) Dexter Max, 70%; 5%	Spray or fungigation	2.1 lbs/A	X	X	X	X		Start application at onset of disease. Do not apply after Feekes 10.5. Do not apply more than 3.75 lbs of product/season. PHI = 26 days for barley, rye and oat. PHI = 45 days for wheat and triticale used for grain.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Leaf spot includes fungal leaf diseases such as tan spot, Septoria blotch and spot blotch on wheat, and spot blotch and net blot on barley.

Barley-Oat-Rye-Wheat
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]					Remarks
			Leaf Spot[4]	Leaf Rust	Stem Rust	Powdery Mildew	Fusarium Head Blight	
Mancozeb (M3) + Copper (M1) ManKocide, 15%:46.1%	Spray or fungigation	2-2.5 lbs/A	X					Not registered for rye. Apply at early heading and follow with second spray 10 days later. Do not apply within 26 days of harvest. Use higher rates when conditions favor disease. Do not graze livestock in treated areas prior to harvest.
Metconazole (3) + Prothioconazole (3) Sphaerex, 10.91%; 18.19%	Spray or fungigation	7.3 fl oz/A	X	X	X	X	X	Apply at early flowering for Fusarium head blight in wheat. Apply to full head for Fusarium head blight in barey. Maximum rate per season is 14.6 fl oz. PHI = 30 days
Penthiopyrad (7) Vertisan, 20.6%	Spray or fungigation	10-24 fl oz/A	X	X	X	X (suppression)		Apply prior to disease development. Optimal timing is to apply at Feekes 9 (flag leaf). Do not apply more than 48 fl oz/A per season. Do not apply after Feekes 10.51 (flowering).
Picoxystrobin (11) Aproach, 22.5%	Spray or fungigation	2-12 fl oz/A	X	X	X	X		Early season application at 2-4 fl oz/A can be made for early season leaf disease control. Use a rate between 6-12 fl oz/A for mid-season disease control. Apply no later than Feekes 10.5. Do not apply more than 36 fl oz/A per season. PHI = 45 days for wheat, 7 days for forage, and 14 days for hay.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Leaf spot includes fungal leaf diseases such as tan spot, Septoria/Stagonospora leaf blotch for wheat and net blotch and spot blotch for barley.

Barley-Oat-Rye-Wheat
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]					Remarks
			Leaf Spot[4]	Leaf Rust	Stem Rust	Powdery Mildew	Fusarium Head Blight	
Picoxystrobin (11) + Cyproconazole (3) Aproach Prima, 17.94%: 7.17%	Spray or fungigation	3.4-6.8 fl oz/A	X	X	X	X		Apply at 3.4 fl oz/A for early season disease suppression. For optimal results, apply at Feekes 9 (flag leaf). Do not exceed 6.8 fl oz/A per season and no more than 2 sequential applications of a picoxystrobin containing product. PHI = 45 days for cereals, 21 days for forage or hay.
Propiconazole (3) Tilt 3.6EC, 41.8%	Spray or fungigation	2-4 fl oz/A	X	X	X	X	X	A 2-4 fl oz/A application for early season leaf disease control. May be applied to wheat until Feekes 10.5. Do not apply more than 8 fl oz per season. Do not apply after Feekes 10.54.
Fitness, 41.8%	Spray or fungigation	2.4 fl oz/A	X	X	X	X	X	
PropiMax EC, 41.8%	Spray or fungigation	2-4 fl oz/A	X	X	X	X	X	
Topaz 41.8%	Spray or fungigation	2-4 fl oz/A	X	X	X	X	X	
Bumper 41.8 EC 41.8%	Spray or fungigation	2-4 fl oz/A	X	X	X	X	X	
Bumper ES, 40.85%	Spray or fungigation	2-4 fl oz/A	X	X	X	X	X	
Propiconazole E-AG, 41.8%	Spray	2-4 fl oz/A	X	X	X	X	X	
Propicure 3.6F, 41.8%	Spray or fungigation	2-4 fl oz/A	X	X	X	X	X	
Prothioconazole (3) Proline 480 SC, 41%	Spray	4.3-5.7 fl oz/A	X	X	X	X	X	Registered for use in wheat (including durum), barley, oat and rye. Apply for *Fusarium* head blight (scab) when the main stems of barley plants are fully headed or when 15% of the main-stem plants of wheat have started flowering. Do not make more than 2 applications of Proline per year. For maximum disease control, tank mix with the lowest rate of a nonionic surfactant and then apply 15-20 gpa by ground or 5 gpa by air. Do not apply within 32 days of barley harvest or 30 days of wheat harvest.

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Leaf spot includes fungal leaf diseases such as tan spot, Septoria/Stagonospora leaf blotch for wheat and net blotch and spot blotch for barley.

Barley-Oat-Rye-Wheat
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]					Remarks
			Leaf Spot[4]	Leaf Rust	Stem Rust	Powdery Mildew	Fusarium Head Blight	
Prothioconazole (3) + Tebuconazole (3) Prosaro 421 SC, 19.0%:19.0%	Spray	6.5-8.2 fl oz/A	X	X	X	X	X	Registered for wheat (including durum) and barley. Prosaro has a 30-day PHI. Apply Prosaro for Fusarium head blight (scab) when the main stems of barley plants are fully headed or when 15% of the main stem plants of wheat have started flowering. Do not apply more than 8.2 oz of Prosaro per year.
Prothioconazole (3) + Tebuconazole (3) + Fluopyram (7) Prosaro PRO, 17.39%; 8.7%; 8.7%	Spray	10.3-13.6 fl oz/A	X	X	X	X	X	Registered for use in all wheat and barley. Apply to barley when the main stems of barley plants are at full-head. Apply to wheat when 15% of main stems have started to flower. Do not apply more than 13.6 fl oz/A per year. PHI for barley = 32 days; PHI for wheat = 30 days. May provide suppression to ergot.
Prothioconazole (3) + Azoxystrobin (11) Cortina Xtra, 15.79%; 17.54%	Spray	7-13.5 fl oz/A	X	X	X	X	X	Do not apply more than 0.293 lbs prothioconazole per acre per year. PHI = 30 days.
Pydiflumetofen (7) + Propiconazole (3) Miravis Ace, 13.7%:11.4%	Spray or fungigation	13.7 fl oz/A	X	X	X	X	X	Apply between Feekes 10.3 (50% of spike has emerged) and Feekes 10.54 (kernel watery ripe)). Do not apply more than 27.4 fl oz/A per year. Also labeled for barley, oats, rye and triticale.
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	Spray or fungigation	6-9 fl oz/A	X	X	X	X		For barley and rye: Apply no later than 50% head emergence. For wheat: Registered for up to full head emergence (Feekes 10.5). A Sec. 2 (ee) allows early application at 3 fl oz/A on wheat and barley. No more than 2 applications per season. Apply prior to disease onset.
Pyraclostrobin (11) + Fluxapyroxad (7) + Propiconazole (3) Nexicor, 18.76%; 2.81%; 11.73%	Spray or fungigation	3.5-13 fl oz/A	X	X	X	X		Do not apply more than 26 fl oz/A per year. Do not make more than two sequential applications. PHI = 7 days for forage and hay in barley, oat, rye, wheat, and triticale.

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Leaf spot includes fungal leaf diseases such as tan spot, Septoria/Stagonospora leaf blotch for wheat and net blotch and spot blotch for barley.

Barley-Oat-Rye-Wheat
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]					Remarks
			Leaf Spot[4]	Leaf Rust	Stem Rust	Powdery Mildew	Fusarium Head Blight	
Pyraclostrobin (11) + Mefentrifluconazole (3) Veltyma, 17.56%; 17.56%	Spray or fungigation	7-10 fl oz/A	X	X	X	X		Do not apply more than 20 fl oz/A. Do not make more than two sequential applications. PHI = 21 days for barley, oats, rye, triticale and wheat.
Sulfur (M) Sulfur DF, 80% Sulfur 90W, 90%	Spray	6-15 lb/A 3-8 lbs/A				X		Do not apply when temperatures are high (above 90 F). For powdery mildew only.
Tebuconazole (3), 38.7% Monsoon, Muscle, Onset, Orius 3.6F, Tebucon, Tebustar, Tebuzol, and Toledo	Spray	4 fl oz/A		X	X		X	For wheat and barley. For suppression of *Fusarium* head blight (scab) and rust control. Do not apply more than 4 fl oz per year. Do not apply within 30 days of harvest.

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[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Leaf spot includes fungal leaf diseases such as tan spot, Septoria/Stagonospora leaf blotch for wheat and net blotch and spot blotch for barley.

Canola (Rapeseed)
Seed Treatment

Chemical	Application	Dosage[1]	Disease Control[2]		Remarks
			Seed-borne Blackleg	Seedling Diseases[3]	
Azoxystrobin (11) Dynasty, 9.6%	Slurry	0.10-3.75 fl oz/cwt	X	X	Seed-borne blackleg, seedling *Rhizoctonia* damping off, *Alternaria* seedling blight. Add Apron XL LS for *Pythium* sp.
Saxony 100 FS, 9.67%	Slurry	0.1-3.75 fl oz/cwt	X	X	
Clothianidin+ Penflufen (7) + Trifloxystrobin (11) + Metalaxyl (4) Prosper EverGol, 22.32%: 0.82%: 0.55%: 0.55%	Slurry or mist	21.5 fl oz/cwt	X	X	Registered for commercial use as a seed treatment in canola only. Contains both fungicide and insecticide.
Difenoconazole (3) Salient 372 FS, 33.3%	Slurry or mist	1 fl oz/cwt	X		Tank mix this product with seed treatment Spirato 480 FS for broad spectrum protection against other diseases such as *Fusarium* and *Rhizoctonia*.
Ethaboxam (22) Intego Solo, 34.2%	Slurry or mist	0.2-0.3 fl oz/cwt		X	For control of *Pythium*.
Ethaboxam (22) + Mandestrobin (11) + Metconazole (3) + Metalaxyl (4), Intego Suite Canola, 0.83%; 1.11%; 0.166%; 0.442%	Slurry	11.27 fl oz/cwt	X	X	Control of *Rhizoctonia solani*, *Fusarium* spp., and *Pythium* spp.
Fludioxonil (12) Maxim 4FS, 40.3%	Slurry	0.08-0.16 fl oz/cwt	X	X	For seed-borne and soil-borne fungi.
Spirato 480 FS	Slurry	0.08-0.16 fl oz/cwt	X	X	
Dyna-Shield Fludioxonil, 40.3%	Slurry	0.08-0.16 fl oz/cwt	X	X	

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.

Canola (Rapeseed)
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Disease Control[2]		Remarks
			Seed-borne Blackleg	Seedling Diseases[3]	
Mefenoxam (4) Apron XL, 33.3 % Precinct, 45.3%	Slurry Mist or slurry	0.32 fl oz/cwt 0.23 fl oz/cwt		X	For suppression of *Pythium*.
Metalaxyl (4) Allegiance FL, 28.35% Sebring 318 FS, 28.35% Belmont 2.7 FS, 28.89% Sebring 480 FS, 44.08%	Mist or slurry	0.25-0.5 fl. oz/cwt 0.3-1.10 fl oz/cwt		X X	For *Pythium* damping off only.
Picarbutrazox (U17) Vayantis, 36%	Slurry or mist	0.05-0.2 fl oz/cwt	X		For root rot, seed rot and damping off due to *Pythium* spp.
Pydiflumetofen (7) Saltro, 41.7%	Slurry	1.23 fl oz/cwt	X		Control of seed- and air-borne blackleg.
Sedaxane (7) Vibrance, 43.7%	Slurry	0.08-0.16 fl oz/cwt or 2.5-5 gai/100 kg seed		X	For seed decay, seedling blight and damping off caused by *Rhizoctonia solani*.
Sedaxane (7) + Difenoconazole (3) + Mefenoxam (4) + Fludioxonil (12) + Thiamethoxam Helix Vibrance, 0.26%; 1.25%; 0.40%; 0.13%; 20.7%	Slurry	23 fl oz/cwt	X	X	For use in commercial seed treatment facilities with closed transfer systems. For seed decay, seedling blight and damping off caused by *Pythium*, *Fusarium*, and *Rhizoctonia*.
Thiram (M3) Thiram 480 DP, 42%	Mist or Slurry	6.4 fl oz/cwt	X	X	For use against seed decay, damping-off and seedling blights.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.

Canola (Rapeseed)
Soil Application

Organism	Application	Dosage[1]	White mold[2] *(Sclerotinia sclerotiorum)*	Remarks
Coniothyrium minitans Contans WG, 5.3%	Soil incorporation	1-2 lb/A	X	Fungus attacks sclerotia of the fungus in the soil.
Fluoxastrobin (11) + Bifenthrin Tepera Plus HD, 15.41%; 24.59%	In furrow and banding	2.3-4.5 fl oz/A		Apply at 4.5 fl oz/A for *Rhizoctonia*

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Canola
Foliar Sprays

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]			Remarks
			Alternaria Black Spot	Black-leg	Sclerotinia Stem Rot (white mold)	
***Bacillus subtilis* strain QST 2808 (44)** Serenade ASO, 1.34%	Spray or fungigation	2-6 qt/A			X	Begin applications when environmental conditions and plant stage are conducive to disease development. For disease suppression.
***Bacillus subtilis* strain IAB/BS03 (44)** AVIV, 0.08%	Spray or fungigation	10-30/A			X	To optimize disease control and maximize yield, apply this product preventatively in 15-40 gallons of water per acre.
***Pythium oligandrum* DV 74 (44)** Polyversum, 1.0%	Spray or fungigation	1.5-3 fl oz			X	Research at NDSU showed efficacy against white mold when applied at 1.5 fl oz, 30 days before flowering and at 3 fl oz at flowering. Do not mix with chemical fungicides.
Azoxystrobin (11) Quadris, 22.9% Satori, 22.9% Equation, 22.9% Tetraban, 22.9% Aframe, 22.9% Arius 250 Sipcam AZteroid FC 3.3, 34.3% Azoxystrobin SC, 22.9%	Spray or fungigation	6.0-15.5 fl oz/A 3.9-9.7 fl oz/A for AZteroid FC	X	X	X	*Alternaria* Black Spot alone: 8.0 fl oz/A at pod stage (95% petal fall). Blackleg: 6.2 fl oz/A at 2-4 leaf stage *Alternaria* Black Spot or *Sclerotinia* Stem rot: 9.2-15.4 fl oz/A at 10-25% flowering (3-7 days after first flower).

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Canola
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]			Remarks
			Alternaria Black Spot	Black-leg	Sclerotinia Stem Rot (white mold)	
Azoxystrobin (11) + Benzovindiflupyr (7) Elatus, 30.0%; 15.0%	Spray or fungigation	7.3 fl oz/A	X	X		For blackleg, apply during rosette stage between 2nd true leaf and bolting. For *Altemaria*, make an application at the end of flowering. Do not apply more than 7.3 fl oz/A per year and a maximum of one application per year. PHI = 30 days.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	Spray or fungigation	7.4-18.4 fl oz/A	X	X	X	Apply 8.3 fl oz/A at early bud with second application of 16.7 fl oz/A approximately 45 days before harvest. A third application (if warranted) can be made 30 days before harvest. Do not apply more than 33.1 fl oz/A per season. PHI = 30 days.
Boscalid (7) Endura, 70%	Spray or fungigation	5-6 oz/A			X	Apply at 20-50% flowering prior to the onset of disease. Apply a second application if conditions continue to be favorable for disease development.
Fluoxastrobin (11) + Tetraconazole (3) Zolera FX, 17.76%; 17.76%	Spray	5.0-7.7 fl oz/A	X	X	X (suppression)	Do not make applications less than 7 days apart. See product label for specific Alternaria, blackleg and white mold application information. Do not apply more than 15.4 fl oz/A per year.
Fluopyram (7) + Prothioconazole (3) ProPulse 17.4%; 17.4%	Spray or fungigation	9.0 fl oz/A	X		X	For optimum disease control, apply at early flowering. Do not apply more than 18 fl oz/A per year. Do not apply ProPulse within 36 days of harvest.
Fluxapyroxad (7) + Pyraclostrobin (11) Priaxor, 14.33% + 28.58% Everlon, 28.58%; 14.33%	Spray or fungigation	4-8 fl oz/A	X	X	X	For black spot, apply at early pod development. For blackleg, apply at 2-4 leaf stage. For *Sclerotinia*, apply at 20-50% bloom, and a second application may be made 14 days later if weather conditions are favorable for disease development. Do not make more than two consecutive applications of Priaxor or more than 16 oz per season.

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Canola
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]			Remarks
			Alternaria Black Spot	Black-leg	Sclerotinia Stem Rot (white mold)	
Isofetamid (7) Kenja, 36%	Spray	10.25-12 fl oz/A			X	Initiate applications at 20 to 40% flowering or prior to disease development. Use the higher rate for extended disease control.
Mefentrifluconazole (3) Provysol, 34.93%	Spray	2.5-5 fl oz/A	X	X		Controls blackleg and black spot. Apply prior to disease development on 14-day intervals. Do not apply more than 10 fl oz/A per year.
Mefentrifluconazole (3) + Pyraclostrobin (11) Veltyma, 17.56%; 17.56%	Spray	7-10 fl oz/A	X	X		Controls blackleg and black spot. Apply prior to disease development. Do not apply more than 20 fl oz/A per year.
Mefentrifluconazole (3) + Pyraclostrobin (11) + Fluxapyroxad (7) Revytek, 11.61%; 15.49%; 7.74%	Spray	8-15 fl oz/A	X	X	X (suppression)	Controls blackleg and black spot and provides suppression of white mold. Apply prior to disease development. Do not apply more than 30 fl oz/A per year. PHI = 21 days.
Metconazole (3) Quash WDG, 50%	Spray	2-4 oz/A			X	Apply at 20-50% bloom, 10-20 gpa by ground, 5 gpa by air. Do not make more than 1 application or apply more than 4 fl oz/A. PHI = 35 days.
Penthiopyrad (7) Vertisan, 20.6%	Spray or fungigation	14-20 fl oz/A	X		X	Begin applications prior to disease development. For white mold, make initial application at 20-50% bloom. Do not exceed 41 fl oz/A per year. PHI = 21 days.
Picoxystrobin (11) Aproach, 22.5%	Spray	6-12 fl oz/A	X	X	X	For white mold, apply at 20-50% bloom at 8-12 fl oz/A. Do not apply more than 24 fl oz/A per season. PHI = 28 days.
Picoxystrobin (11) + Prothioconazole (3) Viatude, 17.05%; 5.68%	Spray	8-16 fl oz/A	X	X	X	Apply 8-16 fl oz/A for Alternaria and black leg. Apply 10-16 fl oz/A for white mold and at 20-50% bloom. Do not apply more than 32 fl oz/A per season. PHI = days.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Canola
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]			Remarks
			Alternaria Black Spot	Black-leg	Sclerotinia Stem Rot (white mold)	
Prothioconazole (3) Proline 480 SC, 41%	Spray	4.3-5.7 fl oz/A		X	X	A 2(ee) allows for application of Proline at 4.3-5.7 oz/A at 2-4 leaf stage for blackleg management. Use higher rate if field has history of severe disease or if susceptible variety grown. Apply at 20-50% flowering for white mold. Do not make more than 2 applications per year. For maximum disease control, apply at 15-20 gpa by ground or 5 gpa by air. Do not apply within 36 days of harvest.
Prothioconazole (3) + Azoxystrobin (11) Cortina Xtra, 15.79%; 17.54%	Spray	12-15 fl oz/A	X		X	
Pydiflumetofen (7) + Azoxystrobin (11) + Propiconazole (3) Miravis Neo, 7.0%; 9.3%; 11.6%	Spray	13.7 oz/A	X	X	X (suppression)	For white mold, apply at 20-50% flowering or prior to disease onset. For black spot, apply at the end of flowering/early pod set. Do not make more than two applications of Miravis Neo before alternating with a fungicide that is not in group 3, 7 or 11. Maximum use is 13.7 fl oz/A/year. PHI = 30 days.
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	Spray	6-12 fl oz/A	X	X	X	For blackleg control, apply at 2-4 leaf stage. For black spot control, apply at early pod development. A second application 7-10 days later may be made if disease persists or weather is favorable for disease.
Tetraconazole (3) Andiamo 230, 20.5% Domark, 20.5%	Spray	4.3-6.7 fl oz/A 4.2-6.7 fl oz/A			X X	Begin applications as a preventative at the beginning of flower between 20-50% bloom and repeat if needed 7-to-14-days after the first application. Recommended 15-20 GPA (minium 10 GPA ground). Maximum of 2 applications a year.
Tetraconazole (3) + Azoxystrobin (11) Brixen, 6.67%:13.76% Affiance, 7.48%; 9.35%	Spray	16-21 fl oz/A 10-19 fl oz/A	X X	X X	X X	Begin applications as a preventative at the beginning of flower between 20-50% bloom and repeat if needed 7-to-14-days after the first application. Blackleg: Make applications of this product at the 2-4 leaf stage.

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[2]Dosage = amount of formulated product to apply.
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Canola
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]			Remarks
			Alternaria Black Spot	Black-leg	Sclerotinia Stem Rot (white mold)	
Thiophanate Methyl (1) Topsin M WSB, T-Methyl WSB 70W 70%	Spray or fungigation	1-2 lb/A			X	Apply 1-2 lb once at 20-50% flowering, or apply 1 lb twice with the first application at 20-30% flowering and the second application at 40-50% flowering. Do not apply more than 2 lbs/A/season.
Incognito 85 WDG Thiophanate Methyl, WDG 85%	Spray or fungigation	0.8-1.6 lb/A			X	Apply 0.8-1.6 lb once at 20-50% flowering, or apply 0.8 lb twice, with the first application at 20-30% flowering and the second application at 40-50% flowering. Do not apply more than 1.6 lbs/A/season.
T-Methyl 4.5F	Spray or fungigation	20-40 fl oz/A			X	See label for specific application timings. Do not apply more than 40 fl oz of T-Methyl 4.5F per acre per season.

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Chickpea (Garbanzo Bean)
Seed Treatment

Chemical	Application	Dosage[1]	Control[2] of Seedling Diseases[3]	Remarks
Azoxystrobin (11) Dynasty, 9.6% Saxony 100 FS, 9.67%	Slurry	0.153-0.765 fl oz/cwt	X	For seed-borne and soil-borne fungi.
Carboxin (7) + Thiram (M3) Vitaflo-280, 15.59%; 13.25%	Ready to use slurry			
Ethaboxam (22) Intego Solo, 34.2%	Slurry	0.3-0.6 fl oz/cwt	X	For management of *Aphanomyces* and some metalaxyl resistant *Pythium* species.
Fludioxonil (12) Maxim 4FS, 40.3% Spirato 480 FS Dyna-Shield Fludioxonil	Slurry Slurry Slurry	0.08-0.16 fl oz/cwt 0.08-0.16 fl oz/cwt 0.08-0.16 fl oz/cwt	X X X	For seed-borne and soil-borne fungi.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Chickpea (Garbanzo Bean)
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control[2] of Seedling Diseases[3]	Remarks
Fludioxonil (12) + Mefenoxam (4) Apron Maxx RFC 2.31%:3.46%	Slurry	1.5 fl oz/cwt	X	
Fludioxonil (12) + Sedaxane (7) + Mefenoxam (4) Vibrance Trio, 2.32%; 2.32%, 13.95%	Slurry	1.55 fl oz/cwt	X	For seed and seedling diseases including *Ascochyta, Botrytis, Fusarium*, *Phomopsis*, *Phytophthora, Pythium* and *Rhizoctonia*.
Fluxapyroxad (7) + Pyraclostrobin (11) + Metalaxyl (4) Obvius, 1.58%; 1.58%; 1.26%	Slurry or mist	4.6 fl oz/cwt	X	Control of *Rhizoctonia* sp., *Fusarium* sp., *Pythium* sp., *Botrytis cinerea*., and seed-borne *Colletotrichum* sp., and *Ascochyta* spp.
Ipconazole (3) Rancona 3.8 FS, 40.7%	Slurry or mist	0.085 fl oz/cwt	X	Does not provide control of *Pythium*.
Ipconazole (3) + Metalaxyl (4) Rancona Summit, 0.902%: 1.44% Rancona CTS, 2.42%; 1.94%	Slurry or mist	1.53 fl oz/cwt	X	For seed-borne and soil-borne fungi.
Mefenoxam (4) Apron XL, 33.3% Precint, 45.3%	Slurry or mist Slurry or mist	0.32-0.64 fl oz/cwt 0.12-0.47 fl oz/cwt	X	For *Pythium* damping off.
Mefenoxam (4) + Fludioxonil (12) + Thiamethoxam Cruiser Maxx, 1.7%:1.12%:22.61%	Slurry or mist	3 fl oz/cwt	X	For seed-borne and soil-borne fungi and insect.

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[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Chickpea (Garbanzo Bean)
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control[2] of Seedling Diseases[3]	Remarks
Metalaxyl (4) Allegiance FL, 28.35% Sebring 318 FS, 28.35% Dyna-Shield, 28.35% Belmont 2.7 FS, 28.98%	 Slurry or mist Slurry or mist Slurry Slurry or mist	 0.75-1.0 fl oz/cwt 0.25-0.5 fl oz/cwt 0.75 fl oz/cwt 0.75 fl oz/cwt	 X X X X	For *Pythium* damping off.
Picarbutrazox (U17) Vayantis, 36%	Slurry or mist	0.05-0.2 fl oz/cwt	X	For seed rot, root rot, seedling rot and damping off due to *Pythium* spp.
Prothioconazole (3) + Penflufen (7) + Metalaxyl (4) EverGol Energy, 7.18%:3.59%:5.74%	Slurry or mist	1 fl oz/cwt	X	For seed-borne and soil-borne fungi and seed rot and damping off caused by *Rhizoctonia*.
Pyraclostrobin (11) Stamina, 18.4%	Slurry or mist	0.4-1.5 fl oz/cwt	X	For seed-borne and soil-borne fungi and for control of seed and seedling disease caused by *Rhizoctonia solani*.
Sedaxane (7) Vibrance, 43.7%%	Slurry	0.08-0.16 fl oz/cwt or 2.5-5 g ai/100 kg of seed	X	For seed decay, seedling blights, and damping off caused by *Rhizoctonia*.
Sedaxane (7) + Mefenoxam (4) + Fludioxonil (12) Vibrance Maxx, 4.69%; 3.52%; 2.35%	Slurry	1.54 fl oz/cwt	X	For seed-borne and soil-borne diseases caused by Rhizoctonia, Pythium and Fusarium.
Thiabendazole (1) Mertect 340-F, 42.3%	Slurry	2.04 fl oz/cwt	X	For seed-borne *Ascochyta*, *Phoma* and seedling diseases caused by *Fusarium*.
Thiabendazole (1) + Sedaxane (7) + Mefenoxam (4) + Fludioxonil (12) Vibrance Maxx Pulses RTA, 4.3%:1.43%:1.07%:0.71%	Slurry	5.0 fl oz/cwt	X	For seed-borne and soil-borne diseases caused by Ascochyta, Botrytis, Colletotrichum, Fusarium, Phoma, Phomopsis, Pythium and Rhizoctonia
Thiabendazole (1) + Sedaxane (7) + Mefenoxam (4) + Fludioxonil (12) + Thiamethoxam Cruiser Maxx Vibrance Pulses, 4.24%; 1.41%; 1.06%; 0.71%; 8.48%	Slurry	5.0 fl oz/cwt	X	For seed-borne and soil-borne diseases caused by *Ascochyta*, *Phoma*, *Botrytis*, *Fusarium*, *Phomopsis*, *Pythium* and *Rhizoctonia*

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Chickpea (Garbanzo Bean)
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control[2] of Seedling Diseases[3]	Remarks
Thiophante-methyl (1) + Metalaxyl (4) + Fluxapyroxad (7) + Pyraclostrobin (11) Obvius Plus, 8.93%; 14.73%; 4.46%; 3.57%	Slurry or mist	1.53 fl oz/cwt	X	Controls anthracnose, *Fusarium* spp., *Phytophthora* spp., Pythium spp., *Rhizoctonia solani,* and *Asochyta spp.*
Tolclofos-methyl (14) Rizolex, 42%	Slurry or mist	0.3 fl oz/cwt	X	For seed-borne and soil-borne diseases. Controls *Rhizoctonia* and *Fusarium* species.
Trifloxystrobin (11) Trilex, 22%	Slurry	0.32 fl oz/cwt	X	For seed-borne and soil-borne fungi.
Trifloxystrobin (11) + Metalaxyl (4) Trilex 2000, 7.12%:5.69%	RTU or slurry or mist	1.0 fl oz/cwt	X	For seed-borne and soil-borne fungi.

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[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Chickpea (Garbanzo Bean)
Foliar Sprays

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control Ascochyta[3,4]	Remarks
***Bacillus subtilis* strain QST 713 (44)** Serenade ASO, 1.34%	Spray or fungigation	2-6 qt/A		Begin applications when environmental conditions and plant stage are conducive to disease development.
***Bacillus subtilis* strain IAB/BS03 (44)** AVIV, 0.08%	Spray or fungigation	10-30 fl oz/A		
***Coniothyrium minitans* strain CON/M/91-08** Contans WG, 5%	Spray or chemigation	1-4 lbs/A		For use to reduce/control *Sclerotinia sclerotiorum* and *Sclerotinia minor* in the soil.
Hydrogen Peroxide + Peroxyacetic Acid OxiDate 5.0, 27%; 5%	Spray	50-128 fl oz/100 gallons		Label suggests management of several fungal and bacterial diseases.
Hydrogen Peroxide + Peroxyacetic Acid SaniDate 12.0, 18.5%, 12%	Chemigation	Dilution rate is 1:1,000-5,000		Label suggests management of several fungal and bacterial diseases.
Phosphorus Acid + Hydrogen Peroxide OxiPhos, 27.1%; 14.0%	Spray	2.5-5.0 qts/A		Label suggests management of several fungal and bacterial diseases.
Phosphorus Acid Phostrol, 53.6%	Spray	2-4 pts/A		For downy mildew caused by *Phytophthora* spp and *Pythium* spp.
Tea Tree Oil (46) Timorex Act, 12.5%	Spray	13-35 fl oz/A		
Tea Tree Oil (BM01) + Difenoconazole (3) Regev, 40.6%:20.3%	Spray	4-8.5 fl oz/A	X	Make applications in the early stages of plant growth when conditions favor disease. Use higher rates under increased disease pressure.

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[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Pathogen populations are resistant and/or less sensitive to FRAC 11.

Chickpea (Garbanzo Bean)
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control Ascochyta[3,4]	Remarks
Azoxystrobin (11) Quadris, 22.9% Satori, 22.9% Equation, 22.9% Tetraban, 22.9% Aframe, 22.9% Azoxystrobin SC, 22.9% Arius 250, 22.93% AZteroid FC 3.3, 34.3%	Spray or fungigation	6.2-15.4 fl oz/A 6-15.5 fl oz/A 3.9-9.7 fl oz/A for AZteroid FC	X	
Azoxystrobin (11) + Chlorothalonil (M5) Quadris Opti, 4.6%: 46%	Spray	1.6-2.4 pt/A	X	Quadris Opti should not be tank mixed with COC, MS0 or silicon adjuvants.
Azoxystrobin (11) + Difenoconazole (3) Quadris Top, 18.2%;11.4%	Spray or fungigation	8-14 fl oz/A	X	Maximum of 56 fl oz/A season. PHI = 14 days. Quadris Top should be used with an adjuvant such as a non-ionic based surfactant or crop oil concentrate or blend.
Azoxystrobin (11) + Propiconazole (3) Quilt, 7.0%;11.7% Trevo P, 13.5%; 11.7%	Spray or fungigation	14 fl oz/A 10.5-14 fl oz/A	X	Maximum of 42 fl oz/A season. PHI = 14 days.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	Spray or fungigation	7.4-18.4 fl oz/A	X	Begin applications prior to disease onset and continue on a 7-to-14-day spray schedule throughout the season. Do not apply more than 110.3 fl oz/A per season. PHI = 30 days.
Boscalid (7) Endura, 70%	Spray or fungigation	6 oz/A	X	Labeled for control of *Botrytis* gray mold, *Sclerotinia* white mold and rust. Apply at the beginning of flowering, prior to the onset of disease. Make a second application at full blossom if conditions continue to be favorable for disease development.

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[4]Pathogen populations are resistant and/or less sensitive to FRAC 11.

Chickpea (Garbanzo Bean)
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control Ascochyta[3,4]	Remarks
Chlorothalonil (M5) Bravo Ultrex, or Equus DF 82.5%	Spray or fungigation	1.25-1.8 lb/A	X	State label allows application to begin at onset of disease, with maybe 2-4 weeks before flowering. Repeat at 7-10-day intervals. Do not make more than 4 applications per growing season. Do not apply within 14 days of harvest. Do not apply more than 11.1 lbs/A per season.
Bravo WeatherStikZN, 51%	Spray or fungigation	1.38-2 pt/A 1.38-2 pt/A	X	
Bravo WeatherStik, 54%	Spray or fungigation	1.38-2 pt/A	X	
Echo 720, 54.0% Bravo Ultrex	Spray or fungigation	1.38-2 pt/A 1.38-2 pt/A	X	
Chlorothalonil 720, 54%	Spray or fungigation	1-1.6 lbs/A	X	
Praiz, 54.0%	Spray or fungigation	2-3 pts/A	X	
Echo 90DF,	Spray or fungigation		X	
Echo Zn, 38.5%	Spray or fungigation		X	
Chlorothalonil (M5) + Tetraconazole (3) Andiamo Advance, 27.69%:2.09%	Spray or fungigation	32.5 fl oz/A	X	Begin applications as a preventative at the beginning of flowering or disease development and repeat if needed 14-to-21 days after the first application. PHI = 14 days.
Cyprodinil (9) + Fludioxonil (12) Switch 62.5WG, 37.5%; 25.0%	Spray	11-14 fl oz/A		For suppression of white mold. Begin applications prior to or at the onset of disease. Make first application at 10-20% bloom. Do not apply more than 56 fl oz/A per season. PHI = 7 days.
Cyazofamid (21) Ranman 400SC, 34.5%	Spray	2.75 fl oz/A		Labeled for suppression of some foliar diseases. Do not apply more than 16.5 fl oz/A per year. PHI = 0 days.
Difenoconazole (3) + Benzovindiflupyr (7) Aprovia Top, 11.25%; 7.50%	Spray or fungigation	10.5-11 fl oz/A	X	Begin applications prior to disease onset when conditions are conducive for disease. Do not make more than two sequential applications before alternating to a fungicide from a different group. Do not apply more than 22 fl oz/A per year. PHI = 14 days.
Fluazinam (29) Omega 500F, 40%	Spray or fungigation	8-13.6 fl oz/A		For suppression of white mold and gray mold. Begin applications at 10-30% bloom. A second application may be applied 7 days later. Do not apply more than 27.2 fl oz/A per year.

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Chickpea (Garbanzo Bean)
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control Ascochyta[3,4]	Remarks
Fluopyram (7) + Prothioconazole (3) ProPulse, 17.4%:17.4%	Spray	8.0-13.6 fl oz/A	X	Apply at early flower or at the first sign of disease, whichever occurs first. Do not make more than two sequential applications before rotating with a fungicide from a different group. Continue applications as needed on a 10–14-day interval. Do not apply within 7 days of cutting or swathing the crop for harvest or within 14 days of harvest.
Fluoxastrobin (11) Evito, 40.3%	Spray or fungigation	2.0-4.75 fl oz/A	X	Maximum of 4.75 fl oz/A/season. PHI = 7 days. or swathing the crop for forage.
Fluxapyroxad (7) + Pyraclostrobin (11) Priaxor, 14.33%:28.58% Everlon, 28.58%; 14.33%	Spray or fungigation	4-8 fl oz/A	X	For optimal disease control, begin applications prior to disease development.
Isofetamid (7) Kenja, 36%	Spray	17 fl oz/A		For white mold caused by *Sclerotinia* and gray mold caused by *Botrytis cinerea*. Begin applications when plants are at 10-30% bloom. A second application can be applied 7-14 days later. Do not make more than 2 sequential applications before rotating to a fungicide with a different mode of action. Do not apply more than 2 applications/A/year. PHI = 30 days.
Mefentrifluconazole (3) Provysol, 34.93%	Spray	2.5-5.0 fl oz/A	X	Controls Alternaria leaf and pod spot, Ascochyta blight, Cercospora leaf spot, Mycosphaerella blight, powdery mildew and rust. Do not apply more than 15 fl oz/A per year.
Mefentrifulconazole (3) + Fluxapyroxad (7) Revylok, 26.04%; 8.68%	Spray	4.5-6.5 fl oz/A	X	Controls Alternaria leaf spot and pod spot, Asochyta blight, Cercospora leaf spot, Mycosphaerella blight, powdery mildew and rust. Do not apply more than 13 fl oz/year. PHI = 21 days.
Mefentrifluconazole (3) + Pyraclostrobin (11) Veltyma, 17.56%; 17.56%	Spray	7-10 fl oz/A	X	Controls Alternaria leaf and pod spot, Ascochyta blight, Cercospora leaf spot, Mycosphaerella blight, powdery mildew and rust. Do not apply more than 20 fl oz/A per year.
Mefentrifluconazole (3) + Pyraclostrobin (11) + Fluxapyroxad (7) Revytek, 11.61%; 15.49%; 7.74%	Spray or fungigation	8-13 fl oz/A	X	Controls Alternaria leaf and pod spot, Ascochyta blight, Cercospora leaf spot, Mycosphaerella blight, powdery mildew and rust. Apply prior to disease development. Do not apply more than 26 fl oz/A per year. PHI = 21 days.

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Chickpea
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control Ascochyta[3,4]	Remarks
Metconazole (3) Quash, 50%	Spray	4.0 fl oz/A	X	Apply when conditions favor disease development and prior to infection. A second application may be made on a 7–10-day interval. Do not make more than 2 applications per year Do not apply more than 8 oz of product/A/year. PHI = 21 days.
Penthiopyrad (7) Vertisan, 20.6%	Spray or fungigation	14-20 fl oz/A	X	Begin applications prior to disease development. For white mold, make initial application at beginning bloom and follow with a second application at full bloom. Do not exceed 41 fl oz/A per year. PHI = 21 days.
Fontelis, 20.4%	Spray or fungigation	14-20 fl oz/A	X	
Picoxystrobin (11) Aproach, 22.5%	Spray or fungigation	6-12 fl oz/A	X	Labeled for white mold when applied at beginning of bloom at 8-12 fl oz/A. Do not apply more than 24 fl oz/A per season. PHI = 14 days.
Prothioconazole (3) Proline 480 SC, 41%	Spray	5.0-5.7 fl oz/A	X	Apply at early flower or at the first sign of disease, whichever occurs first. Use the higher rate when conditions are favorable for severe disease pressure and/or when growing more disease susceptible varieties. Do not make more than three applications per year. Repeat applications as needed on a 10–14-day interval. Do not apply within 7 days of cutting or swathing the crop for harvest.
Prothioconazole (3) + Azoxystrobin (11) Cortina Xtra, 15.79%; 17.54%	Spray	12-15 fl oz/A	X	
Prothioconazole (3) + Trifloxystrobin (11) Delaro, 16.0%; 13.7%	Spray or fungigation	12.0 fl oz/A	X	Begin applications preventatively and continue as needed on a 10–14-day interval. Use shorter intervals when conditions are favorable for severe disease pressure. Do not make more than 2 applications of Delaro per season. Tank mix Delaro at 12 fl oz/A with Proline at 1.0 fl oz/A for resistance management. PHI = 30 days. Do not apply within 7 days of cutting or swathing the crop for forage.
Pydiflumetofen (7) + Difenoconazole (3) Miravis Top, 6.9%; 11.5%	Spray	13.7 fl oz/A	X	Begin applications prior to disease development and continue on 14-day interval. Do not make more than two applications of Miravis Top before alternating to a fungicide that is not group 3 or 7. Maximum use rate is 56 fl oz/A/year. PHI = 14 days.
Pydiflumetofen (7) + Azoxystrobin (11) + Propiconazole (3) Miravis Neo, 7.0%; 9.3%; 11.6%	Spray	13.7 oz/A	X	First application should be applied before disease is established and no later than the onset of flowering. Do not make more than two applications of Miravis Neo before alternating to a fungicide that is not group 3, 7 or 11. Maximum use rate is 27.4 fl oz/A/year. PHI = 14 days.

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Chickpea
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control Ascochyta[3,4]	Remarks
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	Spray or fungigation	6-9 fl oz/A	X	Maximum of 18 fl oz/A per season. PHI = 21 days.
Tetraconazole (3) Andiamo 230, 20.5% Domark, 20.5%	Spray	4.3-6.7 fl oz/A 4.2-6.7 fl oz/A	X	Begin applications as a preventative at the beginning of flowering or disease development and repeat if needed 14-to-21-days after the first application. PHI = 14 days. For control of Ascochyta., white mold powdery mildew and rust.
Tetraconazole (3) + Azoxystrobin (11) Brixen, 6.67%:13.76% Affiance, 7.48%; 9.35%	Spray	16-21 fl oz/A 10-19 fl oz/A	X	Begin applications as a preventative at the beginning of flowering or disease development and repeat if needed 14-to-21-days after the first application. PHI = 14 days. For control of Ascochyta, white mold, powdery mildew and rust.
Thiophanate-methyl (1) Miramar, 41.3%	Spray	32.7-43.6 fl oz/A (single app) OR 21.8-32.7 fl oz/A (multiple apps)		For white mold, gray mold, and anthracnose management. For one application: Apply when 100% of plants have at least one open bloom or when conditions are favorable for disease development. For multiple applications: Make the first application when 10-30% of plants have at least one open bloom and follow with sequential applications on a 4-7 day interval. Apply prior or the development of disease for best results. Do not apply more than 87.2 fl oz of product/acre/year.
Trifloxystrobin (11) + Prothioconazole (3) Stratego YLD, 32.3%:10.8% Protegam YLD, 32.3%:10.8%	Spray or fungigation	4.0-4.8 fl oz/A	X	Apply at early flower or at the first sign of disease, whichever occurs first. Do not exceed 0.28 lb of prothioconazole or 0.24 lb of trifloxystrobin per acre per year. Do not apply within 30 days of harvest. Do not apply within 7 days of cutting or swathing the crop for forage.

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Pathogen populations are resistant and/or less sensitive to FRAC 11.

Corn (Field) and Sorghum
Seed Treatment

Chemical	Application	Dosage[1]	Control[2] of Seedling Blights[3]	Remarks
Azoxystrobin (11) Dynasty, 9.6%	Slurry	0.0688 fl oz/80,000 kernel count unit	X	Also controls seed-borne head smut. Use only in combination with labeled rates of Maxim and Apron XL products.
Saxony 100 FS, 9.67%	Slurry	0.1-3.75 fl oz/cwt	X	For seed-borne and soil-borne fungi causing decay, damping-off, and seedling blight.
Azoxystrobin (11) + Mefenoxam (4) + Fludioxonil (12) + Sedaxane (7) + Thiabendazole (1) Vibrance Cinco, 1.13%; 2.26%; 2.83%; 5.67%; 22.70%	Slurry	1.2 oz/cwt or 0.53 fl oz/80,000 kernels	X	For seed-borne and soil-borne fungi causing decay, damping-off and seedling blight.
Captan (M4) The following captan products are registered for seed treatment of corn and sorghum: Captan - Diazinon Seed Treater, 36.67% Methoxychlor, 70.9% Kernel Guard, 14.67% (corn only) Nu-Gro Captan 4000, 38.7% Sorghum Guard, 32.75%	See individual labels for rates of application, formulations, method of application and registered use	See individual labels for amounts of formulated product to apply.	X	Captan - Diazinon Seed Treater contains 25% diazinon insecticide. Kernel Guard contains 15% diazinon and 25% lindane. Sorghum Guard contains 16.6% lindane insecticide.
Carboxin (7) Kernel Guard Supreme, 14%	Drill box	1.5 oz/42 lb	X	Kernel Guard contains 10.42% permethrin.
Chenopodium quinoa saponins Heads Up Plant Protectant	Slurry	0.32 oz/cwt		For protection against fungal and bacterial seed diseases of corn.
Ethaboxam (22) Intego Solo, 34.2%	Slurry or mist	0.2-0.3 fl oz/cwt	X	For control of *Pythium*. Also registered for sweet corn, sorghum and grain (milo).
Fludioxonil (12) Maxim 4FS, 40.3%	Slurry	0.036-0.072 fl oz/80,000 kernel count	X	For control of seed-borne and soil-borne fungi which cause seed decay, damping off and seedling blight, and seed-borne head smut.
Spirato 480FS 40.3%	Slurry	0.08 fl oz/cwt for sweet corn	X	
Dyna-Shield Fludioxonil, 40.3%	Slurry	0.036-0.072 fl oz/80,000 kernel count	X	

[1]Dosages for corn apply to field corn. Dosages for sweet corn vary with some products, and others are not registered for sweet corn, so consult the label for sweet corn information. Dosages are amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.

Corn (Field) and Sorghum
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control[2] of Seedling Blights[3]	Remarks
Fludioxonil (12) +Mefenoxam (4) Maxim XL, 21%: 8.4%	Water-based slurry	0.071 fl oz/80,000 kernel count unit of seed	X	For field corn. Controls seedling blights and fungi causing seed decay and damping off.
Fludioxonil (12) +Mefenoxam (4) + Azoxystrobin (11) + Thiabendazole (1) Maxim Quattro, 3.32%:2.65%:1.33%:26.5%	Water-based slurry	0.46 fl oz/80,000 kernel count	X	Also controls seed-borne smut.
Inpyrfluxam (7) + Metalaxyl (4) + Ethaboxam (22) Lumiscend Pro, 3.61%; 2.89%; 5.42%	Liquid or slurry	0.042 mg ai per seed or 0.9 fl oz/80,000 seeds	X	Control seed rot, seedling blight, and damping off caused by soilborne *Rhizoctonia solani*, *Fusarium* spp., and *Pythium* spp., including metalaxyl-resistant *Pythium* spp. Not registered for sorghum.
Ipconazole (3) Vortex, 40.7% Rancona 3.8 FS, 40.7%	Water-based Slurry	0.044-0.085 fl oz/cwt	X	For protection against soil- borne and seed-borne diseases.
Mancozeb (M3) Dithane DF Rainshield NT, 75%	Slurry	1.6-3.2 oz/bu field corn 1.6-2.7 oz/bu sorghum	X	Dithane DF, F-45 and M-45 registered for seed treatment of field corn and sorghum but not for seed treatment of sweet corn.
Dithane F-45, 37%	Drill box or slurry	2.4-4.8 fl oz/bu field corn, 2.4-4.0 fl oz/bu sorghum	X	
Dithane ST, 37%	Slurry or mist	2.4-4.8 fl oz/bu field corn 2.4-4.0 fl oz/bu sorghum	X	
Dithane M-45, 80% or Dithane WSP, 80%	Drill box or slurry	1.5-3.0 oz/bu field corn 1.5-2.5 oz/bu sorghum	X	
Grain Guard, 50%	Drill box	3 oz/bu	X	Grain Guard and Grain Guard Plus registered for sorghum only. Grain Guard Plus contains 18.75% lindane insecticide.
Grain Guard Plus, 50%	Drill box	3 oz/bu	X	
Manzate Pro-Stick, 75%	Slurry	1.5-3 oz/bu corn 1.5-2.5 oz/bu sorghum	X	
Manzate Max, 37%	Slurry	2.4-4.8 oz/bu corn 2.4-4.0 oz/bu sorghum	X	
Penncozeb 80 WP, 80%	Drill box or slurry	1.5-3.0 oz/bu field corn 1.5-2.5 oz/bu sorghum	X	Treated seed should be labeled "must not be used for food, feed or oil purposes."
Penncozeb 75 DF, 75%	Drill box or slurry	1.6-3.2 oz/bu field corn 1.6-2.7 oz/bu sorghum	X	
Mefenoxam (4) Apron XL, 33.3%	Liquid or slurry	0.32-0.64 fl oz/cwt	X	For control of *Pythium* damping off only.
Precint, 45.3%	Mist or slurry	0.03-0.06 fl oz/cwt		

[1]Dosages for corn apply to field corn. Dosages for sweet corn vary with some products, and others are not registered for sweet corn, so consult the label for sweet corn information. Dosages are amount of formulated product to apply.
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[3]Seedling blights due to various fungal infections of seed.

Corn (Field) and Sorghum
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control[2] of Seedling Blights[3]	Remarks
Metalaxyl (4) Allegiance FL, 28.35% Sebring 318 FS, 28.35%	Mist or slurry	0.375-0.75 fl oz/cwt sorghum	X	For control of *Pythium* damping off only.
Dyna-Shield, 28.35%	Slurry	0.75 fl oz/cwt corn	X	
Sebring 480 FS, 44.08%	Slurry or mist	0.5 fl oz/cwt	X	
Metalaxyl (4) + PCNB (14) + Carboxin (7) Prevail, 3.12%:15%:15%	Drill box	3 oz/bu	X	Not registered for sorghum. Controls early season *Pythium* and *Rhizoctonia*.
Metalaxyl (4) + Metconazole (3) Metlock CT, 4.51%: 2.25%	Liquid or slurry	1.0-1.5 fl oz/cwt	X	Disease protection for *Rhizoctonia* damping-off, *Fusarium* seed/seedling dieback, seed decay fungi and head smut.
Metconazole (3) Metlock 40%	Liquid or slurry	0.045-0.09 fl oz/cwt	X	Disease protection for Rhizoctonia damping-off, Fusarium seed/seedling dieback, seed decay fungi and head smut.
Picarbutrazox (U17) Vayantis, 36%	Liquid or slurry	0.039-0.195 fl oz/cwt	X	For *Pythium*.
Pydiflumetofen (7) Trebuset	Slurry or mist	0.3-0.926 fl oz/cwt	X	For seed-borne and soil-borne diseases caused by *Fusarium* sp.
Pyraclostrobin (11) Stamina, 18.4%	Slurry or mist	0.4-0.8 fl oz/cwt field corn 0.8-1.5 fl oz/cwt sorghum	X	Controls seed and seedling diseases caused by Rhizoctonia solani and Penicillium oxalicum (corn), suppresses seed and seedling diseases caused Fusarium spp., Pythium spp., and Aspergillus spp. (corn).
Sedaxane (7) Vibrance, 43.7%%	Slurry	2.5-5 gai/100 kg of seed corn 2.5-5 gai/100 kg of seed sorghum	X	For seed decay, seedling blights, and damping off caused by *Rhizoctonia*.
Thiram (M3) 42-S Thiram, 42% Signet 480 FS, 42%	Liquid or slurry	1.5 fl oz/bu field corn 5.0 fl oz/cwt sweet corn 2 fl oz/bu sorghum	X	
Tolclofos-methyl (14) Rizolex, 42%	Slurry or mist	0.3 fl oz/cwt	X	For seed-borne and soil-borne diseases. Controls *Rhizoctonia solani*.
Trifloxystrobin (11) + Metalaxyl (4) Trilex 2000, 7.12%; 5.69%	Slurry or mist	0.5 fl oz/cwt	X	Provides seed and seedling protection against seed-borne fungi.

[1c]Dosages for corn apply to field corn. Dosages for sweet corn vary with some products, and others are not registered for sweet corn, so consultconsult the label for sweet corn information. Dosages are amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.

Corn Nematicide
Seed Treatment

Chemical	Application	Control	Remarks
Abamectin + Thiamethoxam Avicta Duo 250 Corn, 11.3%:14.2%	Commercially applied	Root nematodes (by abamectin) and various insects (by thiamethoxam)	Syngenta Crop Protection LLC has an *Avicta Complete Corn* commercial brand that recommends the combination of multiple separate seed treatment products.
Abamectin + Thiamethoxam + Thiabendazole (1) + Fludioxonil (12) + Mefenoxam (4) + Azoxystrobin (11) Avicta Complete Corn 250, 10.3%: 11.7%: 2.34%: 0.30%: 0.23%: 0.12%	Commercially applied	Root nematodes (by abamectin), various insects (by thiamethoxam), and various diseases (by thiabendazole, fludioxonil, mefenoxam, and azoxystrobin)	Syngenta Crop Protection LLC has a commercially treated blend of nematicide, insecticide, and fungicide seed treatment products.
***Bacillus amyloliquefaciens* Strain PTA 4838** Aveo EZ, 16.5% Lumialza, 16.5%	0.1 fl oz/80,000 seeds	Dagger, lance, needle, pin, ring, root knot, root lesion, spiral, sting, stubby root, and stunt nematode.	
***Bacillus amyloliquefaciens* Strain MBI600 + cis-Jasmone** Trunemco Corn/Soy, 1%; 0.88%	0.3 fl oz/cwt	Dagger, lance, needle, pin, ring, root knot, root lesion, spiral, sting, stubby root, and stunt nematode	
Clothianidin + *Bacillus firmus* Poncho Votivo, 40.3% and 8.1%	Commercially applied	Provides early season protection of the corn plant against root nematodes and broad control of insect pests.	The *Bacillus firmus* bacterium creates a living barrier that prevents nematodes from reaching the roots.

Corn
Soil Application

Chemical (Fungicide Group)	Application	Dosage[1]	Remarks
Abamectin Averland FC, 8.0%	In-furrow spray	4-6 fl oz/A	Restricted use pesticide. Provides early season protection of the corn plant against root nematodes. Do not exceed 6 fl oz/A/year. Do not exceed 0.033 lb abamectin/A/year as a soil application including seed and in-furrow treatments.
Azoxystrobin (11) Quadris, 22.9% AZteroid FC 3.3, 34.3% Azoxystrobin SC, 22.9%	In-furrow spray	0.4-0.8 fl oz/1000 ft. row 0.24-0.48 fl oz/1000 ft. row for AZteroid FC	For soilborne and seedling diseases. Do not apply more than 123 fl oz of product/A per season. Do not apply more than 2.0 lbs azoxystrobin/A/year.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	In-furrow	0.5-0.9 fl oz/1000 ft. row	For soilborne diseases. Apply in-furrow as spray or banded spray over the row targeting the plant bases and surrounding soil.
***Bacillus amyloliquefaciens* strain D747 (44) + Bifenthrin** Ethos XB, 5.0%; 15.67%	In-furrow	4-17 fl oz/A	Restricted use pesticide. Suppression of seedling blights caused by *Pythium*, *Rhizoctonia* and *Fusarium*.
***Bacillus subtilis* strain QST 713 (44)** Serenade ASO, 1.34%	In-furrow	2-6 fl qt/A	For control of *Pythium* and *Rhizoctonia*. Apply as directed. Spray in the seed furrow and onto the covering soil at planting. A 2 (ee) allows application of Serenade ASO at 1 fl qt/A.
Minuet, 9.89%	In-furrow	12-24 fl oz/A	Apply Minuet as directed spray in the seed furrow and onto the covering soil at planting for management of *Pythium* and *Rhizoctonia*.
Fluoxastrobin (11) + Bifenthrin Tepera Plus HD, 15.41%; 24.59%	In-furrow	3.3-10 fl oz/A	For protection against soil-borne and seed-borne diseases.
Flutriafol (3) Xyway LFR, 20.9% Xyway 3D, 26.4%	In-furrow spray	0.44-0.87 oz/1000 ft row 0.33-0.68 oz/1000 ft row	For season long control of Gray leaf spot, Southern corn leaf blight, Northern corn leaf blight, common rust, head smut, and common smut.
Fluoxastrobin (11) Evito 480 SC, 40.3%	In-furrow spray	0.11-0.16 fl oz/1,000 ft. row	For protection against soil-borne diseases. Do not exceed a maximum of 22.8 ounces/acre of fluoxastrobin per year.
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	In-furrow spray	0.1-0.8 fl oz/1,000 ft. row	For suppression of *Rhizoctonia*. Do not apply more than 12 fl oz/A of Headline.

[1]Dosage = amount of formulated product to apply.

Corn (Field)
Foliar Sprays

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]		Remarks
			Rust	Leaf Spots[4]	
***Bacillus pumilus* strain QST 2808** Sonata, 1.38%	Spray or fungigation	1-4 qt/A	X	X	Begin applications when environmental conditions and plant stage are conducive to disease development.
***Bacillus subtilis* strain QST 713 (44)** Serenade ASO, 1.34%	Spray or fungigation	2-6 qt/A	X	X	Begin applications when environmental conditions and plant stage are conducive to disease development.
***Bacillus subtilis* strain IAB/BS03 (44)** AVIV, 0.08%	Spray or fungigation	10-30 fl oz/A			
Hydrogen Peroxide + Peroxyacetic Acid OxiDate 5.0, 27%; 5%	Spray	50-128 fl oz/100 gallons			Label suggests management of several fungal and bacterial diseases.
Hydrogen Peroxide + Peroxyacetic Acid SaniDate 12.0, 18.5%, 12%	Chemigation	Dilution rate is 1:1000 to 40,000			Label suggests management of several fungal and bacterial diseases.
Tea Tree Oil (46) Timorex Act, 12.5%	Spray	7-35 fl oz/A			
Azoxystrobin (11) Quadris, 22.9% Satori, 22.9% Equation, 22.9% Tetraban, 22.9% Aframe, 22.9% AZteroid FC 3.3, 34.3% Azoxystrobin SC, 22.9% Arius 250, 22,93%	Spray or fungigation	6.0-9.0 fl oz/A rust 6.0-15.5 fl oz/A leaf spots 3.9-9.7 fl oz/A for AZteroid FC	X	X	Do not apply more than 2 sequential applications and do not apply more than 123 fl oz per acre per season. For field, pop and sweet corn. Do not apply more than 2.0 lbs azoxystrobin/A/year.
Azoxystrobin (11) + Cyproconazole (3) RustEase, 18.2%; 7.3%	Spray	3.5-6.8 fl oz/A	X	X	Begin applications when disease first appears. A second application may be made 7-14 days later. Maximum of 6.8 fl oz/A/year.
Azoxystrobin (11) + Propiconazole (3) Quilt 7.0%; 11.7%	Spray or fungigation	7-14 fl oz/A	X	X	For field corn and sweet corn: Applications prior to tasseling may impose stress on the plant that could inhibit proper kernel development, especially under stress conditions. Alternate applications of Quilt or Quilt Xcel with Tilt or another non-Group 11 fungicide. For best disease control, make applications after R1. PHI = 30 days.
Quilt Xcel 13.5%; 11.7% Aframe Plus, 13.5%; 11.7% Trevo P, 13.5%; 11.7%	Spray or fungigation	10.5-14 fl oz/A	X	X	

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Leaf spots include fungal leaf diseases such as northern corn leaf blight

Corn (Field)
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]		Remarks
			Rust	Leaf Spots[4]	
Azoxystrobin (11) + Tebuconazole (3) Custodia, 11.0%; 18.35%	Spray or fungigation	9-12.9 fl oz/A	X	X	Apply in protective spray schedule. Repeat applications at 7–14-day intervals. Do not use adjuvants or crop oil after the V8 stage prior to VT. Do not exceed 51.7 fl oz/A per season. PHI = 21 days for forage and 36 days for grain or fodder.
Azoxystrobin (11) + Tetraconazole (3) Affiance, 9.35%; 7.48% Brixen, 13.76%; 6.67%	Spray or fungigation	10.0-17.0 fl oz/A 13.0-19.0 fl oz/A	X	X	Apply prior to disease onset and as part of an integrated pest management program. Do not apply more than 17.0 fl oz/A per year. Do not make more than two applications per year. Applications can be made between V4-R3. Harvest PHI = 7 days. Silage PHI = 21 days.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	Spray or fungigation	7.4-18.4 fl oz/A	X	X	Begin applications prior to disease onset and continue on a 7–14-day spray schedule throughout the season. Do not apply more than 147.1 fl oz/A per year. PHI = 7 days.
Benzovindiflupyr (7) + Azoxystrobin (11) + Propiconazole (3) Trivapro, 2.9%; 10.5%, 11.9%	Spray or fungigation	13.7 fl oz/A	X	X	An early application at V4-V8 may be applied for early-season disease control. For later-season applications apply when disease first appears. Do not apply more than 47 fl oz/A per year. Do not exceed three applications per year. PHI = 30 days.
Chlorothalonil (M5) Equus 720 SST, 54.0 % Bravo WeatherStik, 54.0%	Spray or fungigation	0.75-2.0 pts/A	X	X	Begin applications when conditions favor disease development. Maximum use rate per season is 12.0 pts/A for Equus 720 SST and 10.9 lbs/A for Equus DF. PHI = 14 days.
Equus DF, 82.5% Bravo Ultrex, 82.5%	Spray or fungigation	0.7-1.8 lbs/A	X	X	
Echo 720 AG, 54%	Spray or fungigation	0.75-2 pts/A	X	X	
Echo Zn, 38.5%	Spray or fungigation	1-2.75 pts/A	X	X	
Echo 90DF	Spray or fungigation	1.25-1.6lbs/A	X	X	

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[4]Leaf spots include fungal leaf diseases such as northern corn leaf blight

Corn (Field)
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]		Remarks
			Rust	Leaf Spots[4]	
Copper (M1) MasterCop, 21.46% KOP-5, 20%	Spray or fungigation	0.5-1.5 pt/A			Apply when disease first appears and every 7-10 days as needed. Maximum use rate per season is 6.0 pts/A.
Fluoxastrobin (11) Evito 480SC, 40.3%	Spray or fungigation	2.0-5.7 fl oz/A	X	X	Apply maximum of 2 applications (with final application no later than the R4 early growth stage). Do not apply more than 11.4 fl oz/year. Apply prior to disease onset.
Fluoxastrobin (11) + Bifenthrin Tepera Plus HD, 15.41%; 24.59%	Spray or fungigation	5.7 fl oz/A	X	X	Apply maximum of 2 applications with final application no later than the R4 growth stage. Do not use an adjuvant after V8 and prior to VT.
Fluoxastrobin (11) + Flutriafol (3) Preemptor, 14.84%; 19.3%	Spray or fungigation	4-6 fl oz/A	X	X	Apply preventatively from V5-VT. Do not use surfactant after V8 and before VT. Do not apply more than 12 fl oz/A per year. PHI = 30 days.
Fluoxastrobin (11) + Tetraconazole (3) Zolera FX. 17.76%; 17.76%	Spray or fungigation	4.4-6.8 fl oz/A	X	X	For best results, apply beginning at VT. Do not use surfactant after V8 and before VT. Do not apply more than 6.8 fl oz/A per year. PHI = 30 days.
Flutriafol (3) Topguard. 11.8%	Spray	7-14 fl oz/A	X	X	For control of several fungal diseases. Do not apply more than 2 applications or 28 fl oz/season. PHI=80 days.
Fluxapyroxad (7) + Pyraclostrobin (11) Priaxor, 14.33%: 28.58% Everlon, 28.58%; 14.33%	Spray or fungigation	4-8 fl oz/A	X	X	Apply at V5-V8 growth stages for early season disease control. Apply at VT-R2 growth stages for late season disease control. Do not harvest for forage within 7 days of last application. PHI=21 days.
Mancozeb (M3) Koverall, 75%	Sprays or fungigation	1.5 lb/A	X	X	Do not feed treated forage to livestock.
Manzate Pro-Stick, 75%	Sprays or fungigation	1.5 lb/A	X	X	Do not apply more than 15 lb product per season. Do not apply within 40 days of harvest.
Penncozeb 75DF	Sprays or fungigation	1-1.5 lb/A	X	X	
Manzate Max, 37%	Sprays or fungigation	1.2 qt/A	X	X	
Roper DF Rainshield, 75%	Sprays or fungigation	1.5 lb/A	X	X	

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[4]Leaf spots include fungal leaf diseases such as northern corn leaf blight

Corn (Field)
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]		Remarks
			Rust	Leaf Spots[4]	
Mancozeb (M3) + Azoxystrobin (11) Dexter Max, 70%; 5%	Spray or fungigation	1.6 lbs/A	X	X	Start applications when disease first appears. Do not exceed 24 lbs/A/year. PHI = 40 days.
Mefentrifluconazole (3) + Pyraclostrobin (11) Veltyma, 17.56%; 17.56%	Spray	7-10 fl oz/A	X	X	Controls diseases such as anthracnose, northern corn leaf blight and rust. Apply prior to disease development. Do not apply more than 20 fl oz/A per year.
Penthiopyrad (7) Vertisan, 20.6%	Spray or fungigation	10-24 fl oz/A	X	X	Apply prior to disease development. Controls multiple diseases of corn. Do not apply more than 48 fl oz/A per year. PHI = 7 days.
Picoxystrobin (11) Aproach, 22.5%	Spray or fungigation	6-12 fl oz/A	X	X	For early season disease control/suppression, make a single 3-4 fl oz/A application between V4-V7. Apply no more than 36 fl oz/A per season and no more than 2 sequential applications. PHI = 7 days.
Picoxystrobin (11) + Cyproconazole (3) Aproach Prima, 17.94%: 7.17%	Spray or fungigation	3.4-6.8 fl oz/A	X	X	Apply preventatively for disease control. Apply at 3.4 fl oz/A for early season disease control. Do not apply more than 6.8 fl oz/A per season and no more than two sequential applications of a picoxystrobin containing product. PHI = 30 days for grain corn, and 21 days for silage.
Potassium Phosphite (33) + Tebuconazole (3) Viathon, 49%; 3.3%	Spray	2-3 pts/A	X	X	Apply preventively when weather favors disease development. Repeat on a 7–14-day interval. Apply the higher rate under heavier disease pressure.
Propiconazole (3) Tilt, Propimax, or Bumper 41.8 EC, Propiconazole E-AG, 41.8% Fitness, 41.8% Topaz 41.8% Bumper ES, 40.85% Propicure 3.6F, 41.8%	Spray or fungigation Spray or fungigation	2-4 fl oz/A	X	X	Do not apply to field corn and field corn grown for seed after silking. Do not apply more than 16 oz/A per season. Do not apply to sweet corn within 14 days of harvest or field corn within 30 days of harvest. See label for restrictions on use for forage.
Prothioconazole (3) Proline 480 SC, 41.0%	Spray or fungigation	5.7 fl oz/A	X	X	Apply when symptoms first appear. Do not use adjuvants in sprays made between V8 (8 leaf collar) and VT (tasseling). Do not apply more than 22.8 fl oz/A per season. PHI = 14 days.

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[4]Leaf spots include fungal leaf diseases such as northern corn leaf blight

Corn (Field)
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]		Remarks
			Rust	Leaf Spots[4]	
Prothioconazole (3) + Azoxystrobin (11) Cortina Xtra, 15.79%; 17.54%	Spray	8-12 fl oz/A	X	X	
Prothioconazole (3) + Trifloxystrobin (11) Delaro, 16.0%; 13.7%	Spray or fungigation	4.0-12.0 fl oz/A	X	X	For early season control of anthracnose, apply at 4-6 fl oz/A at V4-V7. Apply at 8.0-12.0 fl oz/A between VT-R2. Do not apply more than 24 fl oz/A/year. PHI = 14 days.
Prothioconazole (3) + Trifloxystrobin (11) + Fluopyram (7) Delaro Complete, 14.9%:13.1%:10.9%	Spray or fungigation	4.0-12.0 fl oz/A	X	X	For early season control of anthracnose, apply Delaro Complete at 4-6 fl oz/A at the V4-V7 stage of growth. Additionally, Delaro Complete at 8-12 fl oz/A can be applied from VT to R2 stages. Do not apply more than 24 fl oz/A/year. Do not apply within 14 days of harvest.
Pydiflumetofen (7) + Azoxystrobin (11) + Propiconazole (3) Miravis Neo, 7.0%; 9.3%; 11.6%	Spray	13.7 oz/A	X	X	Apply when disease first appears or at VT or R1 and apply again on a 7–14-day interval. Do not apply more than 44.5 fl oz/A/year. PHI = 30 days.
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	Spray or fungigation	6-12 fl oz/A			Apply at V5-V8 growth stages for early season disease control. Additionally, applications can be made at VT-R2 growth stages. PHI = 7 days. Do not exceed 72 fl oz/A per season; maximum of 2 sequential applications.
Pyraclostrobin (11) + Metconazole (3) Headline AMP, 13.64%:5.14%	Spray	10-14.4 fl oz/A	X	X	For optimal disease control, begin applications prior to disease development. Apply at VT-R2 growth stages for optimal disease control. Do not exceed 57.6 fl oz/A/season. PHI = 20 days.
Tebuconazole (3) Orius 3.6F, 38.7% Tebuzol 3.6F, Monsoon, Onset 3.6L	Spray or fungigation	4-6 fl oz/A	X	X	See individual labels for spray schedule recommendations and preharvest intervals.
Tetraconazole (3) Domark, 20.5% Andiamo 230, 20.5%	Spray or fungigation	4-6 fl oz/A	X	X	Apply prior to disease onset when conditions favor disease development. Do not apply more 6 fl oz/A/year. Do not apply after R3.
Trifloxystrobin (11) + Prothioconazole (3) Stratego YLD, Protegam YLD, 32.3%:10.8%	Spray or fungigation	2.0-5.0 fl oz/A	X	X	For early season control of anthracnose apply at 2-5 fl oz/A at V4-V7. Apply at 4.0-5.0 fl oz/A between VT-R2. Do not apply more than 10 fl oz/A/year. PHI = 14 days.

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Leaf spots include fungal leaf diseases such as northern corn leaf blight.

Crambe
Seed Treatment

Chemical	Application	Dosage[1]	Control[2] of Seedling Blight[3]	Remarks
Fludioxonil (12) Maxim 4FS, 40.3% Dyna-Shield Fludioxonil, 40.3%	Slurry Slurry	0.08-0.16 fl oz/cwt 0.08-0.16 fl oz/cwt	X X	For *Rhizoctonia* and *Fusarium*.
Mefenoxam (4) Apron XL, 33.3 %	Slurry	0.32 fl oz/cwt	X	For suppression of *Pythium*.
Pydiflumetofen (7) Saltro, 41.7%	Slurry	1.23 fl oz/cwt		For control of seed- and air-borne blackleg.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Dry Edible Bean
Seed Treatment

Chemical	Application	Dosage[1]	Control[2] of Seedling Blights[3]	Remarks
Azoxystrobin (11) Dynasty, 9.6% Saxony 100 FS, 9.67%	Slurry	0.153-0.765 fl oz/cwt	X	For seed-borne and soil-borne fungi.
Carboxin (7) Vitavax-34, 34%	Slurry or mist	3-4 fl oz/cwt	X	For *Rhizoctonia* seed rots, damping off and seedling blight.
Carboxin (7) + Thiram (M3) Vitaflo-280, 15.59%; 13.25%	Slurry or mist	4 fl oz/cwt	X	For seed-borne and soil-borne diseases including *Rhizoctonia*, *Fusarium* and *Pythium*.
Captan (M4) Captan 400, 38.4%	See label for rates of application, formulations and registered use	See label for amounts of formulated product to apply.	X	
Chenopodium quinoa saponins Heads Up Plant Protectant	Slurry	5-8 fl oz/cwt	X	Signaling plant activator for protection against Rhizoctonia.
Chloroneb (14) Chloroneb 65W, 65%	Slurry	4 oz/cwt	X	May be used as a supplemental seed treatment for improved suppression of *Rhizoctonia* and *Pythium*.
Fludioxonil (12) Maxim 4FS, 40.3% Spirato 480 FS, 40.3% Dyna-Shield Fludioxonil, 40.3%	Slurry Slurry Slurry	0.08-0.16 fl oz/cwt	X X X	For seed-borne and soil-borne fungi. Registered for control of *Rhizoctonia* and *Fusarium*.
Fludioxonil (12) + Mefenoxam (4) Apron Maxx RFC 2.31%:3.46%	Slurry	1.5 fl oz/cwt	X	For *Fusarium* and *Rhizoctonia* control.
Fludioxonil (12) + Sedaxane (7) + Mefenoxam (4) Vibrance Trio, 2.32%; 2.32%, 13.95%	Slurry	1.55 fl oz/cwt	X	For seed and seedling diseases including *Ascochyta, Botrytis, Fusarium, Phomopsis, Phytophthora, Pythium* and *Rhizoctonia*.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Dry Edible Bean
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control[2] of Seedling Blights[3]	Remarks
Fluxapyroxad (7) + Pyraclostrobin (11) + Metalaxyl (4) Obvius, 1.58%; 1.58%; 1.26%	Slurry or mist	4.6 fl oz/cwt	X	Control of *Rhizoctonia solani.*, *Fusarium* sp., *Pythium* sp., *Botrytis cinerea*,. and seed-borne *Colletotrichum* sp. and *Asochyta* spp.
Ipconazole (3) Rancona 3.8 FS, 40.7%	Slurry or mist	0.085 fl oz/cwt	X	Does not provide control of *Pythium*.
Ipconazole (3) + Metalaxyl (4) Rancona Summit, 0.902%: 1.443%	Slurry or mist	4.0 fl oz/cwt	X	
Ipconazole (3) + Metalaxyl (4) + Carboxin (7) Rancona V RTU FS, 0.47%:1.26%:12.58%	Slurry or Mist	4.6 fl oz/cwt		Provides control of *Pythium* and *Rhizoctonia*.
Mefenoxam (4) Apron XL, 33.3% Precinct, 45.3%	Slurry or mist Surry or mist	0.32-0.64 fl oz/cwt 0.12-0.47 fl oz/cwt	X	For *Pythium* control. For both commercial and on-farm use.
Mefenoxam (4) + Fludioxonil (12) + Thiamethoxam CruiserMaxx, 1.7%:1.12%:22.6%	Slurry or mix	3 fl oz/cwt	X	For seed-borne and soil-borne fungi and insects. Contains thiamethoxam for insect control.
Mefenoxam (4) + Fludioxonil (12) + Sedaxane (7) + Thiamethoxam CruiserMaxx Vibrance Pulses, 3.13%; 1.04%; 1.04%; 20.8%	Slurry or mix	3.22 fl oz/cwt	X	For seed-borne and soil-borne fungi and insects. Contains thiamethoxam for insect control.
Metalaxyl (4) Allegiance FL, 28.35% Sebring 318 FS, 28.35% Allegiance Dry Seed Protectant, 12.5% Dyna-Shield, 28.35% Belmont 2.7 FS, 28.98%	Mist or slurry Drill box Slurry Slurry or mist	0.75 fl oz/cwt 4 oz/cwt 0.75 fl oz/cwt 0.75 fl oz/cwt	X X X X	Metalaxyl is only for *Pythium* damping off control. For use only with commercial seed treatment equipment. Apron Dry Seed Protectant is for drill box application to seed not previously treated with Apron; thorough mixing of fungicide and seed is essential for good control.
Metalaxyl (4) + PCNB (14) + Carboxin (7) Prevail, 3.12%:15%:15%	Drill box	6-8 oz/cwt	X	Controls early season *Pythium* and *Rhizoctonia*.
Picarbutrazox (U17) Vayantis, 36%	Slurry or mist	0.05-0.2 fl oz/cwt	X	For diseases due to *Pythium* spp.

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[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Dry Edible Bean
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control[2] of Seedling Blights[3]	Remarks
Prothioconazole (3) + Penflufen (7) + Metalaxyl (4) EverGol Energy, 7.18%: 3.59%: 5.74%	Slurry or mist	1 fl oz/cwt	X	For seed-borne and soil-borne fungi and seed rot and damping off caused by *Rhizoctonia*.
Pyraclostrobin (11) Stamina, 18.4%	Slurry or mist	0.4-1.5 fl oz/cwt	X	For seed-borne and soil-borne fungi: *Rhizoctonia solani*, *Asochyta* spp., *Fusarium* spp., and *Pythium* spp.
Sedaxane (7) Vibrance, 43.7%	Slurry	0.08-0.16 fl oz/cwt or 2.5-5 gai/100 kg of seed	X	For seed decay, seedling blights, and damping off caused by *Rhizoctonia*.
Sedaxane (7) + Mefenoxam (4) + Fludioxonil (12) Vibrance Maxx, 4.69%; 3.52%; 2.35%	Slurry	1.54 fl oz/cwt	X	For seed-borne and soil-borne diseases caused by *Rhizoctonia*, *Pythium* and *Fusarium*.
Thiabendazole (1) Mertect 340-F, 42.3%	Slurry	0.30-0.68 fl oz/cwt	X	For seedling diseases caused by *Fusarium* spp. For seed decay seedling wilt, and damping-off caused by *Phomopsis*.
Thiabendazole (1) + Sedaxane (7) + Mefenoxam (4) + Fludioxonil (12) Vibrance Maxx Pulses RTA, 4.3%:1.43%:1.07%:0.71%	Slurry	5.0 fl oz/cwt	X	For seed-borne and soil-borne diseases caused by *Ascochyta*, *Botrytis*, *Colletotrichum*, *Fusarium*, *Phoma*, *Phomopsis*, *Pythium* and *Rhizoctonia*
Thiabendazole (1) + Sedaxane (7) + Mefenoxam (4) + Fludioxonil (12) + Thiamethoxam Cruiser Maxx Vibrance, 4.24%; 1.41%; 1.06%; 0.71%; 8.48%	Slurry	5.0 fl oz/cwt	X	For seed-borne and soil-borne diseases caused by *Ascochyta*, *Phoma*, *Botrytis*, *Fusarium*, *Phomopsis*, *Pythium* and *Rhizoctonia*
Thiophanate-methyl (1) + Metalaxyl (4) + Fluxapyroxad (7) + Pyraclostrobin (11) Obvius Plus, 8.93%; 14.73%; 4.46%; 3.57%	Slurry or mist	1.53 fl oz/cwt	X	Controls anthracnose, Fusarium spp., Phytophthora spp., Pythium, spp., Rhizoctonia solani, and Ascochyta spp.
Thiram (M3) 42-S Thiram, 42% Signet 480 FS, 42%	Liquid or slurry	2 fl oz/cwt	X	
Thiram 50WP Dyed, 50%	Drill box or slurry	2 oz/cwt	X	
Tolclofos-methyl (14) Rizolex, 42%	Slurry or mist	0.3 fl oz/cwt	X	For seed-borne and soil-borne diseases. Controls *Rhizoctonia* and *Fusarium* species.

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[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Dry Edible Bean
Soil Application

Chemical (Fungicide Group)	Application	Dosage[1]	Control[2] of Rhizoctonia	Remarks
Azoxystrobin (11) + Metalaxyl (4) Uniform, 28.2%:10.9%	In-furrow	0.34 fl oz/1,000 linear feet of row	X	Apply in a 7-inch band. One application per season.
Azoxystrobin (11) AZteroid FC 3.3, 34.3%	In-furrow	0.24-0.48 fl oz/1,000 ft. row	X	Apply as a 7-inch band over the seed.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	In-furrow	0.5-0.9 fl oz/1000 ft. row	X	Apply as a 7-inch T-ban over the seed, or a narrower spray or stream directed to the soil adjacent to the seed.
***Bacillus amyloliquefaciens* strain D747 (44) + Bifenthrin** Ethos XB, 5.0%; 15.67%	In-furrow	4-17 fl oz/A	X	Restricted use pesticide. Suppression of seedling blights.
***Bacillus subtilis* strain QST 713 (44)** Serenade ASO, 1.34%	In-furrow	2-6 fl qt/A	X	Apply as directed. Spray in the seed furrow and covering soil at planting.
Minuet, 9.89%	In-furrow	12-24 fl oz/A	X	Apply Minuet as directed spray in the seed furrow and onto the covering soil at planting for management of *Rhizoctonia*.
Coniothyrium minitans Contans WG, 5.3%	Soil incorporation	1-4 lb/A		Fungus attacks sclerotia of the white mold fungus in the soil. Can spray stubble post-harvest on field with previous history of white mold.
PCNB (14) Terraclor FL, 40%	In-furrow spray	2.2-3.3 fl oz/1,000 linear feet of row	X	Spray planting furrow and covering soil at planting. Do not apply to seed. Use lower rates on lighter soils.
Terraclor 75 WP, 75%	In-furrow spray	1.4-2.2 oz/1,000 linear feet of row	X	Apply as a directed spray in the seed furrow and covering soil at planting.
Terraclor EC, 23.8%	In-furrow spray	4.4-6.6 fl oz/1,000 linear feet of row	X	Spray planting furrow and covering soil at planting. Do not apply directly to seed. Use lower rates on lighter soils.
PCNB 2 Spray, 24%	In-furrow spray	8.8 fl oz/1,000 linear feet of row	X	
Terraclor 10G, 10%	In-furrow granules	0.75-1 lb/1,000 linear feet of row	X	Apply in planting furrow and covering soil at planting.

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Dry Edible Bean
Soil Application (continued)

Chemical (Fungicide Group)	Application	Dosage[1]	Control[2] of Rhizoctonia	Remarks
PCNB (14) + Metalaxyl (4) Ridomil Gold PC GR, 10%: 0.5%	In-furrow granules	0.75 lb/1,000 linear feet of row	X	Adjust application equipment so granules are mixed with soil surrounding seed. See label for planting restrictions within 12 months of application.
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	In-furrow	0.1-0.6 fl oz/1,000 linear feet of row	X	For suppression of *Rhizoctonia*. Do not apply more than 9 fl oz/A of Headline.

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Dry Edible Bean
Foliar Sprays

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]				Remarks
			Anthracnose	Rust	Halo Blight	White Mold	
***Bacillus subtilis* strain QST 713 (44)** Serenade ASO, 1.34%	Spray or fungigation	2-6 qt/A		X		X	Begin applications when environmental conditions and plant stage are conducive to disease development.
***Bacillus subtilis* strain IAB/BS03 (44)** AVIV, 0.08%	Spray or fungigation	10-30 fl oz/A					
***Coniothyrium minitans* strain CON/M/91-08** Contans WG, 5%	Spray or chemigation	1-4 lbsA				X	For use to reduce/control *Sclerotinia sclerotiorium* and *Sclerotinia minor* in the soil.
Hydrogen Peroxide + Peroxyacetic Acid OxiDate 5.0, 27%; 5%	Spray	50-128 fl oz/100 gallons					Label suggests management of several fungal and bacterial diseases.
Hydrogen Peroxide + Peroxyacetic Acid SaniDate 12.0, 18.5%, 12%	Chemigation	Dilution rate is 1:1000 to 40,000					Label suggests management of several fungal and bacterial diseases.
Phosphorus Acid + Hydrogen Peroxide OxiPhos, 27.1%; 14.0%	Spray	2.5-5.0 qts/A					Label suggests management of several fungal and bacterial diseases.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Dry Edible Bean
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]				Remarks
			Anthracnose	Rust	Halo Blight	White Mold	
Phosphorus Acid Phostrol, 53.6%	Spray	4 pts/A					For downy mildew caused by *Phytophthora phaseoli*. Apply at 7-day intervals. The number of applications depends on how long favorable conditions for infection persist and/or if downy mildew is present in the area.
Tea Tree Oil (46) Timorex Act, 12.5%	Spray	13-35 fl oz/A					
Tea Tree Oil (BM01) + Difenoconazole (3) Regev, 40.6%:20.3%	Spray	4-8.5 fl oz/A					
Azoxystrobin (11) Quadris, 22.9% Satori, 22.9% Equation, 22.9% Tetraban, 22.9% Aframe, 22.9% Azoxystrobin SC, 22.9% Arius 250, 22.93% AZteroid FC 3.3, 18.4%	Spray or fungigation	6.0 fl oz/A for rust 6.0-15.5 fl oz/A for other leaf diseases 3.9 fl oz/A for rust 3.9-9.7 fl oz/A for other leaf diseases	X X	X X			Apply preventatively for best results. Additional applications may be required on a 7–14-day interval. PHI = 14 days.
Azoxystrobin (11) + Chlorothalonil (M5) Quadris Opti, 4.6%:46% Arius Adv, 11.6%, 44.0%	Spray	1.6-2.4 pt/A	X	X			
Azoxystrobin (11) + Propiconazole (3) Quilt, 7.0%, 11.7% Trevo P, 13.5%; 11.7%	Spray or fungigation	14 fl oz/A 10.5-14 fl oz/A	X	X			Maximum of 42 fl oz/A per season. PHI = 14 days.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	Spray	7.4-18.4 fl oz/A	X	X			Begin applications prior to disease onset and continue on a 7–14-day interval. Do not apply more than 110.3 fl oz/A per year. PHI = 14 days.

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Dry Edible Bean
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]				Remarks
			Anthracnose	Rust	Halo Blight	White Mold	
Boscalid (7) Endura, 70%	Spray or fungigation	8-11 oz/A				X	Apply at the beginning of flowering, prior to disease onset. Use higher rate for extended protection. Make a second application at full bloom if conditions continue to be favorable for disease development. Do not apply within 21 days of harvest.
Chlorothalonil (M5) Bravo WeatherStik Echo, Echo 720, Chlorothalonil 720, Equus 720 SST, 54%	Spray or fungigation	1 3/8-2 pt/A	X	X			Do not apply chlorothalonil within 14 days of harvest. See publication PP-576, "Dry Edible Bean Diseases." Carefully monitor fields for disease.
Bravo Ultrex DG, or Equus DF,82.5%	Spray or fungigation	1.25-1.8 lb/A	X	X			
Echo Zn, Bravo ZN, Chlorothalonil + zn, or Terranil Zn, 38.5%	Spray or fungigation	2-3 pt/A	X	X			Bravo Zn, Bravo ZN, Echo Zn and Terranil Zn also contain zinc.
Echo 90 DF, 90%	Spray or fungigation	1.13-1.63 lb/A	X	X			
Praiz, 54%	Spray or fungigation	1 3/8-2 pt/A	X	X			
Chlorothalonil (M5) + Tebuconazole (3) Muscle Advance, 30.51%, 8.47%	Spray	1.1-1.6 pts/A		X			Apply in a protective spray schedule or when weather conditions are favorable for rust development. Repeat applications at 10 day intervals. Do not apply more than 3.2 pints/acre/season.

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Dry Edible Bean
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]				Remarks
			Anthracnose	Rust	Halo Blight	White Mold	
Copper (M1)							
Basicop WP, 53%	Spray	2-4 lbs/A			X		
Champ DP, 57.6%	Spray or fungigation	0.66-2 lb/A			X		
Champ Formula 2 Flowable, 37.5%	Spray or fungigation	0.66-2 pt/A			X		
ChampION++ 46.1%	Spray or fungigation	0.5-1.25 lb/A			X		
Cuprofix Ultra 40 Disperss 71.1%	Spray or fungigation	0.75-2 lbs/A			X		
Kocide 2000, 53.8%	Spray or fungigation	0.75-2.25 lb/A			X		
Kocide 3000, 46.1%	Spray or fungigation	0.5-1.25 lb/A			X		
Kocide 4.5 LF, 37.5%	Spray or fungigation	0.66-2 pt/A			X		
KOP-5, 20%	Spray or fungigation	0.5-1.0 pt/A			X		
MasterCop, 21.46%	Spray or fungigation	0.5-2.0 lbs/A			X		
Badge X2, 45.31% Badge SC, 32.17%	Spray or fungigation	0.5-2.0 pt/A			X		
Cyazofamid (21) Ranman 400SC, 34.5%	Spray	2.75 fl oz/A					Labeled for suppression of some foliar diseases. Do not apply more than 16.5 fl oz/A per year. PHI = 0 days.
Cyprodinil (9) + Fludioxonil (12) Switch 62.5 WG, 37.5%:25.0%	Spray	11-14 oz/A				X	Make first application at 10-20% bloom. A 2(ee) label allows Switch to be applied in tank mix with Thiophanate-methyl for improved white mold control.

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Dry Edible Bean
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application [1]	Dosage [2]	Disease Control [3]				Remarks
			Anthracnose	Rust	Halo Blight	White Mold	
Difenoconazole (3) + Benzovindiflupyr (7) Aprovia Top, 11.25%; 7.50%	Spray or fungigation	10.5-11 fl oz/A	X	X			Begin applications prior to disease onset when conditions are conducive for disease. Do not make more than two sequential applications before alternating to a fungicide from a different group. Do not apply more than 22 fl oz/A per year. PHI = 14 days.
Fluazinam (29) Omega 500F, 40%	Spray or fungigation	0.5-0.85 pt/A				X	Make first application at 10-30% bloom. Second application may be made 7-10 days later if needed. Do not exceed 1.75 pts/acre/season. PHI = 30 days.
Fludioxonil (12) Cannonball WP, 50%	Spray or fungigation	7 fl oz/A				X	Begin applications at onset of disease. Make first application at 10-20% bloom. Do not apply more than 28 oz/A of Cannonball per season. PHI = 7 days.
Fluopyram (7) + Prothioconazole (3) ProPulse, 17.4%:17.4%	Spray or fungigation	8.0-13.6 fl oz/A				X	Apply ProPulse at 10.3-13.6 fl oz/A for control of white mold. Apply at early flower or at the first sign of disease, whichever occurs first. Do not make more than two sequential applications before rotating with a fungicide from a different group. Continue applications as needed on a 10–14-day interval. Do not apply within 7 days of cutting or swathing the crop for harvest or within 14 days of harvest.
Fluoxastrobin (11) Evito, 40.3%	Spray or fungigation	2.0-4.75 fl oz/A	X	X			Begin applications preventively. Do not apply more than 4.75 fl oz/A/season. PHI = 7 days.

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Dry Edible Bean
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]				Remarks
			Anthracnose	Rust	Halo Blight	White Mold	
Fluoxastrobin (11) + Tetraconazole (3) Zolera FX, 17.76%:17.76%	Spray	5.5-7.7 fl oz/A	X	X		X	Do not apply more than 15.4 fl oz/year and do not make applications less than 7 days apart. PHI = 14 days.
Fluxapyroxad (7) + Pyraclostrobin (11) Priaxor, 14.336%:28.58% Everlon, 28.58%; 14.33%	Spray or fungigation	4-8 oz/A	X	X		X	Do not apply more than 2 applications per season. PHI = 21 days. White mold suppression only.
Iprodione (2) Rovral 4F, 41.6% Nevado 4F, 41.6% Meteor, 41.6%	Ground spray or fungigation	1.5-2.0 pt/A				X	Apply at first bloom (10% of plants with 1 open blossom) and again at peak bloom, if needed. Do not apply after full bloom. Use 50-100 psi and 3 nozzles, 1 over the row and 1 on each side. If pH of spray water exceeds 7.0, buffer it to pH 5.0-7.0.
Isofetamid (7) Kenja, 36%	Spray	17 fl oz/A				X	Also, for gray mold caused by *Botrytis cinerea*. Begin applications when plants are at 10-30% bloom. A second application can be applied 7-14 days later. Do not make more than 2 sequential applications before rotating to a fungicide with a different mode of action. Do not apply more than 2 applications/A/year. PHI = 30 days.
Mefentrifluconazole (3) Provysol, 34.93%	Spray	2.5-5.0 fl oz/A	X	X			Controls Alternaria leaf and pod spot, Ascochyta blight, Cercospora leaf spot, Mycosphaerella blight, powdery mildew and rust. Do not apply more than 15 fl oz/A per year

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Dry Edible Bean
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]				Remarks
			Anthracnose	Rust	Halo Blight	White Mold	
Mefentrifluconazole (3) + Fluxapyroxad (7) Revylok, 26.04%; 8.68%	Spray	4.5-6.5 fl oz/A		X			For optimal disease control, begin applications prior to disease development. Do not apply more than 13 fl oz/A per season. PHI = 21 days.
Mefentrifluconazole (3) + Pyraclostrobin (11) Veltyma, 17.56%; 17.56%	Spray	7-10 fl oz/A	X	X			Controls Alternaria leaf and pod spot, Ascochyta blight, Cercospora leaf spot, Mycosphaerella blight, powdery mildew and rust. Do not apply more than 20 fl oz/A per year
Mefentrifluconazole (3) + Pyraclostrobin (11) + Fluxapyroxad (7) Revytek, 11.61%; 15.49%; 7.74%	Spray	8-15 fl oz/A	X	X		X (suppression)	Controls Alternaria leaf and pod spot, Ascochyta blight, Cercospora leaf spot, Mycosphaerella blight, powdery mildew and rust. Provides suppression of white mold. Apply prior to disease onset. Maximum rate per season is 26 fl oz/A. PHI = 21 days.
Metconazole (3) Quash, 50%	Spray	4.0 fl oz/A				X	Apply when conditions favor disease development and prior to infection. A second application may be made on a 7–10-day interval. Do not make more than 2 applications per year. Do not apply more than 8 oz of product/A/year. PHI = 21 days
Penthiopyrad (7) Vertisan, 20.6%	Spray or fungigation	14-20 fl oz/A	X	X		X	Begin applications prior to disease development. For white mold, make initial application at beginning bloom and follow with a second application at full bloom. Do not exceed 41 fl oz/A per year. PHI = 21 days.
Fontelis, 20.4%	Spray of fungigation	14-20 fl oz/A	X	X		X	
Picoxystrobin (11) Aproach, 22.5%	Spray or fungigation	6-12 fl oz/A	X	X		X	For white mold, make preventative application at beginning bloom at 8-12 fl oz/A. Do not apply more than 24 fl oz/A per season and no more than 2 sequential applications. PHI = 14 days.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Dry Edible Bean
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]				Remarks
			Anthracnose	Rust	Halo Blight	White Mold	
Potassium Phosphite (33) + Tebuconazole (3) Viathon, 49%; 3.3%	Spray	2-3 pts/A		X			Apply on a protective spray schedule or when weather is conducive for rust. Repeat applications on a 10–14-day interval, or as necessary to maintain control.
Prothioconazole (3) Proline 480 SC, 41%	Spray	5.7 fl oz/A		X		X	Apply Proline prior to disease onset or at 15-25% flowering when conditions are favorable for disease development. Do not make more than 3 applications per year. Repeat applications as needed on a 5–14-day interval. For maximum disease control, apply in 20 or more gpa by ground. Do not apply within 7 days of cutting or swathing for harvest.
Prothioconazole (3) + Azoxystrobin (11) Cortina Xtra, 15.79%; 17.54%	Spray	12-15 fl oz/A	X	X		X	
Prothioconazole (3) + Trifloxystrobin (11) Delaro, 16%:13.7%	Spray or fungigation	12 fl oz/A	X	X			Apply preventatively at flower initiation and continue as needed on a 10–14-day interval. GPA = 10 or greater by ground and 5 or greater by air, REI = 12 hrs. Rainfast = when dry on the surface. PHI – 30 days.
Pydiflumetofen (7) + Difenoconazole (3) Miravis Top, 6.9%; 11.5%	Spray	13.7 fl oz/A	X (suppression)	X		X (suppression)	Begin applications prior to disease development and continue on 14-day interval. Do not make more than two applications of Miravis Top before alternating to a fungicide that is not group 3 or 7. Maximum use rate is 56 fl oz/A/year. PHI = 14 days.
Pydiflumetofen (7) + Azoxystrobin (11) + Propiconazole (3) Miravis Neo, 7.0%; 9.3%; 11.6%	Spray	13.7 oz/A	X	X		X (suppression)	First application should be applied before disease is established and no later than the onset of flowering. For white mold, first application should be at R1 to R2. Do not make more than two applications of Miravis Neo before alternating to a fungicide that is not group 3, 7 or 11. Maximum use rate is 27.4 fl oz/A/year. PHI = 14 days.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Dry Edible Bean
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]				Remarks
			Anthracnose	Rust	Halo Blight	White Mold	
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	Spray or fungigation	6-9 fl oz/A	X	X			Apply prior to onset of disease. Maximum of 2 applications per season. PHI = 21 days.
Sulfur (M) Microthiol Disperss, 80%	Spray	7 lb/A		X			
Tebuconazole (3), 38.7% Orius 3.6F, Tebuzol 3.6F, Monsoon, Onset 3.6F	Spray or fungigation	4-6 fl oz/A		X			See labels for information on spray scheduling, preharvest intervals and re-entry intervals. Do not apply more than 12 fl oz per year.
Tetraconazole (3) Andiamo 230, 20.5% Domark, 20.5%	Spray	4.3-6.7 fl oz/A 4.2-6.7 fl oz/A		X		X	Begin applications as a preventative at the beginning of flowering or disease development and repeat if needed 14-to-21-days after the first application.
Tetraconazole (3) + Azoxystrobin (11) Affiance, 7.48%; 9.35% Brixen, 6.67%, 13.76%	Spray	10-19 fl oz/A 16-21 fl oz/A	X	X		X	Begin preventative applications at beginning of flowering, repeat if needed 14-21 days after first application. Recommended 15-20 GPA (minium 10 GPA ground). Maximum of 2 applications per year.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Dry Edible Bean
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]				Remarks
			Anthracnose	Rust	Halo Blight	White Mold	
Thiophanate-methyl (1) Topsin M WSB, T-Methyl WSB 70W T-Methyl WSB E-AG, Cercobin	Spray or fungigation	1.5-2 lb/A- 1 application or 1-1.5 lb/A - 2 applications	X			X	Apply 1.5-2 lb once when 70-100% of the plants have at least 1 open blossom. Or apply 1-1.5 lb twice, with the first application when 10-30% of the plants have at least 1 open blossom and the second application 4-7 days later. Complete coverage of all parts of plant is essential for control of white mold. Do not apply more than 4 lbs product/acre/season. Do not apply thiophanate-methyl within 14 days of harvest.
Topsin or T-Methyl 4.5F or Incognito, 46.2% or Topsin 4.5 FL, 45%	Spray or fungigation	30-40 fl oz/A 1 application or 20-30 fl oz/A if 2 applications	X			X	
Thiophanate Methyl 85 WDG, 85% Incognito 85 WDG, 85%	Spray or fungigation	0.8-1.6 lb/A	X			X	
Miramar, 41.3%	Spray	32.7-43.6 fl oz/A (1 app) OR 21.8-32.7 fl oz/A (2 apps)	X			X	Miramar is for white mold, gray mold, and anthracnose management. For one application: Apply when 100% of plants have at least one open bloom or when conditions are favorable for disease development. For multiple applications: Make the first application when 10-30% of plants have at least one open bloom and follow with sequential applications on a 4-7 day interval. Apply prior or the development of disease for best results. Do not apply more than 87.2 fl oz of product/acre/year.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Flax
Seed Treatment

Chemical	Application	Dosage[1]	Control[2] of Seedling Blight[3]	Remarks
Captan (M4) Captan 400, 37.4%	Slurry	2-3.75 fl oz/cwt	X	
Fludioxonil (12) Maxim 4FS, 40.3%	Slurry	0.08-0.16 fl oz/cwt	X	
Spirato 480 FS, 40.3%	Slurry	0.08-0.16 fl oz/cwt	X	
Dyna-Shield Fludioxonil	Slurry	0.08-0.16 fl oz/cwt	X	
Fluxapyroxad (7) + Pyraclostrobin (11) + Metalaxyl (4) Obvius, 1.58%; 1.58%; 1.26%	Slurry or mist	4.6 fl oz/cwt	X	For *Fusarium* spp. and *Rhizoctonia solani*.
Mancozeb (M3) Dithane DF Rainshield NT, 75%	Slurry	2.1-4.3 oz/bu	X	
Dithane F-45, 37%	Drill box or slurry	3.2-6.4 fl oz/bu	X	
Dithane WSP or Penncozeb 80 WP, 80%	Drill box or slurry	2-4 oz/bu	X	
Penncozeb 75 DF, 75%	Drill box or slurry	2.1-4.3 oz/bu	X	
Manzate Pro-Stick, 75%	Slurry	2-4 oz/bu	X	
Manzate Max, 37%	Slurry	3.2-6.4 fl oz/bu	X	
Mefenoxam (4) Precinct, 45.3%	Mist or slurry	0.23 fl oz/cwt	X	For *Pythium* damping off.
Picarbutrazox (U17) Vayantis, 36%	Liquid or slurry	0.05-0.2 fl oz/cwt	X	Root rot, seed rot, and damping off due to *Pythium* spp.
Thiram (M3) 42-S Thiram, 42% Signet 480 FS, 42% Thiram 480 DP, 42%	Liquid or slurry	3 fl oz/bu	X	

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.

Flax

Foliar Sprays

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Pasmo (*Septoria linicola*) Control[3]	Remarks
***Coniothyrium minitans* strain CON/M/91-08** Contans WG, 5%	Spray or chemigation	1-4 lbs/A		For use to reduce/control *Sclerotinia sclerotiorum* and *Sclerotinia minor* in the soil.
***Bacillus subtilis* strain IAB/BS03 (44)** AVIV, 0.08%	Spray or fungigation	10-30 fl oz/A		
Azoxystrobin (11) Quadris 22.9% Satori, 22.9% Equation, 22.9% Tetraban, 22.9% Aframe, 22.9% Arius 250, 22.9% AZteroid FC 3.3, 34.3% Azoxystrobin SC, 22.9%	Spray or fungigation	6-15.5 fl oz 3.9-9.7fl oz/A for AZteroid FC	X X	Downy mildew and *Alternaria* leaf spot. Make Quadris applications preventatively for best results. Additional applications may be required under favorable environmental conditions. Do not apply more than 27 fl oz/A/season. PHI = 30 days, mid-flowering 7-14 days after flower initiation. Do not apply more than 0.45 lbs azoxystrobin/A/year.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	Spray or fungigation	7.4-18.4 fl oz/A	X	Begin applications prior to disease onset and continue on a 7–14-day interval. Do not apply more than 55.2 fl oz/A per year. PHI = 14 days.
Fluxapyroxad (7) + Pyraclostrobin (11) Priaxor, 14.33%:28.58% Everlon, 28.58%; 14.33%	Spray or fungigation	4-8 fl oz/A	X	For optimal disease control, apply prior to disease development and continue 7-14 days later if conditions are conducive. Do not apply more than 2 applications and 16 fl oz/A per season. PHI = 21 days.
Isofetamid (7) Kenja 400SC, 36%	Spray or fungigation	10.25-12 fl oz/A		For suppression of white mold, begin applications at 20-40% flowering. Do not apply more than 24 fl oz/A per year.
Mefentrifluconazole (3) + Pyraclostrobin (11) + Fluxapyroxad (7) Revytek, 11.61%; 15.49%; 7.74%	Spray	8-15 fl oz/A	X	Controls Pasmo and other foliar diseases of flax. Apply prior to disease development. Maximum use rate is 30 fl oz/A/season. PHI = 21 days.
Picoxystrobin (11) Aproach, 22.5%	Spray or fungigation	6-12 fl oz/A		Begin applications prior to disease development and make a second application on a 7–14-day interval depending on the targeted disease. For Sclerotinia stem rot: Begin application at 20-50% bloom prior to disease development and continue on 7–14-day interval depending on disease pressure. Do not apply more than 24 fl oz/season. PHI = 28 days.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Flax
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application [1]	Dosage[2]	Pasmo (*Septoria linicola*) Control[3]	Remarks
Prothioconazole (3) + Azoxystrobin (11) Cortina Xtra, 15.79%; 17.54%	Spray	12-15 fl oz/A	X	
Prothioconazole (3) + Trifloxystrobin (11) Delaro, 16.0%:13.7%	Spray or fungigation	12 fl oz/A	X	Controls Pasmo (*Septoria linicola*). Apply preventatively when the flax is in the 20-50% bloom stage. The lowest labeled rate of a NIS may be added. GPA = 10 by ground and 5 by air. Only apply once per year. PHI = 30 days.
Pydiflumetofen (7) + Azoxystrobin (11) + Propiconazole (3) Miravis Neo, 7.0%: 9.3%:11.6%	Spray or fungigation	13.7 fl oz/A		Apply at first sign of disease. PHI = 30 days.
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	Spray or fungigation	6-12 fl oz/A	X	For optimal disease control, apply Headline before disease onset. Apply at early to mid-flowering (4-7 days after flower initiation). Make second application if disease persists. Do not apply more than 24 fl oz/season. PHI = 21 days.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Grasses (Forage)
Seed Treatment

Chemical	Application	Dosage[1]	Control[2] of Seedling Blights[3]	Remarks
Fludioxonil (12)				
Maxim 4 FS, 40.3%	Slurry	0.08-0.16 fl oz/cwt	X	For seed-borne and soil-borne fungi.
Spirato 480 FS, 40.3%	Slurry	0.08-0.16 fl oz/cwt	X	
Mefenoxam (4)				
Apron XL LS, 32.3%	Slurry or mist	0.32-0.64 fl oz/cwt	X	Apron XL LS controls only *Pythium*. For both commercial and on-farm use.
Precinct, 45.3%	Mist or slurry	0.06-0.47 fl oz/cwt		
Metalaxyl (4)				
Allegiance FL, 28.35% Sebring 318 FS, 28.35%				Acquire and Allegiance controls only *Pythium*.
Allegiance Dry Seed Protectant, 12.5%	Drill box	3-4 oz/cwt	X	Allegiance Dry Seed Protectant is for drill box application to seed not previously treated with Apron; thorough mixing of fungicide and seed is essential for good control.
Dyna-Shield, 28.35%	Slurry	0.75 fl oz/cwt	X	
Belmont 2.7 FS 28.98%	Slurry or mist			
Sebring 480 FS, 44.08%	Slurry or mist	0.5 fl oz/cwt	X	
Thiram (M3)				
42-S Thiram, 42%	Liquid or slurry	8 fl oz/cwt	X	
Thiram 50WP Dyed, 50%	Drill box or slurry	8 oz/cwt	X	
Signet 480 FS, 42%	Liquid or slurry	8 fl oz/cwt	X	

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.

Lentils
Seed Treatment

Chemical	Application	Dosage[1]	Control[2] of Seedling Blights[3]	Remarks
Azoxystrobin (11) Dynasty 9.6%, Protege 9.6%, Saxony 100 FS, 9.67%	Slurry	0.153-0.765 fl oz/cwt	X	For seed-borne and soil-borne fungi. Not for *Pythium* if used alone.
Ethaboxam (22) Intego Solo, 34.2%	Slurry	0.3-0.6 fl oz/cwt	X	For management of *Aphanomyces* and some metalaxyl resistant *Pythium* spp.
Fludioxonil (12) Maxim 4FS, 40.3% Spirato 480 FS, 40.3% Dyna-Shield Fludioxonil, 40.3%	Slurry	0.08-0.16 fl oz/cwt	X	For seed-borne and soil-borne fungi.
Fludioxonil (12) + Sedaxane (7) + Mefenoxam (4) Vibrance Trio, 2.32%; 2.32%, 13.95%	Slurry	1.55 fl oz/cwt	X	For seed and seedling diseases including Ascochyta, Botrytis, Fusarium, Phomopsis, Phytophthora, Pythium and Rhizoctonia.
Fluxapyroxad (7) + Pyraclostrobin (11) + Metalaxyl (4) Obvius, 1.58%; 1.58%; 1.26%	Slurry or mist	4.6 fl oz/cwt	X	Control of *Rhizoctonia solani*, *Fusarium* spp., *Pythium* spp., *Botrytis cinerea*, and seed-borne *Colletotrichum* spp. (anthracnose) and *Ascochyta* spp.
Ipconazole (3) Rancona 3.8 FS, 40.7%	Slurry or mist	0.085 fl oz/cwt	X	Does not provide control of *Pythium*.
Ipconazole (3) + Metalaxyl (4) Rancona Summit, 0.902%: 1.443% Rancona CTS, 2.42%; 1.94%	Slurry or mist	4.0 fl oz/cwt	X	
Mefenoxam (4) Apron XL, 33.3% Precinct, 45.3%	Slurry or mist Slurry or mist	0.32-0.64 fl oz/cwt 0.12-0.47 fl oz/cwt	X	Use 0.32-0.64 fl oz/cwt for *Pythium* damping off. For early season *Phytophthora*, use 0.64 fl oz/cwt.
Mefenoxam (4) + Fludioxonil (12) Apron Maxx RTA, 1.1%:0.73% Apron Maxx RFC, 3.46%:2.31%	Slurry Slurry	5 fl oz/cwt 1.5 fl oz/cwt	X X	For protection against damping-off and seed rots.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Lentils
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control[2] of Seedling Blights[3]	Remarks
Mefenoxam (4) + Fludioxonil (12) + Thiamethoxam Cruiser Maxx, 1.7%:1.12%:22.61%	Slurry or mist	3 fl oz/cwt	X	
Metalaxyl (4) Allegiance FL, 28.35% Sebring 318 FS Allegiance Dry Seed Protectant, 12.5% Dyna-Shield, 28.35% Belmont 2.7 FS, 28.98%	Slurry or mist Drill box Slurry Slurry or mist	0.75 fl oz/cwt 4 oz/cwt 0.75 fl oz/cwt 0.75 fl oz/cwt	X X X X	Metalaxyl controls only *Pythium*.
Picarbutrazox (U17) Vayantis, 36%	Slurry or mist	0.05-0.2 fl oz/cwt	X	For seed rot, root rot, seedling rot and damping off due to *Pythium* spp..
Prothioconazole (3) + Penflufen (7) + Metalaxyl (4) EverGol Energy, 7.18%:3.59%:5.74%	Slurry or mist	1.0 fl oz/cwt	X	For seed-borne and soil-borne fungi and seed rot and damping off caused by *Rhizoctonia*.
Pyraclostrobin (11) Stamina, 18.4%	Slurry or mist	0.4-1.5 fl oz/cwt	X	For seed-borne and soil-borne fungi: *Rhizoctonia solani*, *Asochyta* spp., *Fusarium* spp., and *Pythium* spp.
Sedaxane (7) Vibrance, 43.7%	Slurry	0.08-0.16 fl oz/cwt or 2.5-5 gai/100 kg of seed	X	For seed decay, seedling blights, and damping off caused by *Rhizoctonia*.
Sedaxane (7) + Mefenoxam (4) + Fludioxonil (12) Vibrance Maxx, 4.69%; 3.52%; 2.35%	Slurry	1.54 fl oz/cwt	X	For seed-borne and soil-borne diseases caused by *Rhizoctonia*, *Pythium* and *Fusarium*.
Thiabendazole (1) Mertect 340-F, 42.3%	Slurry	1.05 fl oz/cwt	X	For seed-borne *Ascochyta*, *Phoma* and seedling diseases caused by *Fusarium*.

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[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Lentils
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control[2] of Seedling Blights[3]	Remarks
Thiabendazole (1) + Sedaxane (7) + Mefenoxam (4) + Fludioxonil (12) Vibrance Maxx Pulses RTA, 4.3%:1.43%:1.07%:0.71%	Slurry	5.0 fl oz/cwt	X	For seed-borne and soil-borne diseases caused by *Ascochyta*, *Botrytis*, *Colletotrichum*, *Fusarium*, *Phoma*, *Phomopsis*, *Pythium* and *Rhizoctonia*
Thiabendazole (1) + Sedaxane (7) + Mefenoxam (4) + Fludioxonil (12) + Thiamethoxam Cruiser Maxx Vibrance Pulses,4.24%; 1.41%; 1.06%; 0.71%; 8.48%	Slurry	5.0 fl oz/cwt	X	For seed-borne and soil-borne diseases caused by *Ascochyta*, *Phoma*, *Botrytis*, *Fusarium*, *Phomopsis*, *Pythium* and *Rhizoctonia*
Thiram (M3) Thiram 480 DP, 42%	Slurry	8 fl oz/cwt	X	For seed-borne and soil-borne diseases.
Tolclofos-methyl (14) Rizolex, 42%	Slurry or mist	0.3 fl oz/cwt	X	For seed-borne and soil-borne diseases. Controls *Rhizoctonia* and *Fusarium* species.
Trifloxystrobin (11) Trilex, 22%	Slurry	0.32 fl oz/cwt	X	For seed-borne and soil-borne fungi.

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[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Lentils

Foliar Sprays

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Ascochyta Control[3]	Anthracnose Control[3]	Remarks
***Bacillus subtilis* strain QST 713 (44)** Serenade ASO, 1.34%	Spray or fungigation	2-6 qt/A			Begin applications when environmental conditions and plant stage are conducive to disease development.
***Bacillus subtilis* strain IAB/BS03 (44)** AVIV, 0.08%	Spray or fungigation	10-30 fl oz/A			
***Coniothyrium minitans* strain CON/M/91-08** Contans WG, 5%	Spray or chemigation	1-4 lb/A			For use to reduce/control *Sclerotinia sclerotiorum* and *Sclerotinia minor* in the soil.
Phosphorus Acid Phostrol, 53.6%	Spray	2-4 pt/A			For downy mildew caused by *Phytophthora* spp. and *Pythium* spp. Apply diluted solution to thoroughly wet foliage. Apply with normal irrigation schedule. Apply at 2–3-week intervals and repeat as needed.
Tea Tree Oil (46) Timorex Act, 12.5%	Spray	13-35 fl oz/A			
Tea Tree Oil (BM01) + Difenoconazole (3) Regev, 40.6%:20.3%	Spray	4-8.5 fl oz/A			
Azoxystrobin (11) Quadris, 22.9% Satori, 22.9% Tetraban, 22.9% Aframe, 22.9% AZteroid FC 3.3, 34.3% Azoxystrobin SC, 22.9% Arius 250, 22.93%	Spray or fungigation	6.0-15.5 oz/A 3.9-9.7 fl oz/A for AZteroid FC	X	X	Begin applications prior to disease development and continue on a 7–14-day interval. Do not apply more than 2.88 qt/A/season for Quadris.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	Spray or fungigation	7.4-18.4 fl oz/A	X	X	Begin applications prior to disease onset and continue on a 7–14-day interval. Do not apply more than 110.3 fl oz/A per year. PHI = 14 days
Boscalid (7) Endura, 70%	Spray or fungigation	8-11oz/A	X		Also controls white mold. Begin applications prior to disease development and repeat on a 7–14-day interval. Do not make more than 2 applications per season (22 oz/A/season).
Chlorothalonil (M5) Equus 720 SST, 54.0% Echo 720, 54.0% Bravo WeatherStik, 54.0%	Spray or fungigation	1.0-1.5 pts/A	X	X	Begin applications prior to disease development. Repeat applications at 7–10-day intervals. Do not apply more than 8.0 pts/A/year. PHI = 14 days.

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Lentils
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Ascochyta Control[3]	Anthracnose Control[3]	Remarks
Difenoconazole (3) + Benzovindiflupyr (7) Aprovia Top, 11.25%; 7.50%	Spray or fungigation	10.5-11 fl oz/A	X	X	Begin applications prior to disease onset when conditions are conducive for disease. Do not make more than two sequential applications before alternating to a fungicide from a different group. Do not apply more than 22 fl oz/A per year. PHI = 14 days.
Fluazinam (29) Omega 500F, 40%	Spray or fungigation	8-13.6 fl oz/A	X	X	Apply 13.6 fl oz/A for control of Asochyta blight and Mycosphaerella blight. For white mold and anthracnose control, apply 8-13.6 fl oz/A. Do not use more than 27.2 fl oz of Omega 500 F per acre per year.
Fluopyram (7) + Prothioconazole (3) ProPulse, 17.4%:17.4%	Spray or fungigation	8.0-10.3 fl oz/A	X		Apply at early flower or at the first sign of disease, whichever occurs first. Do not make more than two sequential applications before rotating with a fungicide from a different group. Continue applications as needed on a 10–14-day interval. Do not apply within 7 days of cutting or swathing the crop for harvest or within 14 days of harvest.
Fluoxastrobin (11) Evito, 40.3%	Spray or fungigation	2.0-4.75 fl oz/A	X	X	Begin applications preventively. Do not apply more than 4.75 fl oz/A/season. PHI = 7 days.
Fluxapyroxad (7) + Pyraclostrobin (11) Priaxor, 14.33%:28.58% Everlon, 28.58%; 14.33%	Spray or fungigation	4-8 fl oz/A	X	X	Begin applications prior to disease development and continue on a 7–14-day interval if conditions are conducive to disease development. Maximum applications per season = 2. PHI = 21 days.
Isofetamid (7) Kenja, 36%	Spray	17 fl oz/A			For gray mold caused by *Botrytis cinerea* and white mold caused by *Sclerotinia*. Begin applications when plants are at 10-30% bloom. A second application can be applied 7-14 days later. Do not make more than 2 sequential applications before rotating to a fungicide with a different mode of action. Do not apply more than 2 applications/A/year. PHI = 30 days.
Mefentrifluconazole (3) Provysol, 34.93%	Spray	2.5-5.0 fl oz/A	X	X	Controls Alternaria leaf and pod spot, Ascochyta blight, Cercospora leaf spot, Mycosphaerella blight, powdery mildew and rust. Do not apply more than 15 fl oz/A per year

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Lentils
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Ascochyta Control[3]	Anthracnose Control[3]	Remarks
Mefentrifluconazole (3) + Fluxapyroxad (7) Revytek, 26.04%; 8.68%	Spray	4.5-6.5 fl oz/A	X		Controls Asochyta blight, powdery mildew and rust. Do not apply more than 13 fl oz/A per year. PHI = 21 days.
Mefentrifluconazole (3) + Pyraclostrobin (11) Veltyma, 17.56%; 17.56%	Spray	7-10 fl oz/A	X	X	Controls Alternaria leaf and pod spot, Ascochyta blight, Cercospora leaf spot, Mycosphaerella blight, powdery mildew and rust. Do not apply more than 20 fl oz/A per year
Mefentrifluconazole (3) + Pyraclostrobin (11) + Fluxapyroxad (7) Revytek, 11.61%; 15.49%; 7.74%	Spray or fungigation	8-13 fl oz/A	X	X	Controls Ascochyta blight, anthracnose, and other foliar diseases of lentils. Do not apply more than 26 fl oz/A per year. PHI = 21 days.
Metconazole (3) **Quash, 50%**	Spray	4.0 fl oz/A	X		Also suppresses white mold. Apply when conditions favor disease development and prior to infection. A second application may be made on a 7–10-day interval. Do not make more than 2 applications per year. Do not apply more than 8 oz of product/A/year. PHI = 21 days.
Penthiopyrad (7)					Begin applications prior to disease development. For white mold, make initial application at beginning bloom and follow with a second application at full bloom. Do not exceed 41 fl oz/A per year. PHI = 21 days.
Vertisan, 20.6%	Spray or fungigation	14-20 fl oz/A	X	X	
Fontelis, 20.4%	Spray or fungigation	14-20 fl oz/A	X	X	
Picoxystrobin (11) Aproach, 22.5%	Spray or fungigation	6-12 fl oz/A	X	X	Begin applications prior to disease development and continue on a 7–14-day interval when disease pressure is high. Apply no more than 24 fl oz/A per season. PHI = 14 days.
Prothioconazole (3) Proline 480 SC, 41%	Spray	5.0-5.7 fl oz/A	X		Apply at early flowering or at the first sign of disease. Use the higher rate when conditions are favorable for severe disease pressure and/or when growing more susceptible varieties. Do not make more than 3 applications per year. Repeat applications as needed on a 10–14-day interval. Do not apply within 7 days of cutting or swathing the crop for harvest.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Lentils
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Ascochyta Control[3]	Anthracnose Control[3]	Remarks
Prothioconazole (3) + Azoxystrobin (11) Cortina Xtra, 15.79%; 17.54%	Spray	12-15 fl oz/A	X	X	
Prothioconazole (3) + Trifloxystrobin (11) Delaro, 16.0%; 13.7%	Spray or fungigation	12.0 fl oz/A	X	X	Begin fungicide applications preventatively and continue as needed on a 10–14-day interval. Use shorter intervals when conditions favor severe disease pressure. Do not make more than 2 applications per season. PHI = 30 days. Do not apply within 7 days of cutting or swathing the crop for forage.
Pydiflumetofen (7) + Difenoconazole (3) Miravis Top, 6.9%; 11.5%	Spray	13.7 fl oz/A	X	X (suppression)	Begin applications prior to disease development and continue on 14-day interval. Do not make more than two applications of Miravis Top before alternating to a fungicide that is not group 3 or 7. Maximum use rate is 56 fl oz/A/year. PHI = 14 days.
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	Spray or fungigation	6-9 fl oz/A	X	X	Begin applications prior to disease development and repeat on a 7–14-day interval if conditions are conducive for disease development.
Tetraconazole (3) Andiamo 230, 20.5% Domark, 20.5%	Spray	4.3-6.7 fl oz/A 4.2-6.7 fl oz/A	X		Begin applications as a preventative at the beginning of flowering or disease development and repeat if needed 14-to-21-days after the first application.
Tetraconazole (3) + Azoxystrobin (11) Brixen, 6.67%:13.76% Affiance, 7.48%; 9.35%	Spray	16-21 fl oz/A 10-19 fl oz/A	X	X	Begin applications as a preventative at the beginning of flowering or disease development and repeat if needed 14-to-21-days after the first application.
Trifloxystrobin (11) + Prothioconazole (3) Stratego YLD, Protegam YLD, 32.3%; 10.8%	Spray or fungigation	4.0-4.8 fl oz/A	X	X	Apply at early flower or at the first sign of the disease, whichever occurs first. Do not exceed 0.28 lb prothioconazole or 0.24 lb of trifloxystrobin per acre per year. Do not apply within 30 days of harvest. Do not apply within 7 days of cutting or swathing the crop for forage.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Pea (Field)
Seed Treatment

Chemical	Application	Dosage[1]	Control[2] of Seedling Blight[3]	Remarks
Azoxystrobin (11) Dynasty, 9.6% Saxony 100 FS, 9.67%	Slurry	0.153-0.765 fl oz/A	X	
Captan (M4) Captan, 75%	See label for directions	1 oz/bu	X	Does not control seed-borne *Ascochyta*.
Ethaboxam (22) Intego Solo, 34.2%	Slurry	0.3-0.6 fl oz/cwt	X	For management of *Aphanomyces* and some metalaxyl resistant *Pythium* species
Fludioxonil (12) Maxim 4FS, 40.3% Spirato 480FS, 40.3% Dyna-Shield Fludioxonil, 40.3%	Slurry Slurry Slurry	0.08-0.16 fl oz/cwt 0.08-0.16 fl oz/cwt 0.08-0.16 fl oz/cwt	X X X	For seed-borne and soil-borne fungi.
Fludioxonil (12) + Sedaxane (7) + Mefenoxam (4) Vibrance Trio, 2.32%; 2.32%, 13.95%	Slurry	1.55 fl oz/cwt	X	For seed and seedling diseases including Ascochyta, Botrytis, Fusarium, Phomopsis, Phytophthora, Pythium and Rhizoctonia.
Fluxapyroxad (7) + Pyraclostrobin (11) + Metalaxyl (4) Obvius, 1.58%; 1.58%; 1.26%	Slurry or mist	4.6 fl oz/cwt	X	Control of *Rhizoctonia solani*., *Fusarium* sp., *Pythium* sp., *Botrytis cinerea*, *Colletotrichum* sp.(seed-borne), and *Ascochyta* sp. (seed-borne).
Ipconazole (3) Rancona 3.8 FS, 40.7%	Slurry or mist	0.085 fl oz/cwt	X	Does not provide control of *Pythium*.
Ipconazole (3) + Metalaxyl (4) Rancona Summit, 0.902%: 1.443% Rancona CTS, 2.42%; 1.94%	Slurry or mist Slurry or mist	4.0 fl oz/cwt 1.53 fl oz/cwt	X X	For seed rot, damping off and seedling blight.
Mefenoxam (4) Apron XL, 33.3%	Slurry or mist	0.32-0.64 fl oz/cwt	X	Use 0.32-0.64 fl oz/cwt for *Pythium* damping off. For early season *Phytophthora*, use 0.64 fl oz/cwt.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Pea (Field)
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control[2] of Seedling Blight[3]	Remarks
Mefenoxam (4) + Fludioxonil (12)				
Apron Maxx RTA, 1.1%:0.73%	Slurry	5 fl oz/cwt	X	For control of seed rots due to *Pythium*, *Phytophthora*, *Fusarium*, *Rhizoctonia*.
Apron Maxx RFC, 2.31%:3.46%	Slurry	1.5 fl oz/cwt	X	
Maxim XL, 8.4%:21%	Slurry	0.167-0.334 fl oz/cwt	X	
Mefenoxam (4) + Fludioxonil (12) + Thiamethoxam Cruiser Maxx, 1.7%:1.12%:22.61%	Slurry or mist	1.5 fl oz/cwt	X	For seed-borne and soil-borne fungi and insects. Contains thiamethoxam for insect control.
Metalaxyl (4)				
Allegiance FL, 28.35% Sebring 318 FS, 28.35%	Mist or slurry	0.75 fl oz/cwt	X	For *Pythium* damping off. See labels for higher rates for systemic downy mildew.
Allegiance Dry Seed Protectant, 12.5%	Drill box	4 fl oz/cwt	X	Apron Dry Seed Protectant for drill box application to seed not previously treated with Apron.
Dyna-Shield, 28.35%	Slurry	0.75 fl oz/cwt	X	Thorough mixing of fungicide and seed is essential for good control.
Belmont 2.7 FS, 28.98%	Slurry or mist	0.75 fl oz/cwt	X	
Prothioconazole + Penflufen + Metalaxyl EverGol Energy, 7.18%:3.59%:5.74%	Slurry or mist	1.0 fl oz/cwt	X	For seed-borne and soil-borne fungi and seed rot and damping off caused by *Rhizoctonia*.
Picarbutrazox (U17) Vayantis, 36%	Slurry or mist	0.05-0.2 fl oz/cwt	X	For seed rot, root rot, seedling rot and damping off due to *Pythium* spp.
Pyraclostrobin (11) Stamina, 18.4%	Slurry or mist	0.4-1.5 fl oz/cwt	X	For seed-borne and soil-borne fungi: *Rhizoctonia solani*, *Asochyta* spp., *Fusarium* spp., and *Pythium* spp.
Sedaxane (7) Vibrance, 43.7%	Slurry	0.08-0.16 fl oz/cwt or 2.5-5 gai/100 kg of seed	X	For seed decay, seedling blights, and damping off caused by *Rhizoctonia*.
Sedaxane (7) + Mefenoxam (4) + Fludioxonil (12) Vibrance Maxx, 4.69%; 3.52%; 2.35%	Slurry	1.54 fl oz/cwt	X	For seed-borne and soil-borne diseases caused by *Rhizoctonia*, *Pythium* and *Fusarium*.
Thiabendazole (1) Mertect 340-F, 42.3%	Slurry	1.02 fl oz/cwt	X	For seed-borne *Ascochyta*, *Phoma* and seedling diseases caused by *Fusarium*.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Pea (Field)
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control[2] of Seedling Blight[3]	Remarks
Thiabendazole (1) + Sedaxane (7) + Mefenoxam (4) + Fludioxonil (12) Vibrance Maxx Pulses RTA, 4.3%:1.43%:1.07%:0.71%	Slurry	5.0 fl oz/cwt	X	For seed-borne and soil-borne diseases caused by *Ascochyta*, *Botrytis*, *Colletotrichum*, *Fusarium*, *Phoma*, *Phomopsis*, *Pythium* and *Rhizoctonia*
Thiabendazole (1) + Sedaxane (7) + Mefenoxam (4) + Fludioxonil (12) + Thiamethoxam Cruiser Maxx Vibrance Pulses, 4.24%; 1.41%; 1.06%; 0.71%; 8.48%	Slurry	5.0 fl oz/cwt	X	For seed-borne and soil-borne diseases caused by *Ascochyta*, *Phoma*, *Botrytis*, *Fusarium*, *Phomopsis*, *Pythium* and *Rhizoctonia*
Thiram (M3) Thiram 480 DP, 42%	Slurry or mist	3 fl oz/cwt	X	For seed-borne and soil-borne diseases.
Tolclofos-methyl (14) Rizolex, 42%	Slurry	0.3 fl oz/cwt	X	For management of *Rhizoctonia* and *Fusarium* species.
Trifloxystrobin (11) + Metalaxyl (4) Trilex 2000, 7.12%:5.69%	Slurry or mist	1.0 fl oz/cwt	X	For seed-borne and soil-borne fungi.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Pea (Field)
Foliar Sprays

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Control of Powdery Mildew[3]	Control of Ascochyta Blight[3,4]	Remarks
***Bacillus subtilis* strain QST 713 (44)** Serenade ASO, 1.34%	Spray or fungigation	2-6 qt/A			Begin applications when environmental conditions and plant stage are conducive to disease development.
***Bacillus subtilis* strain IAB/BS03 (44)** AVIV, 0.08%	Spray or fungigation	10-30 fl oz/A	X		Apply preventatively in 100 gallons of water or when environmental conditions are conducive to rapid disease development. Reapply on a 7-day interval or as needed.
***Coniothyrium minitans* strain CON/M/91-08** Contans WG, 5%	Spray or chemigation	1-4 lbs/A			For use to reduce/control *Sclerotinia sclerotiorum* and *Sclerotinia minor* in the soil.
Hydrogen Peroxide + Peroxyacetic Acid OxiDate 5.0, 27%; 5%	Spray	50-128 fl oz/100 gallons			Label suggests management of several fungal and bacterial diseases.
Hydrogen Peroxide + Peroxyacetic Acid SaniDate 12.0, 18.5%, 12%	Chemigation	Dilution rate is 1:1000 to 40,000			Label suggests management of several fungal and bacterial diseases.
Phosphorus Acid + Hydrogen Peroxide OxiPhos, 27.1%; 14.0%	Spray	2.5-5.0 qts/A			Label suggests management of several fungal and bacterial diseases.
Phosphorus Acid Phostrol, 53.6%	Spray	2-4 pts/A			For downy mildew caused by *Phytophthora* spp. and *Pythium* spp. Apply diluted solution to thoroughly wet foliage. Apply with normal irrigation schedule. Apply at 2–3-week intervals and repeat as needed.
Tea Tree Oil (46) Timorex Act, 12.5%	Spray	13-35 fl oz/A			
Azoxystrobin (11) Quadris, 22.9% Satori, 22.9% Equation, 22.9% Tetraban, 22.9% Aframe, 22.9% AZteroid FC 3.3, 34.3% Azoxystrobin SC, 22.9% Arius 250, 22.93%	Spray or fungigation	6.0-15.5 fl oz/A 3.9-9.7 fl oz/A for AZteroid FC	X	X	Products also control many other fungal leaf diseases. Make applications preventatively for best results. Additional applications may be required under favorable environmental conditions. PHI = 14 days for Quadris.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Pathogen populations are resistant and/or less sensitive to FRAC 11.

Pea (Field)
Foliar Sprays (Continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Control of Powdery Mildew[3]	Control of Ascochyta Blight[3,4]	Remarks
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	Spray or fungigation	7.4-18.4 fl oz/A	X	X	Begin applications prior to disease onset and continue on a 7–14-day interval. Do not apply more than 110.3 fl oz/A per year. PHI = 14 days
Difenoconazole (3) + Benzovindiflupyr (7) Aprovia Top, 11.25%; 7.50%	Spray or fungigation	10.5-11 fl oz/A	X	X	Begin applications prior to disease onset when conditions are conducive for disease. Do not make more than two sequential applications before alternating to a fungicide from a different group. Do not apply more than 22 fl oz/A per year. PHI = 14 days.
Fluoxastrobin (11) Evito, 40.3%	Spray or fungigation	2.0-4.75 fl oz/A		X	May also control many other fungal leaf diseases. Make applications preventatively for best results. Additional applications may be required under favorable environmental conditions. PHI = 7 days.
Fluazinam (29) Omega 500F, 40%	Spray or fungigation	8-13.6 fl oz/A		X	Apply 13.6 fl oz/A for control of Asochyta blight and Mycosphaerella blight. For white mold and anthracnose control, apply 8-13.6 fl oz/A. Do not use more than 27.2 fl oz of Omega 500 F per acre per year.
Fluoxastrobin (11) + Tetraconazole (3) Zolera FX, 17.76%:17.76%	Spray	5.5-7.7 fl oz/A		X	Do not apply more than 15.4 fl oz/year and do not make applications less than 7 days apart. Do not use for feed or harvest field pea for forage or hay. PHI = 14 days.
Fluxapyroxad (7) + Pyraclostrobin (11) Priaxor, 14.33%:28.58% Everlon, 28.58%; 14.33%	Spray or fungigation	4-8 fl oz/A	X	X	Begin applications prior to disease development and continue on a 7–14-day interval if conditions are conducive to disease development. Maximum applications per season = 2. PHI = 21 days. Pea hay may be fed no sooner than 14 days after last application.
Isofetamid (7) Kenja, 36%	Spray	17 fl oz/A			For gray mold caused by *Botrytis cinerea* and white mold caused by *Sclerotinia*. Begin applications when plants are at 10-30% bloom. A second application can be applied 7-14 days later. Do not make more than 2 sequential applications before rotating to a fungicide with a different mode of action. Do not apply more than 2 applications/A/year. PHI = 30 days.
Mefentrifluconazole (3) Provysol, 34.93%	Spray	2.5-5.0 fl oz/A	X	X	Controls Alternaria leaf and pod spot, Ascochyta blight, Cercospora leaf spot, Mycosphaerella blight, powdery mildew and rust. Do not apply more than 15 fl oz/A per year.
Mefentrifluconazole (3) + Fluxapyroxad (7) Revytek, 26.04%; 8.68%	Spray	4.5-6.5 fl oz/A	X	X	Controls Alternaria leaf and pod spot, Ascochyta blight, Cercospora leaf spot, Mycosphaerella blight, powdery mildew and rust. Do not apply more than 13 fl oz/A per year. PHI = 21 days.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Pathogen populations are resistant and/or less sensitive to FRAC 11.

Pea (Field)
Foliar Sprays (Continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Control of Powdery Mildew[3]	Control of Ascochyta Blight[3,4]	Remarks
Mefentrifluconazole (3) + Pyraclostrobin (11) Veltyma, 17.56%; 17.56%	Spray	7-10 fl oz/A	X	X	Controls Alternaria leaf and pod spot, Ascochyta blight, Cercospora leaf spot, Mycosphaerella blight, powdery mildew and rust. Do not apply more than 20 fl oz/A per year.
Mefentrifluconazole (3) + Pyraclostrobin (11) + Fluxapyroxad (7) Revytek, 11.61%; 15.49%; 7.74%	Spray or fungigation	8-13 fl oz/A	X	X	Controls Ascochyta blight, powdery mildew, and other foliar diseases of field peas. Do not apply more than 26 fl oz/A per year. PHI = 21 days.
Metconazole (3) **Quash, 50%**	Spray	4.0 fl oz/A		X	Also suppresses white mold. Apply when conditions favor disease development and prior to infection. A second application may be made on a 7–10-day interval. Do not make more than 2 applications per year. Do not apply more than 8 oz of product/A/year. PHI = 21 days.
Penthiopyrad (7) Vertisan, 20.6% Fontelis, 20.4%	Spray or fungigation Spray or fungigation	14-20 fl oz/A 14-20 fl oz/A	X X	X X	Begin applications prior to disease development. For white mold, make initial application at beginning bloom and follow with a second application at full bloom. Do not exceed 41 fl oz/A per year. PHI = 21 days.
Picoxystrobin (11) Aproach, 22.5%	Spray or fungigation	6-12 fl oz/A	X	X	May also control many other fungal leaf diseases. Make applications preventatively for best results. Additional applications may be required under favorable environmental conditions. PHI = 14 days.
Prothioconazole (3) + Azoxystrobin (11) Cortina Xtra, 15.79%; 17.54%	Spray	12-15 fl oz/A	X		
Prothioconazole (3) + Trifloxystrobin (11) Delaro, 16.0%; 13.7%	Spray or fungigation	12.0 fl oz/A		X	Begin applications preventatively and continue as needed on a 10–14-day interval. Use shorter intervals when conditions are favorable for severe disease pressure. Do not make more than 2 applications of Delaro per season. PHI = 30 days. Do not apply within 7 days of cutting or swathing the crop for forage.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Pathogen populations are resistant and/or less sensitive to FRAC 11.

Pea (Field)
Foliar Sprays (Continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Control of Powdery Mildew[3]	Control of Ascochyta Blight[3,4]	Remarks
Prothioconazole (3) Proline 480 SC, 41%	Spray	5.7 fl oz/A		X	Apply at early flowering or at the first sign of disease. Use higher rate when conditions are favorable for severe disease pressure and/or when growing more susceptible varieties. Do not make more than 3 applications per year. Repeat applications as needed on a 5–14-day interval. Do not apply within 7 days of cutting or swathing the crop for harvest.
Pydiflumetofen (7) + Difenoconazole (3) Miravis Top, 6.9%; 11.5%	Spray	13.7 fl oz/A	X	X	Begin applications prior to disease development and continue on 14-day interval. Do not make more than two applications of Miravis Top before alternating to a fungicide that is not group 3 or 7. Maximum use rate is 56 fl oz/A/year. PHI = 14 days.
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	Spray or fungigation	6-9 fl oz/A	X	X	Products also control many other fungal leaf diseases. Make applications preventatively for best results. Additional applications may be required under favorable environmental conditions. PHI = 21 days.
Sulfur (M) Kumulus DF, 80% Liquid Sulfur Six, 52% Micro Sulf, 80% Microthiol Disperss, 80%	 Spray or fungigation Spray or fungigation Spray or fungigation Spray or fungigation	 3-5 lb/A 3-4 pt/A 3-5 lb/A 7 lb/A	 X X X X		Sulfur has been used in Wisconsin and the Prairie Provinces of Canada. Its economic return has not been determined for North Dakota.
Tea Tree Oil (46) + Difenoconazole (3) Regev, 40.6%:20.3%	Spray	4-8.5 fl oz/A	X		Make applications in the early stages of plant growth when conditions favor disease. Use the higher rate under increased disease pressure. PHI = 14 days.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Pathogen populations are resistant and/or less sensitive to FRAC 11.

Pea (Field)
Foliar Sprays (Continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Control of Powdery Mildew[3]	Control of Ascochyta Blight[3,4]	Remarks
Tetraconazole (3) Andiamo 230, 20.5% Domark, 20.5%	Spray	4.3-6.7 fl oz/A 4.2-6.7 fl oz/A	X	X	Begin applications as a preventative at the beginning of flowering or disease development and repeat if needed 14-to-21-days after the first application. Recommended 15-20 GPA (minimum 10 GPA by ground). Maximum of 2 applications per year.
Tetraconazole (3) + Azoxystrobin (11) Brixen, 6.67%:13.76% Affiance, 7.48%; 9.35%	Spray	16-21 fl oz/A 10-19 fl oz/A	X	X	Begin applications as a preventative at the beginning of flowering or disease development and repeat if needed 14-to-21-days after the first application. Recommended 15-20 GPA (minimum 10 GPA by ground). Maximum of 2 applications per year.
Trifloxystrobin (11) + Prothioconazole (3) Stratego YLD, Protegam YLD 32.3%; 10.8%	Spray or fungigation	4.0-4.8 fl oz/A		X	Apply at early flower or at the first sign of the disease, whichever occurs first. Do not exceed 0.28 lb prothioconazole or 0.24 lb of trifloxystrobin per acre per year. Do not apply within 30 days of harvest. Do not apply within 7 days of cutting or swathing the crop for forage.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Pathogen populations are resistant and/or less sensitive to FRAC 11.

Potato
Seed Treatment

Chemical	Application	Dosage[1]	Disease Control[2,5]		Remarks
			Fungi[3]	Bacteria[4]	
Azoxystrobin (11) Dynasty, 9.6% Saxony 100 FS, 9.67%	Water-based slurry	0.10-3.75 fl oz/cwt	X		For suppression of black scurf and stem canker and seed-borne black dot, and for protection against silver scurf.
Chenopodium quinoa saponins Heads Up Plant Protectant	See label for rates of application, formulation and use.	See label for mixing instructions.	X		Preplant seed treatment for prevention of fungal and bacterial diseases.
Hydrogen Peroxide + Peroxyacetic Acid StorOx 2.0, 27%; 2%	Spray or Dip	See label for use instructions			Label suggests management of several fungal and bacterial diseases.
Difenoconazole (3) Salient 372 FS, 33.3%	Slurry or mist	0.103 fl oz/cwt	X		Must be used in combination with a fludioxonil seed treatment product. For *Fusarium* spp. causing dry rot seed decay, *Rhizoctonia* spp that cause stem canker and tuber black scarf, and seed-borne *Helminthosporium solani* that causes silver scurf.
Fludioxonil (12) Maxim, 0.5%	Dust	8.0 oz/cwt	X		Maxim and Maxim MZ are formulated as dusts to be applied to cut or single-drop seed before planting. Maxim products effectively suppress *Fusarium* dry rot seed decay, stem cankers and tuber black scurf caused by seed-borne *Rhizoctonia solani* and seed-borne *Helminthosporium solani*, the causal agent of silver scurf disease. Half rates are recommended for processing (fries).
Maxim 4FS	Liquid	0.04-0.08 fl oz/cwt	X		
Spirato 480FS, 40.3%	Slurry	0.08 fl oz	X		
Dyna-Shield Fludioxonil, 40.3%	Slurry	0.08-0.16 fl oz/cwt	X		
STartUP FLUDI, 40%	Slurry	0.08 fl oz/cwt	X		
Fludioxonil (12) + Mancozeb (M3) Maxim MZ, 0.5%:9.6%	Dust	0.5 lb/cwt	X		
Fludioxonil (12) + Thiamethoxam Cruiser Maxx Potato, 7.0%:28%	Liquid	0.19-0.27 fl oz/cwt rate depends on seeding rate	X		To aid in control of certain insects and *Fusarium* dry rot and other fungal diseases.
Fludioxonil (12) + Difenoconazole (3) + Sedaxane (7) + Thiamethoxam CruiserMaxx Vibrance Potato, 3.34%; 6.69%; 6.69%; 13.4%	Slurry or mix	0.5 fl oz/cwt	X		To aid in control of *Rhizoctonia*, *Fusarium*, *Helminthosporium* and certain insects.

[1] Dosage = amount of formulated product to apply.
[2] X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3] Fusarium, *Rhizoctonia solani* and *Helminthosporium solani*. These fungi cause dry rot, Rhizoctonia stem canker and silver scurf.
[4] Includes Erwinia, cause of soft rot decay, and *Clavibacter*, cause of ring rot.
[5] Pathogen populations for silver scurf and Fusarium dry rot are resistant and/or less sensitive to FRAC 1.

Potato
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Disease Control[2,5]		Remarks
			Fungi[3]	Bacteria[4]	
Mancozeb (M4) Koverall, 75%	Slurry	1.25lb/50 gal water	X		For suppression of *Fusarium* dry rot, *Rhizoctonia*, seed-borne common scab and silver scurf. Only Mancozeb will reduce the spread of *Phytophthora infestans*, the cause of late blight, during seed-cutting operations. Dip seed pieces into mixture.
Manzate Max, 37%	Slurry	1 qt/50 gal water	X		
Manzate Pro-Stick, 75%	Dust	1.25 lbs/50 gal water	X		
PSP 6%	Dust	1 lb/cwt	X		
PST Plus Bark 6%	Dust	1 lb/cwt	X		
Penncozeb 75%	Slurry	1.25 lbs/50 gal water	X		
Penncozeb 80 WP, 80%	Slurry	1.25 lb/50 gal water	X		
Roper DF Rainshield, 75%	Slurry		X		
STartUP MANZB, 37%	Mist or Slurry	1.6-2.5 fl oz/cwt	X		
Mancozeb (M4) + Flutolanil (7) Moncoat MZ, 6.0%: 1.5%	Dust	0.75-1lb/cwt	X		For suppression of *Rhizoctonia* and *Fusarium* dry rot seed decay. MZ added to suppress *Fusarium* dry rot seed decay.
Mandipropamid (40) Revus, 23.3%	Slurry	0.2-0.4 fl oz/cwt	X		For protection against the infection or spread of seed borne *Phytophthora infestans* (late blight). Do not apply more than 32 fl oz of product/A/year. For use only on potatoes intended for seed. Do not use on potatoes intended for consumptions. Do not exceed 0.4 fl oz per 100 lbs seed.
Mandipropamid (40) + Difenoconazole (3) + Sedaxane (7) Vibrance Ultra Potato, 14.10%; 7.06%; 7.06%	Slurry	0.5 fl oz/cwt	X		Provides early-season protection against seed-borne silver scurf, Fusarium dry rot, seed-borne black scurf, seed-borne late blight and suppression of pink rot.
Penflufen (7) + Prothioconazole (3) Emesto Silver, 9.35%:1.68%	Diluted Spray Slurry	0.31 fl oz-cwt	X		For suppression of *Rhizoctonia solani*, black scurf, stem and stolon canker caused by seed-borne and soil-borne *Rhizoctonia*, silver scurf caused by *Helminthiosporium solani* and seed piece rot caused by *Fusarium*. For added *Fusarium* protection, apply a MZ product designed for potatoes. Do not apply more than 2.5 fl oz of total slurry per 100 lbs of seed.
Sedaxane (7) Vibrance, 43.7%	Slurry	0.05-0.08 fl oz/cwt	X		For suppression of black scurf, stem and stolon canker, and seed-borne silver scurf.
Thiophanate methyl (1) ST-Methyl 540 FS, 46.2%	Slurry	0.5-0.7 fl oz/cwt	X		For aiding the control of dry rot, black scurf and stem canker, and silver scurf. For suppression of *Fusarium, Rhizoctonia,* and *Helminthosporium solani*.
STartUP T-MTYL, 46.2%	Mist or Slurry	0.5-0.7 fl oz/cwt	X		

[1] Dosage = amount of formulated product to apply.
[2] X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3] Fusarium, *Rhizoctonia solani* and *Helminthosporium solani*. These fungi cause dry rot, Rhizoctonia stem canker and silver scurf.
[4] Includes Erwinia, cause of soft rot decay, and *Clavibacter*, cause of ring rot
[5] Pathogen populations for silver scurf and Fusarium dry rot are resistant and/or less sensitive to FRAC 1.

Potato
Soil Application

Chemical (Fungicide Group)	Application	Dosage[1]	Control of Rhizoctonia[2]	Pythium Leak	Pink Rot[3]	Remarks
***Bacillus subtilis Strain QST 713* (44)** Serenade ASO,1.34%	In-furrow at planting	2-6 fl qt/A	X			Apply as directed spray in the seed furrow and to the covering soil at planting for management of Rhizoctonia.
Minuet, 9.89%	In-furrow at planting	12-24 fl oz/A	X			Apply Minuet (biological) as directed spray in the seed piece furrow and to the covering soil at planting for management of Rhizoctonia solani and black dot.
***Bacillus subtilis strain IAB/BS03* (44)** Aviv, 0.08%	Soil drench, in-furrow, chemigation	10-30 fl oz/A				Labeled for broad spectrum control of foliar and soil borne diseases.
***Streptomyces lydicus WYEC 108* (44)** Actinovate AG, 0.04%	In-furrow or side-dressing	3-12 fl oz/A	X	X	X	For suppression of *Colletotrichum* and *Verticillium*.
Tea tree oil (BM01) Timorex Act, 12.5%	Soil application	13-35 fl oz/A				Labeled for broad spectrum control of foliar disease and soil-borne diseases.
Azoxystrobin (11) Quadris, 22.9% Satori, 22.9% Equation, 22.9% Tetraban, 22.9% Aframe, 22.9% AZteroid FC 3.3, 34.3% Azoxystrobin SC, 22.9% Arius 250, 22.93%	In-furrow spray	0.4-0.6 fl oz/1,000 ft. of row (5.8-8.7 fl oz/A with 36" rows) 0.24-0.48 fl oz/1,000 ft. of row for AZteroid FC	X			For control of black scurf (*Rhizoctonia solani*) and silver scurf (*Helminthosporium solani*). Also controls black dot caused by *Colletotrichum coccodes*. Apply as in-furrow spray in 5-15 gal of water at planting.
Azoxystrobin (11) + Benzovindiflupyr (7) Elatus, 30.0%; 15.0%	In-furrow spray	0.34-0.5 oz/1,000 ft. of row	X			Also manages black dot and silver scurf. Do not apply more than 9.5 fl oz/A per year. Do not use as a foliar application. Harvest at commercial maturity.
Azoxystrobin (11) + Mefenoxam (4) Quadris Ridomil Gold SL	In-furrow spray	0.82 fl oz/1,000 ft. of row	X	X	X	Maximum application rate of 1.5 lb of azoxystrobin and 0.5 lb of mefenoxam products per acre per season.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	In-furrow	7.4-18.4 fl oz/A	X			For control of black scurf, silver scurf, and black dot. Apply in-furrow as a spray or as a banded spray over the row targeting plant bases with thorough coverage.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Pathogen populations for pink rot are resistant for FRAC 4.

Potato
Soil Application (Continued)

Chemical (Fungicide Group)	Application	Dosage[1]	Control of Rhizoctonia[2]	Pythium Leak	Pink Rot[3]	Remarks
Cyazofamid (21) Ranman, 34.5%	In-furrow	0.42 fl. oz/1,000 ft row (6.1 fl oz/A on 36" row spacing) 2.75 fl oz/A for lay-by/hilling applications in a minimum of 20 gallons of solution per acre			X	For additional control of pink rot and Pythium root and crown rot.
Ethaboxam (22) Elumin, 42.5%	6-8 inch band, in furrow or side-dress.	8 fl oz/A		X	X	Apply in a 6-8 inch band directly over the seed piece, or in the furrow where the seed piece will be dropped prior to furrow closure. Make a banded side dressing application between hilling and tuber initiation. Make applications at least 25 days apart. Do not make more than 2 applications per year. Do not exceed 16 fl oz/A/year.
Fluazinam (29) Omega 500F, 40%	In-furrow spray	1.5-3.0 pts/A				For suppression of Powdery Scab. Apply in-furrow over the seed piece immediately prior to covering over the seed piece with soil using at least 5 to 10 gpa. Use 1.5 pint per acre rate on fields with a history of low levels of powdery scab or with low numbers of spore balls present in the soil. Apply 3 pints per acre rate to fields with a history of moderate to heavy disease pressure or with moderate to high numbers of spore balls present in the soil. 24c labels for use in Minnesota and North Dakota.
Fluopyram (7) + Penflufen (7) Velum Rise, 22.12%; 9.38%	In-furrow	13.0 fl oz/A	X			Apply in a 6-8 inch band down the row center onto the seed pieces in the furrow just before the seed is covered. Also effective against black dot. Do not make more than one application of Velum Rise/A/season. It is recommended not to make more than one application of fluopyram/A/season.
Fluoxastrobin (11) Evito, 40.3%	In-furrow spray	0.16-0.24 fl oz/1,000 ft of row	X			For control of black scurf, silver scurf and black dot. Do not use more than 22.8 fl oz/acre per year.
Fluoxastrobin (11) +Bifenthrin (3A) Tepera Plus HD, 15.41%:24.59%	In-furrow and banding	6.8 fl oz/A	X			For control of black scurf, silver scurf, and black dot.
Flutolanil (7) Moncut, 70%	In-furrow	0.79-1.18 oz/1,000 ft. row of a 36 in row	X			

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Pathogen populations for pink rot are resistant for FRAC 4.

Potato
Soil Application (Continued)

Chemical (Fungicide Group)	Application	Dosage[1]	Control of Rhizoctonia[2]	Pythium Leak	Pink Rot[3]	Remarks
Fluxapyroxad (7) + Pyraclostrobin (11) Priaxor, 14.33%: 28.58% Everlon, 28.58%; 14.33%	In-furrow spray	0.48-0.6 fl oz/1,000 ft. row.	X			For 34-inch rows or less, use a maximum of 0.48 fl oz product per 1000 row feet.
Mefenoxam (4) Ridomil Gold EC or SL, 48%	6-8 inch band, in furrow or impregnated on dry fertilizer	0.42 fl oz /1000 ft. of row		X	X	For postharvest control of *Pythium* leak and pink rot caused by *Phytophthora erythroseptica*.
Ultra Flourish, 25.1%		0.84 fl oz /1000 ft. of row		X	X	
Ultra Flourish XHL, 45.3%		0.42 fl oz/1000 ft. of row		X	X	
Platinum Ridomil Gold, 9%		2.2 fl oz /1,000 ft. row		X	X	Platinum Ridomil Gold contains 4.5% thiamethoxam for control of various potato insects.
Metalaxyl (4) Xyler FC, 31.3%	In-furrow	1.2 fl oz/1000 ft. row		X	X	For postharvest control of Pythium leak and pink rot.
Oxathiapiprolin (49) Orondis Gold 200, 18.7%	6-8 inch band in-furrow	4.8-9.6 fl oz/A			X	Apply no more than 9.6 fl oz/A/year. PHI = 5 days.
Oxathiapiprolin (49) + Mefenoxam (4) Orondis Gold, 3.29%:9.89%	6-8 inch band in-furrow	27.8 fl oz/A		X	X	Do not follow soil applications of Orondis Gold with foliar applications of Orondis Gold. PHI = 14 days
Penthiopyrad (7) Vertisan, 20.6%	In-furrow	0.7-1.6 fl oz/1,000 ft row	X			Maximum rate per acre per application is 24 fl oz.
Phosphites (33) Sodium (mono - and - dibasic) Potassium, and Ammonium Phosphites (33), Several products		check label			X	Apply in a band at planting directly over the seed pieces. For *Pythium* leak control, apply in combination with mefenoxam fungicide. **Soil applications have not been shown to be efficacious with this fungicide**. Foliar applications are recommended.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Pathogen populations for pink rot are resistant for FRAC 4.

Potato
Soil Application (Continued)

Chemical (Fungicide Group)	Application	Dosage[1]	Control of Rhizoctonia[2]	Pythium Leak	Pink Rot[3]	Remarks
Phosphorus Acid Phostrol, 53.6%	In-furrow band	3.75-10 pts/A		X	X	For the suppression of storage rot diseases such pink rot and Pythium leak.
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 22.3%	In-furrow spray	0.4-0.8 fl oz/1,000 ft. of row	X			Maximum application rate is 0.73 fl oz/1,000 feet of row.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Pathogen populations for pink rot are resistant for FRAC 4.

Potato
Foliar Sprays

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3,4,5]		Remarks[4]
			Late Blight	Early Blight	
***Bacillus subtilis* strain QST 713 (44)** Serenade ASO, 1.34%	Spray or fungigation	2-6 qt/A		X	Include in a multiple spray program for management of early blight.
***Bacillus subtilis* strain IAB/BS03 (44)** AVIV, 0.08%	Foliar	10-30 fl oz/A	X	X	Apply preventatively in 100 gallons of water or when environmental conditions are conducive to rapid disease development. Reapply on a 5-to-10-day interval or as needed.
***Coniothyrium minitans* strain CON/M/91-08** Contans WG, 5%	Spray or chemigation	1-4 lbs/A			For use to reduce/control *Sclerotinia sclerotiorum* and *Sclerotinia minor* in the soil.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Check the NDSU blight hotline, (888) 482-7286, for information on infection potential of early blight and late blight. Whenever late blight is severe, vine killing is extremely important and should be done at least 2 weeks before harvest to prevent tuber infections.
[5]Pathogen populations for late blight and early blight are resistant to fungicides: FRAC 4 for late blight and FRAC 7 for early blight.

Potato
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3,4,5]		Remarks[4]
			Late Blight	Early Blight	
Hydrogen Peroxide + Peroxyacetic Acid OxiDate 5.0, 27%; 5%	Spray	50-128 fl oz/100 gallons			Label suggests management of several fungal and bacterial diseases
Hydrogen Peroxide + Peroxyacetic Acid SaniDate 12.0, 18.5%, 12%	Chemigation	Dilution rate is 1:1000 to 40,000			Label suggests management of several fungal and bacterial diseases
Phosphorus Acid + Hydrogen Peroxide OxiPhos, 27.1%; 14.0%	Spray	2.5-5.0 qts/A			Label suggests management of several fungal and bacterial diseases
Phosphorus Acid Phostrol, 53.6%	Spray	2.5-10 pts/A	X		Apply every 4-14 days depending on disease conditions. Integrate with other products labeled for late blight in a spray rotation program appropriate for disease conditions.
Tea tree oil (BM01) Timorex Act, 12.5%	Foliar	13-35 fl oz/A		X	Make applications in the early stages of plant growth when conditions favor disease. Use higher rates under increased disease pressure.
Azoxystrobin (11) Quadris, 22.9% Satori, 22.9% Equation, 22.9% Tetraban, 22.9% Aframe, 22.9% AZteroid FC 3.3, 34.3% Azoxystrobin SC, 22.9% Arius 250, 22.93%	Spray or fungigation	6.0-15.5 fl oz/A 3.9-9.7 fl oz/A for AZteroid FC	X	X	For all Early blight: 6.2 fl oz/A on a 7-day interval or 12.4 fl oz/A on a 14-day interval. Late blight: 6.2 fl oz/A on a 7-day interval as a preventive, 12.4-15.4 fl oz/A on a 5-day interval when late blight is present. Do not make more than 6 applications per acre per year. Do not apply within 14 days of harvest. Also labeled for black dot control. See label for application instructions.
Azoxystrobin (11) + Chlorothalonil (M5) Quadris Opti, 4.6%:46%	Spray	1.6 pt/A	X	X	Also labeled for black dot and powdery mildew.
Arius Advance, 11.6%:44%	Spray	20.5-25.5 fl oz/A	X	X	

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Check the NDSU blight hotline, (888) 482-7286, for information on infection potential of early blight and late blight. Whenever late blight is severe, vine killing is extremely important and should be done at least 2 weeks before harvest to prevent tuber infections.
[5]Pathogen populations for late blight and early blight are resistant to fungicides: FRAC 4 for late blight and FRAC 7 for early blight.

Potato
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3,4,5]		Remarks[4]
			Late Blight	Early Blight	
Azoxystrobin (11) + Difenoconazole (3) Quadris Top 18.2%:11.4% Amistar Top, 18.2%;11.4%	Spray or fungigation	8-14 fl oz/A	X	X	Also controls black dot, brown spot, powdery mildew and Septoria leafspot. Apply on a 7-14 day interval; do not make more than 2 sequential applications before rotating to an alternate MOA. Quadris Top should be used with an adjuvant such as a non-ionic based surfactant or crop oil concentrate or blend. Do not exceed 55.3 oz/A/season. PHI = 14 days.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	Spray or fungigation	7.4-18.4 fl oz/A			Apply prior to disease onset. Controls several foliar diseases of potato. Do not apply more than 147.1 fl oz/A per year. PHI = 14 days
Boscalid (7) Endura, 70%	Spray or fungigation	5.5-10 oz/A (white mold)		X	Also controls Sclerotinia white mold and Botrytis. For white mold control, apply prior to infection generally just prior to row closure. Do not exceed 20 oz/A per season. PHI = 10 days.
Chlorothalonil (M5) Bravo WeatherStik, Equus 720, Echo 720, Praiz, or Chloranil 720, 54%	Spray or fungigation	0.75 pt/ A 1st application. 1.0-1.5 pt/A subsequent applications	X	X	Do not apply more than 11.25 lb ai of chlorothalonil per acre per season (23 pt of 40.4%, 16 pt of 54%, 14.5 lb of 82.5%, 13 lb of 90%). Do not apply within 7 days of harvest. A 24 (C) state label has been granted to Echo 720, Echo ZN to allow up to 16 lb ai per acre per season for late blight control. Do not apply more than 16 lb ai of Bravo Zn, Bravo WeatherStik or Bravo ZN per season (30.5 pt Bravo Zn, 21.5 pt of Bravo WeatherStik or Bravo WeatherStik Zn). Bravo Ultrex has a maximum 10-day interval between applications for potato late blight control.
Bravo Ultrex DG, 82.5%	Spray or fungigation	0.7-1.4 lb/A	X	X	
Bravo Zn, Echo Zn. Chlorothalonil + Zn or Terranil Zn, 38.5%	Spray or fungigation	1.0-2.13 pt/A	X	X	
Equus DF, 82.5%	Spray or fungigation	0.7 lb/A first application. 0.9-1.36 lb/A subsequent applications	X	X	
Echo 90 DF, 90%	Spray or fungigation	0.63-1.25 lb/A	X	X	

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Check the NDSU blight hotline, (888) 482-7286, for information on infection potential of early blight and late blight. Whenever late blight is severe, vine killing is extremely important and should be done at least 2 weeks before harvest to prevent tuber infections.
[5]Pathogen populations for late blight and early blight are resistant to fungicides: FRAC 4 for late blight and FRAC 7 for early blight.

Potato
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3,4,5]		Remarks[4]
			Late Blight	Early Blight	
Chlorothalonil (M5) + Zoxamide (22) Zing!, 40%, 6.8%	Spray or fungigation	32-34 fl oz/A	X	X	Apply on preventative schedule. Do not make more than 2 sequential applications before alternating with a fungicide that has a different mode of action. Do not make more than 8 applications or apply more than 1.52 lb zoxamide and 8.8 lb chlorothalonil per acre per season. Do not apply within 7 days of harvest.
Copper (M1)					
Basicop WP, 53%	Spray	3-6 lbs/A	X	X	Do not apply Basicop through irrigation system.
Champ DP, 57.6%	Spray or fungigation	0.66-2.66 lb/A	X	X	Coppers are not effective under high disease pressure.
	Spray or fungigation				
Champ WG, 77%	Spray or fungigation	1-1 ½ lbs/A	X	X	
Champ Formula 2 Flowable, 37.5%	Spray or fungigation Spray or fungigation	0.66-2.66 pt/A	X		Control will be improved by tank mixing with other compatible registered fungicides.
ChampION++ 46.1%	Spray or fungigation Spray or fungigation	0.5-1.75 lb/A	X		
Cuprofix Ultra 40 Disperss 71.1%	Spray or fungigation Spray or fungigation Spray or fungigation	0.75-3.0 lb/A	X	X	
Kocide 2000, 53.8%		1.25-6lb/A	X	X	
Kocide 3000, 46.1%	Spray or fungigation	0.5-1.75 lb	X	X	
Kocide 4.5 LF, 37.5%	Spray or fungigation	0.66-2.66 pt/A	X	X	
KOP-5, 20%		0.5-1.5 pt/A	X	X	
MasterCop, 21.46% Badge X2, 45.31%		1-4 lbs/A	X	X	
Badge SC, 32.17%		1-4 pt/A	X	X	
Spinnaker, 46.1%		0.5-1.75 lb/A	X	X	
Copper Sulfate (M1) Blue Viking Star Glow Powder **or** Triangle Brand Copper Sulfate Instant Powder	Spray	10 lb/A			For application with Diquat desiccant to enhance vine desiccation and suppress late blight.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Check the NDSU blight hotline, (888) 482-7286, for information on infection potential of early blight and late blight. Whenever late blight is severe, vine killing is extremely important and should be done at least 2 weeks before harvest to prevent tuber infections.
[5]Pathogen populations for late blight and early blight are resistant to fungicides: FRAC 4 for late blight and FRAC 7 for early blight.

Potato
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3,4,5]		Remarks[4]
			Late Blight	Early Blight	
Cyazofamid (21) Ranman, 34.5%	Foliar	1.4-2.75 fl oz/A	X		Make applications in the early stages of plant growth when conditions favor disease. Apply on a 7-to-10-day schedule as needed.
Cymoxanil (27) Curzate 60 DF, 60%	Spray or fungigation	3 1/3 oz/A	X		Must be tank-mixed with a protectant fungicide. Do not apply within 14 days of harvest.
Cymoxanil (27) + Chlorothalonil (M5) Ariston, 37.15%:4.96% Cymbol Advance, 4.96%:37.15%	Spray or fungigation Spray or fungigation	2 pts/A 2 pts/A	X X	X X	Begin applications early in the season when conditions are favorable for disease. Do not exceed more than 17.5 pts of Ariston or Cymbol Advance per acre per year.
Cymoxanil (27) + Propamocarb hydrochloride (28) Cymbol Balance, 8.34%; 44.3%	Spray or fungigation	21 fl oz/A	X		Begin applications when conditions are favorable for disease, but before disease outbreak. Apply this product at intervals of 5 to 7 days as part of an integrated pest management program.
Dimethomorph (40) Forum, 43.5%	Spray or fungigation	6 oz/A	X		Do not exceed 30 oz/A per season. Do not apply Forum alone; must be tank-mixed with fungicides other than mefenoxam or metalaxyl registered for late blight control. PHI = 4 days.
Famoxadone (11) + Cymoxanil (27) Tanos, 25%: 25%	Spray or fungigation	6-8 oz/A	X	X	Use 6 oz/A for early blight and 8 oz/A for late blight. Do not make more than 1 application of Tanos before alternating with a fungicide that has a different mode of action. Maximum of 72 oz/A/season. Also labeled for brown spot.
Fluazinam (29) Omega 500F, 40%	Spray or fungigation	5.5 fl oz/A for late blight 5.5-8 fl oz/A for white mold 1.5-3.0 pints/A in-furrow for powdery scab	X		Begin applications when conditions favor disease development. Repeat applications at 7-10 days. Do not apply more than 3.5 pts per acre per season. Do not apply within 14 days of harvest. Provides some tuber protection against late blight when used at the end of the season.

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[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Check the NDSU blight hotline, (888) 482-7286, for information on infection potential of early blight and late blight. Whenever late blight is severe, vine killing is extremely important and should be done at least 2 weeks before harvest to prevent tuber infections.
[5]Pathogen populations for late blight and early blight are resistant to fungicides: FRAC 4 for late blight and FRAC 7 for early blight.

Potato
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3,4,5]		Remarks[4]
			Late Blight	Early Blight	
Fluopyram (7) Velum Prime, 41.5%	Fungigation or in-furrow	6.5-6.84 fl oz/A		X	Apply Velum Prime with overhead fungigation equipment. Despite suppression of root-knot nematode, tuber quality may not be adequately protected. If root-knot nematode is severe, other suppression measures should be used. A Velum Prime label allows application in-furrow at 6.5 fl oz/A. It is recommended not to make more than one application of fluopyram/A/season.
Fluopyram (7) + Prothioconazole (3) Luna PRO, 17.4%; 17.4%	Spray or fungigation	10.0 fl oz/A		X	Also effective against white mold, Botrytis, brown spot, and black dot. Apply Luna PRO mid-season on a 7-14 day interval. For resistance management or early blight and improved late blight management, mix Luna PRO with an EBDC or chlorothalonil. Do not apply more than 2 sequential applications of any FRAC 7 or FRAC 3 containing fungicide before rotating with a fungicide from a different FRAC group. PHI = 7 days.
Fluopyram (7) + Pyrimethanil (9) Luna Tranquility, 11.3%:33.8%	Spray or fungigation	11.2 fl oz/A		X	Also effective against white mold, botrytis, brown spot, and black dot. Apply Luna Tranquility mid-season on a 7-14 day interval. For resistance management of early blight and improved late blight management, mix Luna Tranquility with an EBDC or chlorothalonil. Do not apply more than 2 sequential applications or any Group 7 or 9 containing fungicide before rotating with a fungicide from a different group. PHI = 7 days.
Fluoxastrobin (11) Evito, 40.3%	Spray or fungigation	3.8 fl oz/a		X	Do not apply within 7 days of harvest. Do not make more than 6 applications per season.
Fluoxastrobin (11) +Bifenthrin (3A) Tepera Plus HD, 15.41%:24.59%	Spray or fungigation	5.7 fl oz/a	X (Suppression)	X	Apply preventatively on a 7-10 day interval for late blight or early blight control.
Fluxapyroxad (7) + Pyraclostrobin (11) Priaxor 14.33%:28.58% Everlon, 28.58%; 14.33%	Spray or fungigation	4 to 8 fl oz/A	X	X	Also, for control of black dot, brown spot and blackpit, and suppression of Botrytis gray mold. For suppression of late blight only. Do not apply more than 3 applications or 24 fl oz/A per season. PHI = 7 days.
Iprodione (2) Rovral 4F, 41.6% Nevado 4F, 41.6% Meteor, 41.6%	Ground spray or fungigation	1-2 pt/A, early blight		X	Also labeled for control of white mold. Do not apply within 14 days of harvest. If pH of spray water is above 7.0, buffer to pH 5.0-7.0.

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[4]Check the NDSU blight hotline, (888) 482-7286, for information on infection potential of early blight and late blight. Whenever late blight is severe, vine killing is extremely important and should be done at least 2 weeks before harvest to prevent tuber infections.
[5]Pathogen populations for late blight and early blight are resistant to fungicides: FRAC 4 for late blight and FRAC 7 for early blight.

Potato
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3,4,5]		Remarks[4]
			Late Blight	Early Blight	
Isofetamid (7) Kenja, 36.0%					
Mancozeb (M3) Dithane DF Rainshield NT, 75%	Spray or fungigation	0.5-2 lb/A	X	X	Do not apply within 14 days of harvest. Vine kill should occur 14 days before harvest. Do not apply more than 11.2 lb ai/A per season of total EBDC (mancozeb, maneb or metiram). We recommend that this product be used with an Integrated Pest Management Program.
Dithane F-45, 37%	Spray or fungigation	0.8-1.6 qt/A	X	X	
Dithane M-45, 80%	Spray or fungigation	1-2 lb/A	X	X	
Koverall, 75%	Spray or fungigation	1-2 lb/A	X	X	
Manex II, 37%	Spray or fungigation	0.8-1.6 qt/A	X	X	
Manzate Pro-Stick, 75%	Spray or fungigation	1-2 lb/A	X	X	
Manzate Max, 37%	Spray or fungigation	1-2 lb/A	X	X	
Penncozeb, 80%	Spray or fungigation	0.4-1.6 qt/A lb/A	X	X	
Penncozeb DF, 75%	Spray or fungigation	1-2 lb/A	X	X	
Roper DF Rainshield, 75%	Spray or fungigation	1-2 lb/A	X	X	
Mancozeb (M3) + Azoxystrobin (11) Dexter Max, 70%; 5%	Spray or fungigation	1.6-2.1 lbs/A	X	X	Do not apply more than 16 lbs of product/A/year. Begin applications before disease development. PHI = 14 days.
Mancozeb (M3) + Chlorothalonil (M5) Elixir, 62.5%; 12.5%	Spray or fungigation	1.8-2.4 lbs/A	X	X	Do not apply within 14 days of harvest. Do not apply more than 18.0 lbs/A per season. Recommended that this product be used in an Integrated Management Program.
Mancozeb (M3) + Copper (M1) ManKocide, 15.0%:46.1%	Spray or fungigation	1.5-5.0 lbs/A	X	X	Do not use within 3 days of harvest.
Mancozeb (M3) + Zoxamide (22) Gavel, 66.7%:8.3%	Spray or fungigation	1.5-2 lb/A	X	X	Do not apply within 14 days of harvest. Do not make more than 6 applications or apply more than 12 lbs (8 lbs active mancozeb + 1 lb active zoxamide) per acre per season. Provides some tuber protection against late blight when used at the end of the season.

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Check the NDSU blight hotline, (888) 482-7286, for information on infection potential of early blight and late blight. Whenever late blight is severe, vine killing is extremely important and should be done at least 2 weeks before harvest to prevent tuber infections.
[5]Pathogen populations for late blight and early blight are resistant to fungicides: FRAC 4 for late blight and FRAC 7 for early blight.

Potato
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3,4,5]		Remarks[4]
			Late Blight	Early Blight	
Mandipropamid (40) Revus, 23.3%	Spray or fungigation	8 fl oz/A	X		Begin applications prior to disease development and continue on 7-10 day intervals. Make no more than 2 consecutive applications before switching to another non-Group 40 fungicide. Use short intervals under high disease pressure or when conditions are conducive to disease.
Mandipropamid (40) + Difenoconazole (3) Revus Top, 21.9%:21.9%	Spray or fungigation	5.5-7.0 fl oz/A	X	X	Begin applications before disease development and continue on 7-10 day intervals. Also controls black dot and brown spot. Do not make more than 2 applications before switching to a different mode of action. Do not apply within 14 days of harvest or apply more than 28 fl oz/season.
Mefenoxam (4) + Chlorothalonil (M5) Ridomil Gold/Bravo WP,4.5%:72% Ridomil Gold/Bravo Liquid	Spray or fungigation Spray or fungigation	2 lb/A 1 container/ 10 acres	X[5]	X	Do not apply Ridomil Gold/Bravo, Ridomil Gold/Bravo Liquid or Ridomil Gold/Copper within 14 days of harvest. For late blight control, begin applications when conditions are favorable for late blight, but before infection, and continue at 14-day intervals until threat of disease is over. To minimize the potential for resistance, do not make more than 3 applications. The full rate of a protectant fungicide should be applied between Ridomil applications, regardless of the Ridomil formulation used. See label for rotation restrictions: waiting period to plant after application of Ridomil (all formulations) is 0 days for dry beans, soybeans, potatoes and sugarbeets; 40 days for wheat, barley, and oats; 9 months for corn; and 12 months for all other crops. A minimum of two applications at 2 lb/A (flowering and 14 days later) for all Ridomil formulations will control A1 late blight tuber rot, *Pythium* leak and *Phytophthora erythroseptica* pink rot. For aerial applications, a minimum of 5 gal/A spray volume is recommended.
Mefenoxam (4) + Copper Hydroxide (M1) Ridomil Gold/Copper WP, 5%:60%	Spray or fungigation	2.0 lb/A + 0.8 lb ai/A of maneb, mancozeb, metiram or chlorothalonil	X[5]	X	

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[4]Check the NDSU blight hotline, (888) 482-7286, for information on infection potential of early blight and late blight. Whenever late blight is severe, vine killing is extremely important and should be done at least 2 weeks before harvest to prevent tuber infections.
[5]Pathogen populations for late blight and early blight are resistant to fungicides: FRAC 4 for late blight and FRAC 7 for early blight.

Potato
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3,4,5]		Remarks[4]
			Late Blight	Early Blight	
Mefenoxam (4) + Mancozeb (M3) Ridomil Gold MZ, 4%:64%	Spray or fungigation	2.5 lb/A	X[5]	X	Do not apply Ridomil Gold MZ within 14 days of harvest. For late blight control, begin applications when conditions are favorable for late blight, but before infection, and continue at 14-day intervals until threat of disease is over. To minimize the potential for resistance, do not make more than 3 applications. The full rate of a protectant fungicide should be applied between Ridomil applications, regardless of the Ridomil formulation used. See label for rotation restrictions: waiting period to plant after Ridomil application (all formulations) is 0 days for dry beans, soybeans, potatoes and sugar beets; 40 days for wheat, barley and oats; 9 months for corn and sweet corn; and 12 months for all other crops. Two applications (flowering and 14 days later) at 2.5 lb rate will control A1 late blight tuber rot, *Pythium* leak and *Phytophthora erythroseptica* pink rot. For aerial applications, minimum of 5 gal/A spray is recommended.
Mefentrifluconazole (3) Provysol, 34.93%	Spray	4.0 fl oz/A		X	Apply prior to disease development. Controls black dot, brown spot and early blight. Do not make more than one application before alternating with a non FRAC 3 fungicide. Apply at 7-14 day intervals. Do not apply more than 15 fl oz/A per year.
Mefentrifluconazole (3) + Pyraclostrobin (11) Veltyma, 17.56%; 17.56%	Spray	8.0 fl oz/A		X	Apply prior to disease development. Controls black dot, brown spot, early blight, black pit. Do not apply more than 30 fl oz/A per year.
Metconazole (3) Quash, 50%	Spray or fungigation	2.5-4.0 fl oz/A		X	Also effective on black dot, brown spot, and white mold. Use in a tank mix with Chlorothalonil or Mancozeb. Do not apply more than 2 applications per season. PHI = 1 day.

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[4]Check the NDSU blight hotline, (888) 482-7286, for information on infection potential of early blight and late blight. Whenever late blight is severe, vine killing is extremely important and should be done at least 2 weeks before harvest to prevent tuber infections.
[5]Pathogen populations for late blight and early blight are resistant to fungicides: FRAC 4 for late blight and FRAC 7 for early blight.
***Designates restricted-use pesticide.**

Potato
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3,4,5]		Remarks[4]
			Late Blight	Early Blight	
Metiram (M3) Polyram 80 DF, 80%	Spray or fungigation	1.5-2 lb/A	X	X	Do not apply within 14 days of harvest. Vine kill should occur 14 days before harvest. Do not exceed 14 lbs/A per season. We recommend that this product be used with an Integrated Pest Management Program. See label for further restrictions.
Penthiopyrad (7) Vertisan, 20.6%	Spray or fungigation	10-24 fl oz/A (early blight) 14-24 fl oz/A (white mold) 14-24 fl oz/A (black dot)		X	Begin applications prior to disease development. Repeat applications every 7-14 days. For white mold, make initial application at full bloom. Do not exceed 72 fl oz/A per season and make no more than 2 sequential applications. PHI = 7 days.
Picoxystrobin (11) Aproach SC, 22.5%	Spray or fungigation	6-12 fl oz/A		X	Make initial application at 100% full bloom, or prior to row closure, and then again 14 days later. Also controls white mold. Do not make more than two consecutive applications. Do not apply more than 12 fl oz/A per applications. Do not exceed 36 fl oz/A per year. PHI = 3 days.
Potassium Phosphite (33) + Chlorothalonil (M5) Catamaran	Spray or fungigation	4.0-5.5 pt/A	X	X	Also, for pink rot. See label for application instructions. Do not apply more than 17 pts/A/season. Do not apply within 6 weeks of harvest.
Prothioconazole (3) + Trifloxystrobin (11) Delaro, 16.0%; 13.7%	Spray or fungigation	8.0-11.4 fl oz/A		X	Also effective against brown spot. Botrytis, black dot, and white mold. Apply Delaro early-season on a 7-14 day interval. For resistance management of early blight and improved late blight management, mix Delaro with EBDC or chlorothalonil. Do not apply more than 2 applications and rotate to a different MOA before applying the second application. PHI = 14 days.
Pyrimethanil (9) Scala, 54.6%	Spray or fungigation	7 fl oz/A		X	Also effective against *Botrytis*. Use only in tank mix with protectant such as mancozeb and chlorothalonil. Do not apply more than 35 fl oz/A per season. Do not make more than 2 consecutive applications of Scala. PHI = 7 days.

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[4]Check the NDSU blight hotline, (888) 482-7286, for information on infection potential of early blight and late blight. Whenever late blight is severe, vine killing is extremely important and should be done at least 2 weeks before harvest to prevent tuber infections.
[5]Pathogen populations for late blight and early blight are resistant to fungicides: FRAC 4 for late blight and FRAC 7 for early blight.
***Designates restricted-use pesticide.**

Potato
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3,4,5]		Remarks[4]
			Late Blight	Early Blight	
Propamocarb (28) Previcur, 66.5%	Spray or fungigation	0.7 pt/A low disease risk 0.9 pt/A medium disease risk 1.2 pt/A high disease risk	X		Do not apply more than 6 pts of Previcur/acre/season. Do not apply within 14 days of harvest. Use in a tank mix with 0.9 lb ai/acre of chlorothalonil (1.2 pt/acre of Bravo WeatherStik or equivalent) or 1 lb ai mancozeb (1.25 lb/acre of Dithane M-45 or equivalent).
Pydiflumetofen (7) + Fludioxonil (12) Miravis Prime, 12.8%; 21.4%	Spray or fungigation	9.2-11.4 fl oz/A		X	For control of brown spot, early blight, powdery mildew and Septoria. For suppression of gray mold, black dot and white mold. Do not make more than two applications of Miravis Prime before alternating with a fungicide that is not in group 7 or 12.
Pyraclostrobin (11) Headline EC, 23.6%Headlline SC, 23.3%	Spray or fungigation	6-9 fl oz/A early blight 6-12 fl oz/A late blight	X X	X X	Use 6-9 fl oz/A for early blight and 6-12 fl oz/A for late blight. *Do not apply within 3 days of harvest. Do not make more than 6 applications per season. Also controls black dot. Apply prior to disease onset.
Pyraclostrobin (11) + Metiram (M3) Cabrio Plus, 5.0%:55%	Spray or fungigation	2.0-2.9 lbs/A for black dot & early blight; 2.9 lbs/A for late blight	X	X	PHI = 14 days.
Oxathiapiprolin (49) + Chlorothalonil (M5) Orondis Opti, 0.5%; 33.2%	Spray or fungigation	1.75-2 pt/A	X	X	Begin foliar applications prior to disease development. Make no more than 2 sequential applications before rotation with a different mode of action. Also suppresses black dot. Do not exceed 10 pt/A/year. PHI = 7 days.
Oxathiapiprolin (49) + Mandipropamid (40) Orondis Ultra, 2.77%; 23.1%	Spray or fungigation	5.5-8.0 fl oz/A	X		Begin applications prior to disease development. Make no more than 2 sequential applications before rotation with a different mode of action. Do not exceed 32 fl oz/A/year. PHI = 14 days.

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[4]Check the NDSU blight hotline, (888) 482-7286, for information on infection potential of early blight and late blight. Whenever late blight is severe, vine killing is extremely important and should be done at least 2 weeks before harvest to prevent tuber infections.
[5]Pathogen populations for late blight and early blight are resistant to fungicides: FRAC 4 for late blight and FRAC 7 for early blight.
***Designates restricted-use pesticide.**

Potato
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3,4,5]		Remarks[4]
			Late Blight	Early Blight	
Sodium (mono - and dibasic -), Potassium, and Ammonium Phosphites (33) Several products	Spray or fungigation	check label	X		Provides better control when alternated with other fungicides. Also provides suppression of storage rot diseases such as pink rot.
Tea Tree Oil (46) + Difenoconazole (3) Regev, 40.6%:20.3%	Spray	4-8.5 fl oz/A		X	Make applications in the early stages of plant growth when conditions favor disease. Use the higher rate under increased disease pressure. PHI = 14 days.
Triphenyltin Hydroxide (TPTH)* RUP (30) Super Tin 80WP AgPak, 80% or Agri Tin, 80%	Spray or fungigation	2.5-3.75 oz/A	X	X	RESTRICTED-USE PESTICIDE. Do not apply within 7 days of harvest. Do not exceed 11.25 oz/A TPTH per season. May use 1.87 oz/A TPTH when used in combination with another fungicide. Ground application must be with closed cab. Do not enter treated area within 48 hours of treatment without proper PPE specified on label.
or					
Super Tin* 4L, or Agri Tin* 4L, 40%	Spray or fungigation	4-6 fl oz/A	X	X	Super Tin 4L label says "do not exceed 18 fl oz/a/season."
Thiophanate methyl (1) Topsin M WSB, 70%	Spray or fungigation	1-1.5 lbs/A			Topsin M, Topsin 4.5 Fl acre, Incognito 4.5F, Incognito 85 WDG, and Thiophanate methyl WDG are labeled for white mold control in potatoes. Miramar is labeled for white mold control. Make first application at row closure to full bloom of the primary flower clusters. Repeat the application within 7-to-14 days and at 7-14 day intervals if conditions for disease development are favorable. Do not apply more than 87.2 fl oz of product /acre/year. Do not enter or allow worker areas during the restricted entry interval (REI) of 2 days.
Topsin 4.5 FL, 45% or T-Methyl 4.5F, Cercobin, 41.3%	Spray or fungigation	20-30 fl oz/A			
Thiophanate Methyl 85 WDG, 85% Incognito 85 WDG, 85%	Spray or fungigation	0.8-1.2 lb/A			
Incognito 4.5F, 46.2%	Spray or fungigation	20-30 fl oz/A			
Miramar, 41.3%	Spray or fungigation	21.8-32.7 fl oz/A			
Trifloxystrobin (11) Flint Extra, 42.6%	Spray	3.0-3.8 fl oz/A	X	X	For early blight, begin applications preventively and continue as needed on a 7-10 day interval. For late blight, begin applications preventively. Alternate Flint Extra with a protectant fungicide registered for late blight on a 7-10day schedule. Do not apply more than 23 oz. Flint Extra per season. Do not apply within 7 days of harvest. Do not make more than 6 total applications per acre per season.

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[4]Check the NDSU blight hotline, (888) 482-7286, for information on infection potential of early blight and late blight. Whenever late blight is severe, vine killing is extremely important and should be done at least 2 weeks before harvest to prevent tuber infections.
[5]Pathogen populations for late blight and early blight are resistant to fungicides: FRAC 4 for late blight and FRAC 7 for early blight.
***Designates restricted-use pesticide.**

Safflower
Seed Treatment

Chemical	Application	Dosage[1]	Control[2] of Seed-borne Rust	Remarks
Carboxin (7) Vitavax-34, 34%	Slurry	2 fl oz/cwt	X	
Fludioxonil (12) Maxim 4FS, 40.3%	Slurry	0.08-0.16 fl oz/cwt		
Spirato 480FS, 40.3%	Slurry	0.08-0.16 fl oz/cwt		
Dyna-Shield Fludioxonil, 40.3%	Slurry	0.08-0.16 fl oz/cwt		
Mancozeb (M3) Dithane DF Rainshield NT, 75%	Slurry	2.1 oz/cwt	X	
Dithane F-45, 37%	Drill box or slurry	3.2 fl oz/cwt	X	
Dithane WSP, 80%	Drill box or slurry	2 oz/cwt	X	
Manzate Pro-Stick, 75%, 75%	Slurry	2 oz/cwt	X	
Penncozeb 80 WP, 80%	Drill box or slurry	2 oz/cwt		
Penncozeb 75 DF, 75%	Drill box or slurry	2.1 oz/cwt	X	
Thiram (M3) 42-S Thiram, 42%	Liquid or slurry	2 fl oz/bu	X	
Thiram 50WP Dyed, 50%	Drill box or slurry	4 oz/cwt	X	
Signet 480FS, 44%	Liquid or slurry	2 fl oz/bu	X	

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[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Safflower
Foliar Sprays

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Alternaria Leaf Spot Control	Remarks
***Coniothyrium minitans* strain CON/M/91-08** Contans WG, 5%	Spray or chemigation	1-4 lbs/A		For use to reduce/control *Sclerotinia sclerotiorum* and *Sclerotinia minor* in the soil.
Azoxystrobin (11) Quadris, 22.9% AZteroid FC 3.3, 34.3% Azoxystrobin SC, 22.9% Arius 250, 22.93%	Spray or fungigation	6.0-15.5 fl oz/A 3.9-9.7 fl oz/A for AZteroid FC	X	Also controls downy mildew. Make Quadris applications preventatively for best results. Additional applications may be required under favorable environmental conditions. Do not apply more than 27 fl oz of product/season. PHI = 30 days.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	Spray or fungigation	7.4-18.4 fl oz/A	X	Also controls downy mildew. Do not apply more than 33.1 fl oz/A per year. PHI = 30 days
Fluxapyroxad (7) + Pyraclostrobin Priaxor, 14.33%: 28.58% Everlon, 28.58%; 14.33%	Spray or fungigation	4-8 fl oz/A	X	For suppression of *Sclerotinia*. Also controls *Septoria* sp. Apply prior to disease development. Maximum of 2 applications per season. PHI = 21 days.
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	Spray or fungigation	6-12 fl oz/A	X	Also controls *Septoria* sp. Apply prior to disease development for optimum control.
Mefentrifluconazole (3) + Pyraclostrobin (11) + Fluxapyroxad (7) Revytek, 11.61%; 15.49%; 7.74%	Spray or fungigation	8-15 fl oz/A	X	Controls Alternaria leaf spot and other foliar diseases of safflower. Apply prior to disease development. Maximum use rate per season is 30 fl oz/A. PHI = 21 days.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Soybean
Seed Treatment

Chemical	Application	Dosage[1]	Control[2] of Seedling Blights[3]	Remarks
Azoxystrobin (11) Dynasty, 9.6% Saxony 100 FS, 9.67%	Slurry	0.153-0.459 fl oz/cwt	X	For seed-borne and soil-borne fungi causing decay, damping off and seedling blight.
Captan (M4) Captan 4000, 38.4% Hi-Moly/Captan-D, 48.9% Hi-Moly Captan, 18.44%	See individual labels for rates of application, formulations and registered use	See individual labels for rates of application, formulations and registered use	X	Hi-Moly contains molybdenum.
Carboxin (7) Vitavax-34, 34% Germate Plus, 14% Kernel Guard Supreme, 14%	Slurry Drill box Drill box	3-4 fl oz/cwt 1.5 oz/42 lb (2 oz/bu) 1.5 oz/42 lb	X X X	Vitavax-34 may be used on seed previously treated with captan or thiram. Germate Plus contains 15% diazinon and 25% lindane insecticide. Kernel Guard Supreme contains 10.42% permethrin.
Carboxin (7) + Captan (M4) Enhance, 20%:19%	Drill box	3 oz/bu	X	
Carboxin (7) + Thiram (M3) Vitaflo-280, 15.59%; 13.25%	Ready to use slurry or mist	4 fl oz/cwt	X	For seed rot, seedling blight and damping off.
Chenopodium quinoa saponins Heads Up Plant Protectant	Slurry	5-8 fl oz/cwt	X	Signaling plant activator for protection against *Rhizoctonia* and *Fusarium*.
Chloroneb (14) Chloroneb 65W, 65%	Slurry	4 oz/cwt	X	May be used as a supplemental seed treatment for improved suppression of *Rhizoctonia* and *Pythium*.
Ethaboxam (22) Intego Solo, 34.2%	Slurry or mist	0.3-0.6 fl oz/cwt	X	For control of *Pythium* and early season *Phytophthora*.
Ethaboxam (22) + Ipconazole (3) + Metalaxyl (4) Intego Fungicide Soybeans, 5.11%:1.7%:1.36%	Slurry or mist	2.11 fl oz/cwt	X	Commercial fungicide seed treatment with contact and systemic activity that protects against seed rots, *Pythium, Phytophthora, Fusarium, and Rhizoctonia*.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Soybean
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control[2] of Seedling Blights[3]	Remarks
Ethaboxam (22) + Ipconazole (3) + Metalaxyl (4) + Clothianidin Intego Suite Soybeans, or Halifax Fnl, or Armis Fl, 2.97%:0.99%:0.79%:20.06%	Slurry or mist	3.37 fl oz/cwt	X	Commercial fungicide and insecticide seed treatment with contact and systemic activity that protects against seed rots, *Pythium, Phytophthora, Fusarium, and Rhizoctonia*. Contains clothianidin for protection against soil insects and early-season foliar insects.
Fludioxonil (12) Maxim 4FS, 40.3% Spirato 480FS, 40.3% Dyna-Shield Fludioxonil, 40.3%	Slurry	0.08-0.16 fl oz/cwt or .0038-.0076 mg ai seed	X	For seed-borne and soil-borne fungi. Registered for control of *Rhizoctonia* and *Fusarium*.
STartUP FLUDI, 40%	Slurry	0.08-0.16 fl oz/cwt	X	
Fludioxonil (12) + Sedaxane (7) + Mefenoxam (4) Vibrance Trio, 2.32%:2.32%:13.95%	Slurry	1.55 fl oz/cwt or 0.72 fl oz/140,000 seed unit	X	For seed and seedling diseases including *Fusarium*, *Pythium* and *Rhizoctonia*.
Fluopyram (7) ILEVO, 49.02%	Slurry	0.075-0.25 mg ai/seed or 0.6-1.97 fl oz/140,000 seeds		Protects the root system against the SDS fungus and early season Septoria brown spot. ILEVO provides protection from plant-parasitic nematodes including soybean cyst, root knot, root lesion, reniform and lance.
Ipconazole (3) Rancona 3.8 FS, 40.7%	Slurry or mist	0.085 fl oz/cwt	X	Does not provide control of *Pythium*.
Ipconazole (3) + Metalaxyl (4) Rancona Summit, 0.902%:1.443%	Slurry or mist	4.0 fl oz slurry/cwt	X	For seed and seedling diseases.

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[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Soybean
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control of Seedling Blights[2,3]	Remarks
Ipconazole (3) + Metalaxyl (4) + Carboxin (7) Rancona V RTU FS, 0.47%:1.26%:12.58%	Slurry or mist	4.6 fl oz/cwt	X	For seed and seedling diseases.
Ipconazole (3) + Picoxystrobin (11) + Oxathiapiprolin (49) Lumitreo, 6.82%; 6.82%; 20.63%	Liquid or slurry	0.5 fl oz/100 lbs seed	X	Control seed rot, damping off caused by *Rhizoctonia solani*, *Fusarium* spp., Phytopthora seed rot/pre-emergence damping off and post-emergence damping off, seed-borne Phomopsis and seed rot (*Pencillium* spp. and *Aspergillus* spp.)
Mefenoxam (4) Apron XL, 33.3% Precinct, 45.3%	Slurry or mist Slurry or mist	0.16-0.64 fl oz/cwt 0.12-0.47 fl oz/cwt	X	For *Pythium* and early season *Phytophthora* control only. For both commercial and on-farm use.
Mefenoxam (4) + Picarbutrazox (U17) + Fludioxonil (12) + Sedaxane (7) + Thiamethoxam CruiserMaxx APX, 2.45%; 0.82%; 0.82%; 0.82%; 16.3% Warden CX 2.0, 4.89%; 0.82%; 0.82%; 0.33%; 16.3%	Slurry or mix	4.18 fl oz/cwt or 1.95 fl oz/140,000 seeds	X	For seed-borne and soil-borne fungi and insects. Contains thiamethoxam for insect control.
Mefenoxam (4) + Fludioxonil (12) Apron Maxx RFC, 3.46%: 2.31% Maxim XL, 8.4%: 21% Warden RTA 2.2%:0.72%	Slurry Slurry or mist Slurry or mist	1.5 fl oz/cwt 0.167-0.334 fl oz/cwt 5 fl oz/cwt	X X X	See labels for inoculant remarks.
Mefenoxam (4) + Fludioxonil (12) + Thiabendazole (1) + Thiamethoxam Equity, 1.70%; 1.12%; 2.13%: 22.61%	Water based slurry	3.0 fl oz/cwt	X	For protection against insects and early season diseases *Pythium*, *Phytophthora*, *Fusarium*, *Rhizoctonia* and *Phomopsis*.
Mefenoxam (4) + Fludioxonil (12) + Thiabendazole (1) + Sedaxane (7) + Thiamethoxam Equity, 3.35%; 1.12%; 2.24%: 1.12%: 22.40%	Water based slurry	2.96 fl oz/cwt	X	For protection against insects and early season diseases *Pythium*, *Phytophthora*, *Fusarium*, *Rhizoctonia* and *Phomopsis*.
Mefentrifluconazole (3) Relenya, 34.93%	Slurry or mist	0.2-0.8 fl oz/cwt	X	Seed and seedling diseases caused by *Fusarium* spp. and *Rhizoctonia solani*.

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[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Soybean
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control of Seedling Blights[2,3]	Remarks
Metalaxyl (4) Allegiance FL, 28.35%	Mist or slurry	0.75-1.50 fl oz/cwt	see remarks	Metalaxyl is for *Pythium* damping off and early season *Phytophthora* control only. For use only with commercial seed treatment equipment.
Dyna-Shield, 28.35%	Slurry	0.75-1.50 fl oz/cwt		
Sebring 318FS, 30.14%	Mist or slurry	0.75-1.50 fl oz/cwt		
Belmont 2.7 FS, 28.98%	Slurry or mist	0.75-1.50 fl oz/cwt		
Sebring 480 FS, 44.08%	Slurry or mist	0.5-1 fl oz/cwt		
STartUP METXL, 28.98%	Mist or slurry	0.75-1.5 fl oz/cwt		
STartUP METXL 480, 42.50%	Mist or slurry	0.5-1 fl oz/cwt		
Metalaxyl (4) + Thiophanate-Methyl (1) + Fludioxonil (12) + Imidacloprid Dyna-Shield Conquest, 5.05%: 3.28%: 0.81%; 20.17%	Slurry or mist	4.0 fl oz/cwt	X	For protection against damping-off, seed and seedling diseases due to *Pythium*, *Phytophthora*, *Fusarium*, and *Rhizoctonia* and early-season insects. For use only in commercial seed treatment facilities.
Oxathiapiprolin (49) Lumisena, 18.7%	Slurry	0.568 – 1.136 fl oz/cwt	X	Controls Phytophthora seed and stem rot; damping off. Use the higher labeled rate in areas with a history of high disease pressure, or where extended early season protection is required, and/or where field conditions favor development of seed and soil-borne pathogens.
Penflufen (7) + Prothioconazole (3) + Metalaxyl (4) EverGol Energy SB, 3.59%, 7.18%, 5.74%	Slurry or mist	1 fl oz/cwt	X	For seed rot and damping off caused by *Rhizoctonia*, *Fusarium*, and *Pythium*. Also, for seed decay caused by *Phomopsis*.
Picarbutrazox (U17) Vayantis, 36%	Slurry or mist	0.039-0.195 fl oz/cwt	X	For *Pythium* and *Phytophthora*.
Pydiflumetofen (7) Saltro, 41.7%	Slurry	1.52 fl oz/cwt	X	For sudden death syndrome (SDS), early season Septoria brown spot and suppression against plant parasitic nematodes.

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[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Soybean
Seed Treatment (continued)

Chemical	Application	Dosage[1]	Control of Seedling Blights[2,3]	Remarks
Sedaxane (7) Vibrance, 43.7%	Slurry	0.08-.16 fl/oz cwt or 2.5-5 gai/100 kg seed	X	Seed decay, seedling blight and damping off caused by *Rhizoctonia solani*.
Thiophanate-methyl (1) + Metalaxyl (4) + Fluxapyroxad (7) + Pyraclostrobin (11) Obvius Plus, 8.93%; 14.73%; 4.46%; 3.57%	Slurry or mist	1.53 fl oz/cwt	X	Controls anthracnose, *Fusarium* spp., *Phytophthora* spp., *Rhizoctonia solani*, and *Asocychyta* spp.
Tolclofos-methyl (14) Rizolex, 42%	Slurry or mist	0.3 fl oz/cwt	X	For seed-borne and soil-borne diseases. Controls *Rhizoctonia solani* and *Fusarium* species.
Trifloxystrobin (11) Trilex, 22%	Slurry	0.32 fl oz/cwt	X	For seed-borne and soil-borne fungi.
Trifloxystrobin (11) + Metalaxyl (4) Trilex 2000, 7.12%:5.96%	RTU or slurry or mist	1.0 fl oz/cwt	X	For seed-borne and soil-borne fungi.

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[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]Seedling blights due to various fungal infections of seed.
Note: Some seed treatments may affect Rhizobia inoculants; read inoculant label for specific information.

Soybean
Soil Application

Chemical (Fungicide Group)	Application	Dosage[1]	Control of Pythium, Phytophthora[2]	Remarks
Azoxystrobin (11) Equation, 22.98% Tetraban, 22.9% AZteroid FC 3.3, 34.3% Azoxystrobin SC, 22.9% Arius 250, 22.93%	In-furrow spray	0.4-0.8 fl oz/1,000 ft. row 0.24-0.48 fl oz/1,000 ft. row for AZteroid FC		For suppression of *Rhizoctonia*.
Azoxystrobin (11) + Metalaxyl (4) Uniform, 28.2%:10.9%	In-furrow	0.34 fl oz/1,000 linear feet of row		Apply in a 7-inch band. One application per season.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	In-furrow	0.5-0.9 fl oz/1000 ft. row		For suppression of *Rhizoctonia*. Apply in-furrow as a spray or as a banded spray.
***Bacillus amyloliquefaciens* strain D747 (44) + Bifenthrin** Ethos XB, 5.0%; 15.67%	In-furrow	4-17 fl oz/A		Restricted use pesticide. Suppression of seedling blights.
Bacillus subtilis QST 713 (44) Serenade ASO, 1.34% Minuet, 9.89%	In-furrow spray In-furrow	2-6 fl qt/A 3-12 fl oz/A		Apply as a directed spray in the seed furrow and to cover soil at planting. Apply Minuet as directed spray in the seed furrow and onto the covering soil at planting.
Coniothyrium minitans Contans WG, 5.3%	Soil incorporation	1-4 lb/A		Fungus attacks sclerotia of the white mold fungus in the soil.
Fluoxastrobin (11) Evito, 40.3%	In-furrow spray	0.11-0.16 fl oz/1,000 ft row		For suppression of *Rhizoctonia*.
Fluoxastrobin (11) + Bifenthrin (3A) Tepera Plus HD, 15.41%:24.59%	In-furrow spray or banding	3.3-5.7 fl oz/A	X (suppression)	For suppression of *Pythium* and *Phytophthora*. Provide control for Rhizoctonia root rot and stalk rot, southern blight, and charcoal rot and seedling blight.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Soybean
Soil Application (Continued)

Chemical (Fungicide Group)	Application	Dosage[1]	Control of Pythium, Phytophthora[2]	Remarks
Mefenoxam (4) Ridomil Gold EC, 48%	In-furrow spray	0.08-0.28 fl oz/1,000 ft. of row	X	Do not apply directly to seed but to soil that will be mixed in covering the seed. Use lower rates for early to mid-season control; full rates for full-season control. See label for planting restrictions within 12 months of application.
Ridomil Gold GR, 2.5%	In-furrow, 7" band or T-band	1.5-6 oz/1,000 ft. of row	X	
Metalaxyl (4) Xyler FC, 31.3%	In-furrow	0.21-0.79 fl oz/1000 ft. row		Apply in-furrow as a spray or stream directed to the soil adjacent to seed rather than directly on seed to increase crop safety.
Prothioconazole (3) Proline, 41.0%	In-furrow spray	2.6-5.0 fl oz/A		For control of *Rhizoctonia*. Apply up to 5.0 fl oz/A (0.14 fl oz/1,000 ft if on 15" rows or 0.21 fl oz/1,000 ft if on 22" rows).
Pyraclostrobin (11) Headline EC, 23.6%	In-furrow spray	0.4-0.8 fl oz/1,000 ft. row		For suppression of *Rhizoctonia*. For 22" rows, use maximum of 0.5 fl oz/1,000 ft. of row. For 30" rows, use maximum of 0.7 fl oz/1,000 ft. of row.
Pyraclostrobin (11) + Fluxapyroxad (7) Priaxor, 28.58%; 14.33% Everlon, 28.58%; 14.33%	In-furrow spray	0.2-0.6 fl oz/1,000 ft. row	X (*Pythium* suppression)	Do not mix with liquid fertilizer. Also suppresses *Rhizoctonia* and *Fusarium*. Maximum of 1 application per season.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Soybean Nematicide
Seed Treatment

Chemical	Application	Dosage	Control	Remarks
Abamectin Avicta 500FS, 46.3%	Commercially applied		Nematodes	Syngenta Crop Protection LLC has a commercially treated blend of nematicide, insecticide, and fungicide seed treatment products.
Abamectin + Thiamethoxam + Mefenoxam (4) + Fludioxonil (12) Avicta Complete Beans 500, 22.20%: 11.10%: 1.67%: 0.55%	Commercially applied		Nematodes (by abamectin), various insects (by thiamethoxam), and various diseases (by mefenoxam and fludioxonil)	Syngenta Crop Protection LLC has a commercially treated blend of nematicide, insecticide, and fungicide seed treatment products.
Fluopyram (7) ILEVO, 49.02%	Slurry	0.075-0.25 mg ai/seed or 0.6-1.97 fl oz/140,000 seeds	Soybean cyst nematode	Protects the root system against the SDS fungus and early season Septoria brown spot. ILEVO provides protection from plant-parasitic nematodes including soybean cyst, root knot, root lesion, reniform and lance.
***Pasteuria nishizawae* – Pn1** Clariva pn, 15.0%	Slurry	0.9-33.8 fl oz/100 lbs seed	Soybean cyst nematode	
Thiamethoxam + Mefenoxam (4) + Fludioxonil (12) + Sedaxane (7) + *Pasteuria nishizawae* – Pn1 Clariva Elite, 12.5%; 1.88%; 0.63%; 0.63%; 4.06%	Slurry	5.6 fl oz/100 lbs seed	Soybean Cyst Nematode	Protection against damping off and seed borne diseases due to *Pythium*, *Phytophthora*, *Fusarium*, *Rhizoctonia*.
***Bacillus amyloliquefaciens* Strain PTA-4838** Aveo EZ, 16.5%	Slurry	0.1 fl oz/100 lbs of seed	Nematodes.	
***Bacillus amyloliquefaciens* Strain MBI600 + cis-Jasmone** Trunemco Corn/Soy, 1%; 0.88%		0.3 fl oz/cwt	Nematode species.	
Clothianidin + *Bacillus firmus* Poncho Votivo Precise, 40.3%: 8.1%	Commercially applied		Provides early season protection of the soybean plant against root nematodes and broad control of insect pests.	The *Bacillus firmus* bacterium creates a living barrier that prevents nematodes from reaching the roots.

Soybean
Foliar Sprays

Chemical (Fungicide Group)	Application[1]	Dosage[2]	White Mold Control[3]	Remarks
***Bacillus pumulis* QST 2808 (44)** Sonata, 1.38%	Spray or fungigation	0.5-4 qt/A	X	Use 0.5 to 4 qt/A in tank mix with labeled rates of strobilurin fungicides when conditions are conducive to disease development. Use 1 to 4 qt/A stand-alone.
***Bacillus subtilis* strain QST 713 (44)** Serenade ASO, 1.34%	Spray or fungigation	2-6 qt/A	X	For suppression.
***Bacillus subtilis* strain IAB/BM03 (44)** AVIV, 0.08%	Foliar	10-30 fl oz/A	X	Apply preventatively in 100 gallons of water of when environmental conditions favor disease. Use higher rates under increased disease pressure.
***Coniothyrium minitans* strain CON/M/91-08** Contans, 5%	Spray or chemigation	1-4 lbs/A	X	For use to reduce/control *Sclerotinia sclerotiorum* and *Sclerotinia minor* in the soil.
Hydrogen Peroxide + Peroxyacetic Acid OxiDate 5.0, 27%; 5%	Spray	50-128 fl oz/100 gallons		Label suggests management of several fungal and bacterial diseases.
Hydrogen Peroxide + Peroxyacetic Acid SaniDate 12.0, 18.5%, 12%	Chemigation	Dilution rate is 1:1000 to 40,000		Label suggests management of several fungal and bacterial diseases.
Phosphorus Acid + Hydrogen Peroxide OxiPhos, 27.1%; 14.0%	Spray	2.5-5.0 qts/A		Label suggests management of several fungal and bacterial diseases.
Phosphorus Acid Phostrol, 53.6%	Spray	4 qts/A		For downy mildew.
Tea Tree Oil (BM01) Timorex Act, 12.5%	Foliar	13-35 fl oz/A	X	Make applications in the early stages of plant growth when condition favor disease. Use higher rates under increased disease pressure.
Tea Tree Oil (BM01) + Difenoconazole (3) Regev HBX, 20.4.6%:20.3%	Foliar	4-8.5 fl oz/A	X	Make applications in the early stages of plant growth when condition favor disease. Use higher rates under increased disease pressure.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Soybean
Foliar Sprays (Continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	White Mold Control[3]	Remarks
Azoxystrobin (11) Quadris, 22.9% Satori, 22.9% Equation, 22.9% Tetraban, 22.9% Aframe, 22.9% AZteroid FC 3.3, 34.3% Azoxystrobin SC, 22.9% Arius 250, 22.93%	Spray or fungigation	6.0-15.5 fl oz/A 3.9-9.7 fl oz/A for AZteroid FC		Products control pod and stem blight, soybean rust and brown spot.
Azoxystrobin (11) + Chlorothalonil (M5) Arius Advance, 11.6%; 44.0%	Spray or fungigation	20-25 fl oz/A	X	Apply when conditions are favorable for disease development. Do not apply more than 1.5lb of azoxystrobin/A/year. Do not apply more than 4.5 lbs of chlorothalonil/A/year. PHI = 42 days.
Azoxystrobin (11) + Cyproconazole (3) Azure Xtra, 18.2%:7.3% RustEase, 18.2%; **7.3%**	Spray	5.0-6.8 fl oz/A 4.0-6.8 fl oz/A		See label for specifics for target disease. Do not apply more than two applications per year. Do not apply within 30 days of harvest.
Azoxystrobin (11) + Propiconazole (3) Quilt, 7%:11.6% Quilt Xcel, 13.5%:11.7% Aframe Plus, 13.5%; 11.7% Trevo P, 13.5%; 11.7%	Spray or fungigation Spray or fungigation	14-20.5 fl oz/A 10.5-21 fl oz/A		Quilt controls several diseases in soybeans. Do not apply more than 42 fl oz/A. PHI = 21 days for seed; 0 for forage or hay. Quilt Xcel controls several diseases in soybeans. Do not apply more than 42 oz/a/year. Do not apply after R6 stage soybeans.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	Spray or fungigation	7.4-18.4 fl oz/A		For control of pod and stem blight and brown spot. Begin applications prior to disease onset. Use higher rate when disease pressure is high. Do not apply more than 110.3 fl oz/A per year. PHI = 14 days.
Azoxystrobin (11) + Tebuconazole (3) Custodia, 11.0%; 18.35%	Spray or fungigation	8.6 fl oz/A		Apply as a preventative spray prior to disease development. Do not apply more than 25.9 fl oz/A per season. PHI = 21 days.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Soybean
Foliar Sprays (Continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	White Mold Control[3]	Remarks
Azoxystrobin (11) + Tetraconazole (3) Affiance, 9.35%; 7.48% Brixen, 13.76%; 6.67%	Spray or fungigation	10.0-14.0 fl oz/A 13.0-16.0 fl oz/A		Apply prior to disease development when conditions favor disease development. Do not make more than three applications per year or apply more than 28.7 fl oz/A per year. PHI = 14 days.
Benzovindiflupyr (7) + Azoxystrobin (11) + Propiconazole (3) Trivapro, 2.9%; 10.5%; 11.9%	Spray or fungigation	13.7-20.7 fl oz/A		Make application between R1-R3. Do not exceed 41.4 fl oz/A/year. PHI = 14 days or R6, whichever is longest.
Boscalid (7) Endura, 70%	Spray or fungigation	5.5-11 oz/A	X	For optimal white mold control, apply at early flowering. If environment remains favorable for disease development, make a second application 7-14 days after initial application. PHI = 21 days.
Chlorothalonil (M5) Bravo Ultrex, Equus DF, 82.5% Bravo WeatherStik, Echo 720 Equus 720 SST, Praize, or Chlorothalonil 720, 54% Echo 90 DF, 90% Echo Zn, 38.5% Chlorothalonil + Zn, 38.5%	Spray or fungigation Spray or fungigation Spray or fungigation Spray or fungigation	See label See label See label See label		Chlorothalonil products control pod and stem blight and stem canker, and suppress soybean rust. Do not feed soybean hay or thrashings from chlorothalonil-treated fields to livestock.
Chlorothalonil (M5) + Tebuconazole (3) Muscle Advance, 30.51%:8.47%	Spray	0.8-1.1 pts/A		For the suppression of soybean rust and the management of anthracnose. Diaporthe pod and stem blight, frogeye leaf spot, purple seed stain, Cercospora leaf blight, and Septoria brown spot.
Chlorothalonil (M5) + Tetraconazole (3) Andiamo Advance, 27.69%:2.09%	Spray	32 fl oz/A	X	Also, for the management of soybean rust, anthracnose, Diaporthe pod and stem blight, frogeye leaf spot, purple seed stain, Cercospora leaf blight, powdery mildew, and Septoria brown spot. Do not apply more than 64 fl oz/acre/year.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Soybean
Foliar Sprays (Continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	White Mold Control[3]	Remarks
Copper Sulfate (M1) Cuprofix Ultra 40, 71.1%	Spray or fungigation	0.75-1.25 lb/A bacterial diseases 1.25-2.0 lbs/A fungal leaf spots		
Cyproconazole (3) Alto 100 SL, 8.9%	Spray or fungigation	4.0-5.5 fl oz/A		For control of soybean leaf diseases. See label for specific rate recommendations. Do not apply more than 11 fl oz/season. Do not apply with 30 days of harvest.
Fluazinam (29) Omega 500F, 40%	Spray or fungigation	12-16 fl oz/A	X	For control of white mold. Make first application at R1 to R2, and if needed, a second application at R3. Do not apply more than 32 fl oz/A per year.
Fluopyram (7) + Prothioconazole (3) ProPulse, 17.4%:17.4%	Spray or fungigation	6.0-10.2 fl oz/A	X	Apply ProPulse at 6.0-8.0 fl oz/A for control of white mold. For optimum disease control apply at early flowering. Do not apply more than 30.9 fl oz/A/year. PHI = 21 days.
Fluoxastrobin (11) Evito 480SC, 40.3%	Spray or fungigation	2.0-5.7fl oz/a		For control of Asian soybean rust and many fungal leaf spots. Begin applications preventively and continue as needed on 14-21 day interval. Do not apply more than 11.4 fl oz per year.
Fluoxastrobin (11) + Bifenthrin (3A) Tepera Plus HD, 15.41%:24.59%	Spray	5.7 fl oz/a	X	For control of many fungal leaf spots. Begin applications preventatively and continue as needed on 14-21 day interval. Do not apply after R5 stage.
Fluoxastrobin (11) + Flutriafol (3) Preemptor, 14.84%; 19.3%	Spray or fungigation	4-6 fl oz/A		For fungal leaf spots and Asian soybean rust. Apply from R1 to R3. Do not make more than 2 applications per season. Do not apply more than 12 fl oz/A per season. PHI = 30 days.
Fluoxastrobin (11) + Tetraconazole (3) Zolera FX, 17.76%; 17.76%	Spray or fungigation	4.4-6.8 fl oz/A		For fungal leaf spots and suppression of white mold. Do not apply more than 6.8 fl oz/A per season. Apply at or prior to R1 for white mold suppression. PHI = 30 days.
Flutriafol (3) Topguard, 11.8%	Spray or fungigation	7-14 fl oz/A	X Suppression Only	For control of foliar fungal diseases.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Soybean
Foliar Sprays (Continued)

Chemical (Fungicide Group)	Application [1]	Dosage [2]	White Mold Control [3]	Remarks
Fluxapyroxad (7) + Pyraclostrobin (11) Priaxor, 14.33%:28.58% Everlon, 28.58%; 14.33%	Spray or fungigation	4-8 fl oz/A	X Suppression Only	For control of several soybean diseases. Do not apply more than 2 applications and 16 fl oz/A. PWI = 21 days
Mefentrifluconazole (3) + Fluxapyroxad (7) + Pyraclostrobin (11) Revytek, 11.61%:7.74%:15.49%	Spray	8-15 fl oz/A	X Suppression Only	Controls diseases such as, but not limited to, Alternaria leaf spot, anthracnose, Septoria brown spot, and Cercospora leaf blight. Do not apply more than 30 fl oz/A per year.
Penthiopyrad (7) Vertisan, 20.6%	Spray or fungigation	10-30 fl oz/A	X	Begin applications prior to disease development. Vertisan controls several diseases. For white mold, make initial application at beginning of bloom and a second application at full bloom. Apply no more than 61 fl oz/A per year with no more than 2 sequential applications. PHI = 14 days.
Picoxystrobin (11) Aproach, 22.5%	Spray or fungigation	6-12 fl oz/A	X	Apply prior to disease development. Aproach is labeled for suppression of downy mildew. For white mold, make initial application at beginning bloom and a second application at full bloom. Apply no more than 36 fl oz/A season. PHI = 14 days.
Picoxystrobin (11) + Cyproconazole (3) Aproach Prima, 17.94%: 7.17%	Spray or fungigation	5-6.8 fl oz/A		Begin applications prior to disease development for several diseases. Use no more than 13.6 fl oz/A per season and no more than 2 sequential applications of a picoxystrobin containing product. PHI = 30 days.
Picoxystrobin (11) + Prothioconazole (3) Viatude, 17.05%; 5.68%	Spray or fungigation	10-16 fl oz/A		Begin applications prior to disease development for several diseases. Use no more than 48 fl oz/A per year. PHI = 36 days.
Potassium Phosphite (33) + Tebuconazole (3) Viathon, 49%:3.3%	Spray	2-3 pts/A		For control of soybean rust. Do not apply more than 0.225 lbs of tebuconazole/A/year. PHI = 21 days.
Propiconazole (3) Tilt 3.6 EC, or Propiconazole E-AG, 41.80% Bumper 41.8 EC and Topaz 41.8% Bumper ES, 40.85% Propicure 3.6F, 41.8%	Spray	4-6 fl oz/A		Propiconazole controls several diseases of soybeans, including soybean rust. Do not apply more than 12 fl oz/A. Apply up to R6.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Soybean
Foliar Sprays (Continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	White Mold Control[3]	Remarks
Prothioconazole (3) Proline 480 SC, 41%	Spray	3.0-5.0 fl oz/A	X	For optimum control of white mold, apply at late R1 (at petal drop), before canopy closure, and prior to disease development. A subsequent application may be used 7-14 days later. Also, for control of soybean rust and powdery mildew. Do not apply more than 12.9 fl oz/year. PHI = 21 days.
Prothioconazole (3) + Azoxystrobin (11) Cortina Xtra, 15.79%; 17.54%	Spray	8-11 fl oz/A	X (suppression)	
Prothioconazole (3) + Trifloxystrobin (11) Stratego YLD, 10.8%; 32.3% Protegam YLD, 10.8%; 32.3%	Spray or fungigation	4.0-4.65 fl oz/A	X	Apply at early flowering. Repeat applications as needed on a 10-21 day interval. Do not apply more than 13.95 fl oz/A/year. PHI = 21 days.
Prothioconazole (3) + Trifloxystrobin (11) Delaro, 16.0%; 13.7%	Spray or fungigation	8.0-11.0 fl oz/A	X	For optimum control of white mold, apply at late R1 (at petal drop), before canopy closure, and prior to disease development. Repeat applications preventatively and continue as needed on a 10-21 day interval. Use shorter intervals when conditions favor severe disease pressure. Do not apply more than 33 fl oz/A/year. PHI = 21 days.
Prothioconazole (3) + Trifloxystrobin (11) + Fluopyram (7) Delaro Complete, 14.9%:13.1%:10.9%	Spray or fungigation	8-11 fl oz/A	X	For optimum control of white mold, apply at late R1 (at petal drop), before canopy closure, and prior to disease development. Repeat applications preventatively and continue as needed on 10-21 day intervals. Use shorter intervals when conditions are favorable for severe disease pressure. Do not apply more than 33 fl oz/A/year. Do not apply within 21 days of harvest.
Pydiflumetofen (7) + Difenoconazole (3) Miravis Top, 6.9%; 11.5%	Spray	13.7 fl oz/A	X (suppression)	For white mold, the first application should be at R1 (early bloom) to R2 (full bloom). Maximum use rate is 27.5 fl oz/A/year. PHI = 14 days.
Pydiflumetofen (7) + Azoxystrobin (11) + Propiconazole (3) Miravis Neo, 7.0%; 9.3%; 11.6%	Spray	13.7-20.8 fl oz/A	X (suppression)	For white mold, use 20.8 oz/A and the first application should be at R1 (early bloom) to R2 (full bloom). Maximum use rate is 42 fl oz/A/year and do not apply after R6. PHI = 14 days.
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	Spray or fungigation	6-12 fl oz/A		Apply prior to onset of disease. PHI = 21 days. Controls pod and stem blight and several fungal leaf spot pathogens.

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Soybean
Foliar Sprays (Continued)

Chemical (Fungicide Group)	pplication[1]	Dosage[2]	White Mold Control[3]	Remarks
Tebuconazole 38.7% (3) Orius 3.6F Tebuzol 3.6F Monsoon Onset 3.6L	Spray	3-4 fl oz/A		For control of soybean rust and powdery mildew. Do not apply more than 12 fl oz/A per season. PHI = 21 days for all products.
Tetraconazole (3) Domark, 20.5% Andiamo 230, 20.5%	Spray	4.0-5.0 fl oz/A	X	Do not make more than 2 applications per year. Do not graze or feed forage or hay to livestock. Do not apply after soybean growth stage R5.
Tetraconazole (3) + Azoxystrobin (11) Brixen, 6.67%:13.76% Affiance, 7.48%; 9.35%	Spray or fungigation	13-16 fl oz/A 10-19 fl oz/A	X	Apply preventatively when disease infection is likely to occur. Make a second application if conditions are favorable for disease infection no later than R5. Also, for control of Alternaria, anthracnose, brown sot, Cercospora blight, frogeye leaf spot, pod and stem blight, powdery mildew, purple seed staing. Maximum of 28.7 fl oz/A/year. PHI = 14 days.
Thiophanate Methyl (1) Topsin M WSB 70WE	Spray or fungigation	0.75-1 lb/A	X	**For all Thiophanate Methyl (1):** Thiophanate-methyl also controls pod and stem blight but is not labeled for control of soybean rust. One application at early bloom (R1-R2) followed by a second application 7-14 days later if conditions favorable for continued disease pressure. PHI = 21 days. 5 gal/A minimum by air.
T-methyl WSB 70W, 70%	Spray or fungigation	0.75-1 lb/A	X	
Topsin M 70WP	Spray or fungigation	15-20 fl oz/A	X	
Topsin 4.5 FL, 45%	Spray or fungigation	10-20.0 fl oz/A	X	
Incognito 4.5F, 46.2% T-methyl 4.5F, 46.2%	Spray or fungigation	10-20.0 fl oz/A	X	
Cercobin, 41.3%	Spray or fungigation	10.9-21.8 oz/A	X	
Thiophanate Methyl 85 WDG, 85%	Spray or fungigation	0.6-0.8 lb/A white mold	X	
Incognito 85 WDG, 85%	Spray or fungigation	0.6-0.8 lb/A white mold	X	
Miramar, 41.3%	Spray or fungigation	10.9-21.8 fl oz/A 16.3-21.8 fl oz/A for white mold	X	Miramar is also for the management of anthracnose, brown spot, frogeye leaf spot, pod and stem blight, and purple seed stain. Also, for the suppression of aerial blight.

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[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Soybean
Foliar Sprays (Continued)

Chemical (Fungicide Group)	**pplication**[1]	**Dosage**[2]	**White Mold Control**[3]	**Remarks**
Thiophanate Methyl (1) + Propiconazole (3) Protocol, 23.7%:7.1%	Spray	2.0 pt/A	X	For management of white mold, soybean rust and other diseases. Do not apply more than 4 pt/A per season.
Thiophanate-methyl (1) + Tebuconazole (3) Froghorn, 37.5%; 7.5%	Spray	20 fl oz/A	X	For management of white mold, powdery mildew and other diseases. Do not apply more than 1.4 lbs thiophanate-methyl and 0.34 lbs tebuconazole per year. PHI = 21 days.
Lactofen (herbicide) Cobra, 24%	Spray	6-12.5 fl oz/A	X (suppression)	Labeled for suppression of white mold caused by *Sclerotinia sclerotiorum* and Sudden Death Syndrome caused by *Fusarium virguliforme*. Apply at or just before first bloom (R1). Lactofen effect on white mold is not fungicidal, but may involve Systemic Acquired Resistance by the soybean plant.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Sugar Beet
Seed Treatment

Chemical	Application	Dosage[1]	Disease Control[2]				Remarks
			Aphanomyces	Pythium	Phoma	Rhizoctonia	
Chloroneb (14) Chloroneb 65W, 65%	Liquid or slurry	6 fl oz/cwt		X		X	For control of *Pythium* and *Rhizoctonia*. For use as a supplement to another fungicide.
Ethaboxam (22) Intego Solo, 34.2%	Slurry	0.014-0.35 fl oz/unit of 100,000 seeds	X	X			For control of *Aphanomyces* and *Pythium*. Use 0.35 fl oz/unit to control Aphanomyces root rot.
Fludioxonil (12) Maxim 4 FS, 40.3%	Slurry	0.08-0.16 fl oz/cwt			X	X	For control of seed-borne and soil-borne fungi.
Spirato 480FS, 40.3%	Slurry	0.08-0.16 fl oz/cwt				X	Provides suppression of *R. solani*
Fluxapyroxad (7) Systiva, 28.7%	Commercial seed treatment use only.	0.52 fl oz/100,000 seeds				X	For use on *Rhizoctonia* in sugarbeets.
Hymexazol (32) Tachigaren, 70%	Pelleted seed	20-90 g/unit of 100,000 seed	X	X			For control of *Pythium* and *Aphanomyces*. Use of rates greater than 45 g may result in phytotoxicity. In fields with known heavy disease pressure, use of Tachigaren and a tolerant variety is suggested.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Sugar Beet
Seed Treatment (Continued)

Chemical	Application	Dosage[1]	Disease Control[2]				Remarks
			Aphanomyces	Pythium	Phoma	Rhizoctonia	
Inpyrfluxam (7) Zeltera, 34.05%	Slurry	0.0044 to 0.0088 fl zo/unit of 100,000 seeds				X	For control of *Rhizoctonia solani*.
Mefenoxam (4) Apron XL, 33.3%	Slurry or mist	0.32-0.64 fl oz/cwt		X			For control of *Pythium*. May be combined with other fungicides if products are known to be compatible. For use only with commercial seed treatment equipment.
Metalaxyl (4) Allegiance FL, 28.35%	Mist or slurry	0.75 fl oz/cwt		X			For control of *Pythium*. May be combined with other fungicides if products are known to be compatible.
Dyna-Shield, 28.35%	Slurry	0.75 fl oz/cwt		X			
Sebring 318FS, 30.14%	Slurry or mist	0.75 fl oz/cwt		X			
Belmont 2.7 FS, 28.98%	Slurry or mist	0.75 fl oz/cwt		X			
Sebring 480 FS, 44.08%		0.5 fl oz/cwt		X			
Metconazole (3) Metlock, 40%	Mist or slurry	0.008-0.016 fl oz/100,000 seed				X	Provides suppression of *R. solani*
Penthiopyrad (7) Kabina ST	Commerciall y applied	0.53-1.06 fl oz/unit of 100,000 seeds				X	For control of *Rhizoctonia solani*.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Sugar Beet
Seed Treatment (Continued)

Chemical	Application	Dosage[1]	Disease Control[2]				Remarks
			Aphanomyces	Pythium	Phoma	Rhizoctonia	
Pyraclostrobin (11) Stamina, 18.4%	Slurry or mist	1.7-2.5 fl oz/ 100,000 seeds				X	Provides protection from seedling diseases caused by *Rhizoctonia solani* and *Fusarium* spp.
Sedaxane (7) Vibrance, 43.7%	Slurry	0.07-0.13 fl oz/100,000 seeds				X	For use on seed decay, seedling blight and damping-off caused by *Rhizoctonia*.
Thiram (M3) 42-S Thiram, 42% Signet 480 FS, 42% Thiram 480 DP, 42%	Liquid or slurry	8 fl oz/cwt		X		X	
Tolclofos-methyl (14) Rizolex, 42%	Slurry or mist	1.5 fl oz/cwt				X	For seed-borne and soil-borne diseases. Controls *Rhizoctonia solani*.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Sugar Beet
Soil Application

Chemical (Fungicide Group)	Application	Dosage[1]	Control[2] of Pythium	Control[2] of Rhizoctonia	Remarks
***Bacillus subtilis* strain QST 713 (44)** Serenade ASO, 1.34%	In-furrow at planting	2-6 fl qt/A	X	X	Apply as directed spray in the seed furrow and to the covering soil at planting for management of *Rhizoctonia*.
Minuet, 9.89%	In-furrow at planting	6-12 fl oz/A	X	X	Apply Minuet (biological) as a directed spray in the seed furrow and to the covering soil for management of *Rhizoctonia solani*.
Azoxystrobin (11) Quadris, 22.9% Satori, 22.9% Equation, 22.9% Tetraban, 22.9% Aframe, 22.9% Azoxystrobin SC, 22.9% AZteroid FC 3.3, 34.3%	Band 7" or less	0.4-0.7 fl oz/1,000 ft. of row (9.5-15.4 fl oz/A as a band, not broadcast, with 22" row) 0.24-0.48 fl oz/1,000 ft of row for AZteroid FC	X	X	Apply Quadris in a band (7" or less) over cotyledonary 4- to 8-leaf sugarbeets before average daily temperatures at 4" soil depth reaches 65°F, using 5-15 gpa. Rate is already determined as a BAND spray, not broadcast. AZteroid FC 3.3 may be tank mixed with starter fertilizer, but may increase phytotoxicity.
Azoxystrobin (11) + Benzovindiflupyr (7) Elatus, 30%; 15%	In-furrow spray	0.3-0.6 fl oz/1000 linear row feet	X	X	Apply in-furrow at planting or at 2-8 leaf stage. Do not use a starter fertilizer with Elatus fungicide at planting. Do not apply more than 14.6 fl oz/A per year.
Azoxystrobin (11) + Mefenoxam (4) Uniform, 28.2%; 10.9%	In-furrow spray	0.34 fl oz/1000 ft. row	X	X	Apply as a spray at a minimum of 5 gal of water or liquid fertilizer per acre.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Sugar Beet
Soil Application (Continued)

Chemical (Fungicide Group)	Application	Dosage[1]	Control[2] of Pythium	Control[2] of Rhizoctonia	Remarks
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	In-furrow	0.5-0.9 fl oz/1000 ft. row	X	X	Apply in-furrow as a spray or a dribble or as a 3-7 inch banded spray at the 2-8 leaf stage. AZternot may be tank mixed with starter fertilizer.
Mefenoxam (4) Ridomil Gold EC, 48%	7"" band preplant incorporated	0.21-0.43 fl oz/1,000 ft. of row	X		See label for planting restrictions within 12 months of application.
Ridomil Gold GR, 2.5%	7" band preplant incorporated	4.3-8.6 oz/1,000 ft. of row	X		
Ultra Flourish, 25.1%	7" band preplant incorporated	0.43-0.86 fl oz/1,000 ft. of row	X		
Metalaxyl (4) Xyler FC, 31.3%	7" band or pre-plant incorporated	45.7-94.4 fl oz/A	X		
Penthiopyrad (7) Vertisan, 20.6%	In-furrow spray	0.7-1.6 fl oz/1,000 ft of row		X	Maximum rate per acre per application is 30 fl oz.
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	In-furrow spray	0.4 -0.8 fl oz/1,000 ft. of row		X	For suppression of *Rhizoctonia*. For 22" row, use maximum of 0.5 fl oz/1,000 ft. of row. For 30" row, use maximum of 0.7[2] fl[2] oz/1,000 ft. of row.
Pyraclostrobin (11) + Fluxapyroxad (7) Priaxor, 28.58%; 14.33% Everlon, 28.58%; 14.33%	Band 7" or less	0.2-0.4 fl oz/1,000 ft. row	X	X	Apply 6.7 fl oz/A in 22" row spacing. Maximum of 1 soil directed application per season.
Trifloxystrobin (11) Flint Extra, 42.6%	In-furrow spray	3.0-3.6 oz/A in band		X	For suppression of *Rhizoctonia*.

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Sugar Beet Nematicide
Seed Treatment

Chemical	Application	Dosage[1]	Control	Remarks
***Pasteuria nishizawae* – Pn1** Clariva pn, 15.0%	Slurry	0.034-1.35 fl oz per 100,000 seeds	Sugar beet cyst nematode	

[1]Dosage = amount of formulated product to apply.

Sugar Beet
Foliar Sprays

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]		Remarks[5]
			Cercospora Leaf Spot[4]	Powdery Mildew	
***Bacillus pumilus* strain 2808 (44)** Sonata, 1.38%	Spray or fungigation	2-4 qt/A	X	X	Begin applications when environmental conditions and plant stage are conducive to disease development.
***Bacillus subtilis* strain IAB/BS03 (44)** AVIV, 0.08%	Spray or fungigation	10-30 fl oz/A			
***Coniothyrium minitans* strain CON/M/91-08** Contans WG, 5%	Spray or chemigation	1-4 lbs/A			To reduce/control *Sclerotinia sclerotiorum* and *Sclerotinia minor* in the soil.
Hydrogen Peroxide + Peroxyacetic Acid OxiDate 5.0, 27%; 5%	Spray	50-128 fl oz/100 gallons			Label suggests management of several fungal and bacterial diseases.
Hydrogen Peroxide + Peroxyacetic Acid SaniDate 12.0, 18.5%, 12%	Chemigation	Dilution rate is 1:1000 to 40,000			Label suggests management of several fungal and bacterial diseases.
Phosphorus Acid + Hydrogen Peroxide OxiPhos, 27.1%; 14.0%	Spray	2.5-5.0 qts/A			Label suggests management of several fungal and bacterial diseases.

[1]Spray = ground or aerial; Fungigation = application through sprinkler irrigation system.
[2]Dosage = amount of formulated product to apply.
[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Begin when disease is first observed in field. Higher rates are used when disease is severe on susceptible varieties. Use 5-10 gal water with airplane or 20-40 gal water and at least 100 psi with ground equipment. Repeat tin or copper at 10-14 days. Repeat maneb or mancozeb at 7- 10 days. Pathogen has developed reduced sensitivity or resistance to FRAC 1, 2, 11, and 30.
[5]See fungicide resistance management statement on Pages 6-7.

Sugar Beet
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]		Remarks
			Cercospora Leaf Spot[4]	Powdery Mildew	
Azoxystrobin (11) Quadris, 22.9% Satori, 22.9% Tetraban, 22.9% Aframe, 22.9% AZteroid FC 3.3, 34.3% Azoxystrobin SC, 22.9%	Spray or fungigation	6.2-15.4 fl oz/A 3.9-12.8 fl oz/A for AZteroid FC	X	X	123 fl oz Quadris/acre/season maximum. May be applied the day of harvest. REI = 4 hours. Band application at 4-leaf stage for management of Rhizoctonia stem and crown canker.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	Spray or fungigation	7.4-18.4 fl oz/A	X	X	Begin applications prior to disease onset and continue on a 7-14 day interval. Do not apply more than 147.1 fl oz/A per year. PHI = 0 days
Azoxystrobin (11) + Tetraconazole (3) Brixen, 13.76%; 6.67%	Spray	19-21 fl oz/A	X	X	Apply when conditions are favorable for Cercospora leaf spot. Do not apply more than 21 fl oz/A/year. Do not make more than one application of this product per year. PHI = 14 days.
Copper (M1)					
Badge SC, 32.17%	Spray or fungigation	1-4 pt/A	X		Does not provide adequate control of *Cercospora* leafspot.
Badge X2	Spray or fungigation	1-4 pts/A	X		
Basicop WP, 53%	Spray	4 lb/A	X		
Champ DP, 57.6%	Spray or fungigation	1.33-3.33 lb/A	X		
Champ WG, 77%	Spray or fungigation	2-5 lb/A	X		
Champ Formula 2 Flowable, 35.5%	Spray or fungigation	1.33-3.33 pt/A	X		
ChampION++ 46.1%	Spray or fungigation	0.75-2.0 lb/A	X		
Cuprofix Ultra 40 Disperss, 71.1%	Spray or fungigation	1.25-3.0 lb/A	X		
Kocide 2000, 53.8%	Spray or fungigation	1.5-3.75 lb/A	X		
Kocide 3000, 46.1%	Spray or fungigation	0.75-2.0 lb	X		
Kocide 4.5 LF, 37.5%	Spray or fungigation	1.33-2.66 pt/A	X		
KOP-5, 20%	Spray or fungigation	0.5-1.5 pt/A	X		
MasterCop, 21.46%	Spray	0.75-2.0 lbs/A	X		
Spinnaker, 46.1%					

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[4]Begin when disease is first observed in field. Higher rates are used when disease is severe on susceptible varieties. Use 5-10 gal water with airplane or 20-40 gal water and at least 100 psi with ground equipment. Repeat tin or copper at 10-14 days. Repeat maneb or mancozeb at 7- 10 days. Pathogen has developed reduced sensitivity or resistance to FRAC 1, 2, 11, and 30.

Sugar Beet
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]		Remarks
			Cercospora Leaf Spot[4]	Powdery Mildew	
Difenoconazole (3) + Propiconazole (3) 22.8%:22.8% Inspire XT, 23.2%	Spray or fungigation	7 fl oz/A	X	X	Do not apply within 21 days of harvest. Do not apply more than 3 applications per year or 21 fl oz/A/season. Do not apply more than 0.34 lb/ai /A of propiconazole products, and no more than 0.46 lb/ai /A of difenoconazole products per season. REI = 12 hours.
Fenbuconazole (3) Enable 2F, 23.5%	Spray	8 fl oz/A	X	X	Preharvest interval of 14 days. REI = 12 hours.
Flutriafol (3) Topguard, 11.8%	Spray	10-14 fl oz/A	X	X	Do not exceed 28 fl oz or 2 applications per season. PHI = 21 days. REI = 12 hours.
Fluopyram (7) + Prothioconazole (3) ProPulse, 17.4%:17.4%	Spray or fungigation	13.6 fl oz/A	X	X	For optimum disease control, apply at first symptom of disease. Do not apply more than 34.2 fl oz/A per year. Do not apply ProPulse within 7 days of harvest. REI = 12 hours.
Fluxapyroxad (7) + Pyraclostrobin (11) Priaxor, 14.33%:28.58% Everlon, 28.58%; 14.33%	Spray or fungigation	6 to 8 fl oz/A	X	X	For control of *Rhizoctonia* stem canker and crown rot, use 8 fl oz. Do not exceed 3 applications or 24 fl oz/A per season. PHI = 7 days. REI = 12 hours.
Inpyrfluxm (7) Excalia, 31.25%	Spray	2 fl oz/A			For Rhizoctonia foliar blight, crown and root rot. Apply at the 2-8 leaf stage in 10 GPA. Do not make more than 2 broadcast applications per year. Do not apply more than 4 fl oz/A/year. PHI = 50 days. Refer to label for banded application restrictions.

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[4]Begin when disease is first observed in field. Higher rates are used when disease is severe on susceptible varieties. Use 5-10 gal water with airplane or 20-40 gal water and at least 100 psi with ground equipment. Repeat tin or copper at 10-14 days. Repeat maneb or mancozeb at 7- 10 days. Pathogen has developed reduced sensitivity or resistance to FRAC 1, 2, 11, and 30.
See **current "Sugar Beet Production Guide"** for management strategies.

Sugar Beet
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]		Remarks
			Leaf Spot[4]	Powdery Mildew	
Mancozeb (M3) Dithane DF Rainshield NT, 75%	Spray or fungigation	1.5-2 lb/A	X		Do not apply mancozeb within 14 days of harvest. Do not exceed 11.2 lb ai/A per season of total EBDC (mancozeb and/or maneb), i.e., do not exceed 14 lb/A of formulated WP or DF or 11.2 qt/A of formulated flowable product per season.
Dithane F-45, 37%	Spray or fungigation	1.2-1.6 qt/A	X		
Dithane M-45, 80%	Spray or fungigation	1.5-2 lb/A	X		
Koverall, 75%	Spray or fungigation	1.5-2 lb/A	X		Do not feed treated sugarbeets to livestock.
Manex II, 37%	Spray or fungigation	1.2-1.6 qt/A	X		
Manzate Max,37%	Spray or fungigation	1.2-1.6 qts/A	X		
Manzate Pro-Stick, 75%	Spray or fungigation	1.5-2 lb/A	X		
Penncozeb, 80%	Spray or fungigation	1.5-2 lb/A	X		
Penncozeb DF, 75%	Spray or fungigation	1.5-2 lb/A	X		
Roper DF Rainshield, 75%	Spray or fungigation	1-2 lb/A	X		
Mancozeb (M3) + Copper (M1) ManKocide, 15%: 46.1%	Spray or fungigation	2.5-6.5 lbs/A	X		Do not exceed 36.8 lbs product/acre/season. Do not apply within 14 days of harvest.
Mancozeb (M3) + Azoxystrobin (11) Dexter Max, 70%; 5%	Spray or fungigation	1.6-2.1 lbs/A	X	X	Do not apply more than 15 lbs of product/A/year. Begin applications before disease development. PHI = 14 days.
Mefentrifluconazole (3) Provysol, 34.93%	Spray	4.0 fl oz/A	X		Controls Cercospora leaf spot. Do not make more than one application before alternating with a non-FRAC 3 fungicide. Apply in a tank mix with a non-FRAC 3 fungicide. Apply at 7-14 day intervals. Do not apply more than 10 fl oz/A per year.
Mefentrifluconazole (3) + Pyraclostrobin (11) Veltyma, 17.56%; 17.56%	Spray or fungigation	8 oz/A	X		Controls Cercospora leaf spot. Apply at 7-14 day intervals. Do not apply more than 20 fl oz/A per year. PHI = 7 days.

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[4]Begin when disease is first observed in field. Higher rates are used when disease is severe on susceptible varieties. Use 5-10 gal water with airplane or 20-40 gal water and at least 100 psi with ground equipment. Repeat tin or copper at 10-14 days. Repeat maneb or mancozeb at 7- 10 days. Pathogen has developed reduced sensitivity or resistance to FRAC 1, 2, 11, and 30.
See **current "Sugar Beet Production Guide"** for management strategies.
***Designates restricted-use pesticide.**

Sugar Beet
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]		Remarks
			Leaf Spot[4]	Powdery Mildew	
Penthiopyrad (7) Vertisan, 20.6%	Spray or fungigation	14-30 fl oz/A	X	X	Maximum of 61 fl oz/acre per season. PHI = 7 days. REI = 12 hours.
Picoxystrobin (11) Aproach SC, 22.5%	Spray or fungigation	6-19 fl oz/A	X	X	Begin applications prior to row closure and prior to disease development and make a second application on a 5-14 day interval.
Propiconazole (3) Tilt 3.6 EC, 41.8% or Propiconazole E-AG, 41.8%, Bumper 41.8 EC, 41.8% Topaz, 41.8% Bumper ES, 40.85%, Propicure 3.6F, 41.8%	Spray or fungigation	4 fl oz/A	X	X	Begin application at first sign of disease. Do not exceed 12 fl oz/year. PHI = 21 days. REI = 12 hours.
Prothioconazole (3) Proline 480 SC, 41.0%	Spray	5.7 fl oz/A	X	X	Proline at 5.7 fl oz/A in a 7" or less band at the 4-leaf stage also manages *Rhizoctonia* stem and crown canker. Do not apply more than 17.1 fl oz of Proline per year. Do not apply within 7 days of harvest. REI = 12 hours.
Prothioconazole (3) + Trifloxystrobin (11) Delaro, 16.0%; 13.7%	Spray or fungigation	11.0 fl oz/A	X	X	For optimum control apply at the first symptom of disease. Repeat applications on a 14 day interval. Tank mix Delaro at 11 fl oz/A with Proline at 1.7 fl oz/A for best management of leaf spot. Do not apply more than 33 fl oz/A/year. PHI = 21 days.

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[4]Begin when disease is first observed in field. Higher rates are used when disease is severe on susceptible varieties. Use 5-10 gal water with airplane or 20-40 gal water and at least 100 psi with ground equipment. Repeat tin or copper at 10-14 days. Repeat maneb or mancozeb at 7- 10 days. Pathogen has developed reduced sensitivity or resistance to FRAC 1, 2, 11, and 30.
See **current** "**Sugar Beet Production Guide**" for management strategies.

Sugar Beet
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]		Remarks
			Leaf Spot[4]	Powdery Mildew	
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	Spray or fungigation	9-12 fl oz/A	X	X	48 fl oz Headline/acre/season maximum. PHI = 7 days. REI = 12 hours.
Sulfur (M) Super Six, 52%	Spray or fungigation	8 pt/A		X	Apply sulfur fungicide if mildew appears prior to mid-September. One application gives protection for 4 weeks. Degree of control depends on amount of sulfur used (if less than 5 lb ai is used, only partial control may result).
Microthiol Disperss, 80%	Spray or fungigation	5-10 lb/A		X	
Micro Sulf, 80% Sulfur 90W, 90%	Spray or fungigation	5-10 lb/A 3-15 lb/A		X	
Tea Tree Oil (46) + Difenoconazole (3) Regev, 40.6%:20.3%	Foliar	4-8.5 fl oz/A	X	X	Make applications in the early stages of plant growth when conditions favor diseae. Use higher rates under increased disease pressure.
Tetraconazole (3) Minerva, 11.6% Eminent VP, 11.6%	Spray or fungigation	13 fl oz/A	X	X	Preharvest interval of 14 days. Do not apply more than 13 fl oz/A per season. REI = 12 hours.
Domark 230ME, 20.5%	Spray or fungigation	6.9 fl oz/A			Minerva is also for the control Ramularia.
Andiamo, 20.5%		6.9 fl oz/A			
Tetraconazole (3) + Azoxystrobin 11) Brixen, 6.67%:13.76% Affiance, 7.48%; 9.35%	Spray	19-21 fl oz/A 19 fl oz/A	X	X	Apply when conditions are favorable for Cercospora leaf spot, Ramularia, or Powdery Mildew. PHI = 14 days.
Tetraconazole (3) + Triphenyltin Hydroxide – TPTH (30) Minerva DUO, 7.66%; 21.08%	Spray	16 fl oz/A	X	X	RESTRICTED-USE PESTICIDE. Do not make more than one application per growing season. Apply when conditions are favorable for disease development. Also, for control of Ramularia. Apply no more 0.75 lbs/A of TPTH per season. PHI = 14 days.

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[4]Begin when disease is first observed in field. Higher rates are used when disease is severe on susceptible varieties. Use 5-10 gal water with airplane or 20-40 gal water and at least 100 psi with ground equipment. Repeat tin or copper at 10-14 days. Repeat maneb or mancozeb at 7-10 days. Pathogen has developed reduced sensitivity or resistance to FRAC 1, 2, 11, and 30.
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Sugar Beet
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Disease Control[3]		Remarks
			Leaf Spot[4]	Powdery Mildew	
Thiophanate Methyl (1) Incognito 4.5F, 42.6% Incognito 85 WDG, 85.0% MIRAMAR, 41.3%	Spray	10-20 fl oz/A 0.4-0.8 lb/A 10.9-21.8 fl oz/A	X	X	Begin applications when disease first appears and repeat at 14 to 21 day intervals.
Thiophanate Methyl (1) + Propiconazole (3) Protocol, 23.7%:7.1%	Spray or fungigation	1.25-1.33 pt/A	X[6]	X[6]	For management of leaf spot and powdery mildew. Do not make more than 1 application for *Cercospora* leaf spot. PHI = 21 days. REI = 1 day.
Trifloxystrobin (11) Flint Extra, 42.6%	Spray only	3.0-3.6oz/A	X	X	10.0 oz Flint Extra/Acre/season maximum. PHI = 21 days. REI = 12 hours.
Triphenyltin Hydroxide (TPTH) RUP* (30) Super Tin 80WP AgPak, 80% or Agri Tin, 80% Super Tin 4L or Agri Tin 4L, 40%	Spray Spray	2.5-5.0 oz/A 4.0-8.0 fl oz/A	X X		**RESTRICTED-USE PESTICIDE.** Do not exceed 15 oz/A of Super Tin 80WP per season. Do not feed treated tops to livestock. Do not enter treated areas within 48 hours of treatment without protective clothing specified on label. Ground application must be with closed cabs. A Sec 24 (c) state label allows treatment up to 7 days before harvest. Do not exceed 24 fl oz/A/season for Super Tin 4L.

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[3]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[4]Begin when disease is first observed in field. Higher rates are used when disease is severe on susceptible varieties. Use 5-10 gal water with airplane or 20-40 gal water and at least 100 psi with ground equipment. Repeat tin or copper at 10-14 days. Repeat maneb or mancozeb at 7- 10 days. Pathogen has developed reduced sensitivity or resistance to FRAC 1, 2, 11, and 30.
See **current "Sugar Beet Production Guide"** for management strategies.

Sunflower
Seed Treatment

Chemical	Application	Dosage[1]	Disease Control[2]		Remarks
			Seedling Blights[3]	Downy Mildew[4]	
Azoxystrobin (11) Dynasty, 9.6%	Slurry	3.75-15 fl oz/cwt		X	Provides suppression against downy mildew.
Saxony 100 FS, 9.67%	Slurry	3.75-37.5 fl oz/cwt		X	For seedling damping-off caused by *Rhizoctonia solani* and suppression of downy mildew
Acibenzolar-S-Methyl (21) Bion 500 FS, 42.0% Ressivi 375FS, 32.6%	Slurry	0.012-0.029 mg ai/seed 0.0031-0.0062 mg ai/seed		X	Seed weight based on 4,500 seeds/lb. For suppression of downy mildew.
Captan (M4) Captan 400, 37.4%	Slurry	2-4 fl oz/cwt	X		
Ethaboxam (22) Intego Solo, 34.2%	Slurry	0.075-0.1 mg ai/seed	X	X	For suppression of downy mildew and *Pythium*.
Fludioxonil (12) Maxim 4FS, 40.3%	Slurry	0.08-0.16 fl oz/cwt	X		For seed-borne and soil-borne fungi.
Spirato 480 FS, 40.3%	Slurry	0.08-0.16 fl oz/cwt	X		
Dyna-Shield Fludioxonil, 40.3 %	Slurry	0.08-0.16 fl oz/cwt	X		
Fludioxonil (12) + Mefenoxam (4) Maxim XL, 21%: 8.4%	Slurry	0.167-0.334 fl oz/cwt	X		
Mefenoxam (4) Apron XL, 33.3%	Slurry	1.28 fl oz/cwt			
Precinct, 45.3%	Mist or slurry	0.94 fl oz/cwt			
Metalaxyl (4) Allegiance FL, 28.35% Sebring 318 FS, 28.35%	Mist or slurry	1.5-3.0 fl oz/cwt			In North Dakota, the pathogen causing downy mildew has been resistant to metalaxyl for over a decade. The resistance is thought to be widespread and stable.
Dyna-Shield, 28.35%	Slurry	1.5-3 fl oz/cwt			
Belmont 2.7 FS, 28.98%	Slurry or mist	1.5-3.0 fl oz/cwt			
Sebring 480 FS, 44.08%	Slurry or mist	1-2 fl oz/cwt			

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]An increase in stand has been noted only once in moderately severe tests to date, under very severe conditions, some increase in stand might be expected.
[4]Pathogen has developed resistance to FRAC 4.

Sunflower
Seed Treatment (Continued)

Chemical	Application	Dosage[1]	Disease Control[2]		Remarks
			Seedling Blights[3]	Downy Mildew[4]	
Oxathiapiprolin (49) Plenaris 200FS, 18.7% Lumisena, 18.7%	Slurry	1.03-2.06 fl oz/cwt		X	Use higher rate in areas with a history of high disease pressure.
Pyraclostrobin (11) Stamina, 18.4%	Slurry or mist	0.8-2.3 fl oz/cwt	X		For seed-borne and soil-borne fungi: *Rhizoctonia solani*, *Fusarium* spp., and *Pythium* spp.
Thiram (M3) 42-S Thiram, 42% Signet 480 FS, 42%	Liquid or slurry	2 fl oz/bu	X		

[1]Dosage = amount of formulated product to apply.
[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.
[3]An increase in stand has been noted only once in moderately severe tests to date; under very severe conditions, some increase in stand might be expected.
[4]Pathogen has developed resistance to FRAC 4.

Sunflower
Soil Application

Organism	Application	Dosage[1]	*Sclerotinia sclerotiorum* (White Mold) Control[2]	Remarks
Coniothyrium minitans Contans WG, 5.3%	Soil incorporation	1-2 lb/A depending on crop	X	Fungus attacks sclerotia of the fungus.
Fluxapyroxad (7) + Pyraclostrobin (11) Priaxor, 14.33%; 28.58% Everlon, 28.58%; 14.33%	In-furrow	4-8 fl oz/A		Controls Rhizoctonia, Pythium and Fusarium. Maximum use rate per year is 16 fl oz/A.

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[2]X = product labeled for crop and disease; Blank = product not labeled for specific disease.

Sunflower
Foliar Sprays

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Rust Control[3]	Remarks
***Bacillus subtilis* strain IAB/BS03 (44)** AVIV, 0.08%	Spray or fungigation	10-30 fl oz/A		
Azoxystrobin (11) Quadris, 22.9% Satori, 22.9% Equation, 22.9% Tetraban, 22.9% Aframe, 22.9% AZteroid FC 3.3, 34.3% Azoxystrobin SC, 22.9% Arius 250, 22.93%	Spray or fungigation	6-15.5 fl oz/A 3.9-9.7 fl oz/A for AZteroid FC	X	Apply prior to disease development. Also labeled for control of *Alternaria* leaf spot. Do not apply more than 0.45 lb azoxystrobin/A/year. PHI = 30 days.
Azoxystrobin (11) + *Reynoutria sachalinesis* extract (P5) AZterknot, 18.4%; 10.2%	Spray or fungigation	7.4-18.4 fl oz/A	X	Also controls Alternaria leaf spot. Do not apply more than 33.1 fl oz/A per year. PHI = 30 days.
Boscalid (7) Endura, 70%	Spray or fungigation	8-11 oz/A		For suppression of *Sclerotinia* head rot.
Fluopyram (7) + Tebuconazole (3) Luna Experience, 17.6%; 17.6%	Spray of fungigation	9.0-12.8 fl oz/A	X	For suppression of *Sclerotinia* head rot. For optimum disease control, apply prior to disease development. Do not apply more than 34 fl oz/A per year. Do not apply within 50 days of harvest.
Fluxapyroxad (7) + Pyraclostrobin (11) Priaxor, 14.33%:28.58% Everlon, 28.58%; 14.33%	Spray or fungigation	4-8 fl oz	X	For control of several fungal diseases including Alternaria, Septoria, rust and powdery mildew. For suppression of Sclerotinia head rot.
Metconazole (3) Quash, 50%	Spray	2.5-4.0 fl oz/A	X	For suppression of *Sclerotinia* head rot. Apply when conditions favor disease development and prior to infection. A second application may be made on a 7-10 day interval. Do not make more than 2 applications per year Do not apply more than 8 oz of product/A/year. PHI = 21 days.
Mefentrifluconazole (3) + Pyraclostrobin (11) Veltyma, 17.56%; 17.56%	Spray or fungigation	7-10 fl oz/A	X	Controls rust and other foliar diseases of sunflower. Apply prior to disease development. Maximum ruse rate per season is 20 fl oz/A. PHI = 21 days.
Mefentrifluconazole (3) + Pyraclostrobin (11) + Fluxapyroxad (7) Revytek, 11.61%; 15.49%; 7.74%	Spray or fungigation	8-15 fl oz/A	X	Controls rust and other foliar diseases of sunflower. Apply prior to disease development. Maximum ruse rate per season is 30 fl oz/A. PHI = 21 days.
Penthiopyrad (7) Vertisan, 20.6%	Spray or fungigation	10-30 fl oz/A	X	For suppression of *Sclerotinia* head rot. Apply prior to disease development. Do not apply more than 61 fl oz/A per season. PHI = 14 days.

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Sunflower
Foliar Sprays (continued)

Chemical (Fungicide Group)	Application[1]	Dosage[2]	Rust Control[3]	Remarks
Picoxystrobin (11) Aproach SC, 22.5%	Spray or fungigation	6-12 fl oz/A	X	Begin application at early vegetative growth stage through flowering and seed production prior to disease development and make a second application on a 5-14 day interval. Do not make more than two consecutive applications. Do not apply more than 12 fl oz/A per application. Do not exceed 36 fl oz/A per year. PHI = 7 days.
Potassium Phosphite (33) + Tebuconazole (3) Viathon, 49%; 3.3%	Spray	2-3 pts/A	X	Apply at the earliest sign of infection, or when weather conditions favor rust development. Apply the higher rate on susceptible varieties and/or during severe disease conditions.
Pyraclostrobin (11) Headline EC, 23.6% Headline SC, 23.3%	Spray or fungigation	6-12 fl oz/A	X	Apply prior to disease development. Also labeled for control of *Alternaria* leaf spot, powdery mildew, *Septoria* leaf spot and white rust. Maximum of 2 applications per season. PHI = 21 days.
Tebuconazole (3) 38.7% Orius 3.6F Tebuzol 3.6F Monsoon Onset 3.6L	Spray	4-6 fl oz/A	X	For maximum disease control, labels recommend using lowest rate of nonionic surfactant. Apply at earliest sign of infection. Do not apply more than 16 fl oz per season or within 50 days of harvest. See labels for further information or spray scheduling.

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[2]Dosage = amount of formulated product to apply.
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DISTRIBUTOR LIST

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Apron seed treatment products	Syngenta Crop Protection LLC.
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Avicta Systems	Syngenta Crop Protection LLC
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Badge SC, Badge X2	Gowan USA LLC
Basicop	Nufarm
Big 6 Grain Protector	Seed MateBlue Viking Star Glow
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Champ products	Nufarm
Chloroneb 65W	Wilbur Ellis
Chlorothalonil 720	UPL
Clariva pn	Syngenta Crop Protection LLC.
Clariva Elite	Syngenta Crop Protection LLC
Contans WG	Prophyta (Advan), Sipcam Agro
CruiserMaxx Products	Syngenta Crop Protection LLC.
Cuprofix Ultra 40 Disperss	UPL.
Curzate 60 DF	Corteva
Custodia	ADAMA
Cymbol Advance	Sipcam Agro
Delaro, Delaro Complete	Bayer
Dithane products	Corteva
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Dyna-Shield Foothold, Foothold Extra	Loveland Products
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Endura	BASF
Equation	Cheminova
Equity	Loveland Products
Equus	ADAMA
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Everlon	Winfield United
Evito	UPL
Fitness	Loveland Products
Flint Extra	Bayer
Fontelis	Corteva
Forum	BASF
Gavel	Gowan USA LLC
Grain Guard	Trace
Grain Guard plus	Trace
Granol N-M	Wilbur Ellis
Granol plus	Wilbur Ellis

Product	Company
Headline EC & SC, Headline AMP	BASF
HiMoly-Captan D	Trace
Ile=EVO	BASF
Incognito	ADAMA
Inspire XT	Syngenta Crop Protection LLC.
Intego	Valent
Intego SUITE products	Valent
Kenja	ISK Biosciences
Kernal Guard	Trace
Kocide Products	Corteva
Koverall	Cheminova
Kumulus Sulfur	Micro Flo Co.
Liquid sulfur six	Helena Chemical Co.
Lumialza	Corteva
Lumiante	Corteva
Lumiflex	Corteva
Lumiscend Pro	Corteva
Lumisena	Corteva
Lumitreo	Corteva
Luna Experience	Bayer
Luna Tranquility	Bayer
Luna PRO	Bayer
ManKocide	Certis
Manzate Max	UPL
Manzate Pro-Stick	UPL
MasterCop	ADAMA
Maxim Products	Syngenta Crop Protection LLC
Mertect 340-F, Mertect DG	Merck
Meteor	UPL
Metlock	Valent
Microthiol Disperss	UPL.
Micro Sulf	Nufarm
Minerva	Sipcam Agro
Minerva Duo	Sipcam Agro
Minuet	Bayer
Miramar	Sipcam Agro
Moncoat MZ	Nichino
Moncut	Nichino
Monsoon	Loveland Products
Muscle Advance	Sipcam Agro
Nevado 4F	ADAMA
Nexicor	BASF
Nipsit products	Valent
NuFlow M	Wilbur Ellis
Nu-Grow Captan Carboxin	Wilbur Ellis
Nusan 30	Wilbur Ellis
Obvius	BASF
Obvius Plus	BASF
Omega	Syngenta/ISK BioSciences
Onset	Winfield Solutions, LLC
Orius	ADAMA
Orondis Gold	Syngenta Crop Protection LLC.
OxiDate 5.0	BioSafe Systems
OxiPhos	BioSafe Systems
PCNB Seed coat	Wilbur Ellis
Penncozeb products	UPL
Plenaris	Syngenta Crop Protection LLC
Phostrol	Nufarm
Polyram 80DG	Loveland Products
Polyversum	Biopreparaty Co.
Poncho Votivo	BASF
Poncho Votivo Plus	BASF
Potato Seed piece fung. Dust	Wilbur Ellis
Praiz	Winfield Solutions, LLC
Prevail	Trace
Previcur	Bayer
Priaxor	BASF
Proline	Bayer
Propiconazole E-AG	Nufarm

Product	Company
Propicure 3.6F	Winfield Solutions, LLC
Propimax EC	Corteva
ProPulse	Bayer
Prosaro	Bayer
Prosaro PRO	Bayer
Prosper EverGol	Bayer
Protector-L	Trace
Protegam YLD	Winfield United
Protocol	Loveland Products
PST 6% Plus Bark	Simplot
Quadris TOP MP	Syngenta Crop Protection LLC.
Quadris, Quadris Opti	Syngenta Crop Protection LLC.
Quash	Valent
Quilt, Quilt Xcel	Syngenta Crop Protection LLC.
Rancona products	UPL
Raxil PRO MD	Bayer
Raxil PRO Shield	Bayer
Ranman	Summit Agro USA/ISK BioSciences
Regev	Summit Agro USA
Relenya	BASF
Revus, Revus Top	Syngenta Crop Protection LLC.
RustEase	Winfield Solutions, LLC
Ridomil formulations	Syngenta Crop Protection LLC.
Rizolex	Valent
Roper DF Rainshield	Loveland Products
Salient 372 FS	Nufarm
SaniDate	BioSafe Systems
Sativa	Nufarm
Satori	Loveland Products
Saxony 100 FS	Nufarm
Scala	Bayer
Sebring, Sebring 480	Nufarm
Serenade ASO	Bayer
Signet	Nufarm
Sonata	Wilbur Ellis
Sorghum Guard	Trace
Sphaerex	BASF
Spinnaker	Sipcam Agro
Spirato 480 FS	Nufarm
Stamina	BASF
Stamina F4	BASF
Storox 2.0	BioSafe Systems
Switch 62.5WG	Syngenta Crop Protection LLC.

Product	Company
Stratego YLD	Bayer
Sulfur 6, Sulfur DF	Wilbur Ellis
Super Six	Simplot
SuperTin 80WP, 4L	UPL
Systiva	BASF
Tachigaren 70WP	Sumitomo
Tanos	Corteva
T-Methyl	Micro Flo Co.
TebuStar	Albaugh
Tebuzol	UPL
Teraxxa F4	BASF
Terraclor	UPL
Tetraban	Winfield Solutions, LL
Thiophanate Methyl 85 WDG	Mana Inc
Tilt	Syngenta Crop Protection LLC.
Timorex Act	Summit Agro USA
T-Methyl 4.5F	Nufarm
Topaz	Winfield Solutions, LLC
TopGuard	Cheminova
Topsin products	UPL
Triangle Brand Copper Sulfate	Phelps Dodge
Trilex 2000	Bayer
Trinox	Carlson Co.
Trivapro	Syngenta Crop Protection LLC.
Ultra Flourish	Nufarm
Uniform	Syngenta Crop Protection LLC.
Vayantis	Syngenta Crop Protection LLC.
Velum Prime	Bayer
Velum Rise	Bayer
Viatude	Corteva
Vibrance	Syngenta Crop Protection LLC
Vibrance Maxx Pulse RTA	Syngenta Crop Protection LLC
Vibrance Trio	Syngenta Crop Protection LLC
Vertisan	Corteva
Warden products	Winfield Solutions, LLC
Protegam YLD	Winfield Solutions, LLC
Xyler FC	Vive Crop Protection
Xyway LFR, Xyway 3D	FMC
Zolera FX	UPL

The printing cost for this publication was paid for in part by fees paid by certified North Dakota Pesticide Applicators and Dealers.

For information regarding pesticide certification, contact the **North Dakota State University Extension Pesticide Program**

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For pesticide enforcement, compliance assistance, registration, and other regulatory issues, contact the **Agriculture Chemical Division at the North Dakota Department of Agriculture**

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10.75M-12-19, 8M-12-20, 7M-01-21, 6M-12-21, 7.5M-12-22, ??-12-24