

Disease Management for Field Crops

Fungicides are an important component of the pesticide program for some Nebraska fields. While not all fields of corn, dry bean, sorghum, soybean, sugarbeet, sunflower, and wheat will require a fungicide application, it's critical that you know the correct product for the disease in your field when you do need it.

- **Identification.** The first step with any disease management program is to make sure you have correctly identified the problem. Identification is critical as there are many bacterial diseases with symptoms similar to fungal diseases and fungicides will have no activity on them.

For help identifying crop diseases, visit the Plant Disease section of UNL's CropWatch at <http://cropwatch.unl.edu/plantdisease>.

- **Timing.** The second step is to ensure accurate timing of the application. With some diseases it is critical to apply the fungicide before there is significant disease development.

Fungicides are plant protection compounds, but have some of the same restrictions as many other pesticides, such as preharvest intervals and post-application field reentry restrictions. Read and carefully follow all label directions.

Resistance

The use of pesticides, including fungicides, has resulted in the development of organisms that are resistant to their effects. Currently, the only major field crop pathogen with known resistance is *Cercospora sojina* (Frogeye leaf spot of soybean) with resistance to the strobilurin (QoI) fungicide group. This has been identified in other parts of the U.S. and not in Nebraska as of 2014. Misuse of products may result in the development of other resistant populations and jeopardize the benefits that are provided by those products and other closely related fungicides.

Resistance can develop after the repeated use of products with the same modes of action, particularly with single-site modes of action. Also, organisms vary in their ability to become resistant and the

frequency that they develop resistant strains. The Fungicide Resistance Action Committee (FRAC) is responsible for ranking the risk for resistance development in fungal pathogen populations. FRAC assigns codes to each fungicide class based on its mode of action (MOA) and likelihood that its use could lead to the development of resistant strains. Rotating the use of products with different or mixed modes of action and avoiding repeated applications can help prevent the development of resistant populations. It's important to carefully read and follow the directions described in the most recent version of the product label in an attempt to avoid the development of resistant populations.

Using this Resource

When crop diseases become a problem, use the following section to assist with the decision-making process for fungicide applications.

Fungicide Mode of Action Table

FRAC Code	Code Number	Mode of Action	Site of Action	Common Name	Chemical Group
Group 1	B1	MBC (Methyl Benzimidazole Carbamates)	mitosis and cell division	thiabendazole	benzimidazoles
				thiophanate-methyl	thiophanates
Group 3	G1	DMI (DeMethylation Inhibitors)	sterol biosynthesis in membranes	cyproconazole	triazoles
				difenoconazole	
				flutriafol	
				ipconazole	
				metconazole	
				myclobutanil	
				propiconazole	
				tebuconazole	
				tetraconazole	
				triticonazole	
				imazalil	imidazoles
				prothioconazole	triazolinthione
Group 4	A1	PA (PhenylAmides)	nucleic acids synthesis	mefenoxam	acylalanines
				metalaxyl	
Group 7	C2	SDHI (Succinate Dehydrogenase Inhibitors)	respiration	carboxin	oxathiin-carboxamides
				fluopyram	pyridinyl-ethyl-benzamides pyrazole-carboxamides
				fluxapyroxad	
				penflufen	
				penthioopyrad	
				sedaxane	
				boscalid	pyridine-carboxamides
Group 11	C3	QoI (Quinone Outside Inhibitors)	respiration	azoxystrobin	methoxy-acrylates
				picoxystrobin	
				fluoxastrobin	dihydro-dioxazines
				pyraclostrobin	methoxy-carbamates
				trifloxystrobin	oximino-acetates

Fungicide Mode of Action Table *(continued from page 231)*

FRAC Code	Code Number	Mode of Action	Site of Action	Common Name	Chemical Group
Group 12	E2	PP (PhenylPyrroles)	signal transduction	fludioxonil	phenylpyrroles
Group 14	F3	AH (Aromatic Hydrocarbons)	lipids and membrane synthesis	chloroneb PCNB	aromatic hydrocarbons
Group 22	B3	thiazole carboxamide	mitosis and cell division	ethaboxam	ethylamino-thiazole-carboxamide
Group M1	multi-site contact activity	inorganic	multi-site contact activity	copper	inorganic
Group M3	multi-site contact activity	dithiocarbamates and relatives	multi-site contact activity	mancozeb thiram	dithiocarbamates and relatives
Group M4	multi-site activity	phthalimides	multi-site activity	captan	phthalimides

*Based on Fungicide Resistance Action Committee (FRAC) information on the Web at <http://www.frac.info/frac/index.htm>.

Soybean

Fungicide Efficacy for Control of Soybean Seedling Diseases

The members of the Identification and Biology of Seedling Pathogens of Soybean project funded by the North Central Soybean Research Program and plant pathologists across the United States have developed the following ratings for how well fungicide seed treatments control seedling diseases of soybeans in the United States. Efficacy ratings for each fungicide active ingredient listed in the table were determined by field-testing the materials over multiple years and locations by the members of this group, and include ratings summarized from national fungicide trials published in Plant Disease Management Reports (and formerly Fungicide and Nematicide Tests) by the American Phytopathological Society at <http://www.apsnet.org>. Each rating is based on the fungicide's level of disease control, and does not necessarily reflect efficacy of fungicide active ingredient combinations and/or yield increases obtained from applying the active ingredient.

The list includes the most widely marketed products available. It is not intended to be a list of all labeled active ingredients and products. Additional active ingredients may be available, but have not been evaluated in a manner allowing a rating. Products listed are the most common products available as of the release date of the table; all available products may not be listed. Additional active ingredients may be included in some products for insect and nematode control, however; only active ingredients for pathogen control are listed and rated.

Many active ingredients and their products have specific use restrictions. Read and follow all use restrictions before applying any fungicide to seed, or before handling any fungicide-treated seed. This information is provided only as a guide. It is the applicator's and users legal responsibility to read and follow all current label directions. Reference in this publication to any specific commercial product, process, or service, or the use of any trade, firm, or corporation name is for general informational purposes only and does not constitute an endorsement, recommendation, or certification of any kind by members of the group, or by the North Central Soybean Research Program. Individuals using such products assume responsibility for their use in accordance with current directions of the manufacturer. Efficacy categories: E = Excellent; VG = Very Good; G = Good; F = Fair; P = Poor; NR = Not Recommended; NS = Not Specified on product label; U = Unknown efficacy or insufficient data to rank product. Please note: Efficacy ratings may be dependent on the rate of the fungicide product on seed.

Fungicide Active Ingredient	<i>Pythium</i> sp. ¹	Phytophthora Root Rot	<i>Rhizoctonia</i> sp.	<i>Fusarium</i> sp. ²	Sudden Death Syndrome (SDS) (<i>Fusarium virguliforme</i>)	<i>Phomopsis</i> sp.
Azoxystrobin	P	NS	E	G	NR	G
Carboxin	U	U	G	U	NR	U
Chloroneb	U	P	E	P	NR	P
Ethaboxam	E	E	U	U	U	U
Fludioxonil	NR	NR	G	F-E	NR	G
Fluopyram	NR	NR	NR	NR	VG	NR
Fluxapyroxad	U	U	E	G	NR	G
Ipconazole	P	NR	F-G	F-E	NR	G
Mefenoxam	E	E	NR	NR	NR	NR
Metalaxyl	E	E	NR	NR	NR	NR
PCNB	NR	NR	G	U	NR	G
Penflufen	NR	NR	G	G	NR	G
Prothioconazole	NR	NR	G	G	NR	G
Pyraclostrobin	P	NR	F	F	NR	F
Sedaxane	NS	NS	E	NS	NR	G
Thiabendazole	NS	NS	NS	NS	U	U
Trifloxystrobin	P	P	F-E	F-G	NR	G

¹Products may vary in efficacy against different *Fusarium* and *Pythium* species.

²Listed seed treatments do not have efficacy against *Fusarium virguliforme*, causal agent of sudden death syndrome

Soybean

Foliar Fungicide Efficacy for Control of Foliar Soybean Diseases

The North Central Regional Committee on Soybean Diseases (NCERA-137) has developed the following information on foliar fungicide efficacy for control of major foliar soybean diseases in the United States. Efficacy ratings for each fungicide listed in the table were determined by field-testing the materials over multiple years and locations by the members of the committee. Efficacy ratings are based upon level of disease control achieved by product, and are not necessarily reflective of yield increases obtained from product application. Efficacy depends upon proper application timing, rate, and application method to achieve optimum effectiveness of the fungicide as determined by labeled instructions and overall level of disease in the field at the time of application. **Differences in efficacy among fungicide products were determined by direct comparisons among products in field tests and are based on a single application of the labeled rate as listed in the table, unless otherwise noted. Table includes systemic fungicides available that have been tested over multiple years and locations. The table is not intended to be a list of all labeled products¹.** Efficacy categories: NR=Not Recommended; P=Poor; F=Fair; G=Good; VG=Very Good; E=Excellent; NL = Not Labeled for use against this disease; U = Unknown efficacy or insufficient data to rank product efficacy.

Class	Fungicide(s)			Aerial web blight	Anthracnose	Brown Spot	Cercospora Leaf Blight ²	Frogeye Leaf Spot ³	Phomopsis/ Diaporthe (Pod and Stem Blight)	Soybean Rust	White Mold ⁴	Harvest restriction ⁵
	Active Ingredient (%)	Product/Trade Name	Rate/A (fl oz)									
QoI Strobilurins Group 11	Azoxystrobin 22.9%	Quadris 2.08 SC	6.0 – 15.5	VG	VG	G	F	P	U	G-VG	P	14 days
	Fluoxastrobin 40.3%	Aftershock 480 SC Evito 480 SC	2.0 – 5.7	VG	G	G	F	P	U	U	NL	R5 (beginning seed) 30 days
	Picoxystrobin	Approach 2.08 SC	6.0 – 12.0	VG	G	G	F	P	U	G	G ⁹	14 days
	Pyraclostrobin 23.6%	Headline 2.09 EC/SC	6.0 – 12.0	VG	VG	G	F	P	U	VG	NL	21 days
DMI Triazoles Group 3	Cyproconazole 8.9%	Alto 100SL	2.75 – 5.5	U	U	VG	F	F	U	VG	NL	30 days
	Flutriafol 11.8%	Topguard 1.04 SC	7.0 – 14.0	U	VG	VG	F	VG	U	VG-E	F	21 days
	Propiconazole 41.8%	Tilt 3.6 EC Multiple Generics ⁶	2.0 – 4.0	P	VG	G	NL	F	NL	VG	NL	R5 (beginning seed)
	Prothioconazole 41.0%	Proline 480 SC ⁷	5.0 – 5.7	NL	NL	NL	NL	G-VG	NL	VG	F	21 days
	Tetraconazole 20.5%	Domark 230 ME Multiple Generics	4.0 – 5.0	NL	VG	VG	F	G	U	VG-E	F	R5 (beginning seed)
MBC Thiophanates Group 1	Thiophanate-methyl	Topsin-M Multiple Generics	10.0 – 20.0	U	U	U	F	VG	U	G	F	21 days
SDHI Carboximides Group 7	Boscalid 70%	Endura 0.7 DF	3.5 – 11.0	U	NL	VG	U	P	NL	NL	VG	21 days
Mixed Modes of Action	Azoxystrobin 18.2% Difenconazole 11.4%	Quadris Top 2.72 SC	8.0 – 14.0	U	U	U	U	VG	U	VG	NL	14 days
	Azoxystrobin 7.0% Propiconazole 11.7%	Avaris 1.66 SC Quilt 1.66 SC HM-0812 1.66 SC	14.0 – 20.5	U	U	G	U	F	U	VG	NL	21 days
	Azoxystrobin 13.5% Propiconazole 11.7%	Quilt Xcel 2.2 SE	10.5 – 21.0	E	VG	G	F	F	U	VG	NL	R6
	Cyproconazole 7.17% Picoxystrobin 17.94%	Approach Prima 2.34 SC	5.0 – 6.8	U	U	U	U	G	U	U	NL	14 days
	Fluoxastrobin 18.0% Tebuconazole 25.0%	Evito T 3.99 F	4.0 – 6.0	U	F	VG	P-F	F	U	U	NL	30 days
	Flutriafol 19.3% Fluoxastrobin 14.84%	Fortix	4.0 – 6.0	U	U	U	U	G	U	U	U	R5 (beginning seed)
	Pyraclostrobin 28.58% Fluxapyroxad 14.33%	Priaxor 4.17 SC	4.0 – 8.0	E	VG	E	F	F	U	VG	P	21 days
	Pyraclostrobin 28.58% Fluxapyroxad 14.33% Tetraconazole 20.50%	Priaxor D 4.17 SC 1.9 SC	4.0 (each component)	U	U	U	U	G	U	U	U	21 days R5 (beginning seed)
	Trifloxystrobin 32.3% Prothioconazole 10.8%	Stratego YLD 4.18 SC ⁸	4.0 – 4.65	VG	VG	VG	F	F	U	VG	NL	21 days

¹Multiple fungicides are labeled for soybean rust only, powdery mildew, and Alternaria leaf spot, including tebuconazole (multiple products) and Laredo (myclobutanil). Contact fungicides such as chlorothalonil may also be labeled for use.

²Cercospora leaf blight efficacy relies on accurate application timing, and standard R3 application timings may not provide adequate disease control. Fungicide efficacy may improve with earlier or later applications. Fungicides with a solo or mixed QoI or MBC mode of action may not be effective in areas where QoI or MBC resistance has been detected in the fungal population that causes Cercospora leaf blight.

³In areas where QoI-fungicide resistant isolates of the frogeye leaf spot pathogen are not present, QoI fungicides may be more effective than indicated in this table.

⁴White mold efficacy is based on R1-R2 application timing, and lower efficacy is obtained at R3 or later application timings, or if disease symptoms are already present at the time of application.

⁵Harvest restrictions are listed for soybean harvested for grain. Restrictions may vary for other types of soybean (edamame, etc.) and soybean for other uses such as forage or fodder.

⁶Multiple generic products containing this mode of action may also be labeled in some states.

⁷Proline has a supplemental label (2ee) for soybean, only for use on white mold in IL, IN, IA, MI, MN, NE, ND, OH, SD, WI. A separate 2ee for NY exists for white mold.

⁸Stratego YLD has a supplemental label (2ee) for white mold on soybean only in IL, IN, IA, MI, MN, NE, ND, OH, SD, WI.

⁹Rating is based on two applications of a 9 fl oz/A rate of Approach at R1 and R3.

Many products have specific use restrictions about the amount of active ingredient that can be applied within a period of time or the amount of sequential applications that can occur. Please read and follow all specific use restrictions prior to fungicide use. This information is provided only as a guide. It is the responsibility of the pesticide applicator by law to read and follow all current label directions. Reference to products in this publication is not intended to be an endorsement to the exclusion of others that may be similar. Persons using such products assume responsibility for their use in accordance with current directions of the manufacturer. Members or participants in the NCERA-212 or NCERA-208 group assume no liability resulting from the use of these products.

Soybean

Seed Treatment Fungicides

Class	Fungicide Active Ingredient (Conc.)	Rate (per 100 lb)	Application	Comments
PA Acylalanines Group 4	Acceleron DX-309 metalaxyl (28.35%)	0.75-1.5 oz	Commercially applied, slurry	Insecticide and additional treatments can be added to base fungicides
	Acquire metalaxyl (29.99%)	0.75-1.5 oz	Commercially applied, slurry	Acquire comes with Charter seed treatment
	Allegiance Dry metalaxyl (12.5%)	1.5-2.0 oz	On farm application, planter box	
	Allegiance FL metalaxyl (28.35%)	0.75-1.5 oz	Commercially applied, slurry	
	Allegiance LS metalaxyl (17.7%)	1.2-2.4 oz	Commercially applied, slurry	Use higher rate for Phytophthora control
	Apron XL mefenoxam (33.3%)	0.16-0.64 oz	Commercially applied, slurry	Use higher rate for Phytophthora control
MBC Benzimidazoles Group 1	Mertect 340-F thiabendazole (42.3%)	0.08-0.16 oz	Commercially applied, slurry	
SDHI Carboxamides Group 7	Acceleron DX-612 fluxapyroxad (28.7%)	0.24-0.47 oz	Commercially applied, slurry	Insecticide and additional treatments can be added to base fungicides
	Ilevo fluopyram (48.4%)	1.18-1.97 oz per 140,000 seed	Commercially applied, slurry	Specific treatment for sudden death syndrome
	Vibrance sedaxane (43.7%)	0.075-0.16 oz	Commercially applied, slurry	Add Apron XL to improve Phytophthora control
Phenylpyrroles Group 12	Maxim 4FS fludioxonil (40.3%)	0.08-0.16 oz	Commercially applied, slurry	
QoI Strobilurins Group 11	Acceleron DX-109 pyraclostrobin (18.4%)	0.4-1.5 oz	Applied commercially or on farm, slurry	Insecticide and additional treatments can be added to base fungicides
	Dynasty azoxystrobin (9.6%)	0.153-0.459 oz	Commercially applied, slurry	
Mixed Modes of Action	ApronMaxx RFC fludioxonil (2.31%) + mefenoxam (3.46%)	1.5 oz	Applied commercially or on farm, slurry	Add Apron XL to improve Phytophthora control
	ApronMaxx RTA mefenoxam (1.1%) + fludioxonil (0.73%)	5.0 oz	On farm application, slurry	Add Apron XL to improve Phytophthora control
	ApronMaxx RTA + Moly mefenoxam (1.02%) + fludioxonil (0.68%)	5.0 oz	On farm application, slurry	
	Bean Guard/ Allegiance carboxin (12.5%) + metalaxyl (3.75%) + captan (24.45%)	3.3 oz	On farm application, planter box	
	Catapult XL chloroneb (30.00%) + mefenoxam (1.95%)	5.5-7.0 oz	On farm application, RTA	
	CruiserMaxx thiamethoxam (22.61%) + mefenoxam (1.7%) + fludioxonil (1.12%)	3.0 oz	Commercially applied, slurry	Add Apron XL to improve Phytophthora control
	CruiserMaxx Advanced thiamethoxam (21.5%) + mefenoxam (3.21%) + fludioxonil (1.07%)	3.2 oz	Commercially applied, slurry	Add Apron XL to improve Phytophthora control
	CruiserMaxx EZ thiamethoxam (23.1%) + mefenoxam (3.46%) + fludioxonil (1.15%)	3.15 oz	Commercially applied, slurry	Add Apron XL to improve Phytophthora control

Soybean

Seed Treatment Fungicides *(continued)*

Class	Fungicide Active Ingredient (Conc.)	Rate (per 100 lb)	Application	Comments
Mixed Modes of Action (continued)	CruiserMaxx Plus thiamethoxam (21.5%) + mefenoxam (3.21%) + fludioxonil (1.07%)	3.2 oz	Commercially applied, slurry	Add Apron XL to improve Phytophthora control
	CruiserMaxx Vibrance thiamethoxam (20.8%) + mefenoxam (3.13%) + fludioxonil (1.04%) + sedaxane (1.04%)	3.22 oz	Commercially applied, slurry	Add Apron XL to improve Phytophthora control
	EverGol Energy SB prothioconazole (7.18%) + penflufen (3.59%) + metalaxyl (5.74%)	1.0 oz	Commercially applied	Add Allegiance FL in high Phytophthora pressure areas
	Inovate clothianidin (14.34%) + metalaxyl (1.153%) + ipconazole (0.720%)	4.74 oz	Commercially applied, slurry	Add additional metalaxyl or mefenoxam in high Phytophthora pressure areas
	Inovate Pro clothianidin (24.03%) + ipconazole (1.203%) + metalaxyl (0.965%)	2.81 oz	Commercially applied	
	Intego Suite Soybeans clothianidin (20.0%) + ethaboxam (2.97%) + ipconazole (0.99%) + metalaxyl (0.79%)	3.37 oz	Commercially applied	
	Kickstart VP carboxin (14.00%) + permethrin (10.42%)	3.0 oz	On farm application, planter box	
	Prevail carboxin (15.0%) + pentachloronitrobenzine (15.0%) + metalaxyl (3.12%)	2.0-4.0 oz/bu	Applied commercially or on farm	
	Protector-L-Allegiance thiram (14.29%) + metalaxyl (1.61%)	6.7 oz	Application in hopper box or on-farm application seed treatment equipment	
	Trilex 2000 trifloxystrobin (7.12%) + metalaxyl (5.69%)	1.0 oz	Applied commercially or on farm, slurry	
	Warden CX thiamethoxam (20.0%) + mefenoxam (5.99%) + fludioxonil (1.0%) + sedaxane (1.0%)	3.38 oz	Commercially applied, slurry	
Warden RTA mefenoxam (2.21%) + fludioxonil (0.72%)	5.0 oz	On farm application, slurry		
Unknown Mode of Action	Rizolex tolcofos-methyl (42.0%)	0.3 oz	Commercially applied	

Soybean

Foliar Fungicides

Class	Fungicide Active Ingredient (Conc.)	Rate (per acre)	Application			REI (hours)	PHI (days)
			Aerial	Chemigation	Ground		
QoI Strobilurins Group 11	Approach picoxystrobin (22.5%)	6.0-12.0 oz	Adequate for coverage and canopy penetration	Allowed	Adequate for coverage and canopy penetration	12	14
	Evito 480 SC flouxastrobin (40.3%)	2.0-5.7 oz	2 gpa minimum	Allowed, <0.4" application	10 gpa minimum	12	30
	Headline pyraclostrobin (23.6%)	6.0-12.0 oz	2 gpa minimum	Allowed, <0.5" application	Adequate for coverage and canopy penetration	12	21
	Headline SC pyraclostrobin (23.3%)	6.0-12.0 oz	2 gpa minimum	Allowed, <0.5" application	Adequate for coverage and canopy penetration	12	21
	Quadris Flowable azoxystrobin (22.9%)	6.0-15.5 oz	Adequate for coverage and canopy penetration	Allowed, 0.1-0.25" application	Adequate for coverage and canopy penetration	4	14
	Satori azoxystrobin (22.9%)	6.0-15.5 oz	Adequate for coverage and canopy penetration	Allowed, 0.1-0.25" application	Adequate for coverage and canopy penetration	4	14
DMI Triazoles Group 3	Alto 100SL cyproconazole (8.9%)	2.75-5.5 oz	2 gpa minimum	Allowed, <0.5" application	10 gpa minimum	12	30
	Bumper 41.8 EC propiconazole (41.8%)	4.0-6.0 oz	2 gpa minimum	Not allowed	10 gpa minimum	12	Do not apply after R5 (pod fill)
	Bumper ES propiconazole (40.85%)	4.0-6.0 oz	2 gpa minimum	Not allowed	10 gpa minimum	12	Do not apply after R5 (pod fill)
	Domark 230 ME tetraconazole (20.5%)	4.0-5.0 oz	2 gpa minimum	Allowed	10 gpa minimum	12	Do not apply after R5 (pod fill)
	Folicur tebuconazole (38.7%)	4.0 oz	5 gpa minimum	Not allowed	10 gpa minimum	12	30
	Laredo myclobutanil (19.7%)	4.0-8.0 oz	5 gpa minimum	Not allowed	Adequate for coverage and canopy penetration	24	28
	Onset 3.6L tebuconazole (38.7%)	3.0-4.0 oz	5 gpa minimum	Allowed	10 gpa minimum	12	21
	Proline 480 SC prothioconazole (41.0%)	2.5-5.0 oz	2 gpa minimum	Allowed, 0.125- 0.5" application	10 gpa minimum	12	21
	Tilt propiconazole (41.8%)	4.0-6.0 oz	2 gpa minimum	Allowed, 0.1-0.25" application	10 gpa minimum	12	Do not apply after R5 (pod fill)
	Topguard flutriafol (11.8%)	7.0-14.0 oz	5 gpa minimum	Not allowed	10 gpa minimum	12	21
MBC Thiophanates Group 1	Topsin 4.5FL thiophanate-methyl (45.0%)	10.0-20.0 oz application	5 gpa minimum	Allowed, <0.4"	20 gpa minimum	24	21
	Topsin M 70WP thiophanate-methyl (70.0%)	0.5-1.0 lb	Not allowed	Not allowed	20 gpa minimum	24	Data not available
	Topsin M WSB thiophanate-methyl (70.0%)	0.5-1.0 lb	5 gpa minimum	Allowed, <0.4" application	20 gpa minimum	24	21
SDHI Carbox- amides Group 7	Endura boscalid (70.0%)	3.5-11.0 oz	5 gpa minimum	Allowed	Adequate for coverage and canopy penetration	12	21
	Vertisan penthiopyrad (20.6%)	10.0-30.0 oz	2 gpa minimum	Allowed	15 gpa minimum	12	14

Soybean

Foliar Fungicides (continued)

Class	Fungicide Active Ingredient (Conc.)	Rate (per acre)	Application			REI (hours)	PHI (days)
			Aerial	Chemigation	Ground		
Mixed Modes of Action	Affiance azoxystrobin (9.35%) + tetraconazole (7.48%)	10.0-14.0 oz	2 gpa minimum	Allowed, 0.1-0.25" application	10 gpa minimum	12	7
	Approach Prima picoxystrobin (17.94%) + cyproconazole (7.17%)	5.0-6.8 oz	Adequate for coverage and canopy penetration	Allowed	Adequate for coverage and canopy penetration	12	30
	Evito T flouxastrobin (18.0%) + tebuconazole (25.0%)	4.0-6.0 oz	3 gpa minimum	Allowed, <0.4" application	10 gpa minimum	12	30
	Fortix flouxastrobin (14.84%) + flutriafol (19.30%)	4.0-6.0 oz	5 gpa minimum	Not allowed	10 gpa minimum	12	30
	Priaxor fluxapyroxad (14.33%) + pyraclostrobin (28.58%)	4.0-8.0 oz	2 gpa minimum	Allowed, <0.5" application	Adequate for coverage and canopy penetration	12	21
	Quadris Top azoxystrobin (18.2%) + difenoconazole (11.4%)	8.0-14.0 oz	2 gpa minimum	Allowed, 0.1-0.25" application	10 gpa minimum	12	14
	Quadris Top SB azoxystrobin (18.2%) + difenoconazole (11.4%)	8.0-14.0 oz	2 gpa minimum	Allowed, 0.1-0.25" application	10 gpa minimum	12	14
	Quadris Xtra azoxystrobin (18.2%) + cyproconazole (7.3%)	4.0-6.8 oz	2 gpa minimum	Allowed, <0.5" application	10 gpa minimum	12	30
	Quilt azoxystrobin (7.0%) + propiconazole (11.7%)	14.0-20.5 oz	2 gpa minimum	Allowed, 0.1-0.25" application	10 gpa minimum	12	Apply up to R6 (full seed)
	Quilt Xcel azoxystrobin (13.5%) + propiconazole (11.7%)	10.5-21.0 oz	2 gpa minimum	Allowed, 0.125- 0.25" application	10 gpa minimum	12	Do not apply after R5 (pod fill)
	Stratego YLD prothioconazole (10.8%) + trifloxystrobin (32.3%)	4.0-4.65 oz	2 gpa minimum	Allowed, 0.125- 0.5" application	10 gpa minimum	12	21
Topsin XTR thiophanate-methyl (37.5%) + tebuconazole (7.5%)	20.0 oz	5 gpa minimum	Not allowed	20 gpa minimum	24	21	

Sugarbeet

Foliar Fungicides and Bactericides

Class	Fungicide Active Ingredient (Conc.)	Rate (per acre)	Application			REI (hours)	PHI (days)
			Aerial	Chemigation	Ground		
QoI Strobilurins Group 11	Headline pyraclostrobin (23.6%)	9.0-12.0 oz	2 gpa minimum	Allowed, <0.5" application	Adequate for coverage and canopy penetration	12	7
	Headline SC pyraclostrobin (23.3%)	9.0-12.0 oz	2 gpa minimum	Allowed, <0.5" application	Adequate for coverage and canopy penetration	12	7
	Quadris azoxystrobin (22.9%)	6.0-15.5 lb	2 gpa minimum	Allowed, 0.1-0.25" application	Adequate for coverage and canopy penetration	4	0
DMI Triazoles Group 3	Caramba metconazole (8.6%)	9.0-14.0 oz	5 gpa minimum	Allowed, <0.5" application	5 gpa minimum	12	14
	Eminent VP tetraconazole (11.6%)	8.0-13.0 oz	10 gpa minimum	Allowed, 0.1-0.25" application	Adequate for coverage and canopy penetration	12	14
	Proline 480 SC prothioconazole (41.0%)	5.0-5.7 oz	2 gpa minimum	Allowed, 0.125-0.5" application	10 gpa minimum	12	7
	Tilt propiconazole (41.8%)	4.0 oz	2 gpa minimum	Allowed, 0.1-0.25" application	10 gpa minimum	12	21
	Topguard flutriafol (11.8%)	10.0-14.0 oz	5 gpa minimum	Not allowed	10 gpa minimum	12	21
SDHI Carboxamides Group 7	Vertisan penthiopyrad (20.6%)	14.0-30.0 oz	2 gpa minimum	Allowed	15 gpa minimum	12	7
Dithiocarbamates Group M3	Penncozeb 75DF mancozeb (75.0%)	1.0-2.0 lb	2 gpa minimum	Allowed, 0.1-0.25" application	Adequate for coverage and canopy penetration	24	14
	Penncozeb 80WP mancozeb (80.0%)	1.0-2.0 lb	2 gpa minimum	Allowed, 0.1-0.25" application	Adequate for coverage and canopy penetration	24	14
Inorganics Group M1	Badge SC copper oxychloride (16.81%) + copper hydroxide (15.36%)	0.5-2.5 pt	3 gpa minimum	Allowed	Adequate for coverage and canopy penetration	48	0
	Champ copper hydroxide (37.5%)	0.66-2.00 pt	3 gpa minimum	Allowed	Adequate for coverage and canopy penetration	48	0
Mixed Modes of Action	Priaxor Xemium fluxapyroxad (14.33%) + pyraclostrobin (28.58%)	6.0-8.0 oz	2 gpa minimum	Allowed, <0.5" application	Adequate for coverage and canopy penetration	12	7
	Propulse fluopyram (17.4%) + prothioconazole (17.4%)	8.55 oz	Not allowed	Allowed	10 gpa minimum	48	7